

2014

INTERNATIONAL
MECHANICAL
ENGINEERING
CONGRESS
& EXPOSITION

November 14–20 2014
Montreal, Canada

Program



Join Us As We Celebrate The Future of Engineering

KEYNOTE EVENT ENGINEERING FOR GLOBAL DEVELOPMENT Monday, November 17, 2014, 8:00am - 9:30am

ASME has assembled some of the leading minds in industry, academia and social ventures for a lively discussion on the most pressing concerns in the developing world, namely, the necessity to bring appropriate technologies to underserved communities and the critical role engineering plays. Panelists will discuss economic trends in emerging markets, funding mechanisms in social ventures, engineering rigor of the design process and developing partnerships with industry.

MODERATOR



JOHN HOCKENBERRY

is a three-time Peabody Award winner, four-time Emmy winner and "Dateline NBC" correspondent. He has broad experience as a journalist and commentator for more than two decades. He is the anchor of the new public radio morning show The Takeaway on WNYC and PRI.

PANELISTS:



PAUL POLAK
Founder and
CEO of Windhorse
International



SHYAM RAJAN
Chief Technology
Officer for GEHC,
India



JULIANA ROTICH
Executive Director,
Ushahidi, Inc.



BRYAN WILLSON
Professor of Mechanical
Engineering at Colorado
State University and
founder of CSU's
Engines and Energy
Conversion Lab and
co-director of The
Energy Institute

ENGINEERING FOR GLOBAL DEVELOPMENT FORUM Monday, November 17, 2014 9:45am - 4:45pm

The EGD Forum will feature informative sessions for those who are interested in learning more about EGD as well as those engineers who are looking to get more involved. While the keynote session will cover some of the overarching elements of EGD, the forum will delve deeper by presenting case studies and discussions that illustrate the fundamental concepts of global development, such as the user-centric design process, cultural challenges, field testing of working prototypes and the critical roles academia, industry and local communities play in building the necessary (and appropriate) foundation needed to succeed in this space.

Monday, November 17, 2014

Case Studies in Global Development 9:45am - 11:30am

The Rise of Research in Engineering for Global Development 1:00pm - 2:45pm

Aligning Global Development with an Academic Career 3:00pm - 4:45pm



CONGRESS WIDE PLENARIES

Tuesday, November 18, 8:00am-9:15am



"Taking on the 'Impossible':
The Sikorsky Innovations
Story"

CHRIS VAN BUITEN
Vice President
Sikorsky Innovations

Wednesday, November 19, 8:00am-9:15am



"Testing the Future of Flight
— Boeing's ecoDemonstrator
Program"

DENNIS O'DONOGHUE
Vice President
Boeing Test & Evaluation

Thursday November 20, 12:00pm-12:45pm



"The Next Energy Storage
Revolution — Cheap, Clean,
Solid State Devices"

ANN MARIE SASTRY
co-Founder and CEO; Sakti3

INVITED INDUSTRY SPEAKERS

Tuesday, November 18, 1:00pm-1:45pm



"Extension of the Natural
Gas Envelope on Rolls-Royce
Industrial Engines and
Development of the
Industrial Trent DLE"

BRIAN NOLAN
Chief Engineer of Engine
Development Programs,
Rolls-Royce Energy

Wednesday, November 19, 1:00pm-1:45pm



"Trends of the 21st Century
in Aero Engines"

KEITH MORGAN
Engineering Executive
Director, Systems
Organization
Pratt & Whitney Canada

Thursday November 20, 1:00pm-1:45pm



"Bombardier Strategic
Technology: The Future of
Business and Commercial
Aviation"

MATHIEU BOISCLAIR
Chief of Strategic
Technology Program Office



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Assimina (Mina) Pelegri
2014 Congress
General Chair



George Kardomateas
2014 Congress Technical
Program Chair



Ramakrishna Koganti
2014 Congress
Technical Program
Vice Chair

ASME 2014 International Mechanical Engineering Congress and Exposition (IMECE) November 14–20, 2014, Montreal, Canada

Congress offers the unique opportunity to bring together members of academia, industry, and government to discuss a broad range of Mechanical Engineering topics. The 2014 Congress theme is *Engineering for Global Development* and includes 20 multi-disciplinary tracks over 2,400 podium and poster presentations. The breadth of the technical tracks that have been organized by our track chairs and topic organizers is truly amazing and shows the dedication of our volunteers.

Congress will kick off with Sunday's Opening Reception in the Exhibit Hall, giving us a chance to refresh our connections and make new ones. Monday's events begin with the keynote panel presentation on *Engineering for Global Development*, moderated by NPR's **John Hockenberry**. The panel consists of **Paul Polak**, Founder and CEO, Windhorse International and Paul Polak Enterprises, **Shyam Prasad Rajan**, Chief Technology Officer, GE Healthcare – India, **Bryan Willson**, Professor of Mechanical Engineering, Colorado State University, and **Juliana Rotich**, Executive Director, Ushahidi, Inc. The Keynote event is immediately followed by the Engineering for Global Development Forum which features informative sessions for those who are interested in hearing more about EGD as well as those who are looking to get involved.

The Congress-wide breakfast and closing lunch sessions feature exceptional speakers. At Tuesday's breakfast, we will hear **Chris Van Buiten**, Vice President, Sikorsky Innovations, on *Taking on the 'Impossible': The Sikorsky Innovations Story*. At Wednesday's breakfast session, we are pleased to host **Dennis O'Donoghue**, Vice President, Boeing Test & Evaluation, who will speak on *Testing the Future of Flight – Boeing's ecoDemonstrator Program*. At Thursday's lunch session **Ann Marie Sastry**, co-Founder and CEO; Sakti3 will discuss *The Next Energy Storage Revolution – Cheap, Clean, Solid State Devices*. We are truly honored to have these individuals speak at Congress to give a broader perspective of the challenges and successes that Mechanical Engineering can provide to the industrial and government arenas.

A new feature of this year's Congress is the Invited Industry Presentations, presented immediately after lunch by distinguished industry engineering leaders. On Tuesday, we will hear **Brian Nolan**, Chief Engineer, Rolls-Royce Energy, on *Extension of the Natural Gas Envelope on Rolls-Royce Industrial Engines and Development of the Industrial Trent DLE*. On Wednesday, we will hear **Keith Morgan**, Director, Strategic Technology, Bombardier Aerospace, who will speak on *Trends of the 21st Century in Aero Engines*. On Thursday, our invited industry speaker is **Keith Morgan**, Director, Strategic Technology, Bombardier Aerospace on *Bombardier Strategic Technology: The Future of Business and Commercial Aviation*. We are honored to have these distinguished individuals give the industry state of the art and perspective on these important topics.

Monday evening's Honors Assembly events spotlight some of the great contributions our society's members have made. Tuesday's featured event is the annual NSF-sponsored Micro/Nano Forum Poster competition, which brings together researchers from across the Mechanical Engineering disciplines to share their findings in this growing area.

Other Congress highlights include Sunday’s Student Design Competition, Members and Students Luncheon, as well as an exciting event to help draw and showcase the next generation of engineers to ASME and IMECE: the second annual Undergraduate Expo. This poster session features research performed by undergraduate Mechanical Engineering students from around the world. We encourage everyone to attend and contribute to this wonderful event—you may find the next graduate student or employee among the bright minds participating.

Additional events of interest include the ME Department Heads Forum and the Micro and Nano Forum Poster session. The National Science Foundation will continue its active support of Congress by holding the CBET/CMMI Info and New initiatives session and the Session on Proposal Writing. Also, the general Poster session will be held on Wednesday afternoon during lunch time with the latest state-of-the-art research posters on a variety of topics encompassing the essence of all track topics. Use the IMECE itinerary planner to schedule your time for these exciting activities!

There will also be many events hosted by the ASME divisions and committees, including the Heat Transfer Honors and Awards Luncheon and the Applied Mechanics Dinner. Your participation in ASME division and committee meetings is the pathway to helping us continue to improve the Society and future conferences such as IMECE.

An event of this magnitude requires the hard work and dedication of many people, from volunteer organizers to the ASME staff and others too numerous to mention individually here. We want to thank the organizational support of the Congress steering committee, our operations team including our local section representatives, and the dedicated ASME staff with whom we have worked closely. The quality and breadth of the conference program is entirely due to the hard work of our track chairs, topic and symposium organizers, session chairs, reviewers, and judges. These volunteers have put forth an incalculable amount of effort to ensure that this conference has papers and presentations of innovativeness, substance, and quality. Finally, we want to recognize the authors, plenary, and keynote speakers whose contributions and insights we have the pleasure of reading and listening to and whose time here is spent generously discussing and exchanging ideas with us.

While attending the Congress, please take the time to thank the ASME staff and volunteers who make IMECE run. We look forward to meeting many of you in the halls of the convention center and hotel, at the special events, presentations, and in technical sessions. We hope you enjoy Congress!

Sincerely,

Assimina (Mina) Pelegri
2014 Congress General Chair

Ramakrishna Koganti
2014 Congress Technical Program Vice Chair

Aaron Knobloch
2014 Congress Steering Committee Vice Chair

George Kardomateas
2014 Congress Technical Program Chair

Julie Chen
2014 Congress Steering Committee Chair



Julie Chen
2014 Congress
Steering Committee Chair



Aaron Knobloch
2014 Congress Steering
Committee Vice Chair

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SPECIAL EVENTS SUMMARY

FRIDAY, NOVEMBER 14

Conference Registration/Meeting Information
12:00pm–5:00pm p. 10

ASME Business Meeting
5:00pm–5:30pm p. 11

SATURDAY, NOVEMBER 15

Conference Registration/Meeting Information
7:00am–6:00pm p. 10

IAM3D Competition Finals and Reception
7:30am–8:00pm p. 11

Old Guard Oral Presentation Competition Finals
9:00am–4:00pm p. 13

History & Heritage and Old Guard Presentation/Reception
6:00pm–7:30pm p. 13

SUNDAY, NOVEMBER 16

Conference Registration/Meeting Information
7:00am–6:00pm p. 10

5K Fun Run, Sponsored by the ASME Foundation
7:00am–9:00am (check in at 6:30am) p. 14

Guest Hospitality Suite
7:30am–10:00am p. 8

2014 ASME Student Design Competition Finals and Award Ceremony and Reception
8:00am–6:30pm p. 14

Guest Tour: Come and Discover our Beautiful City!
9:00am–3:00pm p. 53

Members and Students Luncheon, Sponsored by the Committee on Honors
12:00pm–1:30pm p. 15

First-Time Attendee Orientation
2:00pm–2:45pm p. 15

VOLT Leadership Workshop
2:00pm–3:30pm p. 15

Exhibit Hall Grand Opening and Opening Reception
6:00pm–7:30pm p. 15

International Undergraduate Research and Design Exposition
6:00pm–7:30pm p. 15

Social Meet-up for Early Career Engineers Featuring Mini-Talks, Presented by the Board on Career Development
8:00pm–10:00pm p. 16

MONDAY, NOVEMBER 17

Conference Registration/Meeting Information
7:00am–6:00pm p. 10

Speaker's Practice Room
7:00am–6:00pm p. 7

Guest Hospitality Suite
7:30am–10:00am p. 8

Keynote Event: Engineering for Global Development
8:00am–9:30am
(7:30am–8:00am, Continental breakfast served) p. 18-19

Guest Tour: The Richelieu Valley & The Apple Region
9:00am–2:30pm p. 53

Technical Tour: Hydro-Québec's Research Institute

9:30am–12:00pm p. 53

Technical Sessions

9:45am–11:30am p. 67-308

Engineering for Global Development Forum

9:45am–4:45pm p. 23

Robert Henry Thurston Lecture

10:00am–12:00pm p. 24

VOLT Leadership Workshop

10:00am–11:30am p. 25

Exhibits Hall

11:00am–4:00pm p. 8

Conference Lunch

11:30am–12:30pm p. 8

President's Luncheon

12:00pm–1:30pm p. 25

Technical Sessions

1:00pm–2:45pm p. 67-308

Invited Industry Presentation

1:00pm–1:45pm p. 28

ME/MET Department Heads Forum

1:30pm–3:30pm p. 25

Conference Break

2:45pm–3:00pm p. 10

Technical Sessions

3:00pm–4:45pm p. 67-308

Open Campus Model

3:00pm–4:00pm p. 23

Honors Reception, Sponsored by the Committee on Honors

5:00pm–6:00pm p. 25

Honors Assembly

6:00pm–7:30pm p. 25

Honors Dinner, Sponsored by the Committee on Honors

7:30pm–10:30pm p. 25

TUESDAY, NOVEMBER 18

Conference Registration/Meeting Information
7:00am–6:00pm p. 10

Speaker's Practice Room
7:00am–5:00pm p. 7

Guest Hospitality Suite
7:30am–10:00am p. 8

Congress Wide Plenary

8:00am–9:15am (7:30am–8:00am, Continental breakfast served)

Technical Tour: Bell Helicopter, Mirabel, Quebec

9:00am–12:00pm p. 53

ME/MET Department Heads Professional Development workshop

9:00am–10:30am p. 28

Technical Sessions

9:45am–11:30am p. 67-308

NSF Advance Workshop: Increasing Women Faculty in ME Careers

10:30am–12:00pm p. 28

Exhibits Hall	
11:00am–4:00pm	p. 8
Conference Lunch	
11:30am–12:30pm	p. 8
Heat Transfer Division Awards Luncheon, Sponsored by the Heat Transfer Division	
11:00am–1:00pm	p. 30
Micro- & Nanotechnology Society Wide Forum	
12:30pm–4:00pm	p. 30
Technical Sessions	
1:00pm–2:45pm	p. 67-308
Invited Industry Presentation	
1:00pm–1:45pm	p. 28
Guest Luncheon Sponsored by the ASME Auxiliary	
1:00pm–3:00pm	p. 30
Symposium for New and Prospective Faculty: “Tips for Faculty Job Search, Promotion and Tenure.” Sponsored by the Mechanical Engineering Department Heads Committee	
1:00pm–3:00pm	p. 30
Calvin W. Rice Lecture	
1:00pm–2:30pm	p. 31
NSF Engineering Information Session	
1:00pm–2:30pm	p. 28
Conference Break	
2:45pm–3:00pm	p. 10
Technical Sessions	
3:00pm–4:45pm	p. 67-308
Rayleigh Lecture	
3:00pm–4:30pm	p. 31
NSF Research Program Development Workshop	
3:00pm–4:30pm	p. 30
Noise Control and Acoustics Division Wine & Cheese Reception. Sponsored by the Noise Control and Acoustics Division	
4:30pm–6:30pm	p. 32
Women in Engineering Reception	
5:00pm–6:30pm	p. 32
Koiter Lecture	
5:00pm–6:15pm	p. 32
Fluids Engineering Division Reception. Sponsored by the Fluids Engineering Executive Committee	
6:30pm–8:30pm	p. 33
Applied Mechanics Division Honors & Awards Banquet. Sponsored by Applied Mechanics Division	
6:30pm–9:00pm	p. 33
Electronic and Photonic Packaging Division Wine and Cheese Reception. Sponsored by the Electronics and Photonics Packaging Division	
7:00pm–8:00pm	p. 33

WEDNESDAY, NOVEMBER 19

Advanced Energy Systems Division Reception. Sponsored by the Advanced Energy Systems Division	
5:30pm–7:30pm	p. 37
Conference Registration/Meeting Information	
7:00am–6:00pm	p. 10
Speaker’s Practice Room	
7:00am–6:00pm	p. 7
Guest Hospitality Suite	
7:30am–10:00am	p. 8
Congress Wide Plenary	
8:00am–9:15am (7:30am–8:00am, Continental breakfast served)	
Technical Tour: the National Research Council Aerospace Manufacturing Research Lab	
9:00am–12:00pm	p. 34
Technical Sessions	
9:45am–11:30am	p. 53
Exhibits Hall	
11:00am–3:00pm	p. 67-308
Conference Lunch	
11:30am–12:30pm	p. 8
Technical Sessions	
1:00pm–2:45pm	p. 8
Invited Industry Presentation	
1:00pm–1:45pm	p. 67-308
Materials Division Lectures and Reception. Sponsored by the Materials Division	
2:30pm–7:00pm	p. 35
Conference Break	
2:45pm–3:00pm	p. 35
Technical Sessions	
3:00pm–4:45pm	p. 10
THURSDAY, NOVEMBER 20	
Conference Registration/Meeting Information	
7:00am–5:00pm	p. 67-308
Speaker’s Practice Room	
7:00am–5:00pm	p. 10
Guest Hospitality Suite	
7:30am–10:00am	p. 7
Technical Sessions	
7:45am–9:15am	p. 8
Technical Tour: Bombardier Challenger Facility	
9:00am–10:30am; 10:30am–12:00pm	p. 67-308
Technical Sessions	
9:30am–11:15am	p. 53
Congress Wide Plenary	
12:00pm–12:45pm (11:15am–12:00pm, lunch is served)	
Technical Sessions	
1:00pm–2:45pm	p. 67-308
Conference Break	
2:45pm–3:00pm	p. 67-308
Technical Sessions	
3:00pm–4:45pm	p. 67-308

ASME Booth

Attendees are encouraged to make time to visit the ASME booth in the Exhibit Hall (Room 210). Representatives from Publications, Membership, and .org will be present to answer any questions you may have.

Information about all publications, such as Proceedings, Transaction Journals, ASME Press, Codes & Standards, Catalogs, and the ASME Digital Library, and other information is available at the ASME Publications & Membership Booth. During the conference, all publications are sold at the ASME member price. You will be billed for shipping and handling charges. Within the U.S. Postal Service, airmail, first class, or any other expedited shipment must be specified, if desired, and charges will be billed to you.

ASME accepts payment in cash, checks, VISA, MasterCard, American Express, and Discover. Conference volumes and technical papers may be ordered after the IMECE by contacting the ASME Order Department, 22 Law Drive, PO Box 2300, Fairfield, NJ 07007-2900, or by calling 800-THE-ASME. Payment must accompany order (check or credit card) and California, Georgia, Illinois, and Texas purchasers must add the appropriate state sales tax or furnish an exemption certificate. International and Canadian checks will not be accepted, unless payable through a U.S. Bank.

ASME Itinerary Planner

Create your own personalized conference itinerary with the ASME Itinerary Planner Mobile App for the iPhone, iPad, Android, and Blackberry. Add technical sessions, committee meetings, special events, personal appointments, and tours to your schedule. View abstracts, exhibitor information, and even vote for the best poster paper at the undergraduate design expo. For more information and to download the mobile app, please go to: <http://www.asmeconferences.org/Congress2014/>

Authors'/Speakers' Practice Room

Room 342 on Level 3 of the Palais des Congrès will serve as the Authors'/Speakers' Practice Room. The schedule is Monday–Thursday, November 17–20, 7:00am–5:00pm. The room is equipped with two (2) LCD projectors and two (2) screens for authors/speakers to practice their presentations.

Audiovisual Equipment in Session Rooms

All technical sessions are equipped with one LCD projector and one screen. Laptops will NOT be provided in the sessions. You MUST bring your own.

Badges Are Required for Admission to All Activities

All conference attendees must wear their official 2014 ASME IMECE badge in order to gain admission to conference sessions/events/activities. No one will be admitted to the technical sessions unless he/she is a full registrant and is wearing a badge.

Business Center at the Palais Des Congrès

There is no official business center within the Palais des Congrès; however, the information desk located in Viger Hall can provide printing, copying, and fax service.

Charge and Recharge Stations Sponsored by the ASME Foundation



Need to recharge yourself and/or recharge your phone? Then come to any one of the five “Charge and Recharge” stations. Two are located in the Exhibit Hall (Room 210) and the other three are located in the foyer of Level 5. An official IMECE conference badge is required to use the “Charge and Recharge” stations.

Child Care Information

Child care service can be obtained through each of the conference hotels. Should you require this service, please contact the hotel directly. Arrangements can be made on-site, but it is recommended to request the service at least 24 hours in advance.

Cyber Café, Sponsored by Mercer



The Cyber Café is located in the Exhibit Hall (Room 210) and open during exhibit hours (Sunday, 11/16, 6:00–7:30pm; Monday, 11/17, 11:00am–4:00pm; Tuesday, 11/18, 11:00am–4:00pm; Wednesday, 11/19, 11:00am–3:00pm).

The Cyber Café is sponsored by Mercer, who offers an array of insurance programs, such as life, long-term care, accident, and disability, along with many other programs for ASME members. Please visit <http://usa.marsh.com/> to learn more about Mercer's products and services.

Emergency Information

Palais des Congrès

If you need medical assistance or have any kind of emergency while in the convention center, dial "555" using any of the building's "house phones" to be connected directly to the 24-hour Security. The Palais des Congrès' security team is fully trained and can provide first response assistance. You can also call 514-871-3141 using your cell phone. Please DO NOT dial 911.

What to do in Emergency Situations:

Remember, the Palais des Congrès has an Emergency Response Team that will guide you through all emergencies. There are also speakers throughout the facility that will advise everyone in the building of an emergency situation and guide you safely. For your safety, please follow these important safety guidelines:

- Never use an elevator during evacuation.
- Evacuate via the emergency exists in an orderly manner to the designated Evacuation Areas.
- Do not leave the Evacuation Areas until you have been accounted for and/or directed by the Emergency Response team to go to another area.
- Never reenter the building until directed by the Emergency Response Team

Exhibits Information

The exhibits are located in Room 210 of the Palais des Congrès. The exhibit hours are as follows:

Sunday, November 16	6:00pm–7:30pm
Monday, November 17	11:00am–4:00pm
Tuesday, November 18	11:00am–4:00pm
Wednesday, November 19	11:00am–3:00pm

General Poster Sessions

Come to the General Poster Session on Wednesday, November 19, from 11:30am–2:30pm and help select the best papers for this session by texting us your vote. Everyone who voted will be eligible to win prizes such as iTunes or Starbucks gift cards.

Hospitality Suite

The hospitality suite is located in Room 445 on Level 4 of the Palais des Congrès. The schedule is as follows:

Sunday, November 16	7:30am–10:00am
Monday, November 17	7:30am–10:00am
Tuesday, November 18	7:30am–10:00am
Wednesday, November 19	7:30am–10:00am
Thursday, November 20	7:30am–10:00am

Badges Are Required for Admission.

Lost and Found

Lost and Found is located in the Meeting Information Booth on Level 2 by registration. Please refer to the Meeting Information Booth section for operating hours.

Lunch

Conference lunches will be served on Monday–Wednesday, November 17–19, in the Exhibit Hall (Room 210). On Thursday, November 20, lunch will be served in Room 517AB. Fully paid attendees are entitled to attend. Guests/Committee Members interested in buying tickets to the lunches can do so at the Registration Desk for \$50 each or \$190 for the entire week.

Meeting Information Booth

The Meeting Information Booths are located outside of the Exhibit Hall (Room 210) on the second level and outside of Room 517 on the fifth level of the Palais des Congrès (starting on Nov. 15). The operating hours are:

Friday, November 14	12:00pm–5:00pm
Saturday, November 15	7:00am–6:00pm
Sunday, November 16	7:00am–6:00pm
Monday, November 17	7:00am–6:00pm
Tuesday, November 18	7:00am–6:00pm
Wednesday, November 19	7:00am–6:00pm
Thursday, November 20	7:00am–5:00pm

Membership to ASME (One Year Free)

Registrants who paid the non-member conference registration fees will receive a complimentary one-year ASME Membership. ASME will automatically activate this complimentary membership for qualified attendees. Please allow approximately four weeks after the conclusion of the conference for your membership to become active. Visit www.asme.org/membership for more information about the benefits of ASME Membership.

Photography

ASME has retained the services of a photographer to capture photo images of the events and activities from the conference. The photographer will be taking photos as assigned by the ASME Communications Department. All photographs are the sole property of ASME, and ASME retains all rights in and to said photographs. These photographs may be used for promotional purposes only, including, but not limited to, the ASME website. If you require more information about the use of IMECE photographs, please go to the media desk at Conference Registration.

Presenter Attendance Policy

The compilation presented in the DVD is not the archival version of the Proceedings. Paper information contained therein should not be used for citation purposes. According to ASME's Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper

also will not be published in the ASME Digital Collection and may not be cited as a published paper.

Professional Development Hours While at IMECE

In keeping with the ongoing need of engineers to monitor their continuing professional development, IMECE attendees can earn PDH credits. Please note: Approval of credits rests with each state's licensing board, and individuals must keep track of their own PDH credits. Please go to the ASME Meeting Information Desk for more information.

Publications: IMECE2014 DVD

The collection of technical papers accepted for presentation and publication for IMECE2014 are posted on the Conference DVD and distributed to registered attendees at the Conference. Presentations, such as panels or posters, that do not have an accompanying paper are considered to be "Oral Presentation Only" and do not appear on the DVD. Please note that the DVD is not the official proceedings of the Conference, which is published in print after the Conference and is also made available online on the ASME Digital Collection at <http://asmedigitalcollection.asme.org>. As such, papers that appear on the DVD may not be cited until after the official Proceedings have been published.

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Publications: Post-Conference Proceedings

Printed volumes of the official Conference Proceedings may be ordered after the Conference by emailing customercare@asme.org or calling 1-800-THE-ASME. Please check with ASME after the Conference for approximate date of release. The Conference Proceedings will also be available after the Conference via the ASME Digital Collection at <http://asmedigitalcollection.asme.org>. All ASME Conference Proceedings are submitted for indexing to the Engineering Index, which publishes COMPENDEX, SCOPUS, and a host of other indexing databases. Proceedings are also submitted to ISI for indexing in the Thomson Reuters Conference Proceedings Citation Index.

Refreshment Breaks

Coffee/tea/decaf will be available on Monday–Wednesday, November 17–19, from 2:45pm to 3:00pm in the Exhibit Hall (Room 210). The refreshment break on Thursday, November 20, from 2:45pm to 3:00pm will be held outside of Room 517.

Registration

Conference registration is located in the foyer outside of the Exhibit Hall (Room 210) on the second level. The operating hours are:

Friday, November 14	12:00pm–5:00pm
Saturday, November 15	7:00am–6:00pm
Sunday, November 16	7:00am–6:00pm
Monday, November 17	7:00am–6:00pm
Tuesday, November 18	7:00am–6:00pm
Wednesday, November 19	7:00am–6:00pm
Thursday, November 20	7:00am–5:00pm

Ticket Sales

Many division and society awards are given at IMECE. Tickets for all these functions may be purchased on-site at the ASME Registration Desk. Please purchase tickets as soon as possible after you register. In order to ensure accurate guarantees and avoid disappointment, tickets for all events will be sold up to 24 hours prior to the event or as long as there is flexibility to adjust the guarantee.

Transportation Around Montreal

Taxis: Taxi service is readily available in the city and also at the front entrance of your hotel. If you wish to pay with a credit card, it is suggested to ask the driver if your method of payment is accepted. The taxi meter start rate is \$3.45.

Taxi rates from and to the airport are fixed at \$40.00, one way.

Airport Shuttle: The 747 Express Bus service runs 24 hours a day to and from the airport. The fare is \$10 each way. Fare cards can be purchased at the airport from automated dispensers or at any Metro (subway) station and can be used for unlimited travel through the public transportation network for a consecutive 24 hours. The 747 Express Bus has a predetermined route with several stops in the downtown area. Stop #7 services the ASME official hotels (Hyatt Regency, Westin Montreal, and InterContinental).

Car Rental: There is a Dollar Thrifty Car Rental counter in the commercial mall of the Palais des Congrès. Please call 514-875-1170.

Twitter

The #IMECE2014 Twitter stream will be displayed prominently around the Palais des Congrès. We encourage you to participate by using the hashtag #IMECE2014 to tweet about anything that's on your mind with regard to IMECE.

WIFI

Free wifi access is provided to IMECE conference attendees throughout the Palais des Congrès. Additionally, free **wifi** access is also provided in the guest rooms of the ASME official hotels (Hyatt Regency, Westin Montreal, and Intercontinental).

FRIDAY, NOVEMBER 14**ASME Business Meeting****5:00pm–5:30pm****Room: 516E**

Call to order by J. Robert Sims, ASME President, 2014–2015
 Report by the Treasurer
 Ratification of Auditor
 Membership Report
 2013–2014 Annual Report
 State of the Society Video Preview
 Election of the 2015 Nominating Committee
 Constitution Amendments
 Report on Proxies Received
 President 2015–2016
 Board of Governors 2015–2018
 Vice Presidents 2015–2018
 Other Business

SATURDAY, NOVEMBER 15**IAM3D Competition Finals****7:30am–8:00pm****Palais des Congres — Room: 519**

All are invited to attend the finals of the ASME'S inaugural Innovative Additive Manufacturing 3d (IAM3D) Challenge. Meet the 24 undergraduate engineering/technology student finalist teams from Bangla Desh, Canada, India and USA whose designs were selected for 3D printing by Cimatrix Solutions, Canada, Sheridan College, Canada, and Stratasys USA. These 24 teams are now vying for five (5) \$2,000 awards each in the Best Overall Design, Best Innovation, and Best Re-engineered/Multidisciplinary Collaboratively Designed Product; Best Freshman Design and Best Verbal Presentation. The faculty advisor of the five (5) winning student/teams will also win a \$1,000 award and 5 years of complimentary ASME membership. .

The IAM3D Challenge is designed to give mechanical and multi-disciplinary undergraduate students around the world an opportunity to re-engineer existing products or create new designs that minimize energy consumption and/or improve energy efficiency. Students will showcase their creativity by demonstrating the value added through their ingenuity, application of sound engineering design principles, and leveraging Additive Manufacturing technology to address a broad spectrum of industrial, manufacturing, and humanitarian challenges. The IAM3D challenge also emphasizes the value of an ability to deliver clear, concise and effective oral presentation..

For more information: please visit

<https://www.asme.org/events/competitions/iam3d-challenge>

IAM3D Finalists**Birla Institute of Technology and Sciences, India**

Aavishkar: A Multi-utility Bicycle
Dhruv Patel (Team leader), Sanket Bhilare;
Faculty Advisor: Dr. Satish Kumar Dubey

East Los Angeles College, USA

STEM Rocket Launcher
Christopher Aguayo (Team leader), Alex Zaragoza; Faculty Advisor: Dr. Khashayar, Kamyar

Gujarat Technological University, India

Development of Viscometer as per Newton's Law of Viscosity
Harsheel Panchasara, Faculty Advisor: Dr. Hemant R Thakkar

Indian Institute of Technology –Kharagpur, India

Ear-friendly Hearing Aid
Saiprasad Arkal (Team leader), Abhishek Jayaswal, Swayankit Sahoo; Faculty Advisor: Dr. Saha P

Jain University, India

Pure Oxygen Supply to an IC Engine
Pramod Ravichandran (Team leader), Akash Naygandhi, Faculty Advisor: Dr. Benaka Prasad

Marwadi Education Foundation Group of Institutions, India

Dual opening ketchup bottle
Tanvir Khorajiya (Team leader), Harsh Bhatt Faculty Advisor: Dr. Arya Changela

Netaji Subhas Institute of Technology – Delhi, India

Toothbrush with replaceable Head
Vaibhav Goyal (Team leader), Utkarsh Singh; Faculty Advisor: Dr. Pradeep Khanna

Oral Roberts University, USA

Innovative Water Bottle Design
Aaron Olsson (Team leader), Daniel Dickie, Daniel Rykert; Faculty Advisor: Dr. John Matsson

Purdue University, USA

FDM UAV
Eli Cohen (Team leader), Jean Ruggiero, Aaron Inouye; Faculty Advisor: Dr. John Sullivan

Rajshahi University Of Engineering & Technology, Bangla Desh

Re-engineering solutions for re-usable spaceship orbiter for a new era
Md Nazmul Ahsan (Team Leader), Md.Nur-E-Alam Siddiky; Faculty Advisor: Dr. Barun Kumar Das

Sheridan College, Canada

Waste Water Pipe Turbine Power System
Amanjot Singh (Team leader), Simrat Kaur; Faculty Advisor: Dr. Godfrey Onwubolu

The 3-D Printed Live Rock

Hituvan Lachhar (Team leader), Randeep Singh Mann; Faculty Advisor: Dr.Hosseini Ahari

Sheridan College, and University of Toronto, Canada

The Winds of Change
Hargurdeep Singh (Team leader), Radhika Sagar, Narges Balouchestani Asli; Faculty Advisor: Dr. Scott D. Currie

State University of New York Buffalo, USA

Project 3D-Mark
Anh Le; Faculty Advisor: Dr. Rahul Rai

Stevens Institute of Technology, USA

3D Printed Granular Jamming Hand
Maggie Serra; Faculty Advisor: Dr. Marehalli Prasad

South Dakota State University, USA

The Fishing Future
Eric Chapin (Team leader), Tyler Tashner, Brandon Westrick; Faculty Advisor: Dr. Todd Letcher

Duck Call

Nicholas Nielsen (Team leader), Brandt Schrankler; Faculty Advisor: Dr. Todd Letcher

IAM3D Wind Turbine

Kaleb Stepanek (Team leader), Zachary Weddington, John Linneman; Faculty Advisor: Dr. Todd Letcher

3D Printed Goose Decoy

Jordan Vanderbush (Team leader), Spencer Kane, Conrad West Dr. Todd Letcher

Wheelchair Mount

Ty Schoellerman (Team leader), Nick Benz, Purna Poudyal; Faculty Advisor: Dr. Todd Letcher

Temple University, USA

Optimizing Airfoil Design with CAD & 3D Printing
Mustafa Alkaysi (Team leader), Mark Laskaris, Alex Benvenuto; Faculty Advisor: Dr. Jim Chen

University of Missouri- Columbia, Missouri, USA

3D Explore
Jonathan Jennings (Team leader), shuangjiu fu; Faculty Advisor: Dr. Yuyi Lin

Virginia Commonwealth University, USA

Designing a puzzle to mimic nanostructures
Thomas Dwyer; Faculty Advisor: Dr. Ramana Pidaparti

Old Guard Oral Presentation Competition Finals

9:00am–4:00pm

Room: 525B

All are invited to attend the finals of the Society-level Old Guard Oral Presentation Competition. Meet the engineering students who have successfully competed at their local universities, at the ASME Student Professional Development Conferences (SPDCs), and are now vying for the \$2,000 ASME Old Guard Prize for outstanding presentation skills.

Like all effective professionals, engineers must possess a well-developed ability to synthesize issues and communicate both orally and in writing. This competition is designed to emphasize the value of an ability to deliver clear, concise, and effective oral presentations, particularly pertaining to some sphere in which an engineer is or should be involved. Presentation topics must address a technical, economic, or environmental aspect of engineering or other basic engineering theme, and often relate to the students' engineering design/analysis projects. For more information, please visit

<https://www.asme.org/events/competitions/old-guard-competitions/old-guard-prize-oral-presentation-competition/>

Participants:

Clemson University

Brandon Horton

Virginia Tech

Analysis and Development of a Fully Articulated Robotic Bird

University of Wisconsin–Madison

Sean Larson

Milwaukee School of Engineering

The Mechanical Design of a Quadcopter

Texas Tech

Michael Crump

Texas Tech

Subsea Fluid Connector

California Polytechnic State University

Jimmy Ma

San Jose State University

UAV for Forest Fire Prediction

Drexel University

Joseph Kim

Yale University

Using Artificial Microstructures to Understand Microstructure-Property Relationships in Metallic Glasses

Mexico

Guillermo Enrique Gutiérrez Neri

Instituto Tecnológico de la Laguna

Practical Applications for Solar Energy

Egypt

Nadia Salman

The British University of Egypt

The Development of Hydrogen Embrittlement Resistant Steel Alloys

Lebanon

Anomitra Banerjee

BITS Pilani–Dubai

Groundwater Remediation Through Nanoscale Iron Particles

India

Wu Chow Kuo

National Tsinghua University

Avoid Getting Your Shoes Wet While Walking on a Wet Floor

Pakistan

Syed Hassan Waqar Gilani

UET Lahore

Vertox Unity: A Vertical Take-Off Box Wing UAV

Peru

Alexander David Rodriguez Castillo

Universidad Nacional de Ingeniería

Development of a Metamodel for the Service Level of Electric Charging Stations for Plug-in Hybrid Electric Vehicles

Denmark

Nicolas Fleury

ISAE-SUPAERO–Toulouse

The Building of a Drone

History & Heritage and Old Guard Presentation/Reception

6:00pm–7:30pm

Room: 516C

Please join us as the History & Heritage and Old Guard Committees host a joint special event. Dr. Terry Reynolds, a member of the History & Heritage Committee, will give a short presentation in support of ASME's newest landmark book edition, *Machines That Made History—Landmarks in Mechanical Engineering*.

The ASME Old Guard Committee will announce the Old Guard Oral Presentation winners and present their award certificates.

SUNDAY, NOVEMBER 16

**5K Fun Run/Walk
Sponsored by the ASME Foundation**

6:30am (Registration)

7:00am (Run/Walk starts)

Location: Clock Tower in the Old Port

The run/walk will start in the Old Port, at the foot of the Clock Tower. This place is approximately 15 minutes by foot from the Palais des Congrès. The run/walk will be on a paved way between the Clock Tower and the Peel Bassin, located at the foot of Peel Street. This stretch is 2.5 km, and with the return to the Clock Tower, the whole distance is 5 km. The entire run/walk will take place on a straight course. It is a safe area, mostly in the Old Port section; therefore, no traffic is in the way except for a few cars that park in that area. The view on one side is the St. Lawrence River and, on the other side, the historical buildings of Old Montreal.



**2014 ASME Student Design Competition
Finals and Award Ceremony and Reception**

8:00am–6:30pm

Room: 511EF

Participant Check-In: 8:00am

Participant Setup: 8:00am–11:00am

Competition: 12:00pm–4:30pm

Award Ceremony and Reception: 4:30pm–6:00pm

The use of Unmanned Air Vehicles (UAVs) has proved to be very efficient. They not only save the pilot from being placed in harm's way, but the expense is much lower. There are many uses of UAVs that have been identified. An example would be to observe a forest fire to provide information so the Forest Service can determine the best way to fight a particular fire.

Our competitor's task is to design a remotely controlled, small UAV to carry a cargo through two gates, drop a payload, and return to the starting point. This is an initial proof-of-concept prototype. The device must be able to maneuver around and through obstacles, change height, and pass through a hoop for sizing.

Participating Teams:

- Baker College of Flint
- BITS Pilani – Dubai – UAE
- California Polytechnic State University – SLO
- Germanna Community College
- Hong Kong Polytechnic University – Hong Kong
- IIT Bombay – India
- Instituto Tecnológico de Ciudad Juárez – Mexico
- ISAE-SUPAERO – France
- National Tsing Hua University – Taiwan
- North Carolina State University
- PMU – Saudi Arabia
- SRM University - India
- Texas Tech University
- The British University of Egypt - Egypt
- TOBB University of Economics & Technology – Turkey
- Wentworth Institute of Technology
- UET Lahore - Pakistan
- Universidad Nacional de Ingeniería – Peru
- University of Arkansas – Little Rock
- University of North Dakota
- University of St. Thomas
- University of the Pacific
- Yeditepe University – Turkey

For more information, visit <http://www.asme.org/events/competitions/student-design-competition>

Major funding provided by: Boeing



Please make plans to attend and support these talented engineering students. You never know, your next grad student or new hire may be a competitor in these finals.

Members and Students Luncheon, Sponsored by the Committee on Honors

12:00pm–1:30pm
Room: 511AB

Ticket: \$60 (members and non-members), \$30 (students)

EDWIN F. CHURCH MEDAL

John W. Cipolla, Ph.D., Fellow
Northeastern University

WILLIAM T. ENNOR MANUFACTURING TECHNOLOGY AWARD

Placid M. Ferreira, Ph.D., Fellow
University of Illinois at Urbana–Champaign

GUSTUS L. LARSON MEMORIAL AWARD

Wei Lu, Ph.D., Fellow
University of Michigan

CHARLES T. MAIN STUDENT SECTION AWARD – GOLD

Meredith A. Campbell, Member
Daniel Webster College

CHARLES T. MAIN STUDENT SECTION AWARD – SILVER

Claire Harper, Member
The University of Alabama

MCDONALD MENTORING AWARD

Nael Barakat, Ph.D., P.Eng., Fellow
Grand Valley State University

PI TAU SIGMA GOLD MEDAL

Ibrahim T. Ozbolat, Ph.D., Member
The University of Iowa

CHARLES RUSS RICHARDS MEMORIAL AWARD

Suresh V. Garimella, Ph.D., Fellow
Purdue University

OLD GUARD EARLY CAREER AWARD

Andres E. Rondon Marin, Member
Université Pierre et Marie Curie-Sorbonne

STUDENT SECTION ADVISOR AWARD

Antonios Kotsos, Ph.D., Member
Drexel University

GEORGE WESTINGHOUSE GOLD MEDAL

Ryoichi S. Amano, Ph.D., Fellow
University of Wisconsin–Milwaukee

ARTHUR L. WILLISTON MEDAL

Mavila M. Miller, Member
Yale University

First-Time Attendee Orientation

2:00pm–2:45pm
Room: 516C

First-time attendees to IMECE are cordially invited to this informal yet informative session to learn about how to navigate the conference, how to use the program, and more importantly, where all the best parties are. Snacks and refreshments will be served.

VOLT Leadership Workshop

2:00pm–3:30pm
Room: 515C

How to Mentor Leaders

Description: Mentoring is an important factor in the leadership development of volunteers at all levels of ASME. In this workshop, ASME leaders will share their experiences as mentors and mentees and recommend best practices for mentoring the next generation of ASME leadership.

Exhibit Hall Grand Opening Ribbon Cutting and Opening Reception

6:00pm–7:30pm
Exhibit Hall, Room 210, 2nd Level

All registrants are invited to this special event to celebrate the opening of the IMECE exhibits. Come grab a drink and some food, meet this year's group of exhibitors, and learn about their products and services.

International Undergraduate Research and Design Exposition

6:00pm–7:30pm
Exhibit Hall, Room 210, 2nd Level

Poster Setup:	3:00pm–5:00pm
Expo (General Viewing):	6:00pm–7:30pm
Winners Announced:	7:30pm–8:00pm

The Student Expo provides undergraduate engineering students with a professional and technical forum for presenting their research, design project, and other engineering solutions and endeavors to top researchers and scientists from academia, industry, government, prospective employers, entrepreneurs graduate schools, and potential faculty advisors.

Vote for your favorite poster by using the Audience Voting feature of the Itinerary Planner mobile application. Simply download the app by visiting www.asmeconferences.org/Congress2014 and start voting.

Social Meet-up for Early Career Engineers Featuring Mini-Talks, Presented by the Board on Career Development

8:00pm–10:00pm

Room: 511ABC

Join us for this special networking experience to meet other engineers with similar interests to network professionally and make new connections with ASME leadership and/or renew past friendships. Mini-Talks are short, relevant, inspirational talks given in an informal setting by experienced early career engineers with stories to tell and new perspectives and experiences to share.

Mini-Talk Presenters/Program Details

This year's Mini-Talks will showcase young professionals from around the world sharing their personal experiences in the global exchange of engineering, information, and business practices.

Program Moderator



Rebecca Ciez

*Carnegie Mellon University,
Ph.D. Student
Engineering and Public Policy, USA*

Moderator biography: Rebecca Ciez's graduate research is focused on energy storage for distributed and renewable energy systems. Before enrolling at Carnegie Mellon University, she graduated from

Columbia University with a Bachelor of Science in Mechanical Engineering, with Economics and Sustainable Engineering minors. She has also spent time working in the public policy and international development technology fields. In addition to ASME, Ciez is an active member of the Society of Women Engineers and Engineers Without Borders.

Confronting Global Energy Challenges



Nathan Johnson

Assistant Professor, The Polytechnic School, Arizona State University

Engineers serve a vital role in confronting global energy challenges. Looking at the next 30 years, young engineers, especially, will be needed to address energy challenges associated with climate change, world population growth,

and demands for economic development. Yet technological innovation is only part of the scope of work. Engineers that view and understand technology as one piece to energy system design will be best suited to address the complex social and economic challenges ahead. In this talk, Dr. Johnson will discuss his work in designing energy technologies and energy systems with respect to dynamic social, economic, and environmental factors. His domestic and international projects will demonstrate how engineers can pursue a variety of career paths locally and globally.

Presenter biography: Dr. Nathan Johnson is an active researcher and teacher of sustainability, multidisciplinary design, and energy systems modeling and optimization. Through his work, Johnson confronts global energy challenges by evaluating energy options against the technical, human, and environmental factors inherent to real-world problems. His work combines experimental design with model-based systems engineering to develop decision-making tools that support the design of sustainable products and services around the world. These tools are primarily applied in the design of micro-grid power systems and building energy systems.

Global Engineering: Your Passport to the World



Ritesh Lakhkar

*Research and Development Engineer,
Corning Incorporated, USA*

In today's global business environment, international mobility offers a unique opportunity for engineers to expand their experiences and skills. The sooner early career engineers get exposed to different cultures and diversity around the

world the better it may be to help them understand the dynamics of international business. Lakhkar will share how international mobility complements career development and helps to enhance interpersonal and business skills.

Presenter biography: Ritesh Lakhkar is a research and development engineer with a diverse interdisciplinary background in manufacturing processes such as laser-based manufacturing, welding, deburring and edge finishing, corrosion management, glass cutting, glass sheet manufacturing, etc., currently working for Corning Incorporated. He has a bachelor's degree in Mechanical Engineering from Government College of Engineering, Pune, India and master's degree in Mechanical Engineering from Purdue University, West Lafayette, Indiana, USA. He is Member-at-Large on ASME's Board on Career Development, member of the Manufacturing Processes Technical Committee, and Chair of the ME Today Committee.

Communication: An Essential Tool Towards Solving Challenges in Global Engineering Collaboration



Dilshad Sulaiman
*Engineer at ITER-India,
Institute for Plasma Research
Gandhinagar, Gujarat, India*

Effective communications involving technical reasoning and soft skills are necessary to solve collaborative engineering challenges. For systems of a one-of-a-kind nature being designed/built for the first time with

exceptional parameters, and also involving technical work by multiple collaborators, the element of communication is essential towards converging on a design that can be taken further for manufacturing. Especially when collaborators are based across the globe having different work cultures and opinions, the communication aspect then plays a vital role in bringing consensus towards solving problems jointly and keeping the work progressing further. The role of joint design reviews, technical meetings, industry meetings, etc., involving people at all levels and ways to interact/deal with them, as learned during my experience, will be discussed.

Presenter biography: Dilshad Sulaiman, an early career engineer based in India, works on the ITER project (the experimental fusion reactor under construction in France) as an employee of ITER-India, the Indian agency contributing its share to the ITER project. This project being a joint collaboration of China, the European Union, Japan, South Korea, Russia, and United States, Sulaiman has been broadly

involved in engineering/project management, technical coordination, and communications on this project for the last six years, which has given him wide global exposure working with collaborators across the world. He volunteers actively for ASME as Chair of Early Career Connect group, Member-at-Large on the Management Division, and member of ASME India section. Widely traveled either on work or leisure, Sulaiman has a great interest in photography, trekking, driving, public speaking, and advising early career engineers.

In Your Career Equation, Always Account for Variable Change



Hope Duntoye
*Shell Petroleum Development
Company of Nigeria Limited*

Ever wondered where you would be a few years from now or how exactly you would achieve that? Does it seem like you have developed an equation for your life and career? Even when we sometimes feel that we have our lives mapped out, we need to remember

that what becomes of our lives is a combination of the reality we are faced with and how we make the most of such. In meandering through change on the path to our dreams, we must never lose focus of what we planned for ourselves while maximizing the opportunities life offers us. Hope Duntoye offers life-changing examples drawn from his experience working for two world leading multinational companies in different industries and consulting.

Presenter biography: Hope Duntoye is a Certified Information System Auditor and a certified Apollo RCA Practitioner with a bachelor's degree in Mechanical Engineering earned in 2006 from the University of Lagos in Nigeria. After his mandatory National Youth Service Corps, he joined PricewaterhouseCoopers (PwC) in 2008 and provided management consulting as well as systems and process assurance services to top industry clients. He joined Shell in 2011 and is presently a mechanical supervisor on a Floating Production, Storage and Offloading facility in Nigeria where he ensures maintenance integrity and reliability of mechanical equipment. Duntoye won the PwC Team Performance Award in 2010, Shell Performance Share Plan Award in February 2014, and a Special Recognition Award from Shell in May, 2014. He was selected through a competitive process and sponsored by ASME to attend the Leadership Training Conference in St. Louis, Missouri, in 2013 as an Early Career Engineer and was selected again in 2014 by ASME through a competitive process to participate in the Early Career Leadership Intern Program to Serve Engineering (ECLIPSE).

MONDAY, NOVEMBER 17

Keynote Event

8:00am–9:30am

(7:30am–8:00am, Continental breakfast served)

Room 517AB, 5th Level

Theme: Engineering for Global Development

Billions across the developing world do not have access to the most basic needs, such as clean water, energy, agriculture and medicine. The engineering of affordable, appropriate and sustainable solutions – combined with building the capacity of local communities and partnering with industry to bring these technologies to market – has more potential to improve and transform the human condition worldwide than conventional aid models. Engineering for Global Development (EGD) is a strategic priority for ASME and a tremendous opportunity for engaging the engineering community in improving the quality of life for those living in poverty. From exploring market-based solutions, expanding the EGD curriculum on college campuses worldwide and engagement with a growing online community on the **Engineering for Change** global platform, EGD has established itself as a legitimate market and discipline.

ASME has assembled some of the leading minds in industry, academia and social ventures for a lively discussion on the most pressing concerns in the developing world, namely, the necessity to bring appropriate technologies to underserved communities and the critical role engineering plays. Panelists will discuss economic trends in emerging markets, funding mechanisms in social ventures, engineering rigor of the design process and developing partnerships with industry.

Moderator:



John Hockenberry is a three-time Peabody Award winner, four-time Emmy winner and “Dateline NBC” correspondent. He has broad experience as a journalist and commentator for more than two decades. He is the anchor of the new public radio morning show *The Takeaway* on WNYC and PRI. He has reported from all over the world, in virtually every medium, having anchored programs for network, cable and radio.

Panelists:



Paul Polak is founder and CEO of Windhorse International, a for-profit social venture with the mission of inspiring and leading a revolution in how companies design, price, market and distribute products to benefit the 2.7 billion customers who live on less than \$2 a day, combining radically affordable technology with radically decentralized supply chains to earn profits serving bottom billion customers.



Shyam Rajan is the Chief Technology Officer for GEHC - India. In this role he leads teams of technologists and engineers that represent close to 20 modalities in the healthcare area at the John F. Welch Technology Centre. Prior to this he was the General Manager for the Maternal Infant Care – Performance segment at GE Healthcare in Bangalore, India. In this role, he was responsible for conceptualizing, designing and

manufacturing maternal infant care products for the underserved and un-served markets especially for the emerging regions of the world. A key goal of the business unit was to create products at the right price points without compromising on clinical efficacy, so that access to quality healthcare equipment in the underserved regions is significantly improved. The products that his team developed, in addition to India is sold in over 65 countries in Europe, Africa, Middle East and the Asia Pacific.



Juliana Rotich is Executive Director of Ushahidi Inc and responsible for the overall management of Ushahidi, partnerships and support of the Ushahidi team. She has worked in the telecommunications industry for over ten years and has extensive experience in Data Warehousing. She has a Computer Science degree from the University of Missouri, Kansas City. Juliana is a TED Senior

Fellow, an MIT Media Lab Director’s Fellow and is Chair for the World Economic Forum Global Agenda Council on Data Driven Development. She is recognized by Fortune Magazine as 2014 50 Global Leaders and as the Social Entrepreneur of the Year 2011 by The World Economic Forum. She is sought after internationally as an expert and commentator on Africa, Technology, innovation, mobile technology, open source, data ecosystems, crowdsourcing and participatory systems.



Bryan Willson is professor of mechanical engineering at Colorado State University and founder of CSU's Engines and Energy Conversion Lab and co-director of The Energy Institute. In the role as professor and co-director, he has worked for over 25 years to develop large-scale solutions for global energy needs with a significant focus on reducing environmental impacts from natural gas production and use.

Dr. Willson is on assignment from CSU serving as program director at the Advanced Research Projects Agency-Energy (ARPA-E). The Energy Institute serves as a nucleus of research, education, and outreach for the faculty, staff, and students of Colorado State University. Energy is a central element of almost every major challenge and opportunity the world faces today. CSU has a long history of pioneering work in energy, with over 160 faculty developing energy technologies, exploring the economics, environmental, and sociological impacts of energy use, and proposing energy policy solutions. The Institute aims to grow the impact, reach, and reputation of energy research and education at Colorado State University by increasing collaboration with industry and governmental partners, creating new research and educational opportunities for CSU faculty and students, and accelerating the dissemination of CSU solutions. This cross-campus, interdisciplinary effort is operated under the Office of the Vice President for Research. The extensive network of researchers, research programs, and centers, spans all eight colleges at CSU, and extends off campus to a global network of public and private partners.

Engineering for Global Development Forum

9:45am–4:45pm

Room: 511EF

The EGD Forum will feature informative sessions for those who are interested in learning more about EGD as well as those engineers who are looking to get more involved. While the keynote session will cover some of the overarching elements of EGD, the forum will delve deeper by presenting case studies and discussions that illustrate the fundamental concepts of global development, such as the user-centric design process, cultural challenges, field testing of working prototypes and the critical roles academia, industry and local communities play in building the necessary (and appropriate) foundation needed to succeed in this space. Sessions will include the following:

Case Studies in Global Development

9:45am–11:30am

Case studies in this session will explore the entrepreneurial aspects of EGD, how to get started and how best to address some of the most pressing concerns in the developing world. More importantly, this session will demonstrate the positive social impact engineers make and will provide a snapshot of what to expect when bringing technologies from concept to scale in these emerging markets. Speakers will include:



Paul Polak

Windhorse International

Paul Polak is founder and CEO of Windhorse International, a for-profit social venture with the mission of inspiring and leading a revolution in how companies design, price, market and distribute products to benefit the 2.7 billion customers who live on less than \$2 a day, combining radically affordable technology with radically

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Lyle Ruppert
Ball Aerospace

Lyle Ruppert is a Principal Systems Engineer at Ball Aerospace & Technologies Corp. During more than eleven years at Ball, he has worked on remote-sensing instruments, from initial design through integration, characterization, calibration, field testing, and development of control

and data-exploitation algorithms. He has a degree in mathematics, and his previous career has included extensive work in factory automation, volume production, metrology, and quality control.



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gas production and use. Dr. Willson is on assignment from CSU serving as program director at the Advanced Research Projects Agency-Energy (ARPA-E). The Energy Institute serves as a nucleus of research, education, and outreach for

the faculty, staff, and students of Colorado State University. Energy is a central element of almost every major challenge and opportunity the world faces today. CSU has a long history of pioneering work in energy, with over 160 faculty developing energy technologies, exploring the economics, environmental, and sociological impacts of energy use, and proposing energy policy solutions. The Institute aims to grow the impact, reach, and reputation of energy research and education at Colorado State University by increasing collaboration with industry and governmental partners, creating new research and educational opportunities for CSU faculty and students, and accelerating the dissemination of CSU solutions. This cross-campus, interdisciplinary effort is operated under the Office of the Vice President for Research. The extensive network of researchers, research programs, and centers, spans all eight colleges at CSU, and extends off campus to a global network of public and private partners.

The Rise of Research in Engineering for Global Development

1:00pm–2:45pm

This session will focus on the research being conducted within academia and the call to action for more researchers and students to get involved in EGD. Speakers will discuss the constantly evolving design process, educational models, curriculum development, their successes and even their failures. They will also make the case for increased research grants and much needed funding mechanisms that will help EGD continue to grow. Speakers will include:



Nate Johnson
Arizona State University

Dr. Nathan Johnson is an Assistant Professor in the Polytechnic School at Arizona State University. He is an active researcher and teacher of sustainability, multidisciplinary design, and energy systems modeling and optimization. Through his work, Dr. Johnson confronts global energy

challenges by evaluating energy options against the technical, human, and environmental factors inherent to real-world problems. His work combines experimental design with model-based systems engineering to develop decision-making tools that support the design of sustainable products and services around the world. These tools are primarily applied in the design of micro-grid power systems and building energy systems. Arizona State University recognizes Dr. Johnson as a Senior Sustainability Scientist in recognition for his globally-

focused sustainability efforts. In addition, Dr. Johnson's research in safety protocols for solid fuel cookstoves has been included in the ISO standards development process to reduce the incidence of burns, cuts, scalds, and house fires from cooking fires around the world. *Aligning Global Development With an Academic Career*

This session will focus on the research being conducted within academia and the call to action for more researchers and students to get involved in EGD. Speakers will discuss the constantly evolving design process, educational models, curriculum development, their successes and even their failures. They will also make the case for increased research grants and much needed funding mechanisms that will help EGD continue to grow. Speakers will include:



Benjamin Linder
Associate Professor of Design and Mechanical Engineering

Dr. Linder works to enable people to engage design and creativity to lead more purposeful, hopeful lives. This effort is focused in the areas of environmental sustainability and international development. He is particularly interested in

understanding how changing mindsets and agency through local innovation and collaboration can lead to more sustainable communities. The outcomes of his work include new techniques and approaches that further a more ecologically connected and socially just design practice.

Linder has extensive experience engaging students, faculty and practitioners around the world in hands-on design and entrepreneurship learning experiences through curricula, workshops, summits, makerspaces and innovation centers. He co-leads the Design Stream at Olin College and co-organizes the Three College Collaboration Sustainability Certificate Program, the Affordable Design and Entrepreneurship Program, the International Development Innovation Network, and the International Development Design Summit, which brings people together from over 20 countries to build local, creative design capacity.



Annica Wayman
U.S. Agency for International Development (USAID)

Annica Wayman is the Research Partnerships for Development Team Lead in the U.S. Global Development Lab at the U.S. Agency for International Development (USAID). The team is responsible for the Partnerships for Enhanced

Engagement in Research (PEER) program and other activities which catalyze and leverage collaborative research that addresses global development challenges. Immediately before this role, she was an AAAS Science and Technology Policy Fellow in the Office of Science and Technology at USAID where she helped initiate PEER and enhanced USAID's partnerships with other federal science agencies. Prior to coming to USAID, Annica worked at Becton, Dickinson & Co. (BD), a leading global medical technology company that manufactures and sells medical devices, instrument systems and reagents. At BD, she served in various R&D engineering roles ranging from advanced technology development to new product development for anesthesia-related procedures. In addition to her primary engineering role, Annica was part of BD's Global Health team where she explored ways to improve biosafety in tuberculosis (TB) laboratories in developing countries in collaboration with the Foundation for Innovative New Diagnostics, the Centers for Disease Control and Prevention and Alliance Biosciences. Annica holds a BS degree in Mechanical Engineering from the University of Maryland Baltimore County as well as MS and PhD degrees in Mechanical Engineering from the Georgia Institute of Technology where her doctoral work focused on selectin-mediated adhesion of leukocytes to vascular surfaces.



Amos Winter
Massachusetts Institute of Technology

Dr. Amos Winter is the Robert N. Noyce Career Development Assistant Professor in the Department of Mechanical Engineering at MIT. His research focuses on the marriage of mechanical design theory and user-centered product design to create simple, elegant technological

solutions for use in highly constrained environments. His work includes design for emerging markets and developing countries, biomimetic design, fluid/solid/granular mechanics, biomechanics, and the design of ocean systems. Prof. Winter is the principal inventor of the Leveraged Freedom Chair (LFC), an all-terrain wheelchair designed for developing countries that was a winner of a 2010 R&D 100 award and was named one of the Wall Street Journal's top innovations in 2011. His Ph.D. work focused on adapting the burrowing mechanisms of razor clams to create compact, low power, and reversible burrowing systems for subsea applications such as anchoring, oil recovery, and cable installation. Prof. Winter is a founder of Global Research Innovation and Technology (GRIT). He was the recipient of the 2010 Tufts University Young Alumni Distinguished Achievement Award, the 2010 MIT School of Engineering Graduate Student Extraordinary Teaching and Mentoring Award, and the 2012 ASME/Pi Tau Sigma Gold Medal.

Aligning Global Development with an Academic Career

3:00pm–4:45pm

Academic administrators who recognize the potential of EGD and who are working diligently to help establish EGD as its own discipline within academia will be convened in a “town hall” format to reflect on EGD’s growing interest within the millennial generation, its role and value within academia and how to establish the tenure track to encourage more researchers to pursue EGD. This discussion will focus on some of the opportunities and challenges presented within the EGD academic landscape going into the future. Speakers will include:



Gang Chen
Massachusetts Institute of Technology

Dr. Gang Chen is currently the Head of the Department of Mechanical Engineering and Carl Richard Soderberg Professor of Power Engineering at Massachusetts Institute of Technology (MIT), and is the director of the “Solid-State Solar-Thermal Energy Conversion Center

(S3TEC Center)” - an Energy Frontier Research Center funded by the US Department of Energy. He obtained his bachelor and master degrees from Huazhong University of Science and Technology, and his PhD degree from the Mechanical Engineering Department, UC Berkeley, in 1993. He was an assistant professor at Duke University, a tenured associate professor at UC Los Angeles, before moving to MIT. He is a recipient of a K.C. Wong Education Foundation fellowship and a John Simon Guggenheim Foundation fellowship. He received an NSF Young Investigator Award, an R&D 100 award, and an ASME Heat Transfer Memorial Award. He is a fellow of AAAS, APS, and ASME. In 2010, he was elected a member of the US National Academy of Engineering.



Gary Dirks
Arizona State University

Dr. Gary Dirks is director of Arizona State University’s Julie Ann Wrigley Global Institute of Sustainability and director of LightWorks, an ASU initiative that capitalizes on ASU’s strengths in solar energy and other light-inspired research. He also is the Julie Wrigley Chair of Sustainable Practices, a professor of practice in

the School of Sustainability, and Distinguished Sustainability Scientist. Before joining ASU, Dirks was president of BP Asia-Pacific and BP China. In China, he grew BP from an operation with fewer than 30 employees and no revenue to more than 1,300 employees and revenues of about \$4 billion in 2008.



Bill Wepfer

Georgia Institute of Technology

Dr. William J. Wepfer is the Eugene C. Gwaltney Jr. School Chair and Professor in the George W. Woodruff School of Mechanical Engineering at Georgia Tech. Dr. Wepfer's research interests are in thermal systems, heat transfer, and thermodynamics, with particular emphasis on energy

systems. Dr. Wepfer is a Fellow of ASME and ASHRAE. He is a member of the Executive Committee of the Engineering Accreditation Commission of ABET and is the Vice-President for Education for ASME. He has served on departmental advisory boards at Pennsylvania State University, Johns Hopkins University, University of Wisconsin-Madison and Marquette University. Robert Henry Thurston Lecture

Open Campus Model: Accelerating Innovation and Discovery at ARL and Beyond

3:00pm–4:00pm

Room: 518C

Presenter



Dr. Thomas Russell

Director Army Research Laboratory

The mission of the U.S. Army Research Laboratory (ARL) is to provide innovative science, technology, and analyses to enable full-spectrum Army operations, now and into the future. To execute this mission, ARL leverages the substantial intellectual resource represented by

the global academic scientific research community. Formation of a collaborative and transparent relationship with this community, with industry, and with small business through the Open Campus initiative offers the prospect for enhanced discovery and innovation, and effective execution of basic and applied research programs in a variety of technical focus areas of high Army interest.

ARL is adaptive and responsive to the challenges of 21st century national security. While the nature of our mission requires that segments of our research be restricted, it is

widely acknowledged that innovation depends on bringing multiple disciplines together to engage in collaborative projects that often yield unpredictable, but highly productive, results. Formal and informal interactions among scientists lead to knowledge building and research breakthroughs. By bringing together academia, industry, small business, and government to address fundamental research problems, the Army can enhance its performance through on-site R&D collaboration, at both ARL and collaborator locations. ARL is implementing an Open Campus initiative as part of our business model to foster better collaboration across industry, academia, and government, attracting and leveraging the best and brightest across the collective research community to more effectively produce transformative science and technology. Participation in ARL's Open Campus will provide ready access to unique facilities, specialized researchers, and collaborative resources for all partners, including foreign nationals.

Biography: As Director of the U.S. Army Research Laboratory, Dr. Thomas Russell is responsible for the Army's premier laboratory for basic and applied research and analysis. ARL conducts research and analysis in weapons and materials, sensors and electron devices, computational and information sciences, human research and engineering, vehicle technology, and survivability and lethality analysis. ARL's Army Research Office executes the Army extramural basic research program in scientific and engineering disciplines. The Laboratory consists of approximately 3,000 military, , and contractor employees with annual revenue of over \$2 billion.

From February 2010 to March 2013, Dr. Russell was the Director of the Air Force Office of Scientific Research, Arlington, VA. He oversaw the management of the entire basic research investment for the Air Force, leading a staff of 200 scientists, engineers and administrators in Arlington, VA, and foreign technology offices in London, Tokyo and Santiago, Chile. Each year, AFOSR selects, sponsors, and manages revolutionary basic research that impacts the future Air Force. Dr. Russell actively managed a \$510 million investment portfolio and transitioned the resulting discoveries to other components of the Air Force Research Laboratory, to defense industries, and other federal agencies. The office's annual investment in basic research was distributed among more than 200 academic institutions, 150 businesses, and 200 research efforts within the AFRL.

Dr. Thomas Russell was selected for the Senior Executive Service in August 2006. From August 2006 to February 2010, he served as the Director of the Aerospace and Material Sciences Directorate, AFOSR. He was responsible for the Air Force basic research program in aerospace, chemical, and material sciences.

Robert Henry Thurston Lecture

10:00am–12:00pm

Room: 519B

Translational Research in Mechanics: From Nano to Continuum



**Ken P. Chong, Ph.D., PE, F.ASME,
Hon.M.ASCE**

George Washington University

Abstract: Nano science and engineering are among the frontiers in transformative and translational research. Led by NSF over the past decade and converging interdisciplinary areas of nanotechnology, biotechnology,

information technology, and cognitive science, NBIC offers the potential of improving human lives as well as society well-being and productivity. Nanotechnology is a very efficient way in the creation of new materials, devices, and systems at the molecular level, which requires simulation in multiscale mechanics. Smart materials, energy, and sustainability on the other hand have also seen new advances. Mechanics is the common thread among these interdisciplinary areas. The research and challenges in nanotechnology, NBIC converging technologies, simulation-based engineering and sciences, multiscale systems, energy, smart materials, and other related areas are to be presented.

Biography: Ken P. Chong, Ph.D., P.E., was the former Interim Division Director, Engineering Advisor, and Program Director of Mechanics and Materials at the National Science Foundation (NSF) until 2009. Currently he is a Research Professor at George Washington University, advising graduate students, teaching, mentoring young faculty members, doing research, lectures, consulting, and other activities. He earned a Ph.D. in Mechanics from Princeton University in 1969. He specializes in wave propagation, solid mechanics and materials, nano-mechanics, smart structures, and structural mechanics. He has been the principal investigator of over 20 federally funded research projects (from NSF, DOD, DOE, DOI, etc). He was a senior research engineer with National Steel Corp. for five years after graduation from Princeton. After that he has been a professor for 15 years at a state university. He has published 200 technical papers, authored four textbooks on mechanics, and edited 10 books. He was the editor of the Elsevier *Journal*

of Thin-Walled Structures, 1987–2013. He is co-editor of the UK journal of *Smart and Nano Materials*, a Spon book series on structures as well as serving on several other editorial boards. Currently he is also assisting the Hong Kong Research Grants Council and University Grants Committee as an engineering panelist. He has given over 50 keynote lectures, the Mindlin and Sadowsky Lectures, received awards including the Fellow of ASME, AAM, SEM, Edmund Friedman Professional Recognition Award; Honorary Doctorate, Shanghai University; Honorary Professor, Harbin Institute of Technology; Distinguished Member, ASCE; NSF highest Distinguished Service Award; AWU-DOE Outstanding Academic and Professional Achievement Award; and the ASME Belytschko Mechanics Award. He is the ASME Thurston Lecturer for 2014.

The Robert Henry Thurston Lecture Award was established in 1925 in honor of ASME's first president. It provides an opportunity for a leader in pure and/or applied science or engineering to present to the Society a lecture that encourages stimulating thinking on a subject of broad interest to engineers. The Robert Henry Thurston Lecture Award was elevated to a Society award in 2000.

VOLT Leadership Workshop

10:00am–11:30am

Room: 515C

How to Mentor Leaders

Description: Mentoring is an important factor in the leadership development of volunteers at all levels of ASME. In this workshop, ASME leaders will share their experiences as mentors and mentees and recommend best practices for mentoring the next generation of ASME leadership.

President's Luncheon

12:00pm–1:30pm

Room: 511AB

PER BRUEL GOLD MEDAL FOR NOISE CONTROL AND ACOUSTICS

Andrew N. Norris, Ph.D., Fellow
Rutgers University

TECHNICAL COMMUNITIES GLOBALIZATION MEDAL

Upendra S. Rohatgi, Ph.D., Fellow
Brookhaven National Laboratory

SOICHIRO HONDA MEDAL

Thomas Morel, Ph.D., Fellow
Gamma Technologies, Inc.

EDWARD F. OBERT AWARD

Ghassan J. Nicolas, Ph.D., Member
Schlumberger

Mohammad Janbozorgi, Ph.D.
University of Southern California

Hameed Metghalchi, Sc.D., Fellow
Northeastern University

PERFORMANCE TEST CODES MEDAL

W. Glenn Steele, Jr., Ph.D., Fellow
Mississippi State University

JAMES HARRY POTTER GOLD MEDAL

Michael R. von Spakovsky, Ph.D., Fellow
Virginia Polytechnic Institute and State University

DIXY LEE RAY AWARD

Leo P. Duffy
Retired

J. HALL TAYLOR MEDAL

Charles Becht IV, Ph.D., Fellow
Becht Engineering Co., Inc.

HENRY R. WORTHINGTON MEDAL

Gerald L. Morrison, Ph.D., Fellow
Texas A&M University

WORCESTER REED WARNER MEDAL

Vigor Yang, Ph.D., Fellow
Georgia Institute of Technology

ME/MET Department Heads Forum

1:30pm–3:30pm

Room: 511D

Sponsored by: Mechanical Engineering and Technology Department Head Committees

The Department Heads Forum is an annual event at the ASME Congress for mechanical engineering and mechanical engineering technology department heads. The forum is a chance to learn about some of the latest research funding developments, curricular innovations, accreditation issues, and upcoming ASME Center for Education activities.

Honors Reception, Sponsored by the Committee on Honors

5:00pm–6:00pm

517 Foyer, 5th Level

All registered attendees are invited to attend this reception and meet this year's Honors Awards Recipients.

Honors Assembly

6:00pm–7:30pm

Room 517D, 5th Level

All registered attendees are cordially invited to attend the 2014 ASME Honors Assembly. This multimedia program celebrates some of today's leading engineers, educators, entrepreneurs, and innovators. This year's Honors Awards Recipients are:

ASME MEDAL



Van C. Mow, Ph.D., Fellow
Columbia University

For significant contributions to biomechanical and biomedical engineering, particularly seminal breakthroughs in understanding the biomechanics of human joints; for educating and mentoring engineering students; for broad and critical leadership of the nascent bioengineering profession; and for

service to ASME and other professional societies.

HONORARY MEMBER



Warren R. DeVries, Ph.D., Fellow
University of Maryland-Baltimore County

For distinctive contributions to engineering education and research as a professor; for dedication to advancing the frontiers of discovery and innovation through public service; and for striving to advance the recognition of engineering's contributions to humankind through

leadership in professional societies.

HONORARY MEMBER



Robert E. Nickell, Ph.D., Fellow
Consultant, Applied Science & Technology

For significant contributions to the development of finite element methods for assessing material fatigue in nuclear reactor pressure vessels and piping, and the development of detonation chambers for the disposal of chemical weapons.

HONORARY MEMBER



Pol D. Spanos, Ph.D., Fellow
Rice University

For seminal contributions to the dynamic analysis and design of diverse mechanical systems; for effective pedagogies that have advanced engineering education; and for achievements resulting from a resolute commitment to societal improvement through engineering innovation.

KATE GLEASON AWARD



Ursula M. Burns
Xerox Corporation

For outstanding engineering and business leadership, and a distinguished career culminating in achieving the distinction of being the first black woman to lead a Fortune 100 company.

MELVIN R. GREEN CODES & STANDARDS MEDAL



James W. Coaker, Fellow
Coaker & Co., PC

For outstanding contributions in promoting the acceptance of ASME standards worldwide through personal engagement with key stakeholders, publications in industry journals, and the development and delivery of professional development programs; and for leadership in the development of performance standards that facilitate the incorporation of new technology and encourage innovative engineering solutions.

**NANCY DELOYE FITZROY AND
ROLAND V. FITZROY MEDAL**



Xiang Zhang, Ph.D., Fellow
University of California-Berkeley

For pioneering contributions in metamaterials and the creation of the first optical superlens to overcome the fundamental diffraction limit in imaging; and for the invention of plasmonic lithography technology to advance nanoscale manufacturing, which is important for microelectronics

and data storage applications.

RALPH COATS ROE MEDAL



**Adam J. Hart-Davis, Ph.D., Member
Writer**

For educating the public about science, technology, engineering, and mathematics by making STEM both inspirational and accessible in multiple media formats; and for celebrating engineers and the lasting impact of their contributions to the world.

**Honors Dinner, Sponsored by the Committee on
Honors**

7:30pm–10:30pm

Room 517C, 5th Level

Ticket: \$85

The Honors Dinner celebrates the achievements of the 2014 Honors Awardees.

TUESDAY, NOVEMBER 18

Congress Wide Plenary

8:00am–9:15am

(7:30am–8:00am, Continental breakfast served)

Room 517AB, 5th Level

Featured Presentation: Taking on the 'Impossible': The Sikorsky Innovations Story



Chris Van Buiten

Vice President, Sikorsky Innovations

Abstract: From its beginning, when founder Igor I. Sikorsky pioneered vertical flight, Sikorsky Aircraft has accepted and tackled some of the biggest engineering challenges.

This history starts with the VS-300, the world's first practical helicopter.

This pioneering spirit remains a

fundamental tenet within Sikorsky Innovations, where some of the most talented individuals in aerospace are tackling vertical flight's greatest challenges. In this talk we will discuss the history of innovation within the company, from its beginnings through today's work to create the industry's future. Chris Van Buiten will discuss X2 Technology™ and the push for speed, SARATM (Sikorsky Autonomous Research Aircraft), DARPA X-Plane, and the evolution of Autonomy and the development of an Intelligent Aircraft. We will also look at how Sikorsky supports others who take on the seemingly impossible, like Toronto's AeroVelo, the recent winners of the AHS/Igor I. Sikorsky Human Powered Vertical Flight Competition.

Biography: Chris Van Buiten is the Vice President of Sikorsky Innovations at Sikorsky Aircraft, where he runs the group responsible for developing and maturing next-generation technologies including X2, active rotor, and Autonomy, as well as defining next-generation products. Chris joined Sikorsky in 1989 where he has been engaged in the conceptual and preliminary design of Sikorsky products including the S-92® commercial helicopter, the CH-53K heavy lift helicopter, and the UH-60M BLACK HAWK helicopter, as well as several advanced concepts. He has served as Chief of Preliminary Design and Manager of Advanced Design and has led Sikorsky's Strategic Planning group. He also has served as a Technical Fellow for Advanced System Design. Chris was a Glenn L. Martin Aerospace Scholar at the University of Maryland, where he received a Bachelor of Science in Aerospace in 1989. He received a Master of Science in System Design and Management from the Massachusetts Institute of Technology and Sloan School of Business in 1999.

Invited Industry Presentation

1:00pm–1:45pm
Room 510D

“Extension of the Natural Gas Envelope on Rolls-Royce Industrial Engines and Development of the Industrial Trent DLE”



Brian Nolan
Chief Engineer of Engine Development Programs, Rolls-Royce Energy

In order to allow their successful operation on gas fuels with high inert content, Rolls-Royce takes a specific approach to design, develop and verify improvements in the capability of the industrial Trent and RB211 Gas Turbines. Brian Nolan will share the latest developments of the industrial

Trent Dry Low Emissions gas turbine with focus on the technical challenges and solutions during the product maturity program.

Biography: Brian qualified with a masters degree in mechanical engineering from the University of Wales, Cardiff in 1998 and joined Rolls-Royce Energy UK on their graduate trainee scheme. Brian spent 3 years with Rolls-Royce Industrial Power Systems as a project engineer working on RB211 and Trent EPC projects being undertaken in Europe and South America. In 2001, Brian moved to Montreal, Canada, into the role of development engineer in the industrial RB211 gas generator in-service support team. In 2004 he was assigned as Team Leader of the industrial Avon 200 technology upgrade programme. After completing that programme in 2006, Brian was assigned assistant chief engineer on the RB211 engine. In 2011 he took the position of Chief Engineer on the RB211 engine. In 2012, Brian became Chief Engineer of Rolls-Royce Energy engine development programs. As Chief Engineer of engine development programs, he is accountable for the execution of the gas generator scope of Rolls-Royce Energy’s New Products. His role is to ensure that the standardized gas turbine product will be safe and effective, meeting all business requirements. His first-line includes the Whole Enterprise Definition team, providing engineering leadership on the major functional disciplines and several Work Package Owners, responsible for technical project management.

ME/MET Department Heads Professional Development Workshop

9:00am–10:30am
Room: 511D

NSF Advance Workshop: Increasing Women Faculty in ME Careers

10:30am–12:00pm
Room: 511D

NSF Engineering Information Session (CMMI, CBET, & IIP)

1:00pm–2:30pm
Room: 515C

This session will present an opportunity for NSF stakeholders to learn about the Foundation and interactively discuss pressing issues with representatives from the NSF Directorate for Engineering (NSF/ENG). Representatives will present a brief overview of NSF and highlight ongoing initiatives within the NSF Directorate for Engineering and their respective divisions. Following their short presentation, they will lead an extended discussion with session attendees on a wide array of topics presently facing NSF/ENG. Topics for discussion may include managing the number of proposal submissions, assessment and evaluation of NSF- funded research programs, and methods to support small-team and interdisciplinary research. An overarching goal of the session will be to discuss ways in which the ASME community and NSF/ENG can work together to strengthen the broader mechanical engineering community.



George Hazelrigg
Acting Division Director
Division of Civil, Mechanical and
Manufacturing Innovation (CMMI)

Speaker Biography: George Hazelrigg has been a program manager and deputy division director at NSF for over 30 years, he has administered to the review of over 5,000 proposals and has run several hundred panels. He

has provided numerous such workshops over the past 15 years and is known for his practical advice on proposal writing.

Brief Division Description: CMMI supports fundamental research and education directed at advances in civil, mechanical, industrial, and manufacturing engineering and materials design, with an additional focus on reducing risks and damage from earthquakes and other natural and technological hazards. These investments are leading to advances that promote the global competitiveness of the nation's manufacturing sector, enhance the sustainability and resiliency of the nation's civil infrastructure, and improve the economics of the nation's health care system.



Ruey-Hung Chen
Program Director, Combustion, Fire,
and Plasma Systems
Program Director (Acting), Thermal
Transport Processes
Division of Chemical, Bioengineering,
Environmental, and Transport Systems
(CBET)

Speaker Biography: Ruey-Hung Chen has been the Program Director for

the Combustion and Fire Systems Program since 2012 and is also the acting Program Director for the Thermal Transport Processes Program; both programs are within the Chemical, Bioengineering, Environmental, and Transport (CBET) Division at NSF. Chen is on an Intergovernmental Personnel Act (IPA) assignment from University of Central Florida's Department of Mechanical and Aerospace Engineering, where he has been a full-time professor since 2004. In addition to his core program functions, he works in collaboration with other federal agencies for co-funding opportunities, project reviews, and workshops.

Brief Division Description: CBET supports innovative research and education in the fields of chemical engineering, biotechnology, bioengineering, and environmental engineering, and in areas that involve the transformation and/or transport of matter and energy by chemical, thermal, or mechanical means. These research investments lead to technologies that can improve environmental conditions, enable reliable and sustainable sources of energy, and create a dependable and resilient national infrastructure. This infrastructure will consist of clean and reliable sources of municipal and drinking water, transportation, information technologies, health-related products, and other areas that impact our lives.



Steven Konsek
Program Director, Small Business
Innovative Research
Division of Industrial Innovation and
Partnerships (IIP)

Speaker Biography: Steven Konsek joined the National Science Foundation in September 2012 as a Program Director in the Small Business Innovation Research

program. Prior to joining the NSF, he was the Chief Technology Officer at Illumitex, a venture-backed company developing light emitting diode chips, packages and fixtures for general illumination. He previously served as Chief of Technical Staff at Glo, recognized as one of Europe's top LED start-ups. Prior to Glo, he was the Director of Device R&D at Nantero, a memory start-up. Throughout his career, Konsek has developed innovative, game-changing technologies across a range of semiconductor applications. He has a PhD in Physics from the University of Washington and a BS in Mathematics from Purdue University. He holds numerous patents and publications in LEDs, memory, process integration, and nanoscale devices. At the National Science Foundation, he leads the semiconductors and photonics portfolio in the NSF seed funding program for start-ups and small business.

Brief Division Description: IIP serves the entire National Science Foundation by fostering partnerships to advance technological innovation and plays an important role in the public-private innovation partnership enterprise. IIP seeks to successfully invest in science and engineering research across all disciplines that have the potential for high impact in meeting national and societal needs. To achieve this goal, IIP focuses on leveraging federal, small business, industrial, university, state and community college resources.

NSF Research Program Development Workshop

3:00pm–5:30pm

Room: 515C



George Hazelrigg
*Acting Division Director
 Division of Civil, Mechanical and
 Manufacturing Innovation (CMMI)
 Directorate for Engineering
 National Science Foundation*

This workshop will cover the fundamentals of formulating and funding an academic research program. It will focus largely on

proposal writing as a means of funding the program and provide guidelines for effective proposal writing. The workshop will also touch on such important topics as ethics and mechanisms for getting involved in your research community.

The workshop presenter is Dr. George A. Hazelrigg. George has been a program manager and deputy division director at NSF for over 30 years, he has administered to the review of over 5,000 proposals and has run several hundred panels. He has provided numerous such workshops over the past 15 years and is known for his practical advice on proposal writing.

Heat Transfer Division Awards Luncheon, Sponsored by the Heat Transfer Division

11:00am–1:00pm

Room: 517C

Ticket: \$40

Micro- & Nanotechnology Society Wide Forum

12:30–4:00pm

Exhibit Hall, Room 210, 2nd Level

12:30pm–4:00pm

Tuesday, November 18

Poster Setup	11:00am–12:30pm
General Viewing/Judging	12:30pm–3:00pm
Awards	3:00pm–4:00pm

Sponsored by the ASME Nanotechnology Institute

Micro- and nanoscale phenomena and processes are widely explored across many ASME divisions to create new applications and to improve existing engineering systems. This forum seeks to bring together ASME members and researchers from academia and industry with a common focus on micro- and nanotechnology. Please join us in discovering small-scale innovation making a large impact.

Best Poster Awards to be presented.

Forum Organizing Leadership
Ronggui Yang, Chair, University of Colorado
Samit Roy, University of Alabama
Xiaobo Yin, University of Colorado
Stuart Williams, Past Chair, University of Louisville

Additional Sponsors:
 National Science Foundation
 ASME Nanotechnology Institute
 ASME NanoEngineering Council: NanoEngineering for Energy and Sustainability (NEES) and NanoEngineering for Medicine and Biology (NEMB) Steering Committees
 ASME Applied Mechanics Division
 ASME Electronic and Photonic Packaging Division
 ASME Heat Transfer Division
 ASME Microelectromechanical Systems Division

Guest Luncheon Sponsored by the ASME Auxiliary

1:00pm–3:00pm

Room: St. Jacques (Westin Montreal)

Ticket: \$40

The ASME Auxiliary welcomes ASME members to an afternoon of great food and refreshments at its semi-annual Guest Luncheon.

Symposium for New and Prospective Faculty: “Tips for Faculty Job Search, Promotion, and Tenure.” Sponsored by the Mechanical Engineering Department Heads Committee

1:00pm–3:00pm

Room: 511D

The target audience is new and prospective faculty, including graduate students and those from research labs and industry. Department heads and early career faculty will discuss tips for tenure and promotion in teaching, service/outreach, and scholarship at institutions that focus on both research and teaching. Department heads, deans, and faculty will also provide tips on obtaining research funding and securing a faculty position. Each talk has been scheduled with sufficient time for Q&A and discussion.

Calvin W. Rice Lecture**1:00pm–2:30pm****Room: 520E*****A New Silk Road: Evolution and Migration of Electronic and Photonic Packaging Technologies From the West to the East*****Shi-Wei Ricky Lee***Professor, Hong Kong University of Science & Technology*

Ricky Lee received his BSc and MSc degrees from National Taiwan University and Virginia Polytechnic Institute & State University, respectively. In 1992, he graduated from Purdue University with a PhD degree in Aeronautical & Astronautical

Engineering. After one year of post-doctoral research at Purdue, he joined the Hong Kong University of Science & Technology (HKUST). During his career of tenure-track faculty at HKUST, Dr Lee once was on secondment to serve as Chief Technology Officer of Nano & Advanced Materials Institute (NAMI) for two and a half years. Currently Dr Lee is Professor of Mechanical and Aerospace Engineering and Director of Center for Advanced Microsystems Packaging (CAMP) at HKUST. He also has concurrent appointments as Associate Dean of Fok Ying Tung Graduate School, Director of HKUST Shenzhen Research Institute, General Manager of HKUST R and D Corporation (Shenzhen) Limited, and Director of HKUST LED-FPD Technology R&D Center at Foshan, Guangdong, China. Dr Lee has been focusing his research on the development of packaging and assembly technologies for electronics and optoelectronics. The topics of his R&D interests include wafer level packaging and 3D IC integration, through silicon vias (TSV) and high density interconnects, LED packaging for solid-state lighting, lead-free soldering and reliability analysis. The research outcomes of Dr Lee's group have been documented in numerous technical papers in international journals and conference proceedings. He also co-authored three books and nine book chapters. Due to his technical contributions, Dr Lee received many honors and awards over the years. In addition to being the recipient of nine best/outstanding paper awards and three major professional society awards, Dr Lee is Fellow of IEEE, ASME, IMAPS, and Institute of Physics (UK). He is also an IEEE CPMT Distinguished Lecturer and the Junior Past-President of IEEE CPMT Society.

Rayleigh Lecture**3:00pm–4:30pm****Room: 523A*****Going Underwater With Acoustic Resonators and Waveguides*****Mardi Hastings***Georgia Institute of Technology*

Abstract: Marine animals depend on sound for communication, navigation, predator avoidance, and prey detection. Conduction of vibration and sound between and among solids, liquids, and gases within the bodies of marine animals underlies their abilities to hear, vocalize, and successfully navigate underwater even while

inherent acoustic coupling with their surroundings makes them especially vulnerable to adverse effects caused by excessive or prolonged sound exposure from anthropogenic sources. Thus, the rise in underwater acoustic energy associated with increasing human activity in the ocean has potential to impact their lives and the larger marine environment. The mechanical building blocks for sound reception and production in underwater animals are truly remarkable biological acoustic resonators and waveguides, which span the frequency range from infrasound to ultrasound. Rayleigh originally provided the foundation for recognizing, understanding, and mathematically modeling these fundamental mechanisms in the second edition of *The Theory of Sound*, an integration of the state-of-knowledge of acoustics in the late 19th century. Now the challenge of the 21st century is accurately combining complicated underwater source, path, and animal receiver models to predict sound exposure and its effects on multiple marine species so that effective mitigation can be developed and implemented to protect the ocean environment.

Biography: Dr. Mardi Hastings received her BSME and MSME from The Ohio State University and then worked in industry over five years prior to returning to graduate school at Georgia Tech, where she received a Ph.D. in March 1987. She stayed on at Georgia Tech as an Assistant Professor and then served two years on the technical staff at AT&T Bell Labs before joining the faculty of Ohio State's Mechanical Engineering Department in 1990. In 2003 she became a program manager at the Office of Naval Research, where she developed international research programs on the biological impacts of underwater sound, biosonar, and passive acoustic monitoring of marine mammals. She worked over three years as a Senior Scientist in Environmental Acoustics at Penn State's Applied Research

Lab prior to returning to Georgia Tech in 2010. Dr. Hastings has studied the interaction of sound with biological systems since 1984. During the last 15 years her research has focused primarily on effects of anthropogenic sound in the marine environment. She has advised 35 graduate students, published more than 65 technical articles, and co-authored the book, *Principles of Marine Bioacoustics* (Springer, 2008). She served on the National Academy of Sciences Study Panel on Potential Impacts of Ambient Noise on Marine Mammals (2001–2002), the Barotrauma Blue Ribbon Panel for the State of California (2007), and has received numerous awards including a 1988 Presidential Young Investigator award from the National Science Foundation, a 2005 Environmental Excellence Award from the U.S. Federal Highway Administration for her work on the effects of pile driving in San Francisco Bay, and the 2011 Per Bruel Gold Medal for Noise Control and Acoustics from ASME. Dr. Hastings is a Fellow and past president of the Acoustical Society of America, former member of the Board of Directors of the Institute of Noise Control Engineering, and Past Chair of the ASME Noise Control and Acoustics Division.

Noise Control and Acoustics Division Wine & Cheese Reception. Sponsored by the Noise Control and Acoustics Division

**4:30pm–6:30pm
Room: 511C**

**Women in Engineering Reception
5:00pm–6:30pm
Room: 511A**

Sponsored by the Diversity & Inclusion Strategy Committee, the Petroleum Division of the TEC Sector and the Women in Engineering Community

The reception provides a focal point at the conference for a gathering of women from the wide range of ASME activity for networking and a bit of casual relaxation at the end of a conference day. The event is open to all ASME women engineers/engineering students.

**Koiter Lecture
5:00pm–6:15pm
Room: 510D**

Peeling of Heterogeneous Adhesive Tapes



Guruswami Ravichandran
California Institute of Technology

Abstract: Peeling is a ubiquitous process, which is important to many applications in engineering and biology. The peeling of homogeneous elastic tape from a rigid substrate has been studied widely. While there is a good understanding of the homogenized behavior of

heterogeneous materials concerning properties such as the overall elastic moduli that are characterized by a variational principle, much remains unknown concerning those properties that are characterized by evolutionary processes such as fracture. This talk will discuss the process of peeling a heterogeneous adhesive tape from a rigid substrate as a case study to demonstrate the complexities that can arise in this situation. Specifically, it is shown through experimentation and theoretical analysis that one can dramatically enhance the overall adhesive strength by patterning the elastic modulus of the tape. It is also shown that by patterning the adhesive, asymmetry can be induced where the force needed to peel the membrane depends not only on the direction but also the sense of the peel. Remarkably, these modifications in peeling strength come from variations in the energy associated with bending of the tape near the peeling front, which is negligible compared to the overall energy in the system. This illustrates that in evolutionary processes, perturbations with apparently negligible energy can have an anomalously large macroscopic effect. The talk will conclude with broader lessons for other phenomena including fracture, dislocations, phase boundaries, and wetting fronts.

THE WARNER T. KOITER MEDAL was established in 1996 to recognize distinguished contributions to the field of solid mechanics with special emphasis on the effective blending of theoretical and applied elements, and on a high degree of leadership in the international solid mechanics community. The medal honors the late Dr. Warner T. Koiter (1914–1997), world-renowned authority in the field of solid mechanics, and commemorates his vast contributions as research engineer and teacher. The medal was funded by the Delft University of Technology, Netherlands.

Biography: Guruswami (Ravi) Ravichandran is John E. Goode, Jr. Professor of Aerospace and Professor of Mechanical Engineering, and Director of the Graduate Aerospace Laboratories (GALCIT) at the California Institute of Technology. He received his B.E. (Honors) in Mechanical Engineering from University of Madras, Sc.M. in Engineering and Applied Mathematics, and Ph.D. in Solid Mechanics and Structures from Brown University. He is a member of the European Academy of Sciences and Arts and the International Academy of Engineering. He is a Fellow of American Society of Mechanical Engineers (ASME), Society for Experimental Mechanics (SEM), and American Academy of Mechanics (AAM). He received Doctor honoris causa from Paul Verlaine University and Chevalier de l'ordre des Palmes Academiques from the Republic of France. His awards include A.C. Eringen Medal from Society of Engineering Science, Charles Russ Richards Memorial Award from Pi Tau Sigma and ASME, and W.M. Murray Lecture Award from SEM. His research interests are in mechanics of materials, particularly deformation, damage and failure, micromechanics, active materials, biomaterials, and experimental methods.

Fluids Engineering Division Reception. Sponsored by the Fluids Engineering Executive Committee

6:30pm–8:30pm

Room: 511B

Applied Mechanics Division Honors & Awards Banquet. Sponsored by Applied Mechanics Division

6:30pm–9:00pm

Room: 517C

Tickets: \$90

The evening's events will include honoring:

Hughes Young Investigator Award: Katia Bertoldi and Ryan S. Elliott

Belytschko Applied Mechanics Award: Glaucio Paulino

Caughey Dynamics Award: Alexander F. Vakakis

Drucker Medal: Lallit Anand

Koiter Medal: Guruswami Ravichandran

Timoshenko Medal: Robert M. McMeeking

Past AMD Chair: Lawrence Bergman

Electronic and Photonic Packaging Division Wine and Cheese Reception. Sponsored by the Electronics and Photonics Packaging Division

7:00pm–8:00pm

Room: 515C

Allan Kraus Thermal Management Medal

THE ALLAN KRAUS THERMAL MANAGEMENT MEDAL, established in 2009, recognizes individuals who have demonstrated outstanding achievements in thermal management of electronic systems and their commitment to the field of thermal science and engineering.



Peter Emile Raad

Conferral at the Electronic and Photonic Packaging Division Reception, 2014 International Mechanical Engineering Congress and Exposition

Peter Emile Raad, P.E., Ph.D., professor of mechanical engineering and Linda Wertheimer Hart professor, Southern Methodist University, Dallas,

for innovative research in deep-submicron thermal metrology; for determining 3-D temperature fields in electronic devices using 2-D thermal measurements; for exemplary teaching and mentoring; and for leadership in incubating cross-disciplinary research and educational initiatives at the intersection of industry and academia.

Dr. Raad joined the faculty at Southern Methodist University (SMU), Dallas, in 1986. He currently holds the Linda Wertheimer Hart professorship and is a professor of mechanical engineering. In 2000 Raad founded the Linda and Mitch Hart eCenter, a universitywide center dedicated to helping business and society address the intended and unintended consequences of interactive network technologies, particularly the Internet. In 2002 he founded The Guildhall at SMU, a novel, industry–university, cross-disciplinary graduate program designed to educate and train future practitioners and innovators in the fast-growing field of digital game development. He served as director of the Hart eCenter and executive director of The Guildhall at SMU until May 2012. Previously he served as the associate dean of the SMU School of Engineering. Raad has received over \$2.5 million in funding support for his research in tsunami mitigation and in metrology of submicron electronics. In 2006 he founded TMX Scientific to innovate and commercialize deep submicron thermal measurement systems and ultrafast thermal computational engines. He has published more than 50 journal articles, and given more than 100 conference and invited talks. He holds U.S. and international patents in thermal metrology and computational characterization of multiscale integrated circuits. An ASME Fellow, Raad served as ASME Student Section advisor at SMU (1990-94) and chair of the College Relations Committee for the North Texas Section (1995-2006). He was lead organizer (1995-2006) for the Forum on Advances in Free Surface and Interface Fluid Dynamics, initially held

at the International Mechanical Engineering Congress and Exposition and subsequently held at the Fluids Engineering Division Summer Meeting. Raad was technical associate editor (1999-2002) for the Journal of Fluids Engineering; vice chair of the ASME Coordinating Group on Computational Fluid Dynamics (2001-02); and chair of the Technical Committee on Computational Fluid Dynamics (2003-04). He was honored as the North Texas Section Engineer of the Year (1999-2000). Raad is a senior member of the IEEE. He is also a member of the American Physical Society; Sigma Xi, the Scientific Research Society; and Tau Beta Pi, the Engineering Honor Society. His honors include SMU's Outstanding Graduate Faculty Award (four times) and Outstanding Undergraduate Faculty Award (twice); the Harvey Rosten Award for Excellence in the Physical Design of Electronics (2006); and inclusion among Next-Gen's Top 25 People of 2007 (most influential in the video gaming industry). Raad earned three degrees in mechanical engineering from the University of Tennessee, Knoxville: his bachelor's degree, with honors, in 1980; and his master's and Ph.D. (thermal sciences) in 1981 and 1986, respectively. He is a registered professional engineer in Texas.

WEDNESDAY, NOVEMBER 19

Congress Wide Plenary

8:00am–9:15am

(7:30am–8:00am, Continental breakfast served)

Room 517AB, 5th Level

Featured Presentation: Testing the Future of Flight—Boeing's ecoDemonstrator Program



Dennis O'Donoghue
*Vice President,
 Boeing Test & Evaluation*

Abstract: The ecoDemonstrator Program is aimed at accelerating innovation and is a key part of Boeing's commitment toward a more sustainable future. The ecoDemonstrator flight test program speeds maturity of new technologies,

methods, materials, and product life-cycle environmentally progressive solutions from R&D to implementation faster than ever before. By proving these environmentally progressive technologies early in their development cycle, key lessons are learned through flight testing, which leads to rapid implementation for new and existing airplane applications. The technologies selected for flight test acceleration span the technology maturity, ranging from basic research on flow physics to promising enablers, such as clean energy sources

like fuel cells for future generations of jetliners, to technologies mature enough to be implemented on our next product. An example of the latter is the 737 MAX's new natural laminar flow winglets, which improve fuel efficiency. This technology implementation was accelerated by the ecoDemonstrator 757 Flight Test Airplane in 2012, which validated the winglet's build concept and performance benefit. This learning-by-doing approach on the ecoDemonstrator Program provides a constant stream of technologies that will be introduced into the fleet, promising cleaner, quieter, and more fuel-efficient airplanes...engineering a better world.

Biography: As vice president of Boeing Test & Evaluation, Dennis O'Donoghue leads an organization of more than 6,500 engineers, pilots, mechanics, and technicians who are responsible for validation and verification of all Boeing products, including commercial airplanes, rotorcraft, unmanned aircraft, tankers, fighters, airlifters, satellites, and network-centric systems. He joined Boeing in 1996 and played an integral part in the design, development, and testing of new products; first as the lead test pilot on the Joint Strike Fighter Concept Demonstrator Aircraft program and then as the deputy project pilot for the Sonic Cruiser and 7E7/787 programs. In 2004, O'Donoghue became chief pilot of Production Test Operations before briefly leaving Boeing in 2005 to serve as director of Flight Operations and chief test pilot of Eclipse Aviation Corporation's Very Light Jet program. He returned in 2006 as vice president of Flight Operations for Commercial Airplanes and progressed through positions of increasing responsibility before assuming his current responsibilities in 2009. Previously, O'Donoghue was a NASA research test pilot at Lewis Research Center and also served as a U.S. Marine Corps fighter pilot and test pilot and as a pilot in the U.S. Air Force Reserve. He commanded the 728th Airlift Squadron and the 446 Airlift Wing at McChord Air Force Base and retired at the rank of colonel. O'Donoghue has logged more than 6,000 hours in 81 types of fixed- and rotary-wing vehicles. He holds type ratings in the B 737, B-757, B-767, B-777, B-787, DC-9, G-159, L-300, L 382, NH-T38, T-33, and AV L39.

Invited Industry Presentation

1:00pm–1:45pm

Room 510D

“Trends of the 21st Century in Aero Engines”



Keith Morgan

*Engineering Executive Director
Systems Organization
Pratt & Whitney Canada*

Education: Bachelor’s degree in Mechanical Engineering from Cambridge University

Career: Keith joined PWC in January 1986, and worked in the Performance Department. He transferred to

the Projects group in December 1989, becoming a Project Manager in 1993 (working on the PT6A engine family) and a Senior Project manager in 1997, working on the PW207 and subsequently the PW600 family of engines.

In January 2002, he led a new organization of Operability and Performance, becoming Director in November 2002

Since June 2010 Keith leads the engineering Systems organization, an inter-disciplinary group composing Advanced Performance, Concept Design, Development Performance, operability Analysis and Simulation, Fluid Systems, Thermal Management, Acoustics, Engine Structures and Dynamics, Rotor Dynamics and Reliability and Safety for all PWC products.

Materials Division Lectures and Reception. Sponsored by the Materials Division.

2:30pm–7:00pm

Room: 511E

The following awards and lectures will be presented:

Materials Division ORR Award Presentation

2:30pm–3:00pm

Unraveling the Physics of Size-Dependent Dislocation Mediated Plasticity



Jaafar A. El-Awady

Johns Hopkins University

Abstract: Size-affected dislocation mediated plasticity is important in a wide range of materials and technologies. Here, a generalized size-dependent dislocation-based model that predicts strength as a function of crystal/grain size and the dislocation density is developed.

Three-dimensional discrete dislocation dynamics simulations reveal the existence of a well-defined relationship between strength and dislocation microstructure at all length scales for both single crystals and polycrystalline materials. The results predict a transition from dislocation source strengthening to forest dominated strengthening at a size-dependent critical dislocation density. It is also shown that the Hall-Petch relationship can be physically interpreted by coupling with an appropriate kinetic equation of the evolution of the dislocation density in polycrystals. The model is shown to be in remarkable agreement with experiments. This work presents a micro-mechanistic framework to predict and interpret strength size-scale effects, and provides an avenue towards performing multiscale simulations without ad hoc assumptions.

Biography: Dr. Jaafar A. El-Awady is an Assistant Professor at the Department of Mechanical Engineering at Johns Hopkins University. He received his Ph.D. in aerospace engineering from the University of California, Los Angeles, and his master’s and bachelor’s degrees from the Aerospace Engineering Department at Cairo University. Prior to joining Johns Hopkins University El-Awady was a visiting scientist in the Materials and Manufacturing Directorate at the Air Force Research Laboratory in Dayton, Ohio. He is the recipient of the 2012 DARPA young faculty award, the 2008 Outstanding PhD in Aerospace Engineering award from UCLA, as well as several other awards. El-Awady’s research is in the area of Mechanics and Materials, with particular focus on multiscale methods to investigate the deformation mechanism in materials and their role in controlling damage accumulations and subsequent failure.

Materials Division Sia Nemat-Nasser Award Presentation

3:00pm–3:30pm

Materials Division Nadai Medal Award Presentation

3:30pm–4:00pm

Nadai Medal



L. Catherine Brinson

Conferral at the Materials Division Reception, 2014 International Mechanical Engineering Congress and Exposition

THE NADAI MEDAL was established in 1975 to recognize significant contributions and outstanding achievements which broaden the field of materials engineering.

L. Catherine Brinson, Ph.D., Jerome B. Cohen professor, Northwestern University (Evanston, Ill.), *for significant contributions to the synthesis and characterization of polymer nanocomposites through research that has provided a fundamental understanding of the interphase and how nanoreinforcements affect polymer behavior, thus shedding light on material design for industry; and for educational contributions and service to the engineering profession.* Dr. Brinson is currently the Jerome B. Cohen professor of engineering at Northwestern University (Evanston, Ill.) with appointments in mechanical engineering, and materials science and engineering. She joined the faculty at Northwestern in 1992 following postdoctoral research at the DLR (Deutsches Zentrum für Luft- und Raumfahrt), Germany's aeronautics and space research center. Her current research involves investigations into nanoconfinement on local polymer mechanical behavior, characterization of nanoparticle reinforced polymers, the phase transformation response of shape memory alloys, nano and microscale response of biomaterials, and materials genome informatics research. Investigations span the range of molecular interactions, micromechanics and macroscale behavior. Brinson served as a member of the Institute for Defense Analysis' Defense Science Study Group, served two terms on The National Academies' National Materials Advisory Board and chaired two National Research Council studies. She has authored/co-authored more than 120 journal articles and co-authored one book. Since 2004 she has been serving on the editorial boards of *Advanced Engineering Materials* and *Mechanics of Advanced Materials and Structures*. An ASME Fellow, Brinson has been a member of the Computational Mechanics Committee, and she served as lead organizer of 2013 International Mechanical Engineering Leadership Summit. She was a member of the ASME Department Head Executive

Board (2011-13); co-organizer of various symposia (between 1994 and 2005) at ASME conferences; and associate editor of the *Journal of Engineering Materials and Technology* (1997-2003) and co-editor of a special volume of the journal for participants in the 1997 Symposium on Characterization and Modeling of Polymeric Material Systems at the Joint ASME/ASCE (American Society of Civil Engineers)/SES (Society of Engineering Science) Summer Meeting. She received the Applied Mechanics Division's Tom J.R. Hughes Young Investigator Award in 2003. Brinson is also a Fellow of the SES and the American Academy of Mechanics; and a member of TMS—The Minerals, Metals and Materials Society, the Society for Experimental Mechanics, the American Society for Engineering Education and the American Association of University Women. She has received a number of awards including a Friedrich Wilhelm Bessel Research Award (2006-07) from the Alexander von Humboldt Foundation and a National Science Foundation CAREER Award (1995-2000). Brinson received her bachelor's degree in engineering science and mechanics from Virginia Polytechnic Institute and State University, Blacksburg, in 1985. She earned her master's degree and Ph.D. in applied mechanics from the California Institute of Technology, Pasadena, in 1986 and 1990, respectively.

Advanced Energy Systems Division Reception. Sponsored by the Advanced Energy Systems Division

5:00pm–7:00pm

Room: 516B

THURSDAY, NOVEMBER 20

Congress Wide Plenary

12:00pm–12:45pm

(11:15am–12:00pm, lunch is served)

Room: 517AB

Featured Presentation: The Next Energy Storage Revolution—Cheap, Clean, Solid State Devices



Ann Marie Sastry

Co-Founder and CEO; Sakti3

Abstract: Energy storage technologies affect every facet of our lives. From today's consumer electronics to tomorrow's electric vehicles and efficient, flexible grids with integrated renewables, energy storage hardware is an essential enabler. For most of the last 2,000 years of development,

batteries have comprised combinations of solids and liquids. Fully solid state battery technology offers a very different development path enabling breakthrough performance

and safety, but has been relegated to the realm of R&D due to intrinsically high cost and unscalable manufacturing processes. Recently, use of advanced simulation in concert with processing approaches that matured in other industries has yielded cells of high performance. These massively replicable, cheap, and reliable production methods enable cell manufacturing in a single, unified line and produce product that is ready to ship. Our vision for technology deployment and future product development using solid state processing of energy storage technology and integration into existing and new infrastructures of these revolutionary products is described.

Biography: Ann Marie Sastry brings over 25 years of technical and leadership experience at the University of Michigan, National Laboratories, and public and private sector corporations to her role at Sakti3. She has co-authored over 80 scientific publications in the world's top journals and delivered over 100 invited lectures at research, government, and private institutions globally. Sastry has co-authored over 70 awarded and filed patents. Her teams' industrial work has ranged from polymer processing (DuPont) to controls, battery design, mechanical design, and statistics. Prior to leading Sakti3, Sastry was the Arthur F. Thurnau Professor of Engineering at UM. Tenured and promoted early, she founded and led two research centers in batteries and bioscience, and a global graduate program in energy systems engineering. Her laboratory originated the technical work that underpins Sakti3 technology and was continuously funded by the DOE for over 17 years. She has received several of the highest technical honors in her field, including the 2011 ASME Frank Kreith Energy Award, 2007 ASME Gustus Larson Award, and the NSF's PECASE (1997). She holds a Ph.D. and MS from Cornell University, and a BS from the University of Delaware, all in Mechanical Engineering.

Invited Industry Presentation

1:00pm–1:45pm

Room 510D

“Bombardier Strategic Technology: The Future of Business and Commercial Aviation”



Mathieu Boisclair

Chief of Strategic Technology Program Office

The global market forecasts an expansion of the world commercial fleet from nearly 19,000 planes today to more than 35,000 airplanes by 2032. However, several elements can slow down significantly this prospective growth. Among them are the price of fuel,

crowding of the skies, concerns over the safety of the system with increased traffic, environmental impacts, such as noise and CO₂ emission, and security of air travel. The industry is addressing these challenges through collaborative research. A number of these can be alleviated by new engine and airframe technologies to reduce noise, CO₂ emission and fuel burn, the use of Satellite Navigation Management Systems for aircraft and automated security screening system for passengers. The presentation discusses Bombardier's contribution to airframe technology solutions, highlighting particular issues of the commercial and business jet markets, and will illustrate how technology insertions on the new Bombardier CSERIES helps improve the prospects of air travel.

Biography: Mathieu brings some 15 years' experience in technology and R&D management, innovation and entrepreneurship. Mathieu holds a bachelor's degree in electrical engineering and a master's degree in industrial engineering at Montreal's Ecole Polytechnique. He started his career with Ericsson (1997-1999), prior to becoming the co-founder and CEO of Nomad Logic (2000-2002) and Maetta Sciences (2003-2010). In 2010, Mathieu joined the Strategic Technology group of Bombardier, a central entity responsible for the Bombardier Aerospace Research & Technology Development program. He is also member of the board of Canada's Green Aviation Research and Development Network (GARDN) and member of the Mitacs Research Council responsible for providing scientific leadership and critical assessment of Mitacs programs.

Track 1: Advances in Aerospace Engineering

Session: 1-14-1, Plenary Session I

Monday, November 17, 9:45am–11:30am

Room: 516C

On the Geometrical Nonlinear Response of Sandwich Panels With a Compliant Core—A High-Order Approach

(IMECE2014-40373)



Yeoshua Frostig

Technion–Israel Institute of Technology

Abstract: Modern sandwich panels usually consist of two face sheets, made of metal or laminated composite and a compliant core – foam or low strength metallic, while classical sandwich panels use a metallic honeycomb that is infinitely stiff

in the vertical direction. The response of the two types of panel is totally different when the panels are subjected to localized effects, stiff regions; imperfections in the form of delamination at face-core interfaces as well as within the face sheets; thermal induced deformation with degrading mechanical properties and more. In the case of a panel with a stiff core, the two face sheets undergo similar displacements and the global bending response may be described through a couple formed in the face sheets. However, in the case of a compliant core, the two face sheets do not follow the same pattern of displacements thus leading to a bending response that consists of a couple in addition to localized bending moments in each of the face sheets. Please notice that these localized isolated bending moments become larger as the core becomes weaker, which may lead to extremely large bending stresses that may initiate failure. In order to clarify these localized effects, a variational based approach has been used denoted as the High-Order Sandwich Panel Theory (HSAPT), where the in-plane rigidity of the core is ignored and extension of the model, denoted as EHSAPT, where this rigidity is considered. The nonlinear geometrical response of sandwich panels with a compliant core in the presence of localized loads, debonding at face-core interfaces, and with face sheets and thermal induced deformations is described. The HSAPT formulation along with its extension is presented first. It is followed by the localized effects due to localized loads, in vicinity of stiff points and regions and in the vicinity of debonds, in face-core interfaces, and within face sheets. The buckling and postbuckling response that differ significantly from the classical postbuckling approaches is discussed next. In the last part, the thermal induced deformation combined

with external loads and cores with degrading mechanical properties is discussed. A typical PVC or PMI core, used for marine or transportation applications, degrades its mechanical properties as the temperatures are raised within the working range of temperatures, while the face sheets maintain their original rigidity. The situation worsens when in addition to the thermal loadings there are also mechanical ones. In general, the response for each type of loading may be linear or nonlinear but stable. But in the case of a combined loading scheme (i.e., thermomechanical loading), the response may shift from a stable one (which can be controlled by stress allowables) into an unstable one (which is associated with loss of stability in the form of buckling or a limit-point response). The buckling and the nonlinear response of some typical unidirectional sandwich panels that are fully bonded and delaminated for mechanical, thermal, and thermomechanical loading schemes is presented. The study discusses the effects of the thermal degradation of the mechanical properties on the nonlinear response. The various results demonstrate that, in the case of an unrestrained panel, the linear or nonlinear stable response shifts into a nonlinear unstable one when a thermomechanical loading scheme is applied and degrading temperature-dependent mechanical properties are involved. Finally, some results of the extended HSAPT are discussed and special finite element models are presented.

Biography: Yeoshua (Shuki) Frostig is a Professor of Structural Engineering at the Faculty of Civil Engineering at Technion–Israel Institute of Technology. He received his B.Sc., M.Sc., and D.Sc. from Technion, with expertise in structural engineering in the years 1975, 1977, and 1981, respectively. He did his postdoc at Georgia Institute of Technology with Prof. Simitsev in the Engineering, Mechanics and Materials (ESM) Department. Frostig worked as a research scientist at Israel Aircraft Industries (1985–1987). He introduced the closed-form computational model for the analysis of sandwich panels with a compliant core that takes into account the flexibility of the core in the vertical direction. He has collaborated intensively with a research group at Aalborg University at the Institute of Mechanical of Engineering, Denmark (1995–2010). The collaboration included sabbaticals as a visiting professor, mutual research, student supervision, and special graduate and Ph.D. courses on sandwich structures within the framework of the high-order sandwich panel theory. Recently, he is in collaboration with a research group at Georgia Tech exploring the extended HSAPT model. He is an author of more than 100 papers with peer review and a very large number of conferences with presentations in the fields of mechanics, sandwich structures—linear and nonlinear static, dynamic, delamination, and thermal effects.

Track 1: Advances in Aerospace Engineering

Session: 1-14-2, Plenary Session II

Monday, November 17, 9:45am–11:30am

Room: 516C

Advances in Aerospace Morphing Structures With Shape Memory Alloy Actuators

(IMECE2014-40890)



Dimitris Lagoudas
Texas A&M University

Abstract: Advances in actuation materials development over the past two decades have led into the availability of solid state actuators undergoing reversible phase transformations with stable performance over a large span of actuation ranges. Various compositions

of intermetallic Shape Memory Alloys (SMA) have emerged as actuator materials capable of providing large deformations at high actuation loads with reasonable reliability and performance. This presentation will provide an overview of recent advances in the development of SMA, including high temperature and magnetic SMA. Different research areas will be outlined including thermomechanical and actuation characterization, constitutive modeling, and numerical implementation using finite element analysis. The influence of cyclic reversible phase transformation on fracture and actuation fatigue will be discussed. Examples from SMA integration into morphing structures will be given, emphasizing design optimization approaches for maximum actuation performance. Finally, current challenges will be outlined and future directions for the use and integration of shape memory materials in smart structures will be proposed.

Biography: Dimitris C. Lagoudas is the holder of the John and Bea Slattery Chair in the Department of Aerospace Engineering with a joint appointment in the Materials Science and Engineering Department and is the Senior Associate Dean for Research at Texas A&M College of Engineering and a University Distinguished Professor. He serves the Texas A&M University System as the Associate Vice Chancellor for Engineering Research and Deputy Director of the Texas Engineering Experiment Station (TEES). His research team is recognized internationally in the area of modeling and characterization of shape memory materials. The models that his research group developed have been implemented into finite element analysis frameworks and utilized by industrial and governmental entities as well as academic institutions worldwide.

Track 2: Advanced Manufacturing

Session 2-17-1: Plenary Session

Tuesday, November 18, 9:45am–11:30am

Room: 513D

Low Pt Loading, Pt-Alloys, and Core-Shell Catalysts Manufacturing by Scalable Flame Base Process

(IMECE2014-40584)



Radenka Maric
University of Connecticut

Abstract: Catalytic materials are complex systems where the desired performance (i.e., activity, selectivity, and stability) depends on many factors, such as geometry, surface and bulk composition, defects, interactions with the support material, etc. Realizing fully functional and stable catalysts

requires an understanding of the structure and function of materials, and control over matter and energy at the atomic, molecular, and meso scales during the material synthesis process. Developing scalable fabrication processes that provide the necessary control of nanoparticle structure for enhanced activity presents significant techno-economic challenges for bringing alloys and core-shell nanoparticles to large-scale industrial catalytic applications. Core-shell and alloy nanoparticles of Pd, and Pd-Ru, Pt-Rh-SnO₂, and Pd supported on an amorphous carbon were synthesized, by a flame-based process called Reactive Spray Deposition Technology (RSDT), onto glassy carbon rotating disk electrodes and gas diffusion layers. With RSDT flame methods developed by Maric, solid nanoparticles are grown from the vapor phase. The vaporization, adsorption, and condensation mechanism makes RSDT effectively a layer-by-layer growth technique that can precisely deposit submonolayer to multilayer quantities of Pt and other metals and oxides onto different supports. This method employs fine temperature and gas-phase stoichiometry to encourage sequential nucleation of materials in order to achieve desired core-shell nanoparticle structures. In addition, a reducing atmosphere must be maintained through the quench and condensation steps so that the supports are not oxidized during synthesis. For scalable manufacturing, RSDT also provides adjustable process variables such as flame temperature, stoichiometry, residence time, and downstream quenching rates that couple with solvent and metal precursor concentrations to affect particle growth, annealing, and oxidation state.

Pharmaceutical Manufacturing: Mechanics of Compaction of Pharmaceutical Solids

(IMECE2014-39671)



Alberto Cuitiño
Rutgers University

Abstract: Solid pharmaceutical dosages are multicomponent heterogeneous systems manufactured to deliver active pharmaceutical ingredients (API) to patients. In particular, oral solid dosage (OSD) (such as tablets) is utilized in more than 80% of pharmaceutical

treatments. The main performance characteristic of OSD is the API release profile, which determines the rate at which the active ingredient becomes available. Since the key importance of these profiles, different strategies have been developed to adjust them to desired medical treatments, going from immediate release to controlled release, in which the active is released gradually and predictably over a 12-hour to 24-hour period. If these profiles are not properly tuned, ineffective or unsafe treatments arises due to an under or over dosage. Strategies for controlling the release profiles involve both manufacturing and materials. For example, freeze drying is used for fast-release OSD while surface modification and micro-encapsulation are utilized for controlled release.

The assessment of the drug dissolution profiles is a complex problem involving a number of competing and interacting factors, including penetration of the fluid into the OSD matrix, alteration of the matrix structure, API dissolution, and subsequent diffusion into an external medium. Several of these mechanisms are mediated by the external medium chemical conditions such as pH and physical conditions such as fluid flow. In addition, these processes are dependent on the internal structure of the solid, which is determined by the formation process conditions. such as compaction pressure and speed in tablets. Increasing the predictability window for dissolution and disintegration of heterogeneous solids in complex environments such as those encountered for in vivo conditions, requires mechanistic models that capture the dominant behaviors of each unit process, as well as simulation platforms that can incorporate and integrate these models and their interactions into coherent computational tools.

In this presentation, a predictive multiscale modeling and simulation of microstructure evolution during compaction of granular solids is discussed, including the development of predictive constitutive models of interparticle interactions that

account for high levels of confinement and a variety of physical mechanisms, as well as the development of concurrent multiscale strategies that combine a detailed description of the granular scale with the computational efficiency typical of continuum-level models. The predictions afforded by this methodology provide a new insight into the post jammed state of granular solids, which impacts manufacturing strategies for compaction and consolidation of powders.

Biography: Dr. Alberto Cuitiño, Professor and Chair of Mechanical and Aerospace Engineering at Rutgers, is currently the Site Director of the NSF Engineering Research Center for Structured Organic Particulate Systems, which brings together a cross-disciplinary team of engineers and scientists as well as industry leaders to improve the way pharmaceuticals, foods and agriculture products are manufactured. C-SOPS is advancing the scientific foundation for the optimal design pharmaceutical products with advanced functionality while developing the methodologies for their active control and manufacturing. Dr. Cuitiño received a Civil Engineering Diploma from the University of Buenos Aires, Argentina, in 1986, and a MS degree in Applied Mathematics and a Ph.D. degree in Solid Mechanics from Brown University in 1992 and 1994, respectively. His research interests include pharmaceutical manufacturing, material modeling and simulations, dislocation mechanics, fracture in metal single crystals, granular materials, mechanical behavior of solid foams and folding patterns in thin films. Dr. Cuitiño served as editor of *Mechanics* a publication of The American Academy of Mechanics and as subject editor for *Applied Mechanics of Latin American Applied Research*.

Track 3: Biomedical & Biotechnology Engineering

Session 3-1-1: Respiratory and Cardiovascular Advancement

Tuesday, November 18, 9:45am–11:30am

Room: 522B

The Dynamic Mechanical Function of the Lung as a Signature of Pulmonary Disease

(IMECE2014-40495)



Jason H.T. Bates
University of Vermont

Abstract: Respiration is an inherently dynamic and mechanical process, so the mechanical properties of the lung are critical determinants of its function. These properties can change significantly in a number of common pulmonary diseases, as is evident in measurements of the mechanical input impedance of the lungs. In

anesthetized animal models of pulmonary disease, lung impedance over the frequency range 1–20 Hz is well described by a mathematical model consisting of a single airway serving a homogeneously ventilated alveolar compartment comprised of tissue with a constant-phase impedance. However, interpreting the parameters of this simple model in physiological terms requires the use of much more complex anatomically based forward models of the lung. The results of forward and inverse computational modeling will be used to provide insights into the mechanistic bases of airway hyperresponsiveness, such as occurs in asthma. Recent measurements of impedance above 4 Hz in spontaneous breathing human asthmatics will also be interpreted in terms of a simple compartment model of heterogeneous ventilation throughout the lung.

Biography: Jason H.T. Bates received an honors B.Sc. in physics from Canterbury University, Christchurch, New Zealand in 1978, and a Ph.D. from the Department of Medicine at Otago University, Dunedin, New Zealand in 1981. After postdoctoral positions in Christchurch and then at McGill University in Montreal, he gained a faculty position at McGill in 1986, eventually rising to become a full professor of medicine and biomedical engineering. In 1999, he moved to the University of Vermont, Burlington, VT to join the Vermont Lung Center. From 2010 to 2014, he also served as the Interim Director of the School of Engineering at the University of Vermont. Dr. Bates was awarded the Doctor of Science degree by Canterbury University in 1994 and in 2002 was elected a Fellow of the American Institute for Medical and Biological Engineering. He

has published 240 journal papers and numerous other articles, as well as a book on inverse modeling in lung mechanics. Dr. Bates currently undertakes research in the areas of pulmonary mechanics, cardiac electrophysiology, and complex systems in biomedicine.

Mechanical Cardiovascular Assist Devices (IMECE2014-40496)



Said Jahanmir
Mitiheart

Abstract: According to the American Heart Association, nearly five million Americans have congestive heart failure (CHF) and more than half a million new cases are reported every year. CHF is a chronic condition in which at least one chamber of the heart is not pumping well enough to

meet the body's need. Heart failure presents an increasing public burden of morbidity and mortality even as the mortality from coronary artery disease and hypertension is decreasing. It is estimated that at least 40,000 of these patients are candidates for heart transplantation; however, only 2,200 donor hearts are made available each year. While effective pharmacologic therapies have improved outcomes for mild to moderate CHF, the need for mechanical circulatory support is well defined and growing. It is estimated that with fully implantable and wearable devices, at least 100,000 patients annually would benefit from this technology. Significant technological advances have been made in recent years in the design and development of implantable mechanical circulatory support devices. The objective of this presentation is to provide an overview of the status of these life-saving devices, particularly, the implantable left ventricular assist devices, or LVADs, that fall into two categories: pulsatile and rotary pumps. The pulsatile blood pumps are either pneumatic or mechanically driven. These devices often have complex mechanical systems with many moving components. The rotary blood pumps are simpler and provide either continuous centrifugal or axial flow. Some of the current designs, however, contain mechanical pivot bearing systems, which are the potential source of thrombogenicity within these pumps due to the flow into and around the highly stressed mechanical contacts. Therefore, recent attention has been focused on bearings to alleviate thrombus formation. The new LVADs use blood-lubricated hydrodynamic bearings or noncontact magnetic bearings. The new blood pumps with a magnetic suspension system have received considerable attention since such bearings remove the potential for wear and pump failure, and reduce the risk of thrombosis, thus ensuring long-term use for destination therapy. The mag lev blood pumps include both axial and centrifugal pumps. The presentation will include an overview of critical design issues with attention to fluid flow, biocompatibility, hemocompatibility, and other issues that must be addressed in every blood pump design.

Biography: Said Jahanmir is President and CEO of the MITiHeart Corporation, a subsidiary of Mohawk Innovative Technology, Inc. (MITi), where he serves as Vice President for Biotechnology and leads R&D efforts on implantable blood pumps, tribological coatings and high-speed micromachining. His pioneering research in tribology and machining of advanced materials is widely recognized in the scientific and engineering communities. He has published over 240 papers and reports related to machining of ceramics, mechanisms and mechanics of interfaces, wear and friction, boundary lubrication, and biotribology; and has given more than 300 lectures on these subjects. He has edited several books and conference proceedings on machining and tribology of advanced materials. He has been active in technical and administrative committees and boards in several engineering societies and has served in several advisory groups in the federal government and universities. He is a Fellow and Honorary Member of the American Society of Mechanical Engineers (ASME) and has served in various capacities, including Chair of the Research Committee on Tribology, Associate Editor of the *Journal of Tribology*, and Chair of the Tribology Division's Executive Committee. He served as ASME's Vice President for Research and Chair of the Board on Research and Technology Development. He also served as Technical Program Chair, General Chair, and Steering Committee Chair for International Mechanical Engineering Congress and Exposition. He has served on several ASME Presidential Task Forces and was elected and served a three-year term as ASME Governor. His awards include the ASME Mayo D. Hersey Award, the ASME Donald F. Wilcock Award, the Federal Laboratory Consortium Technology Transfer Award, the Society of Tribologists and Lubrication Engineers International Award, and the ASME Dedicated Service Award. He has been honored as the Community Hero by the Montgomery County Civic Federation for his contribution to local educational issues. He is listed in *Who's Who in America*, *Who's Who in Science and Engineering*, and *American Men and Women of Science*. He received his bachelor's degree in mechanical engineering, magna cum laude, at the University of Washington, and his master's and doctoral degrees in mechanical engineering at the Massachusetts Institute of Technology. He holds six U.S., Canadian, and European Patents.

Track 4: Dynamics, Vibration, and Control

Session 4-18-1: Plenary Session

Tuesday, November 18, 3:00pm–4:45pm

Room: 524A

Targeted Energy Transfer: Intentional Use of Strong Nonlinearity for Vibration and Shock Control

(IMECE2014-40623)



Lawrence Bergman

University of Illinois at Urbana-Champaign

Abstract: For the past fifteen years, our research group has been developing and applying the concept of Targeted Energy Transfer (TET) as an effective strategy for passively managing energy flow in dynamical systems subject to broadband

transient loading. The technology has been studied analytically, computationally, and experimentally in applications covering a range of scales from nano to macro. I will explain the principles behind TET, followed by presentation of results focused on several of these applications demonstrating the efficacy of the technology.

Biography: Professor Lawrence A. Bergman received the B.S. in Mechanical Engineering from Stevens Institute of Technology, and the M.S. in Civil Engineering, and Ph.D. in Applied Mechanics from Case Western Reserve University. Prior to graduate school, he was on the technical staff of TRW, Inc. and the Lord Corporation. His research is primarily in the areas of structural dynamics and control, nonlinear dynamics, applied stochastic processes, system identification, and computational methods. He is the author of more than 200 articles in archival journals and books, has co-authored one research monograph, edited or co-edited six volumes, and holds five United States patents and two provisional U.S. patents. He was the co-recipient of the 1983 State of the Art in Civil Engineering Award and the 1999 Norman Medal from the American Society of Civil Engineers, and the recipient of the 2001 Senior Research Prize in Computational Stochastic Mechanics from the International Association for Structural Safety and Reliability. He was also a co-recipient of the PE Publishing Award from the Institution of Mechanical Engineers (UK) for the best paper of 2008 ("Passive Non-linear Targeted Energy Transfer and its Applications to Vibration Absorption: A Review," *Journal of Multi-body Dynamics, Part K of the Proceedings of the IMechE*, Vol. 222, K2, pp. 77–134, 2008), and a co-recipient of the Thomas Bernard Hall Prize from the

Institution of Mechanical Engineers (UK) for an outstanding original communication dealing with invention, design, or research in Mechanical Engineering published during the previous year ("Current Efforts Towards a Nonlinear System Identification Methodology of Broad Applicability," *Journal of Mechanical Engineering Science, Part C of the Proceedings of the IMechE*, Vol. 225, pp. 2497–2515, 2011.) He served as editor-in-chief of the *ASME Journal of Vibration and Acoustics* from 2000 through 2004, and served on the editorial boards of the *Journal of Vibration and Control*, *Probabilistic Engineering Mechanics*, and *Shock and Vibration Digest*. He recently completed a one-year term as chair of the Executive Committee of the Applied Mechanics Division of ASME. Professor Bergman has been a faculty member at the University of Illinois at Urbana–Champaign since 1979, where he is a professor in the Department of Aerospace Engineering, an affiliate professor of the Departments of Civil and Environmental Engineering and of Mechanical Science and Engineering, and where he served as assistant dean of the College of Engineering during the 1996–1997 academic year. He is a Fellow of the American Society of Mechanical Engineers and an Associate Fellow of the American Institute of Aeronautics and Astronautics.

Track 4: Dynamics, Vibration, and Control

Session 4-18-2: Plenary Session

Tuesday, Wednesday, November 19, 1:00pm–2:45pm

Room: 520B

Dynamics of Intracellular Nano-Transport: A Treadmill for Biomolecular Machines

(IMECE2014-40624)



Bogdan I. Epureanu
University of Michigan

Abstract: How is chemical energy transformed into motion inside cells? How is intracellular motion involved in neural processes? How can the intracellular dynamics be interrogated and used as a marker for neurodegenerative diseases?

These questions interface mechanics, chemistry, nonlinear dynamics, and stochastic processes. Teams of molecules inside cells exploit chemical reactions to create mechanical stresses, which lead to motion. Such molecules are known as motor proteins. Kinesins are such proteins that transport various cellular cargoes against loads and facing obstacles. These proteins are currently characterized by a deconstructive approach where the motion of a single protein is examined in vitro in water in terms of its steady-state transport velocity corresponding

to a constant load. In reality, however, these proteins work in a fluid that is not water, they operate in teams, they often move along long tracks confined in space and exposed to obstacles, and their load is far from being constant. Modeling the nonlinear biodynamics of this collective transport is a significant challenge. In this talk we first discuss novel models for cooperative kinesin transport that bridge the gap between nano/pico length/time scales and macroscales through combined atomistic/continuum modeling and experiments. We further discuss the creation of a dynamic treadmill for motor proteins to actively interrogate kinesins about their properties. Not unlike treadmills are used for interrogating the body for cardiac deficiency, we explore a unique approach to actively interrogate the complex bio-nanotransport of groups of motor proteins. We discuss the implications of the interrogation approach, the quantitative models, and the results of our analysis on the future diagnosis of neurodegenerative diseases.

Biography: Bogdan I. Epureanu is a Professor of mechanical engineering at the University of Michigan. He received his Ph.D. in mechanical engineering from Duke University in 1999. His current research interests and activities blend theory and fundamental experiments in nonlinear dynamics, structural health monitoring, aeroelasticity, and computational dynamics, with applications relevant to biological systems, aerospace and automotive structures, and turbomachinery. Examples include creating novel mechano-chemical dynamic models of nanoscale intracellular transport processes, developing the next generation of highly sensitive structural health monitoring techniques, discovering novel methods for forecasting the nonlinear dynamics of complex systems, developing innovative reduced-order models of complex structures, and creating advanced system identification and control methodologies for complex structures and fluid-structural systems. Professor Epureanu has published more than 85 articles in archival journals and has made numerous presentations at conferences and universities. He is also an Associate Editor of the *ASME Journal of Vibration and Acoustics* and *AIAA Journal* and served as guest editor for several other journals. He organizes conferences/symposia and serves on several University and ASME technical committees. He has earned several national and international awards. Among his honors are the 2004 American Academy of Mechanics Junior Achievement Award, a NSF Career Award in 2004, the 2003 ASME/Pi Tau Sigma Gold Medal Award, the 2001 Young Innovator Award from Petro-Canada, the Society of Manufacturing Engineers' 2001 Best Paper Finalist Award, and he was the winner of Eaton Corporation's 1999 International Mechanical Design Contest. In 1998, Professor Epureanu received the A. M. Strickland Award from the Institution of Mechanical Engineers' Division of Manufacturing Industries. He was also awarded the 2005 Beer and Johnston Outstanding Mechanics Educator Award by the American Society for Engineering Education.

Track 5: Education and Globalization

Session 5-7-1: Problem Solving in Engineering Education, Research, and Practice (Session Dedicated to Professor Robert G. Jeffers)

Tuesday, November 18, 9:45am–11:30am

Room: 518B

Fostering Diversity in Engineering Education

(IMECE2014-38080)



Amir Faghri

University of Connecticut

Abstract: The future integrity of the American engineering workforce, and with it America's technological and economic preeminence, is threatened by an inadequate number of qualified graduates, with particular emphasis on diversity. This paper suggests that fostering greater diversity in

engineering education—making science and engineering degrees more attractive to U.S. women and underrepresented minorities—is one compelling avenue toward salvaging America's crumbling engineering primacy and economic vigor. Nurturing a new generation of engineers that more closely reflects society's diversity will reduce America's reliance on foreign talent. This paper will consider trends and barriers relating to underrepresented populations—ethnic minority populations as well as women—in the sciences and engineering in an effort to identify the root causes of, and means of combating, minority underrepresentation in those fields. We will discuss a case study related to a decade ago at the University of Connecticut School of Engineering, which has developed an integrated series of programs to address these concerns. Engineering educators are particularly concerned about low minority representation; that is, the numbers of female, African American, Hispanic, and Asian students at all degree levels. Of these four groups, the first three have long suffered, and continue to suffer, from underrepresentation in the engineering student population. Although women constitute more than half of the U.S. population, they consistently represent less than one-quarter of the engineering student population at all levels. African Americans, who constitute about 12.3% of the total population, and Hispanics, constituting about 12.5%, are similarly underrepresented. As students progress to higher degree levels, the rates of attrition are clearly higher for underrepresented minorities than for the rest of the engineering population. As evidenced by the lengthy list of initiatives and activities developed at the University of Connecticut to encourage the enrollment and academic success of women and underrepresented minorities in engineering, there is no

single solution. Underrepresentation is a complex problem with scholastic, social, and economic challenges. Programs and efforts must be initiated at all levels, starting with K–12 students and carrying the momentum through the B.S., M.S., and Ph.D. levels. The many groups and universities seeking to address these problems should coordinate efforts and eliminate duplication so as to maximize their effects. Through sustained collaboration between advocacy groups, academia, and industry, the entire culture of the engineering profession can be improved. In the end, the entire nation will benefit from the valuable perspectives that engineers from diverse backgrounds offer.

Track 7: Energy

Session 7-7-1: ASME NED – Plenary Session

Wednesday, November 19, 9:45am–11:30am

Room: 519B

BISON-MOOSE Simulation Framework

(IMECE2014-40077)



Richard Williamson

Idaho National Laboratory

Abstract: BISON is a modern finite element–based nuclear fuel performance code applicable to a variety of fuel forms including light water reactor fuel rods, TRISO particle fuel, and metallic rod and plate fuel. It solves the fully coupled equations of thermomechanics and species

diffusion for either 1D spherical, 2D axisymmetric, or 3D geometries. Models are included to describe important aspects of fuel behavior during irradiation, including temperature–dependent and burn-up–dependent thermal properties, fission product swelling, densification, thermal and irradiation creep, fracture, and fission gas production and release. For clad materials, models are available to capture plasticity, irradiation growth, and thermal and irradiation creep models. BISON also provides models to simulate gap heat transfer, mechanical contact, and the evolution of the gap/plenum pressure with changing plenum volume, gas temperature, and fission gas release.

Nuclear fuel performance modeling is an inherently multiphysics problem, with strong dependencies between all of the physics involved. BISON is based on Idaho National Laboratory's MOOSE simulation framework, which facilitates the scalable solution of coupled physics problems on massively parallel computing platforms. This is accomplished using the Jacobian-free Newton Krylov solver, which provides full coupling of all solution variables in the nonlinear solution

with minimal effort required on the part of the physics model developer.

This software framework also provides extensive support for coupling between models at various length scales. BISON provides a fully coupled multiscale fuel performance modeling capability by coupling to the mesoscale fuel performance code, MARMOT. BISON has also been coupled with reactor physics and thermal-hydraulic models as part of a full core simulation. BISON is currently being validated against a wide variety of integral light water reactor fuel rod experiments.

Track 9: Fluids Engineering Systems and Technologies

Session 9-3-1: Symposium on Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems

Tuesday, November 18, 9:45am–11:30am

Room: 520F

Using Shear and DC Electric Fields to Manipulate and Self-Assemble Dielectric Particles on Microchannel Walls

(IMECE2014-37547)



Minami Yoda

Georgia Institute of Technology

Abstract: Manipulating suspended neutrally buoyant colloidal particles of radii $a = O(0.1\text{--}1\ \mu\text{m})$ near solid surfaces, or walls, is a key technology in various microfluidics devices. These particles, suspended in an aqueous solution at rest near a solid surface, or wall, are subject to wall-normal

“lift” forces described by the DLVO theory of colloid science. The particles experience additional lift forces, however, when suspended in a flowing solution. A fundamental understanding of such lift forces could therefore lead to new methods for the transport and self-assembly of particles near and on solid surfaces.

Various studies have reported repulsive electroviscous and hydrodynamic lift forces on colloidal particles in Poiseuille flow (with a constant shear rate near the wall) driven by a pressure gradient. A few studies have also observed repulsive dielectrophoretic-like lift forces in electroosmotic (EO) flows

driven by electric fields. Recently, evanescent-wave particle tracking has been used to quantify near-wall lift forces on $a = 125\text{--}245\ \text{nm}$ polystyrene (PS) particles suspended in a monovalent electrolyte solution in EO flow, Poiseuille flow, and combined Poiseuille and EO flow through $\sim 30\ \mu\text{m}$ deep fused-silica channels. In Poiseuille flow, the repulsive lift force appears to be proportional to the shear rate, a scaling consistent with hydrodynamic, vs electroviscous, lift.

In combined Poiseuille and EO flow, the lift forces can be repulsive or attractive, depending on whether the EO flow is in the same or opposite direction as the Poiseuille flow, respectively. The magnitude of the force appears to be proportional to the electric field magnitude. Moreover, the force in combined flow exceeds the sum of the forces observed in EO flow for the same electric field or in Poiseuille flow for the same shear rate. Initial results also imply that this force, when repulsive, scales as the square root of shear rate. These results suggest that the lift force in combined flow is fundamentally different from electroviscous, hydrodynamic, or dielectrophoretic-like lift.

Moreover, for the case when the EO flow opposes the Poiseuille flow, the particles self-assemble into dense stable periodic streamwise bands with an average width of $\sim 6\ \mu\text{m}$ and a spacing of two to four times the bandwidth when the electric field magnitude exceeds a threshold value. These results are described and reviewed here.

Biography: Minami Yoda is a Professor in the G. W. Woodruff School of Mechanical Engineering. After receiving her undergraduate and graduate degrees from Caltech and Stanford, she was a von Humboldt and National Science Foundation postdoctoral fellow at the Technical University of Berlin. Dr. Yoda is a Fellow of ASME and the American Physical Society, Chair of the American Nuclear Society Fusion Energy Division, and an Associate Editor for the journal *Experiments in Fluids*. Her research interests include experimental fluid mechanics, optical measurement techniques, microfluidics, colloid science, convection driven by Marangoni effects and buoyancy, and the thermal-hydraulics of fusion energy.

Track 10: Heat Transfer and Thermal Engineering

Session 10-53-1: Heat Transfer Plenary Lecture I
Monday, November 17, 9:45am–11:30am
Room: 524C

Innovating Thermal Materials, Devices, and Energy Conversion Systems

(IMECE2014-40605)



Gang Chen

Massachusetts Institute of Technology

Abstract: The last two decades have witnessed significant advances in the fundamental understanding of micro- and nanoscale heat transfer processes. Simultaneously, a trend has emerged toward developing researchers with an interdisciplinary understanding of the physics that

govern transport processes, materials science, and thermal systems. In this presentation, I will give examples of some of our own research applying such multifaceted knowledge toward innovation in devices, materials, and systems. In the field of solar energy utilization, we have developed a double-layer carbon structure that generates steam from surface regions at high efficiencies. We have also designed an aerogel structure that allows full-spectrum absorption of solar radiation wherein the IR region is used for solar thermal power generation and the visible and UV light is converted by a PV system. In addition to these technologies, we have developed a two-stage solar thermoelectric generator, which can be combined with thermal storage to provide electricity after sunset. We invented a thermogalvanic cycle that converts heat into electricity at relatively high efficiencies using batteries and low-grade heat sources. The talk will close with an overview of the development of a continuous drawing platform to synthesize polymer sheets with high thermal conductivity caused by molecular chain alignment.

Biography: Dr. Gang Chen is the Carl Richard Soderberg Professor of Power Engineering and the Head of the Department of Mechanical Engineering at Massachusetts Institute of Technology. He obtained his Ph.D. degree from UC Berkeley in 1993 under then-Chancellor Chang-Lin Tien. He subsequently served on the faculties of Duke University (1993-1997) and the University of California at Los Angeles (1997-2001) before joining MIT in 2001. He is a recipient of the NSF Young Investigator Award, the ASME Heat Transfer Memorial Award, the R&D100 Award, and the MIT McDonald Award for Excellence in Mentoring and Advising. He is a

member of the U.S. National Academy of Engineering, a Guggenheim Fellow, an AAAS Fellow, an APS Fellow, and an ASME Fellow. He has published extensively in the areas of nanoscale energy transport and conversion and nanoscale heat transfer. He is the director of the Solid-State Solar-Thermal Energy Conversion (S3TEC) Center funded by the U.S. DOE's Energy Frontier Research Centers program.

Track 10: Heat Transfer and Thermal Engineering

Session 10-53-2: Heat Transfer Plenary Lecture II
Tuesday, November 18, 9:45am–11:30am
Room: 510B

Ultrafast Spectroscopy for Energy Research

(IMECE2014-40606)



Xianfan Xu

Purdue University

Abstract: Ultrafast measurements are increasingly used for investigations of thermal transport, including thermal properties at the nanoscale and thermal transport across interface. With the time resolution of the order of tens of femtoseconds (10–15 s) from commercially available

femtosecond laser sources, it becomes possible to directly access energy transport among fundamental energy carriers, including photons, electrons, phonons, and excitons. From a microscopic viewpoint, energy transport and conversion are determined by interactions among these energy carriers, which often occur at a time scale of femtoseconds to picoseconds (10–12 s). Recently, there are renewed interests in energy materials due to the discovery of much improved transport properties and energy conversion efficiency in nanomaterials such as quantum dots, nanowires, and superlattices. In this talk, I will discuss investigations of energy transfer and conversion using ultrafast laser spectroscopy. We develop experimental techniques to investigate interactions among energy carriers, with the aim of discovering new energy coupling channels to facilitate or inhibit energy transport and discovering new applications for energy conversion and utilization. In nanoscale photovoltaic materials (e.g., quantum dots), it is possible that quantized phonon vibration states lead to decreased interactions between electrons and phonons, therefore, increasing the probability for harvesting energy from hot electrons before it is converted to heat. This charge transfer depends on the morphology of quantum dots as well as the interface between quantum dots and their surrounding

materials. We also investigate phonon vibrations of THz (1012 Hz) frequencies in thermoelectric materials. In nanoscale thermoelectric materials, interfaces, boundaries, and impurities are engineered to produce extra phonon scattering channels, which reduce thermal conductivity and increase thermoelectric efficiency. We employ coherent phonon spectroscopy to shed light on the role of phonon scattering vs coherence of phonon vibrations and the resulting lattice thermal conductivity. A potential application of nanoscale thermoelectric materials for waste heat recovery from automobile exhaust gas will also be discussed.

Biography: Xianfan Xu is the James J. and Carol L. Shuttleworth Professor of Mechanical Engineering at Purdue University. He received a B.Eng. in Engineering Thermophysics from the University of Science and Technology of China in 1989, and M.S. and Ph.D. in Mechanical Engineering from the University of California, Berkeley in 1991 and 1994. His current research is focused on heat transfer in nanoscale materials, heat transfer in micro- and nanoscale materials processing and manufacturing, fundamentals of nanoscale radiation and applications in nanoscale materials processing and manufacturing. His group develops advanced experimental techniques for investigating ultrafast dynamics of energy conversion processes. His work on laser processing and manufacturing has contributed to the fundamental understanding of heat transfer processes during laser-matter interactions and development of new laser manufacturing technologies. He has made significant contributions to both fundamental engineering science and engineering applications of nanoscale radiation, including the development of new data storage technologies. Professor Xu has supervised 71 Ph.D. and M.S. students, postdoctoral researchers, and visiting scholars, and has written about 400 publications, including 142 archival journal papers, six book chapters, many conference papers and technical reports, and has given over 100 invited talks worldwide. He is a recipient of the NSF CAREER Award, the Office of Naval Research Young Investigator Award, GM Faculty Fellowship, Purdue University B.F.S. Schaefer Young Faculty Scholar Award, Discovery in Mechanical Engineering Award, and Ruth and Joel Spira Award. He is a Fellow of ASME and a Fellow of SPIE-The International Society for Optics and Photonics.

Track 12: Mechanics of Solids, Structures and Fluids

Session 12-45-1: Plenary

Monday, November 17, 1:00pm–2:45pm

Room: 513D

Composite Materials Research for Marine Applications— Current Efforts and Future Directions

(IMECE2014-40375)



Yapa Rajapakse

Office of Naval Research

Abstract: The Solid Mechanics Program of the Office of Naval Research (ONR) provides the scientific bases for the effective design and utilization of affordable and reliable Naval structures operating in severe environments. Current emphasis on energy efficient, reliable, agile structures with enhanced capabilities and reduced life-cycle costs, has led to increased use of composite materials in ship structures. The marine environment is hostile because of high humidity, sea water, wave loading, hydrostatic pressure, and temperature extremes. The performance of composite structures in this environment, the challenges encountered, and the physics underlying these processes are the central themes addressed by the ONR Solid Mechanics Program. The current research focus is on the mechanics of marine composite materials and composite sandwich structures. The program seeks to establish physically-based models for the physical processes involved in the thermo-mechanical response of glass-fiber and carbon-fiber reinforced marine composite materials and composite sandwich structures, subjected to static, cyclic, and dynamic multiaxial loading conditions in severe environments. Several recent research accomplishments will be summarized: implosion of composite structures, dynamic failure under fluid-structure interactions caused by underwater blasts and hull slamming, accelerated testing methods for life prediction, characterization of the dynamic behavior and failure of composites and foam core materials, advanced models for the mechanics of sandwich structures, and three-dimensional failure theories. The presentation will also include a discussion of future directions of research in mechanics of marine composites and sandwich structures for affordable naval structures, with enhanced performance and reduced life-cycle costs.

Biography: Dr. Yapa Rajapakse is the Program Manager of the Solid Mechanics Program at the Office of Naval Research (ONR). He completed his graduate studies at Stanford University, receiving a M.S. in Mathematics and Ph.D. in Applied Mechanics. His doctoral dissertation in the area of fracture mechanics was directed by the late Prof. J.N. Goodier and supported by the ONR Solid Mechanics Program. He has been elected Fellow of four technical societies: American Society of Mechanical Engineers (ASME), American Academy of Mechanics (AAM), Society of Engineering Science (SES), and American Society for Composites (ASC). He has served as President, Vice-President, and Member-Board of Directors (two terms) of SES. He has served as Chairman, Composites Committee, Applied Mechanics Division of ASME, and as Chairman, Polymer Composites Division of ASC. He has organized (with others) symposia for ASME, with published proceedings, in several areas including: "Mechanics of Thick Composites," "Thick Composites for Load Bearing Structures," "Mechanics of Sandwich Structures," "Dynamic Failure in Composite Materials and Structures," "Ultrasonic Characterization and Mechanics of Interfaces," "High Strain Effects on Polymer Composites and Other Advanced Materials," "Analytical, Numerical, and Experimental Aspects of Three Dimensional Fracture Processes," and "Ice Mechanics." Dr. Rajapakse has served on the Editorial Boards of several journals, including *Composite Science and Technology*, *J. Sandwich Structures and Materials*, *J. Composite Materials*, *J. Reinforced Plastics & Composites*, *Composites Part B*, *Engineering Fracture Mechanics*, *Int. J. Plasticity*, and *Int. J. Strength, Fracture and Complexity*. He is co-editor of several special issues of journals, including: "Marine Composites" in *Composites Part B*; "Failure of Heterogeneous Materials" and "Sandwich Structures" in *J. Experimental Mechanics*; "Marine Applications of Composite Structures and Materials" in *Int. J. Multi-physics*, and "Fracture Scaling," in *Int. J. Fracture*. He is the editor/co-editor of 32 books/conference proceedings, including the recently published: "Dynamic Failure of Materials and Structures," "Dynamic Failure of Composite and Sandwich Structures," "Major Accomplishments in Composite Materials and Sandwich Structures," "Durability of Composites in a Marine Environment," and "Blast Mitigation: Experimental and Numerical Studies." He has delivered numerous plenary presentations at national/international conferences.

Track 13: Micro- and Nanosystems Engineering and Packaging

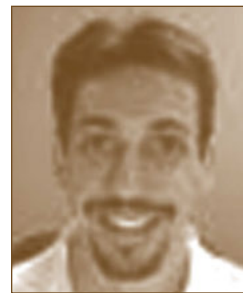
Session 13-13-1: Plenary Presentations in MEMS and Microfluidics

Tuesday, November 18, 9:45am–11:30am

Room: 520D

NIAC: The Most Visionary and Far-Reaching Program in NASA

(IMECE2014-40611)



Jay Falker

NASA NIAC & CIF

Abstract: NASA Innovative Advanced Concepts (NIAC) is a visionary early research program. Part of NASA's Space Technology Mission Directorate (STMD), NIAC supports initial feasibility and benefit studies of exciting concepts that could "change the possible" for future aerospace

endeavors. This will be a short talk about NIAC and the broader STMD context, highlighting some of the exciting concepts that we are currently developing and the opportunities for wider involvement.

Biography: Dr. John M. "Jay" Falker works at NASA Headquarters in Washington, DC, as the Program Executive leading the NASA Innovative Advanced Concepts (NIAC) and Center Innovation Fund (CIF) Programs. Since joining NASA in 2003, he has supported HQ and JSC in various roles related to technology, systems, and architecture development. He has received over a dozen awards recognizing distinguished achievement and outstanding leadership. His prior work includes other agencies, contractors, universities, and federal research centers. Dr. Falker holds a Ph.D. in Aerospace Engineering & Policy Analysis from MIT, where his research focused on future air and space traffic management.

Capillary Microfluidics and Microfluidic Probes: Concepts and Applications

(IMECE2014-40612)



David Juncker
McGill University

Abstract: Microfluidics drives the miniaturization of biochemical analysis as well as chemical reaction. Here, I will discuss our latest advances in capillary microfluidics and microfluidic probes. Capillary microfluidics have long been valued for their “autonomous” character, but have

remained limited. Using a number of new capillary elements, we introduced advanced “capillanic” circuits, in reminiscence to electronic circuits, and that likewise may be designed on paper by using a symbolic circuit representation. The use of thread and strings as a support for capillary microfluidics will be presented, and new approaches to mixing and unconventional fluidic operations shown. Next, the microfluidic probe—a hybrid between scanning probes and microfluidics—will be introduced along with fluidic dipoles and quadrupoles. The use of the probe for surface patterning, tissue staining, and for forming so-called floating gradients will be shown, along with studies of single cell migration within moving chemical gradients.

Biography: Dr. David Juncker is an Associate Professor in the Biomedical Engineering Department and a PI at the McGill University and Genome Quebec Innovation Centre. He received a degree in Electronics-Physics from the University of Neuchatel in Switzerland, and obtained a Ph.D. for work on microfluidics and nanotechnology completed at the IBM Zurich Research Lab under the supervision of Dr. Delamarche. He has made contributions in numerous areas and introduced capillary microfluidics on chips and on thread for low-cost, point-of-care diagnostics; microfluidic probes—comprising both microfluidic dipoles and quadrupoles—for surface processing, tissue staining, and single cell manipulation; low-cost protein nanopatterning, and digital nanodot gradients for studying cell navigation; and a scalable, high-performance antibody microarray along with a snap chip liquid handling technology used for multiplexed protein analysis and biomarker discovery for early breast cancer diagnosis. Dr. Juncker has published more than 40 papers, filed 14 patents, and gave over 100 invited presentations. He holds a Canada Research Chair

in Micro- and Nanobioengineering and received a number of awards, most recently the IAP Young Scientist award and a DKFZ one-year fellowship for a study at the German Cancer Research Centre. For additional information about Dr. Juncker and his lab please see <http://wikisites.mcgill.ca/djgroup>.

Track 14: Systems, Design, and Complexity

Session 14-1-3: Plenary Session

Thursday, November 20, 9:30am–11:15am

Room: 512E

Noninvasive Measurement Technique of Brain Activity and Its Application to Human-Machine Interfaces

(IMECE2014-40914)



Keiichi Watanuki
Saitama University

Abstract: Comfortableness of a ride is an important issue to improve the passenger experience in an automobile. It is affected by a variety of factors, such as vibration, noise, and interior space. In particular, vibration comfortableness of a ride, attributed to the vibration of

a running car, is one of the factors that affect the comfort of an automobile. Therefore, the level of vibration of a running car should be reduced as much as possible to improve the comfortableness of a ride. However, it is difficult to quantify comfortableness of a ride because it is significantly affected by not only the performance of the car but also by passengers' emotions and physiology. Since the evaluation of ride comfort depends on a developer's subjective evaluation using his/her emotion evaluation, it is necessary to carry out sensory evaluations repeatedly to improve comfortableness of a ride. For more efficient development, objective evaluation methods of human emotion are needed to quantitatively evaluate comfortableness of a ride based on interaction science. In recent years, the spread of noninvasive brain function measurement devices, such as functional magnetic resonance imaging (fMRI) and near-infrared spectroscopy (NIRS), has allowed the measurement of brain activity during thinking or acting. This has made it possible to objectively evaluate emotion using brain function measurement devices, which had previously been dependent on subjective evaluations. Because its size is smaller than fMRI instrumentation, NIRS

is advantageous for its portability and fewer constraints on subjects. It allows measurement of a subject's brain functions while the subject is moving. Moreover, NIRS is appropriate for the practical brain-machine interface (BMI), since NIRS is resistant to environmental noise such as electromagnetism because of its method for measurement of changes in the concentration of oxygenated hemoglobin (oxy-Hb) and deoxygenated hemoglobin (deoxy-Hb) in cerebral blood flow using near-infrared light. It has been reported that oxy-Hb most closely correlates with the transition of regional cerebral blood flow. Accordingly, the transition of oxy-Hb is regarded as the parameter that most accurately reflects brain activity. Here we dissociate brain activity related to human kansei and brain function measurement using NIRS while the subject feels vibration. The brain activity during a passive movement irrelevant to the subject's intention and that during a voluntary movement are different from each other. An unintended physical movement caused by vibration does not significantly affect brain activity. It appears that the transition of brain activity during feeling vibration is not caused by physical movement but by emotion affected by vibration. This presentation provides an interaction science and noninvasive brain function measurement using NIRS to examine brain activity during vibration. In the presentation, the comfort level is evaluated using the sensory evaluation as the subjective evaluation of vibration, and the brain activities are evaluated using NIRS for objective evaluation. On the basis of the analysis of brain activity during the sensation of vibration, the relationship between vibrations, comfortableness of a ride, and brain activity will be considered.

Biography: Dr. Keiichi Watanuki received his Ph.D. in the Department of Precision Machinery Engineering from Tokyo Institute of Technology, Japan, in 1991. From 1991, he was on the faculty of Mechanical Engineering at Saitama University, and from 2005, he has been a Professor of Mechanical Engineering at Saitama University. He also serves as Director, Area of Human-Machine Interaction Systems Engineering; Deputy Director-General, Research Management Bureau; Director, Institute of Ambient Mobility Interfaces; Director, Comprehensive Open Innovation Center; and Professor, Brain Science Institute at Saitama University. Dr. Watanuki's research interests include systems design that support various human activities in the field of design and manufacturing. Specifically, he develops intelligent computer-aided design and manufacturing (CAD/CAM) system; design system; for the environment, knowledge management and technology transfer system, virtual reality, human interface, brain-machine interface (BMI), intelligent assistive technology, ambient mobility interface, and intelligent robots. He has published more than 150 articles in peer-reviewed core international proceedings

and journals, 18 books and chapters, and 220 articles in the engineering field. He has also delivered more than 40 plenary, keynote, and invited talks at various international conferences and in a number of institutions worldwide, and more than 290 talks at various domestic conferences. The research in the lab has been featured and discussed by NHK World News, NHK BS-1, NHK, BS Japan, Saitama TV, Nikkei, Asahi Shimbun, Nikkan Kogyo Shimbun, Aichi World EXPO, among others. Dr. Watanuki is the recipient of 25 awards, including the Machine Design and Tribology Division Award, Design and Systems Division Award, Education Award, Best Presentation Award from the Japan Society for Mechanical Engineers (JSME), Computers and Information in Engineering Division Award, Best Design Award, Japan Society for Design Engineering, JSDE, among others. He is an elected Fellow of the Japan Society for Mechanical Engineers (JSME). He served as Editor-in-Chief, *Journal of Advanced Mechanical Design, Systems, and Manufacturing*; Associate Editor, *ASME Journal of Computing and Information Science in Engineering*; and core international journals in the field of mechanical engineering. He has served as a number of conference chairs and on program/advisory committees of international conferences. He is a head of the Machine Design and Tribology Division (2010–2011), the Design and Systems Division (2014–2015), the Japan Society for Mechanical Engineers.

Track 15: Transportation Systems

Session 15-4-1: Plenary Session

Tuesday, November 18, 9:45am–11:30am

Room: 522A

Engineering Management of Product Development Process

(IMECE2014-40913)



Mohamed El-Sayed

Kettering University

Abstract: Engineering Management of Product Development Process

Biography: Dr. Mohamed El-Sayed is SAE and ASME Fellow. He is the Editor-in-Chief of the *SAE International Journal of Materials and Manufacturing* and the Chair of the SAE Journals' Editorial Board. He is well recognized

as technical leader in vehicle integration, vehicle development, and optimization. Through his research, teaching, and practice, he made numerous original contributions to advance the state of the art in automotive development, performance, vehicle development process, lean, and integrated design and manufacturing. Currently, Dr. El-Sayed is a professor of Mechanical Engineering and Director of the Vehicle Durability and Integration Laboratory at Kettering University. He has over 30 years of industrial, teaching, and research experience and more than 100 publications in the field of automotive design, development, and validation. Dr. El-Sayed worked as lead engineer on the design optimization and Quality, Durability, and Reliability integration of several General Motors vehicles and architectures. He earned several awards from GM related to vehicle development and validation. He has also worked as the director of engineering and chief engineer and consultant for several automotive suppliers.

Track 16: Vibration, Acoustics, and Wave Propagation

Session 16-15-1: Noise Control and Acoustics Tutorial

Wednesday, November 19, 9:45am–11:30am

Room: 519A

Control of Sound With Periodic Structures

(IMECE2014-40654)



Andrew Norris

Rutgers University

Abstract: This tutorial will focus on recent developments aimed at using periodic structures for passive control of sound and vibration. The frequency-dependent properties of finite and infinite structures will first be defined, including band gaps, internal resonators, negative mass,

negative stiffness, and modal density. Applications will be discussed, based on select examples from the literature on phononic crystals and acoustic metamaterials, including gradient index acoustic lenses, super absorbent low-frequency damping, and acoustic transparency. Specific computational and experimental issues that arise with these types of periodic devices will be mentioned.

Biography: Andrew Norris is an internationally recognized expert in modeling of acoustic and elastic wave phenomena. In his 35-year research career he has worked on topics ranging from ultrasonic nondestructive evaluation for detecting cracks, modeling of underground sound for geophysical prospecting, structural acoustics for naval applications, and consulting to industry on acoustics and structural dynamics. He enjoys tackling problems that combine physics, engineering science, applied mathematics, and numerical simulation. His current interests are in developing fundamental models for mechanical metamaterials that exhibit extraordinary wave-bearing properties. Dr. Norris joined Rutgers University in 1985 after post-doc positions at Northwestern University and at Exxon Research and Engineering Corporate Laboratories, NJ, and is currently a Distinguished Professor of Mechanical and Aerospace Engineering in the School of Engineering. He has authored or co-authored more than 160 papers in refereed journals, is editor in chief of the journal *Wave Motion*, and a member of the board of Editors of several journals, including the *Journal of the Acoustical Society of America*, *Mathematics and Mechanics of Solids*, and the *Journal of Elasticity*. In his spare time, he enjoys reading, running, and roaming.

Track 16: Vibration, Acoustics, and Wave Propagation

Session 16-16-1: Rayleigh Lecture

Tuesday, November 18, 3:00pm–4:45pm

Room: 523A

Going Underwater With Acoustic Resonators and Waveguides

(IMECE2014-40655)



Mardi Hastings

Georgia Institute of Technology

Abstract: Marine animals depend on sound for communication, navigation, predator avoidance, and prey detection. Conduction of vibration and sound between and among solids, liquids, and gases within the bodies of marine animals underlies their abilities to hear, vocalize, and successfully

navigate underwater even while inherent acoustic coupling with their surroundings makes them especially vulnerable to adverse effects caused by excessive or prolonged sound exposure from anthropogenic sources. Thus, the rise in underwater acoustic energy associated with increasing human activity in the ocean has potential to impact their lives and the larger marine environment. The mechanical building blocks for sound reception and production in underwater animals are truly remarkable biological acoustic resonators and waveguides, which span the frequency range from infrasound to ultrasound. Rayleigh originally provided the foundation for recognizing, understanding, and mathematically modeling these fundamental mechanisms in the second edition of *The Theory of Sound*, an integration of the state-of-knowledge of acoustics in the late 19th century. Now the challenge of the 21st century is accurately combining complicated underwater source, path, and animal receiver models to predict sound exposure and its effects on multiple marine species so that effective mitigation can be developed and implemented to protect the ocean environment.

Biography: Dr. Mardi Hastings received her BSME and MSME from The Ohio State University, and then worked in industry over five years prior to returning to graduate school at Georgia Tech, where she received her Ph.D. in March 1987. She stayed on at Georgia Tech as an Assistant Professor and then served two years on the technical staff at AT&T Bell Labs before joining the faculty of Ohio State's Mechanical Engineering Department in 1990. In 2003 she became a program manager at the Office of Naval Research, where she developed international research programs on the biological impacts of underwater sound, biosonar, and passive acoustic monitoring of marine mammals. She worked over three years as a Senior Scientist in Environmental Acoustics at Penn State's Applied Research Lab prior to returning to Georgia Tech in 2010. Dr. Hastings has studied the interaction of sound with biological systems since 1984. During the last 15 years, her research has focused primarily on the effects of anthropogenic sound in the marine environment. She has advised 35 graduate students, published more than 65 technical articles, and co-authored the book, *Principles of Marine Bioacoustics* (Springer, 2008). She served on the National Academy of Sciences Study Panel on Potential Impacts of Ambient Noise on Marine Mammals (2001–2002), the Barotrauma Blue Ribbon Panel for the State of California (2007), and has received numerous awards, including a 1988 Presidential Young Investigator award from the National Science Foundation, a 2005 Environmental Excellence award from the U.S. Federal Highway Administration for her work on the effects of pile driving in San Francisco Bay, and the 2011 Per Bruel Gold Medal for Noise Control and Acoustics from ASME. Dr. Hastings is a Fellow and past president of the Acoustical Society of America, former member of the Board of Directors of the Institute of Noise Control Engineering, and past chair of the ASME Noise Control and Acoustics Division.

Tour of Hydro-Québec's Research Institute

Date: Monday, November 17, 2014

Time: 9:30am–12:00pm (attendees to meet at 8:30am)

Cost: \$25

Location: 1800, Boul, Lionel-Boulet, Varennes (Québec), Canada J3X 1S1

Identity verifications will be done in advance by Hydro-Québec for every visitor.

Canadian and United States visitors have to give us at least two weeks prior to a visit their complete name, passport number and country issuing the passport or drivers license number and name of the state or province issuing the license.

Visitors from other countries must provide (also two weeks in advance) their complete name, passport number, and country issuing the passport.

All visitors must provide out on arrival a valid identification document and sign our visitors register. Visitors who do not provide identification info in advance or visitors who do not carry valid ID papers will not be allowed to visit IREQ.

Tour Description: Hydro-Québec's research institute, IREQ, is one of the largest integrated electrical research and testing centers in North America. Created in 1967, IREQ has developed large-scale expertise in electrical apparatus, network analysis and control, automation and measurement, materials, chemical and mechanical engineering, and applications of electricity. It has impressive facilities at its disposal: high-voltage laboratory, mechanical-thermomechanical laboratory, a power system study, and simulation center and an electrotechnology laboratory, as well as numerous specialized laboratories, notably in robotics, battery materials and mechanical engineering. IREQ has facilities in Varennes, which is 45 minutes from downtown Montréal.

Tour of Bell Helicopter, Mirabel, Quebec (SOLD OUT)

Date: Tuesday, November 18, 2014

Time: 9:00am–12:00pm (attendees to meet at 8:20am in lobby of the Intercontinental Hotel)

Cost: \$25

Location: 12 800 rue de l'Avenir, Mirabel, Quebec, Canada J7J 1R4

Tour Description: Bell Helicopter, a wholly owned subsidiary of Textron Inc., is an industry-leading producer of commercial and military, manned and unmanned vertical-lift aircraft and the pioneer of the revolutionary tiltrotor aircraft. Globally recognized for world-class customer service, innovation, and superior quality, Bell's global workforce serves customers flying Bell aircraft in more than 120 countries.

Upon arrival, the guests will receive a "Welcome to Bell" briefing on the history and scope of the commercial helicopter development and manufacturing operations at Bell Helicopter in Mirabel. The subsequent tour of the commercial helicopter production facility will cover the aspects of the Mirabel manufacturing operations: the tour guides will show the guests the subassembly component manufacturing areas, the final production lines for the four commercial helicopters manufactured at Mirabel (Models 206-L4, 407, 429, and 412), and the production flight test hangar. All of these operations are uniquely all under one roof. The tour will be conducted in small groups and facilitated by technical staff from the Engineering Department.

Tour of the National Research Council Aerospace Manufacturing Research Lab (SOLD OUT)

Date: Wednesday, November 19, 2014

Time: 9:00am–12:00pm (attendees to meet at 8:30am in lobby of the Intercontinental Hotel)

Cost: \$25

Location: 5145, Avenue Decelles, Campus de l'Université de Montréal, Quebec, Canada H3T 2B2

Special Instructions: For safety reasons, attendees **MUST** wear closed-toe shoes.

Tour Description: The tour of the Aerospace Manufacturing Research Laboratory of the National Research Council includes visits to four areas of manufacturing research: Automation/Robotics, Composites Products, Material Removal, and Metallic Products (forming/joining). Upon arrival to the lab, attendees will be treated to a brief presentation of the NRC structure and areas of research, with emphasis on the Aerospace Portfolio (Research Programs and Laboratories). Immediately following the presentation, attendees are divided into four groups with each taking a turn to visit the four manufacturing research labs. The tour concludes with an open discussion/conversation with the lab director and team leaders of the four research areas.

Tour of Bombardier Challenger Facility (SOLD OUT)

Date: Thursday, November 20, 2014

Time: 9:00am–12:00pm (attendees to meet at 8:30am in lobby of the Intercontinental Hotel)

Cost: \$25

Location: 400 Côte-Vertu Ouest, Dorval (Québec), Canada H4S 1Y9

Tour Description: The Challenger facility is a 1,049,000 sq. ft. facility where Bombardier assembles, completes the interior, paints, and delivers the Challenger aircraft family (Challenger 350 and 605). During this visit, attendees will have the opportunity to see the entire process that a customer experiences when they purchase one of these business aircrafts.

Come and Discover our Beautiful City!

Date: Sunday, November 16, 2014

Time: 9:00am–3:00pm

Location: Confirmed attendees to gather in the lower lobby of the Intercontinental hotel at 8:30am

Price: \$68.00 per person (includes light lunch)

This exciting tour will introduce you to various parts of the city that make Montréal what it is today. You will have the chance to see how culturally diverse Montréal is, as well as visit landmarks and new developments that are so very important in making Montréal such a unique and wonderful city. See Montreal's elegant upper class communities, our universities and part of our Underground City. Also, the Plateau Mont-Royal, one of the top four "hippest" neighborhoods in North America, known for its distinctive Montréal architecture, with its spiral staircase and finely wrought cornices. Along the way, the tour includes a stop at the summit of Mt. Royal Park for a panoramic view of the city and a guided tour in the beautiful Notre Dame Basilica. After a quick lunch, we will make you discover Old Montreal Old Montréal constitutes one of North America's most remarkable architectural ensembles. A stroll through a maze of narrow lanes and old buildings provide a perfect opportunity to discover its history and charm. With their exuberant display of architecture, the streets and buildings testify to Montréal's rich heritage and illustrate a period of its history. The walk will feature a number of remarkable restorations that have breathed new life into the Old Port.

The Richelieu Valley & The Apple Region

Date: Monday, November 17, 2014

Time: 9:00am–2:30pm

Location: Confirmed attendees to gather in the lower lobby of the Intercontinental hotel at 8:30am

Price: \$78.00 per person (includes light lunch)

The Richelieu Valley has often been described as the 'Garden of Québec' because of its many agricultural producers. The rich soils and tempered climate makes this region perfect for agro-tourism, gastronomy, history and heritage. The valley is surrounded by enormous apple orchards so as Québec's very first region for cider and apple production, you will visit an apple cider mill and learn how ice cider is made. Then we follow the mighty Richelieu River to the village of Chambly, where we will enjoy a French Canadian meal and sample a few regional beers. The restaurant is located right next door to the famous Fort Chambly, a National Historical Site of Canada built in 1711.

Flavourful Montréal

Date: Tuesday, November 18, 2014

Time: 9:00am–2:00pm

Location: Confirmed attendees to gather in the lower lobby of the Intercontinental hotel at 8:30am

Price: \$78.00 per person (includes all tastings)

Our professional guide will lead your small group through the city to discover some of the cultures that have influenced the Montréal cuisines. We will discover the smorgasbord of shops and eateries along lively Saint-Laurent Boulevard and enjoy a few local favorites like some Québec Cheeses, smoked meat, delicious Ice Wine and bagels (said to be better than New York). We'll visit the open-air Jean Talon Market located in Little Italy, the biggest of its kind in North America, to savor the incredible cornucopia of fruits and vegetables grown by Québec producers. You will return with an appreciation of the cultures that shaped this international city.

Monday, November 17			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
512A	12-4-1 Multiphysics in Solids and Material Failure Analysis	12-4-2 Multiphysics Study of Biological and Soft Materials	12-4-3 Coupled Phenomena in Nanomaterials
512B	12-28-1 Fatigue Failure I	12-28-2 Fatigue Failure II	12-28-3 Fatigue Failure III
512C	12-29-1 Multi-Scale Computations in Fluids, Structures, and Materials 1	12-29-2 Multi-Scale Computations in Fluids, Structures, and Materials 2	12-29-3 Multi-Scale Computations in Fluids, Structures, and Materials 3
512E	12-33-1 Soft Active Materials	12-33-2 Gels and Soft Machines	12-33-3 Instability, Damage and Degradation in Soft Materials
513D	12-39-1 Multiscale Fracture and Fatigue of Materials	12-45-1 Plenary	12-7-1 Response of Composite Materials under Extreme Loading Conditions
513E	1-5-1 Aircraft Modeling and Simulation	1-10-1 Propulsion	12-16-1 Processing and Performance of Nanocomposites
514A	12-34-1 Instability In Solids and Structures I	12-34-2 Instability In Solids and Structures II	12-34-3 Instability In Solids and Structures III
514B	12-42-1 Peridynamics for Failure Prediction I	12-42-2 Peridynamics for Failure Prediction II	12-22-1 Multifunctional and Micro/Nano-structured Materials - Modeling and Characterization (I)
514C	12-43-1 Medalist Symposium	12-37-1 Drucker Medalist Symposium	12-37-2 Drucker Medalist Symposium
516C	1-14-1 Plenary Session I	1-7-1 Materials for Extreme Environments	1-7-2 Environmental Effects of Aerospace Structures and Materials
516D	1-11-1 Turbine and Blade Aerodynamics and Performance I	1-11-2 Turbine and Blade Aerodynamics and Performance II	1-7-3 Design & Analysis of Aerospace Structures and Materials
516E	1-2-1 Advances in Aerodynamics I	1-2-2 Advances in Aerodynamics II	1-6-1 Combustion and Engine Operation
518A	5-2-1 Education Research Innovation and Sustainable Trends in Engineering	5-3-1 Curriculum Innovations, Pedagogy and Learning Methodologies- I	5-3-2 Curriculum Innovations, Pedagogy and Learning Methodologies- II
518B	5-9-1 Fluid Mechanics, Heat Transfer, Experiments and Energy Systems	5-4-1 Distance/Online Engineering Education, Models and Enabling Technologies	5-12-1 Invited Presentations of the Education and Globalization Track
518C	5-11-1 Engineering Accreditation, Data Collection, Assessment and ABET	5-5-1 Globalization of Engineering	
519A	6-2-1 Innovative Sensors and Sensing Technologies	12-40-1 Full-field Experimental Techniques for Quantifying Fracture and Failure	6-1-1 Emerging Simulation and Modeling Tools in NDE/SHM
519B		13-12-2 Flows in Microfluidic Systems	13-12-3 Novel Applications of Micro/Nanofluidics — II
520A	13-2-1 Computational Studies on MEMS and Nanostructures I	13-2-2 Computational Studies on MEMS and Nanostructures II	13-2-3 Computational Studies on MEMS and Nanostructures III

Monday, November 17			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
520A	13-2-1 Computational Studies on MEMS and Nanostructures I	13-2-2 Computational Studies on MEMS and Nanostructures II	13-2-3 Computational Studies on MEMS and Nanostructures III
520B	13-3-1 Analysis, Processes, and Technology 1	13-3-2 Analysis, Processes, and Technology 2	13-3-3 Analysis, Processes, and Technology 3
520C	13-14-1 Quality and Reliability in Electronic and Photonic Packaging 13-	4-1 Physics and Chemistry of Carbon Nanomaterials and Devices	
520D	13-7-1 Sensors and Actuators	13-5-1 Microscale Power Harvesting Devices	13-7-2 Fabrication and Structure
520E	13-20-1 Preparing for Success - Careers in Industry, Academia and Government	13-20-2 Opportunities and Challenges in Semiconductors, Packaging, and Micro- and Nano-Systems Engineering.	13-20-3 Resume-critique & Networking
520F	13-17-1 Power Electronics, High Temperature, and Advanced Packaging	13-18-1 Emerging Technologies	13-1-1 Dynamic and Thermal Behavior of Micro- and Nano-Systems
521A	15-1-2 Occupant Protection and Biomechanics I	15-1-3 Occupant Protection and Biomechanics II	15-3-5 Design optimization of Advanced Automotive Systems
521B	15-3-2 Advances in Control Systems and Methodologies	15-3-4 Automotive Systems Modeling and Analysis	15-3-6 Advanced Automotive Systems and Methodologies
521C		15-2-1 Railroad and Off-Road Systems Dynamics	15-3-7 Advances in Hybrid Systems and Engine Technology
522A	10-2-2 Two-phase Heat Transfer in Energy Systems	10-2-3 Heat Conduction and Convection in Energy Systems	10-4-1 Virtual Product Development in Energy Systems I
522B	10-9-5 Phase Change Heat Transfer-5	10-9-1 Phase Change Heat Transfer-1	10-9-2 Phase Change Heat Transfer-2
522C	10-18-1 Nanofluids	10-18-2 Phase Change & Convection	10-18-3 1D Nano-materials & Systems: CNTs, NWs, Polymers, etc.
523A	10-19-1 Advances in Enhanced Heat Transfer Equipment I		
523B	10-13-1 Mean Free Path Accumulation and Distributions	10-13-2 Interfaces - I	10-13-3 2D Materials: Graphene, MoS2, BN, etc.
524A	10-38-1 Heat Transfer Under Extreme Conditions	10-20-1 Heat Exchangers in Thermal Storage Systems	10-38-2 Condensation Heat Transfer
524B	10-49-1 Visualization of Flow and Heat Transfer-I	10-49-2 Visualization of Flow and Heat Transfer-II	10-49-3 Visualization of Flow and Heat Transfer-III
524C	10-53-1 Heat Transfer Plenary Lecture-I	10-8-1 Thermophysical Properties I	10-8-2 Thermophysical Properties II
525A	20-1-1 General Topics	20-1-2 General Topics - II	20-1-3 General Topics - III

Tuesday, November 18			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
510A	10-18-4 3D Nano-materials & Systems: Bulk and Nanocomposites	10-18-5 Thermal Transport at the Nanoscale	
510B	10-53-2 Heat Transfer Plenary Lecture-II	3-6-1 Biological and Bioinspired Structures	Nanomaterials for Biomedical Applications
510C		3-8-1 Dynamics, and Control in Biomechanical Systems I	3-8-2 Dynamics, and Control in Biomechanical Systems II
512A	12-34-4 Instability In Solids And Structures IV	12-34-5 Instability In Solids and Structures V	12-10-1 Mechanics and Design of Cellular Materials I
512B	12-2-1 Mechanics of Adhesion and Friction I	12-2-2 Mechanics of Adhesion and Friction II	12-2-3 Mechanics of Adhesion and Friction III
512C	12-4-4 Multiphysical Applications	12-12-1 Multi-Field Studies in Heterogeneous Materials Part 1	12-12-2 Multi-Field Studies in Heterogeneous Materials Part 2
512E	12-11-1 Damage and Failure of Composites I	12-11-2 Damage and Failure of Composites II	12-11-3 Damage and Failure of Composites III
513D	12-17-1 Polymer Nanocomposites: Simulations and Experiments	2-2-1 Nanomanufacturing: Bottom-up / Top-Down Mechanisms for Nanomaterials and Nanodevices	2-2-2 Nanomanufacturing: Electrophoretic or Spray Deposition Techniques for Nanomaterials and Nanostructures
513E	2-3-1 Material Processing of Flexible Electronic Devices and Sensors I	2-3-2 Material Processing of Flexible Electronic Devices and Sensors II	2-3-3 Material Processing of Flexible Electronic Devices and Sensors III
514A	12-22-2 Multifunctional and Micro/Nano-structured Materials - Modeling and Characterization (II)	12-22-3 Multifunctional and Micro/Nano-structured Materials - Modeling and Characterization (III)	12-22-4 Multifunctional and Micro/Nano-structured Materials - Modeling and Characterization (IV)
514B	12-28-4 Fracture Mechanics	12-31-1 Engineering Reserach Innovation and Computation	12-31-2 Computational Engineering and Validation Simulations I.
514C	12-33-4 Computation and modeling of Soft Materials	12-33-5 Bioinspired and Biological Materials	12-33-6 Structure-Interface-Property Relations in Soft Materials
515A	11-13-1 Nanomaterials for Energy	12-18-1 Materials and Metamaterials at Varying Length Scales and Frequency Ranges	11-19-3 Materials Processing and Characterization-3
516C	1-14-2 Plenary Session II	1-7-4 Lifing and Prognosis of Aerospace Structures and Materials	1-7-5 Composite Structures
516D	1-9-1 Peridynamics Modeling I	1-9-2 Peridynamics Modeling II	1-13-1 Wing Aeroelasticity
516E	1-12-1 Next Generation Aircraft Technologies I	1-12-2 Next Generation Aircraft Technologies II	1-8-1 Lightweight Sandwich Composites and Layered Structures
518A	5-6-1 Pre-College (K-12) STEM-University, School and Industry Alliance	5-10-1 Applied Mechanics, Dynamic Systems and Control Engineering-I	5-10-2 Applied Mechanics, Dynamic Systems and Control Engineering-II

Tuesday, November 18			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
518B	5-7-1 Problem Solving in Engineering Education, Research and Practice (Session Dedicated to Professor Robert G. Jeffers)	5-8-1 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing-I	5-8-2 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing-II
518C	11-22-1 Modeling and Experiments in Nanomechanics and Nanomaterials 1	11-22-2 Modeling and Experiments in Nanomechanics and Nanomaterials 2	11-22-3 Modeling and Experiments in Nanomechanics and Nanomaterials 3
519A	11-19-1 Materials Processing and Characterization-1	11-19-2 Materials Processing and Characterization-2	11-18-2 Phase Transformation, Solidification and Casting
519B		11-17-1 Innovations in Processing, Characterization and Applications of Bioengineered Materials I	11-17-2 Innovations in Processing, Characterization and Applications of Bioengineered Materials II
520A	12-26-1 Effects of Defects, Damage Tolerance and Repair of Composites	13-6-1 Sensing and Manipulation of Cells	13-6-2 Tools for Studying Properties of Tissues, Cells, or Molecules
520B	12-27-1 Multiscale Modeling of Textile Composites	13-10-1 NEES Panel on Nanomanufacturing: Successful, Scalable, and Sustainable at the Nanometer Scale	13-11-1 Micro/NanoScale Phononic Crystals: Fundamentals, Devices, and Applications
520C		13-8-2 Nanomaterials and Nanostructures	13-8-3 Manufacturing and Devices
520D	13-13-1 Plenary Presentations in MEMS and Microfluidics	13-15-1 Modeling in Integrated Structures and Materials	13-7-2 Fabrication and Structure
520E	13-19-1 Thermal Management in Electronics I		13-19-2 Thermal Management in Electronics II
520F	9-3-1 12th Symposium on Electric, Magnetic and Thermal Phenomena in Micro and Nano-scale Systems	9-1-1 Fluid Mechanics and Rheology of Non-linear Materials and Complex Fluids I	9-1-2 Fluid Mechanics and Rheology of Non-linear Materials and Complex Fluids II
521A	9-7-1 Wind Turbines: Aerodynamic and Control I	9-5-1 Fundamental Issues and Perspectives in Fluid Mechanics I	9-5-2 Fundamental Issues and Perspectives in Fluid Mechanics II
521B	9-12-1 Young Engineer Paper (YEP) Contest	9-8-1 Industrial Flows I	9-8-2 Industrial Flows II
521C	9-15-1 14th International Symposium on Measurement and Modeling of Environmental Flows	9-10-1 FMITC Session 1	9-10-2 FMITC Session 2
522A	15-4-1 Plenary Session	3-3-1 Diagnostics, Characterisation and Therapy-I	3-3-2 Diagnostics, Characterisation and Therapy II
522B	3-1-1 Respiratory and Cardiovascular Advancement	3-2-1 Brain Injury Biomechanics	3-2-2 Tissue Mechanics and Injury Mechanisms
522C	3-11-6 Computational Modeling and Device Design	3-11-1 Computational Modeling	13-11-2 Computational Modeling 2

Tuesday, November 18			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
523A	16-16-1 Rayleigh Lecture	16-10-1 Flow Induced Noise and Vibration	16-16-1 Rayleigh Lecture
523B	16-12-1 Vibration and Acoustic Measurement Techniques and Facilities	16-12-2 Vibration and Acoustic Measurement Techniques and Facilities	13-16-1 Manufacturing, Materials and Processes for Microelectronics and Photonics
524A	4-9-1 Dynamics and Control in Micro/Nano Engineering I	4-12-1 Dynamics of Structures With Contact and/or Frictional Interfaces	4-18-1 Professor Lawrence A. Bergman - Targeted Energy Transfer: Intentional Use of Strong Nonlinearity for Vibration and Shock Control
524B	4-13-1 Fluid-Structure Interaction I	4-13-2 Fluid-Structure Interaction II	10-7-1 Thermal Management Challenges in Energy Conversion and Conservation
524C	10-13-4 Superlattices and Thin Films	4-14-1 Vibrations of Continuous Systems I	10-13-5 Interfaces - II
525A		4-17-1 Measurement and Analysis Techniques in Dynamic Systems	
525B	10-9-3 Phase Change Heat Transfer-3	10-9-4 Phase Change Heat Transfer-4	10-17-2 Nanoscale Thermal Metrology II: Other Techniques

Wednesday, November 19			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
510A	10-28-1 Heat Transfer in Gas Turbine Systems (I)	10-28-2 Heat Transfer in Gas Turbine Systems (II)	
510B	10-9-7 Phase-Change Heat Transfer-7	10-9-6 Phase Change Heat Transfer-6	10-26-1 Industrial Combustion and its Environmental Impact
510C	10-53-2 Heat Transfer Plenary Lecture-II	10-36-1 Transport in Medicine and Biology	10-21-1 Heat Transfer Equipment for Energy and Water - I
512A	12-36-1 Young Investigator Awards Presentations	12-10-2 Mechanics and Design of Cellular Materials II	12-10-3 Mechanics and Design of Cellular Materials III
512B	12-1-1 General Topics I	12-1-2 General Topics II	12-1-3 General Topics III
512C	12-35-1 Hydraulic Fracturing	12-35-2 Mechanical Systems	12-35-3 Elastomeric Materials
512E	12-11-4 Damage and Failure of Composites IV	12-41-1 Experiments and Simulations I	12-15-1 Polymer Nanocomposites and Nanostructured Materials: Simulations and Experiments
513D	2-2-3 Nanomanufacturing: Advances in Stamping and Patterning	2-1-1 Tribology and Mechanical Properties	12-42-2 Peridynamics for Failure Prediction II
513E	2-5-1 AM I - Modeling and Process Planning	2-5-2 AM II - Process Development and Improvement	2-5-3 AM III - Applications
514A	12-32-1 Modeling Materials with Morphological Complexities and Evolving Microstructures	12-8-1 Time-Dependent Materials and Their Composites	12-8-2 Time-Dependent Materials and Their Composites
514B	12-33-7 Morphogenesis of Soft and Living Matter	12-31-3 Computational Engineering and Validation Simulations II	12-17-1 Polymer Nanocomposites: Simulations and Experiments
514C	12-44-1 Mechanics in Biology and Medicine	12-44-2 Mechanics of Single Cell / Cluster I	12-44-3 Mechanics of Single Cell / Cluster II
515A	10-54-1 Max Jakob Award Lecture	10-6-1 Advanced Solar Sub-Atmospheric M-Power Generation	10-47-1 Advances in Heat Transfer Education
516C	2-7-1 Metallic Materials - Processing and Synthesis	2-7-2 Metallic and Fiber Composites - Processing and Synthesis	2-7-3 Machining and Innovative Processing Methods
516D	2-6-1 Advanced Forming I	2-6-2 Advanced Forming II	
516E	7-2-1 Fundamentals of Thermodynamics	7-2-2 Applied Thermodynamics	
518A	7-3-1 Thermoconomics	17-4-1 Natural Gas-Based Systems and Chemical Processes	7-3-2 Thermoconomics 2
518B	7-8-1 Energy Modelling-1	7-8-2 Energy Systems	7-8-3 Efficient Design
518C	7-9-1 Lithium Ion Batteries	7-9-2 Advanced Electrochemical Storage Concepts	7-9-3 Lithium Air Batteries

Wednesday, November 19			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
519A	16-15-1 Noise Control and Acoustics Tutorial	16-5-1 Special Properties	16-5-2 Nonlinear Waves
519B		16-4-1 Noise and Vibration Control	16-7-1 Vibration and Acoustic/Elastic Waves
520A	4-1-1 Dynamics and Vibration-General	4-1-2 System Control and Management-General	4-16-1 Multi-Physics Dynamics and Control of Structures and Devices I
520B	4-5-1 Design and Control of Robots, Mechanisms and Structures I	4-18-2 Professor Bogdan Epureanu - Dynamics of Intracellular Nano-Transport: A Treadmill for Biomolecular Machines	4-5-2 Design and Control of Robots, Mechanisms and Structures II
520C	4-6-1 System Modelling Techniques	4-4-1 Dynamics Modeling, Theory and Application I	4-6-2 Model Predictive and Adaptive Control
520D	4-13-3 Fluid-Structure Interaction III	4-7-1 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems - I	4-7-2 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems -II
520E	4-3-1 Multibody Dynamic Systems and Applications	4-2-1 Nonlinear Dynamics, Control, and Stochastic Mechanics I	4-2-2 Nonlinear Dynamics, Control, and Stochastic Mechanics II
520F	9-4-1 Gas-Solid and Liquid-Solid Flows	9-4-2 Computational Analyses and Modeling of Gas-Liquid and Liquid-Liquid Flows	
521A	9-6-1 CFD Applications for Optimization and Controls I	9-6-2 CFD Applications for Optimization and Controls II	9-6-3 CFD Applications for Optimization and Controls III
521B	9-9-1 Microscale Multiphase Flow and Surface Interactions	9-9-2 Droplet/Particle/Bubble Dynamics and Capillary Flow	9-9-3 Novel Applications of Micro/Nanofluidics
521C	9-11-1 CFD/EFD Choice - A Dilemma for Industries	9-13-1 Experimental Validation of CFD Modeling in Heat Exchangers (K10 and FED)-A	10-10-1 Heat Pipes and Industrial Applications of Multiphase Heat Transfer
522A	8-3-6 Forensic Applications & Failure Analysis II		8-3-7 Reliability Method II
522B	8-3-1 Safety Engineering & Management and Risk Analysis		8-3-5 Reliability Methods I
522C	8-2-1 Engineering Management I	8-2-2 Engineering Management II	8-4-1 Technology and Society and Societal and Ethical Dimensions of Engineering Education and Practice

Wednesday, November 19			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
519A	16-15-1 Noise Control and Acoustics Tutorial	16-5-1 Special Properties	16-5-2 Nonlinear Waves
519B		16-4-1 Noise and Vibration Control	16-7-1 Vibration and Acoustic/Elastic Waves
520A	4-1-1 Dynamics and Vibration-General	4-1-2 System Control and Management-General	4-16-1 Multi-Physics Dynamics and Control of Structures and Devices I
520B	4-5-1 Design and Control of Robots, Mechanisms and Structures I	4-18-2 Professor Bogdan Epureanu - Dynamics of Intracellular Nano-Transport: A Treadmill for Biomolecular Machines	4-5-2 Design and Control of Robots, Mechanisms and Structures II
520C	4-6-1 System Modelling Techniques	4-4-1 Dynamics Modeling, Theory and Application I	4-6-2 Model Predictive and Adaptive Control
520D	4-13-3 Fluid-Structure Interaction III	4-7-1 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems - I	4-7-2 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems -II
520E	4-3-1 Multibody Dynamic Systems and Applications	4-2-1 Nonlinear Dynamics, Control, and Stochastic Mechanics I	4-2-2 Nonlinear Dynamics, Control, and Stochastic Mechanics II
520F	9-4-1 Gas-Solid and Liquid-Solid Flows	9-4-2 Computational Analyses and Modeling of Gas-Liquid and Liquid-Liquid Flows	
521A	9-6-1 CFD Applications for Optimization and Controls I	9-6-2 CFD Applications for Optimization and Controls II	9-6-3 CFD Applications for Optimization and Controls III
521B	9-9-1 Microscale Multiphase Flow and Surface Interactions	9-9-2 Droplet/Particle/Bubble Dynamics and Capillary Flow	9-9-3 Novel Applications of Micro/Nanofluidics
521C	9-11-1 CFD/EFD Choice - A Dilemma for Industries	9-13-1 Experimental Validation of CFD Modeling in Heat Exchangers (K10 and FED)-A	10-10-1 Heat Pipes and Industrial Applications of Multiphase Heat Transfer
522A	8-3-6 Forensic Applications & Failure Analysis II		8-3-7 Reliability Method II
522B	8-3-1 Safety Engineering & Management and Risk Analysis		8-3-5 Reliability Methods I
522C	8-2-1 Engineering Management I	8-2-2 Engineering Management II	8-4-1 Technology and Society and Societal and Ethical Dimensions of Engineering Education and Practice

Wednesday, November 19			
	9:45am–11:30am	1:00pm–2:45pm	3:00pm–4:45pm
523A	3-2-3 Musculoskeletal and Spinal Injuries	3-4-1 Innovations in Processing, Characterization and Applications of Bioengineered Materials-I	3-4-2 Innovations in Processing, Characterization and Applications of Bioengineered Materials-II
523B	3-11-3 Computational Modeling of Injury	3-11-4 Device Design	13-7-2 Tissue Viscoelasticity - II
524A	3-9-1 Clinic Application of Bioengineering: Biomedical Imaging	3-9-2 Clinic Application of Bioengineering: Biomechanics	3-9-3 Clinic Application of Bioengineering: Diagnostic and Therapeutic Methods
524B	3-8-3 Dynamics, and Control in Biomechanical Systems III	3-7-1 Tissue Viscoelasticity - I	3-10-1 Transport Phenomena in Biomedical Applications
524C		7-12-1 Alternative Power Generation	7-12-2 Energy Harvesting, Storage, and Analysis
525A	10-3-1 Cooling, Heating and Power Systems I	10-3-2 Cooling, Heating and Power Systems II	10-3-3 Cooling, Heating and Power Systems III
525B	10-5-1 Performance Assessment of Energy Systems	10-5-2 Waste Heat Harvesting and Energy Conversion	10-15-1 Thermal Conductivity Accumulation: Measurement and Prediction

Thursday, November 20				
	7:45am–9:15am	9:30am–11:15am	1:00pm–2:45pm	3:00pm–4:45pm
512A	14-1-1 General Topics in Systems, Design, and Complexity I	14-1-2 General Topics in Systems, Design, and Complexity II	14-3-1 Product and Process Design I	14-3-3 Product and Process Design II
512B	14-6-1 Systems, Design and Complexity	14-2-1 Design Innovations, Methodologies and Philosophies I	14-2-2 Design Innovations, Methodologies and Philosophies II	14-2-3 Design Innovations, Methodologies and Philosophies III
512C	14-5-1 Optimization I	14-5-2 Optimization II	14-4-1 CAD, CAM and CAE	
512E	11-33-1 Fatigue and Fracture of Joining Methods for Lightweight Materials I	14-1-3 Plenary Session	11-33-2 Fatigue and Fracture of Joining Methods for Lightweight Materials II	
513D	11-25-1 Modeling and Experimental Characterization for the Behavior of the Micro/ Nanostructured Thin Films I	11-12-1 Processing Structure Property Relationships of Polymers and Composites 1	11-12-2 Processing-Structure-Property Relationships of Polymers and Composites 2	
513E	2-2-4 Nanomanufacturing: Novel Synthesis and Assembly of Carbon Nanostructures	2-12-1 Sustainable Materials and Processes	2-13-1 Visualization, Informatics, and Digital Manufacturing Technologies	2-14-1 Pharmaceutical & Biomedical-Related Processes
512A	14-1-1 General Topics in Systems, Design, and Complexity I	14-1-2 General Topics in Systems, Design, and Complexity II	14-3-1 Product and Process Design I	14-3-3 Product and Process Design II
512B	14-6-1 Systems, Design and Complexity	14-2-1 Design Innovations, Methodologies and Philosophies I	14-2-2 Design Innovations, Methodologies and Philosophies II	14-2-3 Design Innovations, Methodologies and Philosophies III
512C	14-5-1 Optimization I	14-5-2 Optimization II	14-4-1 CAD, CAM and CAE	
512E	11-33-1 Fatigue and Fracture of Joining Methods for Lightweight Materials I	14-1-3 Plenary Session	11-33-2 Fatigue and Fracture of Joining Methods for Lightweight Materials II	
513D	11-25-1 Modeling and Experimental Characterization for the Behavior of the Micro/ Nanostructured Thin Films I	11-12-1 Processing Structure Property Relationships of Polymers and Composites 1	11-12-2 Processing-Structure-Property Relationships of Polymers and Composites 2	
513E	2-2-4 Nanomanufacturing: Novel Synthesis and Assembly of Carbon Nanostructures	2-12-1 Sustainable Materials and Processes	2-13-1 Visualization, Informatics, and Digital Manufacturing Technologies	2-14-1 Pharmaceutical & Biomedical-Related Processes

Thursday, November 20				
	7:45am–9:15am	9:30am–11:15am	1:00pm–2:45pm	3:00pm–4:45pm
514A	11-14-1 Experimental Methods and Processing in Hierarchical and Multi-Scale Materials	11-14-2 Innovative Modeling and Simulations	11-14-3 Hierarchical Composite Material Systems	11-14-4 Innovative Hierarchical Composite Materials
514B	11-18-1 Phase Transformation and Microstructural Evolution	11-18-2 Phase Transformation, Solidification and Casting		
514C	11-6-1 Biomimetic Materials	11-8-1 Modeling of Multifunctional Materials	11-8-2 Modeling of Multifunctional Materials	
516C	2-10-1 Computational Modeling and Simulation for Advanced Manufacturing I	2-10-2 Computational Modeling and Simulation for Advanced Manufacturing II	2-10-3 Computational Modeling and Simulation for Advanced Manufacturing III	2-10-4 Computational Modeling and Simulation for Advanced Manufacturing IV
516D	2-15-1 Advanced End-to-End manufacturing	2-15-2 Advanced Product Design	2-11-1 Robotic Machining Processes	2-11-2 Machining Processes
516E	2-16-1 Bolted Joints Technology	2-16-2 Welding Technology	2-16-3 Advances in Testing and Analysis	2-8-1 Advanced Sensing, Measurement, and Process Control in Manufacturing
518A	7-5-1 Energy Systems Components 1	7-5-2 Energy Systems Components 2	7-18-1 Novel Systems, Solar Cells and Materials	7-18-2 Solar Tracking, Concentration for PV and Hybrid PV Modules
518B	7-4-3 Advanced Power Generation and District Heating	7-4-4 Design and Analysis of Energy Systems	7-23-1 Energy Storage and Applications	7-23-2 Energy Conversion
518C	7-7-5 Modeling and Simulation	7-15-1 Thermal Energy Storage I	7-15-2 Thermal Energy Storage II	7-15-3 Thermal Energy Storage III
519A		7-20-4 Biofuels Production	7-20-5 Biofuels Combustion	7-20-6 Biofuels Combustion - II
519B	7-13-1 Solar and Advanced Energy Applications	7-21-1 Blade/Rotor Design & Modeling	7-21-2 Wind Turbine Modeling	7-21-3 Wind Farm Optimization
520A	7-10-1 Low Temperature Fuel Cells	7-10-2 High Temperature Fuel Cells	7-25-1 Energy and the Environment 1	7-6-1 Design and Analysis of Combined Cycles, CHP & CCHP
520B	7-24-1 Energy-Water Nexus 1	7-24-2 Energy-Water Nexus 2	7-24-3 A Call for Better Data Collection and Stress Metrics for Integrated Resource Management	7-26-1 Carbon Capture
520C	16-5-3 Effective Properties and Cloaking	16-5-4 2D Structures and Bravais Lattices	16-5-5 Wave Manipulation	16-5-6 Nano and Bio Systems

Thursday, November 20				
	7:45am–9:15am	9:30am–11:15am	1:00pm–2:45pm	3:00pm–4:45pm
520D	10-45-1 Validation, Verification, and Uncertainty Quantification in Computational Heat Transfer I	16-5-7 Tunability and Optimization	16-5-8 Computation and Fabrication	7-16-1 Building Integrated Solar Technologies
520E	4-5-3 Design and Control of Robots, Mechanisms and Structures III	4-5-4 Design and Control of Robots, Mechanisms and Structures IV	4-5-5 Design and Control of Robots, Mechanisms and Structures V	4-5-6 Design and Control of Robots, Mechanisms and Structures VI
520F	4-2-3 Nonlinear Dynamics, Control, and Stochastic Mechanics III	4-8-1 Vibration, Noise Control and Damping Technologies I	4-8-2 Vibration, Noise Control and Damping Technologies II	4-6-3 Linear Multivariable Control
521A	4-11-1 Novel Control of Dynamic System and Design I	4-11-2 Novel Control of Dynamic System and Design II	4-4-2 Dynamics Modeling, Theory and Application II	
521B	10-35-1 Thermal Management of Electronic Devices	4-7-3 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems - III	10-17-1 Nanoscale Thermal Metrology I: Thermoreflectance-Based Techniques	10-31-1 Thermal Management of Data Centers and Computer Devices
521C	10-11-1 Fundamentals of Single Phase Convection -1	10-11-2 Fundamentals of Single Phase Convection -2	10-11-3 Fundamentals of Single Phase Convection -3	
522A	10-14-1 Fundamentals of Multiscale Modeling I	10-14-2 Fundamentals of Multiscale Modeling II	10-39-1 Heat and Mass Transfer in Indoor Environment	10-39-2 Heat and Mass Transfer in the Ground and Buildings
522B	10-24-1 Combustion and Fire Simulation, Modeling, and Experimental Techniques I	10-24-2 Combustion and Fire Simulation, Modeling, and Experimental Techniques II	10-24-3 Combustion and Fire Simulation, Modeling, and Experimental Techniques III	10-29-1 Transport Phenomena in Manufacturing (Including Additive) and Materials Processing
522C	10-41-1 Inverse Problems and Optimal Design in Computational Heat Transfer I	10-12-1 Fundamentals of Radiative Transport including Nanoscale Effects	10-12-2 Fundamentals of Radiative Transport including Nanoscale Effects -2	10-40-1 Thermal Systems for Energy Efficiency and Water Conservation
523A	10-42-1 Applications of Natural Convection in Computational Heat Transfer	10-42-2 Computational Heat Transfer Methods and Applications	10-42-3 Applications of Computational Fluid Dynamics and Heat Transfer	10-42-4 Applications of Computational Heat Transfer
523B	11-2-1 Nanostructured Materials	4-10-1 Smart Structures and Structronic Systems: Sensing, Energy Generation and Control I	4-10-2 Smart Structures and Structronic Systems: Sensing, Energy Generation and Control II	

TRACK 1: ADVANCES IN AEROSPACE TECHNOLOGY

1-2 Advances in Aerodynamics

1-2-1: Advances in Aerodynamics I

1-2-2: Advances in Aerodynamics II

1-5 Aircraft Modeling and Simulation

1-5-1: Aircraft Modeling and Simulation

1-6 Combustion and Engine Operation

1-6-1: Combustion and Engine Operation

1-7 Aerospace Structures and Materials

1-7-1: Materials for Extreme Environments

1-7-2: Environmental Effects of Aerospace Structures and Materials

1-7-3: Design & Analysis of Aerospace Structures and Materials

1-7-4: Lifing and Prognosis of Aerospace Structures and Materials

1-7-5: Composite Structures

1-8 Lightweight Sandwich Composites and Layered Structures

1-8-1: Lightweight Sandwich Composites and Layered Structures

1-9 Peridynamics Modeling

1-9-1: Peridynamics Modeling I

1-9-2: Peridynamics Modeling II

1-10 Propulsion

1-10-1: Propulsion

1-11 Turbine and Blade Aerodynamics and Performance

1-11-1: Turbine and Blade Aerodynamics and Performance I

1-11-2: Turbine and Blade Aerodynamics and Performance II

1-12 Next-Generation Aircraft Technologies

1-12-1: Next-Generation Aircraft Technologies I

1-12-2: Next-Generation Aircraft Technologies II

1-13 Aeromechanics and Aeroelasticity

1-13-1: Wing Aeroelasticity

1-14 Plenary

1-14-1: Plenary Session I

1-14-2: Plenary Session II

ACKNOWLEDGMENT

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TRACK 1 ADVANCES IN AEROSPACE TECHNOLOGY

Monday, November 17

1-2 Advances in Aerodynamics

1-2-1 Advances in Aerodynamics I

516E 9:45am–11:30am

Session Organizer: José C. Páscoa, *Universidade Da Beira Interior, Covilhã, Portugal*

Session Co-Organizers: Michele Trancossi, *UNIMORE, PR, Italy*, Carlos M. Xisto, *Universidade da Beira Interior, Covilhã, Portugal*

9:45am – Design of Centrifugal Compressor Using CFD (Preliminary Design and Geometry Generation)

Technical Paper Publication. IMECE2014-36051

Kannadi Vattakat Muralidharan, *MVJ College of Engineering, Bangalore, Karnataka, India*

10:06am – Cycloidal Rotor Propulsion System With Plasma-Enhanced Aerodynamics

Technical Paper Publication. IMECE2014-38291

Carlos M. Xisto, José C. Páscoa, Jakson A. Leger, *Universidade da Beira Interior, Covilhã, Portugal*

10:27am – Frequency Analysis of a Trailing Vortex Flow Subjected to External Turbulence

Technical Paper Publication. IMECE2014-37699

Mojtaba Ahmadi-Baloutaki, Rupp Carriveau, David S.-K. Ting, *University of Windsor, Windsor, ON, Canada*

10:48am – On the Vortex Breakdown Phenomenon in High Angle of Attack Flows Over Delta Wing Geometries

Technical Paper Publication. IMECE2014-39354

Eric Robertson, Varun Chitta, D. Keith Walters, Shanti Bhushan, *Mississippi State University, Starkville, MS, United States*

11:09am – Development of a Variable-Diameter Synthetic Jet Actuator

Technical Paper Publication. IMECE2014-36936

Spencer Albright, Stephen Solovitz, *Washington State University, Vancouver, WA, United States*

1-5 Aircraft Modeling and Simulation

1-5-1 Aircraft Modeling and Simulation

513E 9:45am–11:30am

Session Organizer: Ruxandra Botez, *École de Technologie Supérieure, Montreal, QC, Canada*

9:45am – Conceptual Design of a 200-Passenger Blended Wing Body Aircraft

Technical Paper Publication. IMECE2014-36676

Sami Ammar, Jean-yves Trepanier, *École Polytechnique Montreal, Montreal, QC, Canada*

9:58am – Application of a Morphing Wing Technology on Hydra Technologies Unmanned Aerial System UAS-S4

Technical Paper Publication. IMECE2014-37619

Oliviu Sugar Gabor, Antoine Simon, Andreea Koreanschi, Ruxandra Botez, *École de Technologie Supérieure, Montreal, QC, Canada*

10:11am – Towards Lightweight Structures Based on Tensairity Concept for Lighter-Than-Air Vehicles

Technical Paper Publication. IMECE2014-38174

Anna Suñol Jiménez, Dean Vucinic, Lars De Laet, *Vrije Universiteit Brussel, Brussels, Belgium*

10:24am – CFD-Based Aerodynamic Analysis of Damaged Delta Wings

Technical Paper Publication. IMECE2014-38420

Charbel Bou-Mosleh, *Notre Dame University–Louaize, Zouk Mosbeh, Lebanon*, **Samir Patel**, *HighVista Strategies, Boston, MA, United States*

10:37am – New Methodology for the Calculation of Aerodynamic Coefficients on ATR-42 Scaled Model With Neural Network—EGD Method

Technical Paper Publication. IMECE2014-38865

Abdallah Ben Mosbah, Ruxandra Botez, Thien-My Dao, *École de Technologie Supérieure, Montreal, QC, Canada*

10:50am – “Cut-Glue” Approximation in Problems on Static and Dynamic Mathematical Model Development

Technical Paper Publication. IMECE2014-37236

Rudolf Neydorf, *Don State Technical University, Rostov on Don, Russia*

1-11 Turbine and Blade Aerodynamics and Performance

1-11-1 Turbine and Blade Aerodynamics and Performance I
516D **9:45am–11:30am**

Session Organizer: Albert Ratner, *University of Iowa, Iowa City, IA, United States*

9:45am – Numerical Investigation on the Performance of Novel Sister Shaped Single-Hole Configurations for Film Cooling Flow

Technical Paper Publication. IMECE2014-36263
Siavash Khajehhasani, Bassam A. Jubran, Ryerson University, Toronto, ON, Canada

10:02am – Numerical Investigation of Loss Coefficient Variation in Various Incidence Angles in Tandem Blades Cascade

Technical Paper Publication. IMECE2014-39881
Arash Soltani Dehkharghani, Masoud Boroomand, Hamzeh Eshraghi, Amirkabir University of Technology, Tehran, Iran

10:19am – 3D-Modeling and Simulation Physicochemical Transformations for High-Pressure Turbine (HPT) of an Aircraft Engine

Extended Abstract Publication. IMECE2014-40190
Trung Hieu Nguyen, François Garnier, École de Technologie Supérieure, Montréal, QC, Canada

10:36am – Improved Turbulence and Transition Prediction for Turbomachinery Flows

Technical Paper Publication. IMECE2014-36866
Christoph Bode, Thorben Aufderheide, Jens Friedrichs, Technische Universitaet Braunschweig, Braunschweig, Germany, Dragan Kozulovic, HAW Hamburg, Hamburg, Germany

11:53am – Design and Analysis of a Highly Loaded Tandem Axial Flow Compressor Stage

Technical Paper Publication. IMECE2014-39750
Hamzeh Eshraghi, Masoud Boroomand, Abolghasem Mesgarpour Tousi, Amirkabir University of Technology, Tehran, Iran

11:10am – Secondary Flow Control on Axial Flow Compressor Cascade Using Vortex Generators

Technical Paper Publication. IMECE2014-37790
Mahmoud Ahmed, Ahmed Diaa, Omar Abdel-Hafez, Mohamed El-Dosoky, Assiut University, Assiut, Egypt

1-14 Plenary

1-14-1 Plenary Session I

516C **9:45am–11:30am**

Session Organizer: Olesya Zhupanska, *University of Iowa, Iowa City, IA, United States*

9:45am – On the Geometrical Nonlinear Response of Sandwich Panels With a Compliant Core—A High-Order Approach Plenary Presentation. IMECE2014-40373

Yeoshua Frostig, Technion—Israel Institute of Technology, Haifa, Israel

1-2 Advances in Aerodynamics

1-2-2 Advances in Aerodynamics II

516E **1:00pm–2:45pm**

Session Organizer: José C. Páscoa, *Universidade Da Beira Interior, Covilhã, Portugal*

Session Co-Organizers: Carlos M. Xisto, *Universidade da Beira Interior, Covilhã, Portugal*, Michele Trancossi, *Unimore, PR, Italy*

1:00pm – Exit Flow Vector Control on a Coanda Nozzle Using Dielectric Barrier Discharge Actuator

Technical Paper Publication. IMECE2014-38915
José C. Páscoa, Frederico Rodrigues, Shyam Sumanta Das, Mahdi Abdollahzadeh, Universidade da Beira Interior, Covilhã, Portugal, Antonio Dumas, Università di Modena e Reggio Emilia, RE, Italy, Michele Trancossi, UNIMORE, PR, Italy, Maharshi Subhash, Università degli Studi di Modena Reggio-Emilia, Reggio-Emilia, Italy

1:17pm – Wind Energy Production Using an Optimized Variable Pitch Vertical Axis Rotor

Technical Paper Publication. IMECE2014-38966
Carlos M. Xisto, José C. Páscoa, Michele Trancossi, UNIMORE, PR, Italy, Jakson A. Leger, Universidade da Beira Interior, Covilhã, Portugal

1:34pm – Analysis of Fluid Motion in Dynamic Stall and Forced Cylinder Flow Using Koopman Operator Methods

Technical Paper Publication. IMECE2014-39146
Bryan Glaz, ARL, Aberdeen Proving Ground, MD, United States, Maria Fonoberova, Sophie Loire, Aimdyn, Inc., Santa Barbara, CA, United States, Igor Mezić, University of California, Santa Barbara, Santa Barbara, CA, United States

1:51pm – Flow Structure on a Retreating Rotor Blade at High Advance Ratios

Technical Paper Publication. IMECE2014-37593
Michael Mayo, Vrishank Raghav, Natasha Barbely, Brandon Liberi, Narayanan Komerath, *Georgia Institute of Technology, Atlanta, GA, United States*

2:08pm – Evaluation of a Parallel Agglomeration Multigrid Finite-Volume Algorithm, Named Galatea-I, for the Simulation of Incompressible Flows on 3D Hybrid Unstructured Grids

Technical Paper Publication. IMECE2014-39759
Sotirios S. Sarakinos, Georgios N. Lygidakis, Ioannis K. Nikolos, *Technical University of Crete, Chania, Greece*

2:25am – Using the DLR-F6 Aircraft Model for the Evaluation of the Academic CFD Code “Galatea”

Technical Paper Publication. IMECE2014-39756
Georgios N. Lygidakis, Ioannis K. Nikolos, *Technical University of Crete, Chania, Greece*

1-7 Aerospace Structures and Materials**1-7-1 Materials for Extreme Environments**

516C 1:00pm–2:45pm

Session Organizer: **Olesya Zhupanska**, *University of Iowa, Iowa City, IA, United States*

1:00pm – A Multiscale Viscoelastic Cohesive Layer Model for Predicting Delamination in HTPMC

Technical Paper Publication. IMECE2014-36397
Samit Roy, Priyank Upadhyaya, *University of Alabama, Tuscaloosa, AL, United States*, **Mohammad Haque, Hongbing Lu**, *University of Texas at Dallas, Richardson, TX, United States*

1:17pm – Effective Mechanical Properties of C/C Composites

Technical Paper Publication. IMECE2014-36583
Aswathi Sudhir, *Indian Institute of Science, Bangalore, India*, **M.N. Abhilash**, *Aerospace Engineering, Bangalore, Karnataka, India*, **Suhasini Gururaja**, *Indian Institute of Science, Karnataka, India*

1:34pm – Understanding Grain Boundary Embrittlement and Its Correlation With Polycrystalline Material Fracture

Technical Presentation. IMECE2014-36622
Hongsuk Lee, Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

1:51pm – Thermostructural Analyses Supporting the Design of the HYPROB Heat Sink Subscale Breadboard

Technical Paper Publication. IMECE2014-36882
Michele Ferraiuolo, Adolfo Martucci, Francesco Battista, Daniele Ricci, *Centro Italiano Ricerche Aerospaziali–CIRA, Capua, Caserta, Italy*

2:08pm – Thermomechanical Behavior of Spatially Tailored Functionally Graded Materials in a High-Temperature Environment

Technical Presentation. IMECE2014-37371
Phillip Deierling, Olesya Zhupanska, *University of Iowa, Iowa City, IA, United States*, **Crystal Pasillio**, *Air Force Research Laboratory, Eglin AFB, FL, United States*

2:25pm – First-Principles Predictions of Thermal Stability and Expansion Coefficients of Rare Earth Zirconate Pyrochlores

Technical Presentation. IMECE2014-39914
Lan Guoqiang, Jun Song, *McGill University, Montréal, QC, Canada*

1-10 Propulsion**1-10-1 Propulsion**

513E 1:00pm–2:45pm

Session Organizer: **Lea-Der Chen**, *Texas A&M University–Corpus Christi, Corpus Christi, TX, United States*

1:00pm – RQL Combustion as an Effective Strategy to NOx Reduction in Gas Turbine Engines

Technical Paper Publication. IMECE2014-36898
Antonella Ingenito, Antonio Agresta, Fausto Gamma, *University of Rome “La Sapienza,” Rome, Italy*, **Roberto Andriani**, *Politechnical University of Milan, Milan, Italy*

1:21pm – Redesign of the B-1B Bomber Inlets for Improved Supersonic Performance

Technical Paper Publication. IMECE2014-36989
Lee Berra, *USAF, Black Hawk, SD, United States*, **Semih Olcmen**, *University of Alabama, Tuscaloosa, AL, United States*, **John W. Slater**, *NASA John H. Glenn Research Center, Cleveland, OH, United States*

1:42pm – Viscous Effects on Performance of Linear Plug Micronozzles

Technical Paper Publication. IMECE2014-37612
Jason Pearl, William F. Louisos, Darren Hitt, *University of Vermont, Burlington, VT, United States*

2:03pm – Generation of Intake Distortion Due to Angle of Attack for a High Bypass Turbofan Model

Technical Paper Publication. IMECE2014-38097

Jan-Hendrik Krone, Jens Friedrichs, *Technische Universität Braunschweig, Braunschweig, Germany*

2:24pm – Numerical Study of High-Temperature and High-Velocity Gaseous Hydrogen Flow in a Cooling Channel of a Nuclear Thermal Rocket Core

Technical Paper Publication. IMECE2014-38438

Kazim Akyuzlu, *University of New Orleans, New Orleans, LA, United States*

1-11 Turbine and Blade Aerodynamics and Performance

1-11-2 Turbine and Blade Aerodynamics and Performance II

516D

1:00pm–2:45pm

Session Organizer: Albert Ratner, *University of Iowa, Iowa City, IA, United States*

1:00pm – Multidisciplinary Design Optimization of Transonic Fan Blade Design Using Analytical Target Cascading

Technical Paper Publication. IMECE2014-36903

Saima Naz, Jean-yves Trepanier, Christophe Tribes, Eddy Petro, *École Polytechnique de Montréal, Montreal, QC, Canada*, Jason Nichols, *Pratt & Whitney Canada, Mississauga, ON, Canada*

1:17pm – Multiobjective and Multipoint Aerodynamic Optimization of Transonic Fan Blades

Technical Paper Publication. IMECE2014-39079

Maryam Khelghatibana, Jean-yves Trepanier, Christophe Tribes, *École Polytechnique de Montréal, Montreal, QC, Canada*, Jason Nichols, *Pratt & Whitney Canada, Mississauga, ON, Canada*

1:34pm – Effects of Blade Leading Edge Fillet on Near Wall Pressure and Heat Transfer in a Linear Turbine Cascade

Technical Paper Publication. IMECE2014-39768

Gazi Mahmood, *University of Pretoria, Pretoria, Gauteng, South Africa*, Sumanta Acharya, *Louisiana State University, Baton Rouge, LA, United States*

1:51pm – Optimal Design and Aerodynamic Study of Leaned Transonic Axial Flow Fan Rotors

Technical Paper Publication. IMECE2014-39796

Seyed reza Razavi, Masoud Boroomand, Amirkabir *University of Technology, Tehran, Iran*

2:08pm – Design and Internal Flow Analysis of a Ducted Contra-Rotating Axial Flow Fan

Technical Paper Publication. IMECE2014-39883

Ali Mohammadi, Masoud Boroomand, *Amirkabir University of Technology, Tehran, Iran*

2:25 – Transient Response of Jet Engine Subject to Fan Blade-Off

Technical Presentation. IMECE2014-39587

Shaker Meguid, Prayers Roy, *University of Toronto*

1-6 Combustion and Engine Operation

1-6-1 Combustion and Engine Operation

516E

3:00pm–4:45pm

Session Organizer: Albert Ratner, *University of Iowa, Iowa City, IA, United States*

3:00pm – Effect of Secondary Air Configuration on Gas Turbine Combustor Firing Natural Gas

Technical Paper Publication. IMECE2014-36255

Ahmed Farag, Akram Zaid, *Arab Acadmy for Marine Transport, Alexandria, Egypt*, Tarek Belal, *Pharos University, Alexandria, Egypt*

3:17pm – Numerical Investigation of High Speed Combustion and Its Impact on Thermal Structure

Technical Paper Publication. IMECE2014-36830

Litao Zhang, Lili Zheng, Lingyun Hou, *Tsinghua University, Beijing, China*

3:34pm – Thermostructural and Thermofluid Dynamics Analyses Supporting the Design of the Cooling System of a Methane Liquid Rocket Engine

Technical Paper Publication. IMECE2014-36998

Daniele Ricci, Michele Ferraiuolo, Francesco Battista, Vito Salvatore, Pietro Roncioni, *Centro Italiano Ricerche Aerospaziali, Capua, (CE), Italy*

3:51pm – Transient Two-Phase Effects in an Aeroengine Bearing Chamber Scavenge Test Rig

Technical Paper Publication. IMECE2014-37554
Budi Chandra, *Surya University, Banten, Indonesia*, **Kathy Simmons**, *University of Nottingham, Nottingham, United Kingdom*

4:08pm – Thermodynamic Nondimensional Model to Estimate the Emitted Greenhouse Gases of a Turbofan Engine at Flight Altitude

Technical Paper Publication. IMECE2014-39748
Hamzeh Eshraghi, Ali Ghaseminezhad, Masoud Boroomand, Abolghasem Mesgarpour Tousi, *Amirkabir University of Technology, Tehran, Iran*

4:25pm – Investigation and Improvement of Thermal Efficiency of Hypersonic Scramjet

Technical Paper Publication. IMECE2014-37385
Mohammad Arif Hossain, MD. Taibur Rahman, Sarzina Hossain, *University of Texas at El Paso, El Paso, TX, United States*, **Mohammad Ikthair Hossain Soiket**, *McGill University, Montreal, QC, Canada*

1-7 Aerospace Structures and Materials

1-7-2 Environmental Effects of Aerospace Structures and Materials

516C **3:00pm–4:45pm**

Session Organizer: Vikas Tomar, *Purdue University, West Lafayette, IN, United States*
Session Co-Organizer: Ramazan Asmatulu, *Wichita State University, Wichita, KS, United States*

3:00pm – Effects of UV Light and Moisture Absorption on the Impact Resistance of Three Different Carbon Fiber-Reinforced Composites

Technical Paper Publication. IMECE2014-39999
Ramazan Asmatulu, Jithin M. George, Vamsidhar R. Patlolla, Soo-han Loo, *Wichita State University, Wichita, KS, United States*

3:17pm – Moisture Absorption of Composite Sandwich Structures

Technical Paper Publication. IMECE2014-39956
Todd Coburn, *California State Polytechnic University Pomona, La Habra Heights, CA, United States*

3:34pm – Silanized Graphene-Based Nanocomposite Coatings on Fiber-Reinforced Composites Against the Environmental Degradations

Technical Paper Publication. IMECE2014-39818
Ramazan Asmatulu, Daouda Diouf, *Wichita State University, Wichita, KS, United States*

3:51pm – Development and Oxidation Test of Metal Mesh-Reinforced Ceramic Composite Material

Technical Paper Publication. IMECE2014-36827
Mitch Kibsey, Xiao Huang, *Carleton University, Ottawa, ON, Canada*

4:08pm – Graphene Thin Films on Fiber-Reinforced Epoxy Composites for Improved Fire Retardancy

Technical Paper Publication. IMECE2014-39817
Ramazan Asmatulu, Louie Le, Bangwei Zhang, *Wichita State University, Wichita, KS, United States*

4:25pm – Experimental Investigation to Study Cutting Temperature During Milling of Unidirectional Carbon Fiber-Reinforced Plastic

Technical Paper Publication. IMECE2014-36767
Seyedbehzad Ghafarizadeh, Jean-François Chatelain, *École de Technologie Supérieure, Montreal, QC, Canada*, **Gilbert Lebrun**, *Université du Québec à Trois-Rivières, Trois-Rivières, QC, Canada*

1-7-3 Design & Analysis of Aerospace Structures and Materials

516D **3:00pm–4:45pm**

Session Organizer: Zahra Sotoudeh, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:00pm – Combined Static and Dynamic Optimization of a Gas Turbine Disk

Technical Paper Publication. IMECE2014-38992
Li Jun, Fan Ning, Zhao Xuecheng, *Beijing Power Machinery Institute, Beijing, Beijing, China*

3:15pm – Fully Coupled Dynamic Analysis of Electromagnetomechanical Problems in Electrically Conductive Composite Plates

Technical Paper Publication. IMECE2014-37377
Dmitry Chernikov, Olesya Zhupanska, *University of Iowa, Iowa City, IA, United States*

3:30pm – Three-Dimensional Microstructures Printed With Polyvinylidene Fluoride

Technical Presentation. IMECE2014-38490

Sampada Bodkhe, Daniel Therriault, *École Polytechnique de Montreal, Montreal, QC, Canada*

3:45pm – Analysis of Complex Structure Coupling Variable Kinematics One-Dimensional Models

Technical Paper Publication. IMECE2014-37961

Erasmus Carrera, Enrico Zappino, *Politecnico di Torino, Torino, Italy*

4:00pm – Micromechanics Approach to Homogenizing Damaged Elastoplastic Heterogeneous Materials

Technical Presentation. IMECE2014-39101

Liang Zhang, Wenbin Yu, *Purdue University, West Lafayette, IN, United States*

4:15pm – Ultimate Strength of Aircraft Structures

Technical Paper Publication. IMECE2014-39986

Todd Coburn, *California State Polytechnic University Pomona, La Habra Heights, CA, United States*

4:30pm – Preliminary Design and Analysis Tool for Aeroengines Turbine Fixings

Technical Paper Publication. IMECE2014-39039

Abdulhalim Twahir, Hany Moustapha, *École de Technologie Supérieure, Montreal, QC, Canada*, **François Roy**, *Pratt & Whitney, Longueuil, QC, Canada*, **Magdy Attia**, *Embry Riddle Aeronautical University, Daytona Beach, FL, United States*

Tuesday, November 18

1-9 Peridynamics Modeling

1-9-1 Peridynamics Modeling I

516D

9:45am–11:30am

Session Organizer: Erdogan Madenci, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: Erkan Oterkus, *University of Strathclyde, Glasgow, United Kingdom*

9:45am – Asymptotically Compatible Schemes for Peridynamics Based on Numerical Quadratures

Extended Abstract Publication. IMECE2014-39620

Qiang Du, Xiaochuan Tian, *Pennsylvania State University, University Park, PA, United States*

10:02am – Ordinary State-Based Peridynamic Truss Element

Technical Presentation. IMECE2014-37288

Erdogan Madenci, Atila Barut, Mehmet Dorduncu, *University of Arizona, Tucson, AZ, United States*

10:19am – Crack Branching in Dynamic Brittle Fracture: Results From a Peridynamic Approach

Technical Presentation. IMECE2014-37697

Florin Bobaru, Guanfeng Zhang, *University of Nebraska-Lincoln, Lincoln, NE, United States*

10:36am – Ordinary State-Based Plasticity Model for Peridynamics

Technical Presentation. IMECE2014-40057

John A. Mitchell, *Sandia National Laboratories, Albuquerque, NM, United States*, **John T. Foster**, *University of Texas at San Antonio, San Antonio, TX, United States*

10:53am – Peridynamic Beams and Plates: A Non-Ordinary State Based Model

Technical Paper Publication. IMECE2014-39887

James O’Grady, John T. Foster, *University of Texas at San Antonio, San Antonio, TX, United States*

11:10am – Nonlocal Mindlin Plate Formulation in Peridynamics

Technical Presentation. IMECE2014-37564

Cagan Diyaroglu, Erkan Oterkus, *University of Strathclyde, Glasgow, United Kingdom*, **Selda Oterkus, Erdogan Madenci**, *University of Arizona, Tucson, AZ, United States*

1-12 Next-Generation Aircraft Technologies

1-12-1 Next-Generation Aircraft Technologies I

516E

9:45am–11:30am

Session Organizer: Pier Marzocca, *Clarkson University, Potsdam, NY, United States*

9:45am – Novel Active Control Strategy for LCO and Flutter Suppression by a Coordinated Use of Multiple Distributed Surface Actuators

Technical Paper Publication. IMECE2014-36905

Mario Cassaro, *Politecnico di Torino, Torino, Italy*, **Pier Marzocca**, *Clarkson University, Potsdam, NY, United States*, **Manuela Battipede**, *Politecnico di Torino, Torino, Italy*, **András Nagy**, *Budapest University of Technology and Economics, Budapest, Hungary*, **Goodarz Ahmadi**, *Clarkson University, Potsdam, NY, United States*

10:02am – Analysis of Performances of a Semi-Active Suspension Implemented on a Landing Gear

Technical Paper Publication. IMECE2014-37024

Marta Ocaña, *Eva Novillo*, *Esteban Morante*, *Eduardo Chamorro*, *Compañía Española de Sistemas Aeronáuticos (CESA), Madrid, Spain*

10:19am – Integrating Soft Actuators With Three-Dimensionally Printed Airfoils to Control Aerodynamic Performance

Technical Presentation. IMECE2014-37327

Jingjin Xie, *James McGovern*, *Rutvij Patel*, *Woobiehn Kim*, *Aaron Mazzeo*, *Rutgers University, Piscataway, NJ, United States*

10:36am – SJA-Based Robust Nonlinear Control of Airfoil Gust-Induced LCO

Technical Paper Publication. IMECE2014-38215

Vladimir Golubev, *Lap Nguyen*, *William MacKunis*, *Natalie Ramos*, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*

10:53am – Deployable Membrane Wing for Micro Aerial Vehicle Applications

Technical Paper Publication. IMECE2014-38581

Igor Petrovic, *University of Ljubljana, Ljubljana, Slovenia*, **Sean P. Shea**, *Ian P. Smith*, *Clarkson University, Potsdam, NY, United States*, **Franc Kosel**, *University of Ljubljana, Ljubljana, Slovenia*, **Pier Marzocca**, *Clarkson University, Potsdam, NY, United States*

11:10am – Development of an Aeroelastic Wing Model With Piezoelectric Elements for Gust Load Alleviation and Energy Harvesting

Technical Paper Publication. IMECE2014-38851

Claudia Bruni, *Enrico Cestino*, *Giacomo Frulla*, *Politecnico di Torino, Turin, Turin, Italy*, **Pier Marzocca**, *Clarkson University, Potsdam, NY, United States*

1-14 Plenary

1-14-2 Plenary Session II

516C

9:45am–

11:30am

Session Organizer: Olesya Zhupanska, *University of Iowa, Iowa City, IA, United States*

9:45am – Advances in Aerospace Morphing Structures With Shape Memory Alloy Actuators

Plenary Presentation. IMECE2014-40890

Dimitris Lagoudas, *Texas A&M University, College Station, TX, United States*

1-7 Aerospace Structures and Materials

1-7-4 Lifting and Prognosis of Aerospace Structures and Materials

516C

1:00pm–2:45pm

Session Organizer: Ozden Ochoa, *Texas A&M University, College Station, TX, United States*

1:00pm – Micromechanical Approach to Static Failure Prediction of Heterogeneous Materials

Extended Abstract Presentation. IMECE2014-39196

Hamsasew Sertse, *Wenbin Yu*, *Purdue University, West Lafayette, IN, United States*

1:21pm – Affine Formulation of the Constitutive Relations for Damaged Elasto-Viscoplastic Materials

Technical Presentation. IMECE2014-39103

Liang Zhang, *Wenbin Yu*, *Purdue University, West Lafayette, IN, United States*

1:42pm – High-Fidelity Computed Tomography Validation of Progressive Damage Evolution in Notched-Tension PMC Specimens by A-FEM Analysis

Technical Presentation. IMECE2014-36266

Qingda Yang, *University of Miami, Coral Gables, FL, United States*

2:03pm – Bonded Composite Repairs on Cracked Plates in Aluminum Alloy 2024T3

Technical Paper Publication. IMECE2014-36316

Faycal Benyahia, Abdulmohsen Albedah, King Saud University, Riyadh, Saudi Arabia, Bel Abbes Bachir Bouiadjra, University of Sidi Bel Abbes, Sidi Bel Abbes, Algeria

2:24pm – Integrating Thin Piezoelectric Sensors Network Into Hybrid Interfaces Between Shape Memory Alloy–Woven Fabric Polymer Matrix Composites and Experimental Investigations

Technical Presentation. IMECE2014-39097

Hieu Truong, Texas A&M University, College Station, TX, United States, Yu-Hung Li, Fu-kuo Chang, Stanford University, Stanford, CA, United States, Ozden Ochoa, Dimitris Lagoudas, Texas A&M University, College Station, TX, United States

1-9 Peridynamics Modeling

1-9-2 Peridynamics Modeling II

516D

1:00pm–2:45pm

Session Organizer: Erdogan Madenci, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: Erkan Oterkus, *University of Strathclyde, Glasgow, United Kingdom*

1:00pm – Simulation of Wave Propagation and Impact Damage in Brittle Materials Using the Peridynamics Technique

Technical Presentation. IMECE2014-38772

Patrick Diehl, Marc Alexander Schweitzer, University of Bonn, Bonn, Germany

1:21pm – Ordinary State-Based Peridynamic Modeling of Hyperelastic Materials

Technical Presentation. IMECE2014-38487

Dong Jun Bang, University of Arizona, Tucson, AZ, United States, Mehmet Ali Guler, TOBB University of Economics and Technology, Ankara, Turkey, Erdogan Madenci, University of Arizona, Tucson, AZ, United States

1:42pm – Influence of Notch-Size in Interersonic Crack Propagation in Unidirectional FRC: A Peridynamic Approach

Technical Presentation. IMECE2014-36817

Florin Bobaru, Yenan Wang, University of Nebraska–Lincoln, Lincoln, NE, United States

2:03pm – Statistical Physics of Discrete Peridynamics

Technical Presentation. IMECE2014-40205

Rezwanur Rahman, John T. Foster, University of Texas at San Antonio, San Antonio, TX, United States

2:24pm – Integration of Peridynamics in Flexible Multibody Dynamics

Technical Presentation. IMECE2014-37294

Atila Barut, Erdogan Madenci, University of Arizona, Tucson, AZ, United States

1-12 Next-Generation Aircraft Technologies

1-12-2 Next-Generation Aircraft Technologies II

516E

1:00pm–2:45pm

Session Organizer: Pier Marzocca, *Clarkson University, Potsdam, NY, United States*

1:00pm – Flight Trajectory Optimization Through Genetic Algorithms Coupling Vertical and Lateral Profiles

Technical Paper Publication. IMECE2014-36510

Roberto Salvador Félix Patrón, Ruxandra Botez, École de Technologie Supérieure, Montreal, QC, Canada

1:17pm – Load Detection and Fatigue Health Monitoring in Landing Gears

Technical Paper Publication. IMECE2014-37029

Andres Jimenez, Eva Novillo, Esteban Morante, Eduardo Chamorro, Compañía Española de Sistemas Aeronáuticos, Getafe, Spain,

1:34pm – Microwave Ignition for the Pulse Detonation Engine

Technical Paper Publication. IMECE2014-37542

Gurjap Singh, National Institute of Technology, Jalandhar, Jalandhar, Punjab, India

1:51pm – Method to Calculate Aircraft VNAV Trajectory Cost Using a Performance Database

Technical Paper Publication. IMECE2014-37568

Alejandro Murrieta Mendoza, École de Technologie Supérieure–LARCASE, Montreal, QC, Canada, Ruxandra Botez, École de Technologie Supérieure, Montreal, QC, Canada

2:08pm – Lateral Navigation Optimization Considering Winds and Temperatures for Fixed Altitude Cruise Using Dijkstra's Algorithm

Technical Paper Publication. IMECE2014-37570
Alejandro Murrieta Mendoza, *École de Technologie Supérieure–LARCASE, Montreal, QC, Canada*, **Ruxandra Botez**, *École de Technologie Supérieure, Montreal, QC, Canada*

2:25pm – Docking Control of Stratospheric Lighter-Than-Air Vehicles With External Immeasurable Disturbances

Technical Paper Publication. IMECE2014-38991
Viacheslav Pshikhopov, Mikhail Medvedev, Victor Krukhmalev, Roman Fedorenko, Boris Gurenko, *Southern Federal University, Taganrog, Russia*

1-7 Aerospace Structures and Materials

1-7-5 Composite Structures

516C **3:00pm–4:45pm**

Session Organizer: Wenbin Yu, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizer: Zahra Sotoudeh, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:00pm – Modeling of Composite Beams With Nonlinear Constitutive Relations

Technical Presentation. IMECE2014-39178
Fang Jiang, Wenbin Yu, *Purdue University, West Lafayette, IN, United States*

3:17pm – Dynamics of 3D Micropolar Gyroelastic Beams

Technical Paper Publication. IMECE2014-39259
Soroosh Hassanpour, Glenn Heppler, *University of Waterloo, Waterloo, ON, Canada*

3:34pm – Converting Helicopter Rotor Blades From D-Spar to C-Spar: Allowing for Aeromorphing Structures

Extended Abstract Publication. IMECE2014-36966
Nathan Hosking, Zahra Sotoudeh, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:51pm – Crashworthy Landing Gear Design Using a Composite Tube by Extra Energy Absorber

Technical Paper Publication. IMECE2014-36452
Tae-uk Kim, Sung Joon Kim, Seunggyu Lee, *Korea Aerospace Research Institute, Daejeon, Korea (Republic)*

4:08pm – Aeroelastic Analysis of a Thin-Walled Composite Aircraft Wing With an External Store Subjected to a Follower Force

Technical Paper Publication. IMECE2014-38479
Alev Kacar Aksongur, Seher Eken, Metin Orhan Kaya, *Istanbul Technical University, Istanbul, Turkey*

4:25pm – Stress Optimization of TBC System Based on Parametric Study of Aluminum Depletion and TGO Growth

Extended Abstract Publication. IMECE2014-39345
Jang-Gyun Lim, Chang-Sung Seok, *Sungkyunkwan University, Gyeong Gi-Do, Korea (Republic)*, **Jae-Mean Koo**, *Sungkyunkwan University, Suwon, Kyonggi-do, Korea (Republic)*, **Moon Ki Kim**, *Sungkyunkwan University, Suwon, Korea (Republic)*

1-8 Lightweight Sandwich Composites and Layered Structures

1-8-1 Lightweight Sandwich Composites and Layered Structures

516E **3:00pm–4:45pm**

Session Organizer: Yeoshua Frostig, *Technion–Israel Institute of Technology, Haifa, Israel*

Session Co-Organizer: George Kardomateas, *Georgia Institute of Technology, Alpharetta, GA, United States*

3:00pm – Creep Effects in the Nonlinear Behavior of Debonded Sandwich Panels With a Compliant Core

Technical Presentation. IMECE2014-36907
Ehab Hamed, *University of New South Wales, Sydney, NSW, Australia*, **Yeoshua Frostig**, *Technion–Israel Institute of Technology, Haifa, Israel*

3:21pm – Static and Dynamic Debonding in Layered, Adhesively Bonded, and Sandwich Beams With a Soft Layer

Technical Presentation. IMECE2014-37491
Oded Rabinovitch, *Technion–Israel Institute of Technology, Haifa, Israel*

3:42pm – Concentrated Load Impulse Response of a Sandwich Beam/Wide Plate Based on the Extended High-Order Sandwich Panel Theory (EHSAPT)

Technical Presentation. IMECE2014-39285
Nunthadech Rodcheuy, *Georgia Institute of Technology, Atlanta, GA, United States*, **George Kardomateas**, *Georgia Institute of Technology, Alpharetta, GA, United States*, **Yeoshua Frostig**, *Technion–Israel Institute of Technology, Haifa, Israel*

4:03pm – Geometric Nonlinearity Effects in the Static and Dynamic Response of Sandwich Beams/Wide Plates

Technical Presentation. IMECE2014-39309

Zhangxian Yuan, *Georgia Institute of Technology, Atlanta, GA, United States*, **Yeoshua Frostig**, *Technion–Israel Institute of Technology, Haifa, Israel*, **George Kardomateas**, *Georgia Institute of Technology, Alpharetta, GA, United States*

4:24pm – Mode Mixity and Energy Release Rate of Face/Core Debonds in Sandwich Beams

Technical Presentation. IMECE2014-40429

George Kardomateas, *Georgia Institute of Technology, Alpharetta, GA, United States*, **Christian Berggreen**, *Technical University of Denmark, Lyngby, Denmark*, **Leif Carlsson**, *Florida Atlantic University, Boca Raton, FL, United States*

1-13 Aeromechanics and Aeroelasticity

1-13-1 Wing Aeroelasticity

516D

3:00pm–4:45pm

Session Organizer: **Weihua Su**, *University of Alabama, Tuscaloosa, AL, United States*

3:00pm – Analysis of Gust Response of Very Flexible Aircraft With Different Aerodynamics

Technical Presentation. IMECE2014-37525

Weihua Su, *University of Alabama, Tuscaloosa, AL, United States*

3:17pm – Flutter Analysis of Swept Wings With Cubic Structural Nonlinearities

Technical Paper Publication. IMECE2014-38740

Seher Eken, *Istanbul Technical University, Istanbul, Turkey*

3:34pm – Energy Harvesting From Aeroelastic Instabilities for Highly Flexible Aircraft

Extended Abstract Publication. IMECE2014-36967

Zahra Sotoudeh, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:51pm – Multidisciplinary Optimization Technology Research on Typical Turbine Assembly Structure

Technical Paper Publication. IMECE2014-37473

Huming Liao, **Jiang Fan**, **Rongqiao Wang**, *BeiHang University, Beijing, China*, **Xiuli Shen**, *Beijing University of Aeronautics and Astronautics, Beijing, China*, **Dianyin Hu**, *BeiHang University, Beijing, China*

4:08pm – Probabilistic Assessment of Turbine Disk Considering Geometry Distribution Based on Surrogate Models

Technical Paper Publication. IMECE2014-37484

Jiang Fan, **Hao Wang**, *Beihang University, Beijing, China*

4:25pm – Aeroelastic Modeling of Horizontal Axis Wind Turbine Blades With Geometrically Nonlinear Beam Formulation

Technical Presentation. IMECE2014-37510

Weihua Su, *University of Alabama, Tuscaloosa, AL, United States*

TRACK 2: ADVANCED MANUFACTURING

2-1 General

2-1-1: Tribology and Mechanical Properties

2-2 Nanomanufacturing: Novel Processes, Applications, and Process-Property Relationships for 2D and 3D Nanostructures

2-2-1: Nanomanufacturing: Bottom-Up/Top-Down Mechanisms for Nanomaterials and Nanodevices

2-2-2: Nanomanufacturing: Electrophoretic or Spray Deposition Techniques for Nanomaterials and Nanostructures

2-2-3: Nanomanufacturing: Advances in Stamping and Patterning

2-2-4: Nanomanufacturing: Novel Synthesis and Assembly of Carbon Nanostructures

2-3 Material Processing of Flexible Electronic Devices and Sensors

2-3-1: Material Processing of Flexible Electronic Devices and Sensors I

2-3-2: Material Processing of Flexible Electronic Devices and Sensors II

2-3-3: Material Processing of Flexible Electronic Devices and Sensors III

2-5 Additive Manufacturing

2-5-1: AM I—Modeling and Process Planning

2-5-2: AM II—Process Development and Improvement

2-5-3: AM III—Applications

2-6 Advanced Forming

2-6-1: Advanced Forming I

2-6-2: Advanced Forming II

2-7 Advanced Materials Design, Synthesis, and Processing

2-7-1: Metallic Materials—Processing and Synthesis

2-7-2: Metallic and Fiber Composites—Processing and Synthesis

2-7-3: Machining and Innovative Processing Methods

2-8 Advanced Sensing, Measurement, and Process Control in Manufacturing

2-8-1: Advanced Sensing, Measurement, and Process Control in Manufacturing

2-10 Computational Modeling and Simulation for Advanced Manufacturing

2-10-1: Computational Modeling and Simulation for Advanced Manufacturing I

2-10-2: Computational Modeling and Simulation for Advanced Manufacturing II

2-10-3: Computational Modeling and Simulation for Advanced Manufacturing III

2-10-4: Computational Modeling and Simulation for Advanced Manufacturing IV

2-11 Machining Processes

2-11-1: Robotic Machining Processes

2-11-2: Machining Processes

2-12 Sustainable Materials and Processes

2-12-1: Sustainable Materials and Processes

2-13 Visualization, Informatics, and Digital Manufacturing Technologies

2-13-1: Visualization, Informatics, and Digital Manufacturing Technologies

2-14 Pharmaceutical & Bio Manufacturing

2-14-1: Pharmaceutical & Biomedical-Related Processes

2-15 Innovative Product Design

2-15-1: Advanced End-to-End Manufacturing

2-15-2: Advanced Product Design

2-16 Fastening and Joining

2-16-1: Bolted Joints Technology

2-16-2: Welding Technology

2-16-3: Advances in Testing and Analysis

2-17 Plenary Lectures

2-17-1: Plenary Session

ACKNOWLEDGMENT

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 Stephen Tse, *Rutgers MAE, USA*

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 Junghoon Yeom, *Michigan State University, USA*

SESSION ORGANIZERS

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 Thomas Whitney, *University of Dayton, USA*
 Junghoon Yeom, *Michigan State University, USA*
 Chi Zhou, *University at Buffalo, USA*

TRACK 2 ADVANCED MANUFACTURING

Tuesday, November 18

2-3 Material Processing of Flexible Electronic Devices and Sensors

2-3-1 Material Processing of Flexible Electronic Devices and Sensors I

513E

9:45am–11:30am

Session Organizer: Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

Session Co-Organizer: Devdas Pai, *North Carolina A&T State University, Greensboro, NC, United States*

9:45am – Flexible and Stretchable Transparent Conductive Electrodes Based on Silver Nanowire/Polymer Composites

Technical Presentation. IMECE2014-37312

Michael S. Miller, Tricia Carmichael, *University of Windsor, Windsor, ON, Canada*

10:02am – Transformational Electronics—Stretching the Digital World in a Flexible Way for a Transparent World

Invited Presentation. IMECE2014-37512

Muhammad Mustafa Hussain, *King Abdullah University of Science and Technology, Thuwal, Saudi Arabia*, **Johnathan Rojas,** **Galo Torres Sevilla,** **Mohamed Ghoneim,** **Aftab Hussain,** **Sally Ahmed,** **Joanna Nassar,** **Rabab Bahabry,** **Maha Nour,** **Arwa Kutbee,** **Ernesto Lizardo,** **Amal Amri,** **Bidoor Al-Saif,** **Hossain Fahad,** *King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia*

10:19am – Ultra-Stretchable, Soft, and Self-Healing Wires and Antennas Using a Micromoldable Metal

Technical Presentation. IMECE2014-39219

Michael Dickey, Collin Eaker, *North Carolina State University, Raleigh, NC, United States*

10:36am – Artificial Compound Eye Camera Inspired by the Arthropod Eye

Technical Presentation. IMECE2014-40235

Jianliang Xiao, *University of Colorado, Boulder, Boulder, CO, United States*, **Yonggang Huang,** *Northwestern University, Evanston, IL, United States*, **John Rogers,** *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10:53am – High-Performance ZnO TFTs Through Improved Material Processing and Device Design

Technical Paper Publication. IMECE2014-36941

Ahmad Adl, Samira Farsinezhad, Alex Ma, Douglas W. Barlage, *University of Alberta, Edmonton, AB, Canada*, **Karthik Shankar,** *University of Alberta & National Research Council, Edmonton, AB, Canada*

11:10am – Investigation of Carbon Nanotube Mixing Methods and Functionalization for Electrically Conductive Polymer Composites

Technical Paper Publication. IMECE2014-39970

Brijpal Singh Talwar, Daniel Therriault, Kambiz Chizari, Shuangzhuang Guo, *École Polytechnique de Montreal, Montreal, QC, Canada*

2-17 Plenary Lectures

2-17-1 Plenary Session

513D

9:45am–11:30am

Session Organizer: Stephen Tse, *Rutgers MAE, Piscataway, NJ, United States*

Session Co-Organizer: Cary Pint, *Vanderbilt University, Nashville, TN, United States*

9:45am – Pharmaceutical Manufacturing: Mechanics of Compaction of Pharmaceutical Solids

Plenary Presentation. IMECE2014-39671

Alberto Cuitino, *Rutgers University, Piscataway, NJ, United States*

10:37am – Low Pt Loading, Pt-Alloys, and Core-Shell Catalysts Manufacturing by Scalable Flame Base Process

Plenary Presentation. IMECE2014-40584

Radenka Maric, *University of Connecticut, Storrs, CT, United States*

2-2 Nanomanufacturing: Novel Processes, Applications, and Process-Property Relationships for 2D and 3D Nanostructures

2-2-1 Nanomanufacturing: Bottom-Up/Top-Down Mechanisms for Nanomaterials and Nanodevices

513D

1:00pm–2:45pm

Session Organizer: Junghoon Yeom, *Michigan State University, East Lansing, MI, United States*

1:00pm – Hierarchically Assembled DNA Origami Tubules With Reconfigurable Chirality

Technical Presentation. IMECE2014-36708

Haorong Chen, Jong Hyun Choi, *Purdue University, West Lafayette, IN, United States*

1:21pm – Nanoscale Thermal Transport in Plasmonic Nanofocusing Structure With Strong Nonlocality

Technical Paper Publication. IMECE2014-37334

Chen Chen, Zhidong Du, Liang Pan, *Purdue University, West Lafayette, IN, United States*

1:42pm – Bottom-Up/Top-Down Hybrid Fabrication of Functional Nanomaterials

Invited Presentation. IMECE2014-40097

Inkyu Park, Daejong Yang, *Korea Advanced Institute of Science and Technology, Daejeon, Korea (Republic)*

2:03pm – Filtration-Guided Assembly (FGA) Method for One-Dimensional Nanostructures—A Route To Hybrid and Heterogeneous Integration

Technical Presentation. IMECE2014-40144

Yaosheng Zhang, Chuan Wang, Junghoon Yeom, *Michigan State University, East Lansing, MI, United States*

2:24pm – Low-Pressure Flame Synthesis of Carbon-Doped Titania Nanoparticles of Different Phases

Technical Presentation. IMECE2014-40401

Hadi Halim, Bernard Kear, *Rutgers University, Piscataway, NJ, United States*, **Stephen Tse,** *Rutgers MAE, Piscataway, NJ, United States*

2-3 Material Processing of Flexible Electronic Devices and Sensors

2-3-2 Material Processing of Flexible Electronic Devices and Sensors II

513E

1:00pm–2:45pm

Session Organizer: Howon Lee, *Rutgers University, Piscataway, NJ, United States*

Session Co-Organizer: Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

1:00pm – Bubble-Based Agitation for the Dissolution of Transient Flexible Electronics

Technical Presentation. IMECE2014-38473

Jihyun Ryu, Sandesh Gopinath, Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

1:21pm – Processing of Conducting Polymer Films for High-Performance Organic Transistors

Technical Presentation. IMECE2014-38980

Shiming Zhang, Prajwal Kumar, Hao Tang, Zhihui Yi, Fabio Cicoira, *École Polytechnique de Montreal, Montreal, QC, Canada*

1:42pm – Numerical Modeling of Wave Soldering in PCB

Technical Paper Publication. IMECE2014-39051

Bruno Arcipreste, Delfim Soares, *University of Minho, Guimaraes, Portugal*, **Luis Ribas,** *Bosch Car Multimedia Portugal S.A., Braga, Portugal*, **Jose C.F. Teixeira,** *Universidade do Minho School of Engineering, Guimaraes, Portugal*

2:03pm – Paper-Based Piezoelectric Touch Pads Integrating Zinc Oxide Nanowires

Technical Presentation. IMECE2014-39186

Yu-Hsuan Wang, Xiao Li, Chen Zhao, Xinyu Liu, *McGill University, Montreal, QC, Canada*

2:24pm – Elastically Soft Electronics With Rapid Prototyping

Invited Presentation. IMECE2014-40912

Carmel Majidi, *Carnegie Mellon University, Pittsburgh, PA, United States*

2-2 Nanomanufacturing: Novel Processes, Applications, and Process-Property Relationships for 2D and 3D Nanostructures

2-2-2 Nanomanufacturing: Electrophoretic or Spray Deposition Techniques for Nanomaterials and Nanostructures

513D 3:00pm–4:45pm

Session Organizer: Matthew R. Maschmann, *University of Missouri, Columbia, MO, United States*

3:00pm – Electrophoretic Roll-to-Roll Nanomanufacturing of Carbon Nanostructures

Technical Presentation. IMECE2014-38912

Landon Oakes, Adam Cohn, Rachel Carter, Cary Pint, William Yates, *Vanderbilt University, Nashville, TN, United States*

3:17pm – Electrospray Ionization of Polymers: Evaporation, Drop Fission, and Deposited Particle Morphology

Technical Paper Publication. IMECE2014-37119

Marriner H. Merrill, William R. Pogue, III, Jared N. Baucom, *U.S. Naval Research Laboratory, Washington, MD, United States*

3:34pm – Fabrication and Applications Highly Dense Ceramic Thick Films by Room Temperature Powder Spray

Invited Presentation. IMECE2014-37906

Jungho Ryu, Dong-Soo Park, Woon-Ha Yoon, Jong-Jin Choi, Byung-Dong Hahn, Jong-Woo Kim, Cheol-Woo Ahn, *Korea Institute of Materials Science, Changwon, Gyeongnam, Korea (Republic)*

3:51pm – Materials Printing Using Electrospray

Technical Paper Publication. IMECE2014-38336

Nicholas A. Brown, Jessica N. Gladstone, Paul R. Chiarot, *State University of New York at Binghamton, Binghamton, NY, United States*

4:08pm – Pulsed Laser Deposition of Graphene

Technical Presentation. IMECE2014-40402

William T. Mozet, Stephen Tse, *Rutgers MAE, Piscataway, NJ, United States*, **Bernard Kear, Manish Chhowalla, Sang-Wook Cheong,** *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

4:25pm – Unconfined Flame Synthesis of Monolayer Graphene

Technical Presentation. IMECE2014-40390

Hua Hong, Gang Xiong, Zhizhong Dong, Bernard Kear, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, **Stephen Tse,** *Rutgers MAE, Piscataway, NJ, United States*

2-3 Material Processing of Flexible Electronic Devices and Sensors

2-3-3 Material Processing of Flexible Electronic Devices and Sensors III

513E 3:00pm–4:45pm

Session Organizer: Rebecca Kramer, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizer: Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

3:00pm – Process Performance of Silicon Thin-Film Transfer Using Laser Micro-Transfer Printing

Technical Paper Publication. IMECE2014-37133

Ala'a Al-Okaily, Placid Ferreira, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

3:21pm – Liquid Metal Inks for Flexible Electronics and 3D Printing: A Review

Technical Paper Publication. IMECE2014-37993

Lei Wang, *Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, China*, **Jing Liu,** *Chinese Academy of Sciences, Beijing, China*

3:42pm – Direct Laser Writing of Microchannels for Soft Sensor Applications

Technical Presentation. IMECE2014-38549

Edward White, Jennifer Case, Rebecca Kramer, *Purdue University, West Lafayette, IN, United States*

4:03pm – Centrifugal Processing of Layered Sheets on Liquid Substrates

Technical Presentation. IMECE2014-38453

Chen Yang, Saugata Dutt, Koundinya Kuppa, Steven Chen, Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

4:24pm – Large-Scale Production of Soft Robots

Invited Presentation. IMECE2014-40902

Robert F. Shepherd, *Cornell University, Ithaca, NY, United States*

Wednesday, November 19

2-2 Nanomanufacturing: Novel Processes, Applications, and Process-Property Relationships for 2D and 3D Nanostructures

2-2-3 Nanomanufacturing: Advances in Stamping and Patterning

513D 9:45am–11:30am

Session Organizer: Matthew R. Maschmann, *University of Missouri, Columbia, MO, United States*

9:45am – Multidimensional Filler Design for Flexible/Stretchable Conductive Composites

Invited Presentation. IMECE2014-37369

Seunghyun Baik, *Sungkyunkwan University, Suwon, Korea (Republic)*

10:06am – Glass Nanoimprinting Process Using Vitreous Carbon Nanostamp

Technical Presentation. IMECE2014-38006

Jonghyun Ju, Youngkyu Kim, Seok Min Kim, *Chung-Ang University, Seoul, Korea (Republic)*

10:27am – Metal-Assisted Electrochemical Stamping for Semiconductor Photonic Devices

Technical Presentation. IMECE2014-38289

Bruno Azeredo, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*, **Keng Hsu**, *Arizona State University, Mesa, AZ, United States*, **Placid Ferreira**, *University of Illinois, Urbana, IL, United States*

10:48am – Transfer Printing of Quantum Dot Films and Charge Transport Layers for the Assembly of Solar Cell Arrays

Technical Presentation. IMECE2014-37059

Sang Il Rhee, Seok Kim, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

11:09am – Tunable Hierarchical Micro- and Nanoscale Patterning via Wrinkling of Pre-patterned Surfaces

Technical Presentation. IMECE2014-39114

Sourabh Saha, *Massachusetts Institute of Technology, Brighton, MA, United States*, **Martin Culpepper**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

2-5 Additive Manufacturing

2-5-1 AM I—Modeling and Process Planning

513E

9:45am–11:30am

Session Organizer: Chi Zhou, *University at Buffalo, Amherst, NY, United States*

9:45am – Algorithm for Detecting and Solving the Problem of Underfilled Pointed Ends Based on 3D Printing Plastic Droplet Generation

Technical Paper Publication. IMECE2014-36573

Jelena Prsa, Tim C. Lueth, *Technical University Munich, Garching, Germany*, **Franz Irlinger**, *Institute of Micro Technology and Medical Device Technology, Technical University of Munich, Garching, Germany*

10:02am – Direct Tool Path Planning Algorithm for Line Scanning Based Stereolithography

Technical Paper Publication. IMECE2014-37322

Chi Zhou, *University at Buffalo, Amherst, NY, United States*

10:19am – Multilayer Computational Modeling of Selective Laser Sintering Processes

Technical Paper Publication. IMECE2014-37535

Daniel Moser, Scott Fish, Joseph J. Beaman, Jr., Jayathi Murthy, *University of Texas at Austin, Austin, TX, United States*

10:36am – Design for Rapid Prototyping, Manufacturing, and Tooling: Guidelines

Technical Paper Publication. IMECE2014-39310

Hugo Ivan Medellin Castillo, Jorge Zaragoza-Siqueiros, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, San Luis Potosí, Mexico*

10:53am – Identifying Relative Importance of the Input Parameter(s) for Developing Predictive Model for Laser Cladding Process

Technical Paper Publication. IMECE2014-37719

Kush Aggarwal, Luv Aggarwal, Ruth Jill Urbanic, Syed Saqib, *University of Windsor, Windsor, ON, Canada*

11:10am – Mathematical Model of the Influence of Process Parameters on Geometrical Values and Shape in MIG/MAG Multitrack Cladding

Technical Paper Publication. IMECE2014-37479

Andris Ratkus, Toms Torims, *Riga Technical University, Riga, Latvia*

2-6 Advanced Forming

2-6-1 Advanced Forming I

516D

9:45am–11:30am

9:45am – Hot Extrusion of Hollow Spur Gear of Magnesium Alloys

Technical Paper Publication. IMECE2014-36315

Yeong-Maw Hwang, Sung-Hsiu Lin, *National Sun Yat-Sen University, Kaohsiung, Taiwan*

10:02am – Mechanical Properties of Glass Fiber-Reinforced Polyoxymethylene Composites by Direct Fiber Feeding Injection Molding

Technical Paper Publication. IMECE2014-36980

Suchalinee Mathurosemontri, Putinun Uawongsuwan, Hiroyuki Inoya, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Kyoto, Japan*, Hiroaki Ichikawa, *Nihon Yuki Co., Ltd., Kanagawa, Japan*

10:19am – Influence of Hard Turning on Microstructure Evolution in the Subsurface Layers of Inconel 718

Technical Paper Publication. IMECE2014-37348

Heithem Touazine, Mohammad Jahazi, Philippe Bocher, *École de Technologie Supérieure, Montréal, QC, Canada*

10:36am – Development of CAM System for 3D Surface Machining With CNC Lathe

Technical Paper Publication. IMECE2014-37647

Keigo Takasugi, Kanazawa Yoshitaka Morimoto, *Kanazawa Institute of Technology, Hakusanshi, Japan*, Katsuhiro Nakagaki, Yoshiyuki Kaneko, *Takamatsu Machinery Co., Ltd., Hakusan, Ishikawa, Japan*

10:53am – Evaluation of Zinc Coating Adhesion in Stanpimg Advanced High-Strength Steel

Technical Paper Publication. IMECE2014-37977

Hua-Chu Shih, *United States Steel Corporation, Rochester Hills, MI, United States*

11:10am – Direct Contact Heating for Hot Forming Die Quenching

Technical Paper Publication. IMECE2014-38373

Joshua N. Rasera, Kyle Daun, *University of Waterloo, Waterloo, ON, Canada*, Mike D'Souza, *F&P Manufacturing Inc., Tottenham, ON, Canada*

2-7 Advanced Materials Design, Synthesis, and Processing

2-7-1 Metallic Materials—Processing and Synthesis

516C

9:45am–11:30am

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Chair: Peng-Sheng Wei, *National Sun Yat-sen University, Kaohsiung, Taiwan*

Session Co-Chairs: Fred Amorim, *Pontificia Universidade Católica do Paraná, Curitiba, Parana, Brazil*, Raghu Prakash, *Indian Institute of Technology Madras, Chennai, India*

9:45am – Development and Application of Copper-Nickel Zirconium Diboride as EDM Electrodes Manufactured by Selective Laser Sintering

Technical Paper Publication. IMECE2014-36294

Fred Amorim, Tiago Czelusniak, *Pontificia Universidade Católica do Paraná, Curitiba, Parana, Brazil*

10:11am – Mechanical and Microstructural Characterization of Friction-Stir Welded Twin-Roll Cast AZ31B Sheets

Technical Paper Publication. IMECE2014-36739

Ali Ammouri, *American University of Beirut, Beirut, Riad El Solh, Lebanon*, Haig Achdjian, Ramsey Hamade, *American University of Beirut, Beirut, Lebanon*, Abdelhakim Dorbane, Georges Ayoub, *Texas A&M University at Qatar, Doha, Qatar*, Ghassan Kridli, *University of Michigan Dearborn, Bloomfield Hills, MI, United States*

10:37am – Study on Cutting Forces and Surface Finish During End Milling of Titanium Alloy

Technical Paper Publication. IMECE2014-36992

Krishnaraj Vijayan, Samsudeen Sadham, *PSG College of Technology, Coimbatore, India*, Redouane Zitoune, *Clément Ader Institute of Toulouse University, Toulouse, France*, Kuppan Palaniyandi, *VIT University, Vellore, Tamil Nadu, India*, Saikumar Sangeetha, *DRDL, Hyderabad, India*

11:03am – Additive Manufacturing of Nitinol Shape Memory Alloys to Overcome Challenges in Conventional Nitinol Fabrication

Technical Paper Publication. IMECE2014-40432

Jason Walker, Mohsen Taheri Andani, Christoph Haberland, Mohammad Elahinia, *University of Toledo, Toledo, OH, United States*

2-1 General

2-1-1 Tribology and Mechanical Properties

513D

1:00pm–2:45pm

Session Organizer: Cary Pint, *Vanderbilt University, Nashville, TN, United States*

Session Co-Organizer: Hassan Mahfuz, *Florida Atlantic University, Boca Raton, FL, United States*

Session Chair: Ahmad Barari, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

1:00pm – Chaotic Tool Wear During Machining of Titanium Metal Matrix Composite (TiMMCs)

Technical Paper Publication. IMECE2014-36494

Xuan-Truong Duong, Marek Balazinski, Rene Mayer, *École Polytechnique de Montréal, Montreal, QC, Canada*

1:17pm – Study on Tribological Properties of Copper and Copper Oxide Based Nanolubricants for Machine Tool Slideway applications.

Technical Paper Publication. IMECE2014-37707

Mahesh Chandran, Saravanakumar Nesappan, Nallasamy Palanisamy, *PSG College of Technology, Coimbatore, Tamilnadu, India*

1:36pm – Simultaneous Improvement of Microhardness and Surface Finish in Die Steels by Powder-Mixed EDM Process

Technical Paper Publication. IMECE2014-37890

Sanjeev Kumar, *PEC University of Technology, Chandigarh, India*

1:51pm – Numerical Investigation of the Performance of Microbumped Cutting Tool in Dry Machining of AISI 1045 Steel

Technical Paper Publication. IMECE2014-36773

Jeff Ma, Nick Duong, *Saint Louis University, Saint Louis, MO, United States*, **Shuting Lei,** *Kansas State University, Manhattan, KS, United States*

2:08pm – Comparison of Machining Performances Using Multiple Regression Analysis, Group Method Data Handling Technique, and Artificial Neural Network in Wire EDM of EN-8 Material

Technical Paper Publication. IMECE2014-37916

Ugrasen Gonchikar, *B M S College of Engineering, Bangalore, India*, **Ravindra Holalu Venkatdas,** *P E S College of Engineering, Mandya, Karnataka, India*, **Naveen Prakash Goravi Vijaya Dev,** *Vidyavardhaka College of Engineering, Mysore, India*, **Keshavamurthy Ramaiah,** *Dayananda Sagar College of Engineering, Bangalore, India*

2:25pm – Localized Decision-Making for Materials

Transportation Systems Subject to Stochastic Uncertainty

Technical Paper Publication. IMECE2014-38274

Matthew Chee, Cameron Turner, *Colorado School of Mines, Golden, CO, United States*

2-5 Additive Manufacturing

2-5-2 AM II–Process Development and Improvement

513E

1:00pm–2:45pm

Session Organizer: Jaehyung Ju, *University of North Texas, Denton, TX, United States*

1:00pm – Temperature Measurements in Powder-Bed Electron Beam Additive Manufacturing

Technical Paper Publication. IMECE2014-36661

Steven Price, *University of Alabama, Huntsville, AL, United States*, **James Lydon, Kenneth Cooper,** *Marshall Space Flight Center, Huntsville, AL, United States*, **Y. Kevin Chou,** *University of Alabama, Tuscaloosa, AL, United States*

1:21pm – Speed Function Effects in Electron Beam Additive Manufacturing

Technical Paper Publication. IMECE2014-36664

Bo Cheng, Xibing Gong, Y. Kevin Chou, *University of Alabama, Tuscaloosa, AL, United States*, **Steven Price,** *University of Alabama, Huntsville, AL, United States*, **James Lydon, Kenneth Cooper,** *Marshall Space Flight Center, Huntsville, AL, United States*

1:42pm – Microstructural Analysis and Nanoindentation Characterization of Ti-6Al-4V Parts from Electron Beam

Additive Manufacturing

Technical Paper Publication. IMECE2014-36675

Xibing Gong, Y. Kevin Chou, *University of Alabama, Tuscaloosa, AL, United States*, **James Lydon, Kenneth Cooper,** *Marshall Space Flight Center, Huntsville, AL, United States*

2:03pm – i3DP, an Enabling 3D Printing Method for Generic Postprinting Surface/Material Modifications

Technical Presentation. IMECE2014-38888

Jun Yang, *University of Western Ontario, London, ON, Canada*

2:24pm – Indirect Additive Manufacturing Based Casting (I AM Casting) of a Cellular Copper Alloy

Technical Paper Publication. IMECE2014-38055

Jiwon Mun, Jaehyung Ju, James Thurman, *University of North Texas, Denton, TX, United States*

2-6 Advanced Forming

2-6-2 Advanced Forming II

516D

1:00pm–2:45pm

1:00pm – Process Analysis of Expert and Nonexpert Engineers in Quartz Glass

Technical Paper Publication. IMECE2014-38059

Masamichi Suda, *Daico Mfg Co., Ltd., Kyoto, Kyoto, Japan*, Peng Qiu, Yuqiu Yang, *Donghua University, Shanghai, China*, Toru Takahashi, Akio Hattori, *Techno-Eye Corporation, Kyoto, Japan*, Akihiko Goto, *Osaka Sangyo University, Osaka, Japan*, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*

1:17pm – Variable Geometry Dies for Polymer Extrusion

Technical Paper Publication. IMECE2014-38409

Kevin Giaier, David Myszka, Wesley Kramer, Andrew Murray, *University of Dayton, Dayton, OH, United States*

1:34pm – Sheet Metal Blank Development of a Deep Drawing Fan Support Using Theoretical Rules and FEM

Technical Paper Publication. IMECE2014-38537

Pedro De Jesus Garcia Zugasti, Juan Gabriel Sandoval Granja, *Instituto Tecnológico de San Luis Potosí, San Luis Potosí, S.L.P., Mexico*, Erick Salcedo Murillo, *Diser Industrial, San Luis Potosí, San Luis Potosí, Mexico*, Hugo Ivan Medellin Castillo, Dirk Frederik De Lange, *Universidad Autónoma De San Luis Potosí, San Luis Potosí, Mexico*

1:51pm – Elastoplastic Analysis of the Erichsen Cupping Test Using Comsol Multiphysics FEM Code

Technical Paper Publication. IMECE2014-39018

Julio Alberto Boix Salazar, Dirk Frederik De Lange, Hugo Ivan Medellin Castillo, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, San Luis Potosí, Mexico*

2:08pm – Formability Characterization of Aluminium Lithium Alloys Used in Aerospace Industry

Technical Paper Publication. IMECE2014-39176

Krishna Kumar Saxena, *Indian Institute of Technology, Gandhinagar, Ahmedabad, India*, K.V. Ramesh, *Vasavi College of Engineering, Hyderabad, India*, Jyoti Mukhopadhyay, *Indian Institute of Technology, Gandhinagar, Ahmedabad, Ahmedabad, Gujarat, India*

2:25pm – Influence of Geometrical Parameters on the Maximum Deep Drawing Height of Rectangular Parts

Technical Paper Publication. IMECE2014-36924

Hugo Ivan Medellin Castillo, Aaron Rivas Menchi, Dirk Frederik De Lange, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico*, Pedro De Jesus Garcia Zugasti, *Instituto Tecnológico de San Luis Potosí, San Luis Potosí, Mexico*

2-7 Advanced Materials Design, Synthesis, and Processing

2-7-2 Metallic and Fiber Composites—Processing and Synthesis

516C

1:00pm–2:45pm

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Chair: Mamidala Ramulu, *University of Washington, Seattle, WA, United States*

Session Co-Chair: Mariano Marcos, *Universidad de Cádiz, Cádiz, Cadiz, Spain*

1:00pm – Design of Double Cone Twist Drill Geometry to Improve the Holes Quality During Drilling in One-Shot Operation on Multimaterial Stack Made of CFRP/Al

Technical Paper Publication. IMECE2014-36526

Redouane Zitoune, Sofiane Alma Bouacif, Collombet Francis, *Clément Ader Institute of Toulouse University, Toulouse, France*, Krishnaraj Vijayan, *PSG College of Technology, Coimbatore, India*

1:26pm – Machining Quality and Tool Wear Analysis When Drilling 3D Woven Carbon/Epoxy Composites using Core Drills With Electro-Deposited Diamond Grains

Technical Paper Publication. IMECE2014-37467

Nicolas Cadorin, Redouane Zitoune, *Clément Ader Institute of Toulouse University, Toulouse, France*, Philippe Seitier, *Institut Clément Ader Toulouse, Toulouse, France*

1:52pm – Experimental Investigation of Porosity Effects on Machinability and Residual Strength in Brittle Materials

Technical Paper Publication. IMECE2014-39304

Alexander O'Connor, Mamidala Ramulu, *University of Washington, Seattle, WA, United States*

2:18pm – Mechanical Properties of Out-of-Autoclave Noncrimp Fabric Epoxy Composites for Manufacturing Plant Elevations

Technical Paper Publication. IMECE2014-39771

Seyed Soltani, Gena Le, Ramazan Asmatulu, *Wichita State University, Wichita, KS, United States*

2-5 Additive Manufacturing

2-5-3 AM III—Applications

513E

3:00pm–4:45pm

Session Organizer: Jae-Won Choi, *University of Akron, Akron, OH, United States*

3:00pm – Cost Optimization of FDM Additive Manufactured Parts

Extended Abstract Publication. IMECE2014-36697

Hargurdeep Singh, Godfrey Onwubolu, *Sheridan Institute of Technology and Advanced Learning, Brampton, ON, Canada,* **Farzad Rayegani,** *Sheridan College, Brampton, ON, Canada*

3:17pm – Functional Prototyping and Tooling of FDM Additive Manufactured Parts

Technical Paper Publication. IMECE2014-37828

Godfrey Onwubolu, Attila Nagy, Hargurdeep Singh, *Sheridan Institute of Technology and Advanced Learning, Brampton, ON, Canada,* **Farzad Rayegani,** *Sheridan College, Brampton, ON, Canada*

3:34pm – Recreation of a Human Face Using a Low-Cost Reverse Engineering System

Extended Abstract Publication. IMECE2014-38830

Cassandra Jacobsen, Rafiqul Noorani, Andrew Dominguez, *Loyola Marymount University, Los Angeles, CA, United States*

3:51pm – Material Property Testing of PLA Specimen 3D Printed on an Entry-Level 3D Printer

Technical Paper Publication. IMECE2014-39379

Todd Letcher, Megan Waytashek, *South Dakota State University, Brookings, SD, United States*

4:08pm – Bio-Printing of Microneedles for Transdermal Drug Delivery

Technical Presentation. IMECE2014-39679

Yanfeng Lu, Yang Hyun Yun, Jae-Won Choi, *University of Akron, Akron, OH, United States*

4:25pm – Multitechnology, Multimaterial Direct-Print Photopolymerization for 3D Printed Sensors

Technical Presentation. IMECE2014-39680

Morteza Vatani, Jae-Won Choi, *University of Akron, Akron, OH, United States*

2-7 Advanced Materials Design, Synthesis, and Processing

2-7-3 Machining and Innovative Processing Methods

516C

3:00pm–4:45pm

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Chair: Mouhab Meshreki, *National Research Council Canada, Montreal, QC, Canada*

Session Co-Chair: Sinan Muftu, *Northeastern University, Boston, MA, United States*

3:00pm – Efficient Analytical Model for the Structural Analysis of Wrapping Machine Rotating Rings

Technical Paper Publication. IMECE2014-37243

Dario Croccolo, Massimiliano De Agostinis, Stefano Fini, Giorgio Olmi, *University of Bologna, Bologna, Italy*

3:17pm – Revision Technique of Curved Textile Machine Parts by Expert

Technical Paper Publication. IMECE2014-37724

Kontawat Chottikampon, Suchaline Mathurosemontri, Noriaki Kuwahara, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan,* **Porakoch Sirisuwan,** *Kyoto Institute of Technology, Sakyou-Ku, Japan,* **Yuqiu Yang,** *Donghua University, Shanghai, China*

3:34pm – Low Density Actuators for Soft Machines

Technical Presentation. IMECE2014-38743

Ben Mac Murray, Huichan Zhao, Ilse van Meerbeek, Christian Rieger, Frances Jaffe, Robert F. Shepherd, *Cornell University, Ithaca, NY, United States*

3:51pm – Design of a Retrofittable Spindle Attachment for High-Frequency Vibration-Assisted Drilling

Technical Paper Publication. IMECE2014-39307

Jyoti Panju, *McGill University, Montreal, QC, Canada,* **Mouhab Meshreki, Mahmoud Attia,** *National Research Council Canada, Montreal, QC, Canada*

4:08pm – Effect of Tool Kinematics on the Drilling Forces and Temperature in Low-Frequency High-Amplitude Vibration-Assisted Drilling

Technical Paper Publication. IMECE2014-39370

Ahmad Sadek, Mouhab Meshreki, Mahmoud Attia, *National Research Council Canada, Montreal, QC, Canada*

4:25pm – Assessment of Interface Energy in Particle Deposition by Cold-Particle Gas Spray Technique

Technical Presentation. IMECE2014-40194

Sinan Muftu, Andrew Gouldstone, Teiichi Ando, Moneesh Upmanyu, Soheil Zhalehpour, *Northeastern University, Boston, MA, United States*

Thursday, November 20

2-2 Nanomanufacturing: Novel Processes, Applications, and Process-Property Relationships for 2D and 3D Nanostructures

2-2-4 Nanomanufacturing: Novel Synthesis and Assembly of Carbon Nanostructures

513E 7:45am–9:15am

Session Organizer: Marriner H. Merrill, *U.S. Naval Research Laboratory, Washington, MD, United States*

7:45pm – Ultrastrong/Tough Continuous Nanofibers

Technical Presentation. IMECE2014-40336

Yuris Dzenis, *University of Nebraska, Lincoln, NE, United States*

8:03pm – Investigation of Carbon Nanotube Dispersion in Vinyl Ester Resin Using Mechanical, Thermal, and Statistical Techniques

Technical Paper Publication. IMECE2014-40416

Seyed Morteza Sabet, Hassan Mahfuz, Javad Hashemi, *Florida Atlantic University, Boca Raton, FL, United States*

8:21pm – Towards Manufacturing of Ultimate Carbon Nanotube Materials

Invited Presentation. IMECE2014-40488

A. John Hart, *Massachusetts Institute of Technology, Cambridge, MA, United States*

8:39pm – Scalable Texturing of Graphene for Three-Dimensional, Multifunctional Nanodevices

Technical Presentation. IMECE2014-39246

Michael Cai Wang, SungGyu Chun, SungWoo Nam, *University of Illinois, Urbana–Champaign, Urbana, IL, United States*

8:57pm – High-Voltage Electrophoretic Deposition of Structured Hybrid Material Forests for High-Performance Supercapacitors

Technical Presentation. IMECE2014-39088

Sunand Santhanagopalan, Dennis Meng, *University of Texas at Arlington, Arlington, TX, United States*

2-10 Computational Modeling and Simulation for Advanced Manufacturing

2-10-1 Computational Modeling and Simulation for Advanced Manufacturing I

516C

7:45am–9:15am

Session Organizer: Jeff Ma, *Saint Louis University, St. Louis, MO, United States*

Session Co-Organizer: Sayed M. Metwalli, *Cairo University, Cairo, Cairo, Egypt*

7:45am – Assessment of Restricted Contact Cutting Tool in Dry Machining of AISI 1045 Steel

Technical Paper Publication. IMECE2014-36804

Jeff Ma, Xianchen Ge, Nick Duong, *Saint Louis University, Saint Louis, MO, United States*, **Shuting Lei**, *Kansas State University, Manhattan, KS, United States*

8:00am – On the Effect of Jonson Cook Material Constants to Simulate AI2024-T3 Machining Using Finite Element Modeling

Technical Paper Publication. IMECE2014-37170

Monzer Daoud, *University of Quebec, ETS, Montreal, QC, Canada*, **Jean-François Chatelain, Hakim Bouzid**, *École de Technologie Supérieure, Montreal, QC, Canada*

8:15am – Modeling of Orthogonal Cutting of Idealized FRP Composites

Technical Paper Publication. IMECE2014-37631

Harshit Agarwal, *Aerospace Engineering, Bangalore, Karnataka, India*, **Suhasini Gururaja**, *Indian Institute of Science, Karnataka, India*

8:30am – 2D Cutting Stock Problem Using Hybrid 3-D Overlapped Grouping Genetic Algorithm

Technical Paper Publication. IMECE2014-38052

Maged R. Rostom, *Manufacturing Commercial Vehicles, MCV, Cairo, Egypt*, **Ashraf Nassef**, *American University in Cairo, New Cairo, Egypt*, **Sayed M. Metwalli**, *Cairo University, Cairo, Cairo, Egypt*

8:45am – Development of High-Speed Shear-Slitting Method Applicable for Estimation of Workpiece Flow Stress for FEM Simulation

Technical Presentation. IMECE2014-37808

Norfariza Wahab, Sasahara Hiroyuki, Baba Shinnosuke, *Tokyo University of Agriculture and Technology, Tokyo, Japan*

9:00am – On the Robustness of the Volumetric Shrinkage Method in the Context of Variation Simulation

Technical Paper Publication. IMECE2014-38472

Samuel Lorin, Lars Lindkvist, Rikard Soderberg, *Chalmers University of Technology, Göteborg, Sweden*, **Christoffer Cromvik, Fredrik Edelvik**, *Fraunhofer-Chalmers Research Centre, Gothenburg, Sweden*

2-15 Innovative Product Design

2-15-1 Advanced End-to-End Manufacturing

516D

7:45am–9:15am

Session Organizer: Ricardo Jardim-Goncalves, *Universidade Nova de Lisboa, Caparica, Portugal*

Session Chair: Joao P. Mendonca, *Universidade do Minho, Guimaraes, Portugal*

Session Co-Chair: Elisabeth Ilie-Zudor, *Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI), Budapest, Hungary*

7:45am – Methodology for Negotiation in Collaborative Working Environment for Innovation in Services Design

Technical Paper Publication. IMECE2014-37514

Carlos Coutinho, *Caixa Magica Software, Lisboa, Portugal*, **Adina Cretan**, *Nicolae Titulescu University, Bucharest, Romania*, **Ricardo Jardim-Goncalves**, *Universidade Nova de Lisboa, Caparica, Portugal*

8:00am – Framework for Knowledge Management Towards Human Centric Internet of Things and Sentiment Analysis

Technical Paper Publication. IMECE2014-38278

Fernando Luis-Ferreira, *Departamento de Engenharia Electrotécnica, Caparica, Portugal*, **Sudeep Ghimire**, *UNINNOVA, Caparica, Portugal*, **Ricardo Jardim-Goncalves**, *Universidade Nova de Lisboa, Portugal*, **Milan Zdravkovic**, *University of Nis, Nis, Serbia*

8:15am – Numerical Simulation of Impact Events of the Ultimate Metallic Toe Cap Model for Safety Footwear

Technical Paper Publication. IMECE2014-39360

Sérgio L. Costa, Joao P. Mendonca, Nuno Peixinho, *University of Minho, Guimarães, Portugal*

8:30am – Configuration Recommendation Strategy Based on Similarity in Product Configuration for Manufacturing

Technical Paper Publication. IMECE2014-36684

Niya Li, Jian Zhang, *Jilin University, China, Changchun, Jilin, China*, **Yucheng Liu**, *Mississippi State University, Mississippi State, MS, United States*

8:45am – Load Distribution of Ball Screw With Consideration of Contact Angle Variation and Geometry Errors

Technical Paper Publication. IMECE2014-37380

Zhenqiang Yao, *State Key Laboratory of Mechanical System and Vibration, Shanghai Jiao Tong University, Shanghai, China*, **Sheng Xu, Hong Shen, Yaofei Sun**, *Shanghai Jiao Tong University, Shanghai, China*

9:00am – Using Genetic Algorithms to Optimize the Build Orientation for Fused Deposition Modeled Components Containing Internal Reinforcement Structures

Technical Paper Publication. IMECE2014-37683

Hasti Eiliat, Ruth Jill Urbanic, *University of Windsor, Windsor, ON, Canada*

2-16 Fastening and Joining

2-16-1 Bolted Joints Technology

516E

7:45am–9:15am

Session Organizer: Yosef Amir, *AMJT Consulting & Training LLC, Glendale, WI, United States*

Session Co-Organizers: Christoph Friedrich, *University of Siegen, Siegen, Germany*, Thomas Whitney, *University of Dayton, Dayton, OH, United States*

7:45am – Mechanism of Screw Thread Loosening in Bolted Joints With Dissimilar Clamped Parts Under Repeated Temperature Changes

Technical Paper Publication. IMECE2014-38077

Mitsutoshi Ishimura, *Shonan Institute of Technology, Kanagawa, Japan*, **Shunichiro Sawa**, *Hardlock Industry Co. Ltd., Tokyo, Japan*, **Yuya Omiya**, *Okayama University, Okayama, Japan*, **Toshiyuki Sawa**, *Hiroshima University, Higashi-hiroshima City, Japan*

8:00am – Mechanical Characteristics and Design of Bolted T-Shape Flange Joints Subjected to Tensile Loadings

Technical Paper Publication. IMECE2014-38086

Shunichiro Sawa, *Hardlock Industry Co. Ltd., Tokyo, Japan*, **Yuya Omiya**, *Okayama University, Okayama, Japan*, **Mitsutoshi Ishimura**, *Shonan Institute of Technology, Kanagawa, Japan*, **Toshiyuki Sawa**, *Hiroshima University, Higashi-Hiroshima City, Japan*

8:15am – Analysis of the Influence of Fretting on the Fatigue Life of Interference Fitted Joints**Technical Paper Publication. IMECE2014-38128****Dario Croccolo, Massimiliano De Agostinis, Stefano Fini, Alessandro Morri, Giorgio Olmi, University of Bologna, Bologna, Italy****8:30am – Toward Automated Design of Fastening Systems for Accelerated Product Development****Technical Paper Publication. IMECE2014-38150****Christoph Friedrich, Hendrik Hubbertz, University of Siegen, Siegen, Germany, Holger Roser, Paul Walker, University of Technology, Sydney, NSW, Australia****8:45am – Working Load Analysis and Strength Evaluation Method for Bolted Joint During Actual Machine Operation****Technical Paper Publication. IMECE2014-39193****Soichi Hareyama, Tokyo Metropolitan University, Chiba, Japan, Ken-ichi Manabe, Tokyo Metropolitan University, Hachioji-city Tokyo, Japan, Takayuki Shimodaira, Akio Hoshi, Hitachi Construction Machinery Co., Ltd., Tuchiura-City, Ibaraki, Japan****9:00am – Thread Reinforcement of Screw Connections in Lightweight Design****Technical Paper Publication. IMECE2014-39465****Tobias Hoernig, Christoph Friedrich, University of Siegen, Siegen, Germany****2-10 Computational Modeling and Simulation for Advanced Manufacturing****2-10-2 Computational Modeling and Simulation for Advanced Manufacturing II****516C****9:30am–11:15am****Session Organizer:** Jeff Ma, *Saint Louis University, St. Louis, MO, United States***Session Co-Organizer:** Thomas James, *Tufts University, Boxford, MA, United States***9:30am – Validation of a Conventional Finite Element Model for Simulation of a Micropunching Process****Technical Paper Publication. IMECE2014-36908****Amrit Sagar, Christopher Nehme, Anil Saigal, Tufts University, Medford, MA, United States, Thomas James, Tufts University, Boxford, MA, United States****9:47am – Deformation Prediction of Aero-Structural Assembly Involving Drilling-Induced Stresses****Technical Paper Publication. IMECE2014-36948****Hua Wang, Qing Ge, Shanghai Jiao Tong University, Shanghai, Shanghai, China****10:04am – Numerical Analysis of Tool Performance in Up Milling of Ti-6AL-4V Alloy****Technical Paper Publication. IMECE2014-38647****Jeff Ma, Patrick Andrus, Nick Duong, Marissa Fischer, Saint Louis University, Saint Louis, MO, United States, Sridhar Condoor, Parks College, St. Louis, MO, United States, Shuting Lei, Kansas State University, Manhattan, KS, United States****10:21am – Identification and Validation of the Marusich Constitutive Law for Finite Element Modeling of High-Speed Machining****Technical Paper Publication. IMECE2014-39503****Walid Jomaa, Monzer Daoud, Victor Songmene, Philippe Bocher, Jean-François Chatelain, École de Technologie Supérieure, Montreal, QC, Canada****10:38am – Generalized Runge-Kutta Method for Stability Prediction of Milling Operations With Variable Pitch Tools****Technical Paper Publication. IMECE2014-39721****Jinbo Niu, Ye Ding, Limin Zhu, Han Ding, Shanghai Jiaotong University, Shanghai, China****10:55am – FEA Simulation Model for Thin-Walled C-Section Composite Beam Assembling With R-Angle Deviation****Technical Paper Publication. IMECE2014-36956****Hua Wang, Suo Si, Shanghai Jiaotong University, Shanghai, Shanghai, China**

2-12 Sustainable Materials and Processes

2-12-1 Sustainable Materials and Processes

513E

9:30am–11:15am

Session Organizer: Hassan Mahfuz, *Florida Atlantic University, Boca Raton, FL, United States*

9:30am – Scratch Free and Low Wear Aluminium Panel: From Scrap to Boeing

Technical Paper Publication. IMECE2014-36727

Ramdziah Md Nasir, Yamin Saad, *Universiti Sains Malaysia, Penang, Malaysia*

9:56am – Disassembly Process Planning for Remanufacturing and Sequence Generation for a Mechanical Device

Technical Paper Publication. IMECE2014-38898

Oluwafunbi Simolowo, Olalekan Akintunde, *University of Ibadan, Ibadan, Oyo, Nigeria*

10:22am – Ultrasonic Fluxless Soldering of Eutectic SnPb and SnAgCu Alloys: A Feasibility Study

Technical Paper Publication. IMECE2014-39476

Jing Shi, Yachao Wang, *North Dakota State University, Fargo, ND, United States*

10:48am – Analysis of Deep Hole Drilling in Presence of Electromagnetic Field Using Taguchi Technique

Extended Abstract Publication. IMECE2014-40139

F. Najarian, M.Y. Noordin, Denni Kurniawan, *Universiti Teknologi Malaysia, Skudai, Malaysia*, **F.M. Nor,** *Universiti Tun Hussein Onn Malaysia, Parit Raja, Johor, Malaysia*

2-15 Innovative Product Design

2-15-2 Advanced Product Design

516D

9:30am–11:15am

Session Organizer: Joao P. Mendonca, *Universidade do Minho, Guimaraes, Portugal*

Session Co-Chair: Ricardo Jardim-Goncalves, *Universidade Nova de Lisboa, Caparica, Portugal*

Session Chair: Elisabeth Ilie-Zudor, *Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI), Budapest, Hungary*

9:30am – Role of Ethical Issues in Collaborative Manufacturing Research

Technical Paper Publication. IMECE2014-37509

Elsa Marcelino-Jesus, Joao Sarraipa, *UNINOVA, Caparica, Portugal*, **Elisabeth Ilie-Zudor,** *Institute for Computer Science and Control, Hungarian Academy of Sciences (MTA SZTAKI), Budapest, Hungary*, **Ricardo Jardim-Goncalves,** *Universidade Nova de Lisboa, Caparica, Portugal*

9:51am – Investigation on the Relationship Between Operator's Skill Level and Dimension Stability in Gel Coating

Technical Paper Publication. IMECE2014-37725

Tetsuo Kikuchi, Erika Suzuki, *Toyugiken Co., Ltd., Kanagawa, Japan*, **Xiahui Liu, Yuqiu Yang,** *Donghua University, Shanghai, China*, **Yuka Takai,** *Osaka Sangyo University, Daito-shi, Japan*, **Akihiko Goto,** *Osaka Sangyo University, Osaka, Japan*, **Hiroyuki Hamada,** *Kyoto Institute of Technology, Kyoto, Japan*

10:12am – Comparison of Machining Performances in Drilling AL-Si3N4 Metal Matrix Composites Material Using Multiple Regression Analysis and Group Method Data Handling Technique

Technical Paper Publication. IMECE2014-37956

Umesh Gowda Bettahally Mahadevegowda, *Department of Mechanical Engineering, Mandya, Karnataka, India*, **Ravindra Holalu Venkatdas,** *P E S College of Engineering, Mandya, Karnataka, India*, **Naveen Prakash Goravi Vijaya Dev,** *Vidyavardhaka College of Engineering, Mysore, India*, **Ugrasen Gonchikar,** *B M S College of Engineering, Bangalore, India*

10:33am – Design Method for Lattice-Skin Structure Fabricated by Additive Manufacturing

Technical Paper Publication. IMECE2014-38645

Yunlong Tang, Yaoyao Fiona Zhao, *McGill University, Montreal, QC, Canada*

10:54am – Design of Innovative Protective Insoles: A Hybrid Component for Safety Footwear

Technical Presentation. IMECE2014-38890

Joel Silva, Sérgio L. Costa, Joao P. Mendonca, Sofia C. Ferreira, Maria J. Abreu, *Universidade do Minho, Guimarães, Portugal*

2-16 Fastening and Joining

2-16-2 Welding Technology

516E

9:30am–11:15am

Session Organizer: Christoph Friedrich, *University of Siegen, Siegen, Germany*

Session Co-Organizers: Yosef Amir, *AMJT Consulting & Training LLC, Glendale, WI, United States*, Thomas Whitney, *University of Dayton, Dayton, OH, United States*

9:30am – Experimental Evaluation of Wear Features of W-25%Re Pin Tool Used in Friction Stir Welding Mild Steel

Technical Paper Publication. IMECE2014-38916

Zafar Iqbal, Abdelrahman Shuaib, Fadi Al-Badour, Necar Merah, Abdelaziz Bazoune, *King Fahd University of Petroleum and Minerals, Dhahran, Eastern, Saudi Arabia*

9:47am – Experimental and Numerical Analysis of Mechanical Behavior in Friction Stir Welded Different Titanium Alloys

Technical Paper Publication. IMECE2014-39211

Neha Kulkarni, Mamidala Ramulu, *University of Washington, Seattle, WA, United States*

10:04am – Evaluation of Electron Beam Welded AISI 415 Stainless Steel

Extended Abstract Publication. IMECE2014-39317

Sheida Sarafan, Henri Champlaud, *École de Technologie Supérieure, Montreal, QC, Canada*, Priti Wanjara, *National Research Council Canada, Montreal, QC, Canada*, Denis Thibault, *Institut de Recherche d'Hydro-Québec, Varennes, QC, Canada*, Louis Mathieu, *ALSTOM Canada Inc., Tracy, QC, Canada*

10:21am – Analysis of Welded Joint Under Residual Stresses

Technical Paper Publication. IMECE2014-39484

Hemant Jawale, Rahul Singh, *Vivesvaraya National Institute of Technology, Nagpur, Maharashtra, India*

10:38am – Axial Force Reduction in Friction Stir Welding of AA6061-T6 at Right Angle

Technical Paper Publication. IMECE2014-39649

Yusef Imani, Michel Guillot, *Laval University, Quebec, QC, Canada*

10:55am – Optimizing the Efficiency in Direct Laser Deposition Process Using Vibrations to Control the Flow of Powder

Technical Paper Publication. IMECE2014-39828

Kamran Nazir, *National University of Science & Technology, Pakistan, Rawalpindi, Pakistan*, Hyun Sohn Chang, *Kyungpook National University, Daegu, Korea (Republic)*, Fahad Hassan, Muhammad Awais, *National University of Science and Technology, Rawalpindi, Punjab, Pakistan*, Sajjad Miran, *Kyungpook National University, Daegu, Korea (Republic)*, Muhammad Ali, *National University of Sciences & Technology, Rawalpindi, Punjab, Pakistan*

2-10 Computational Modeling and Simulation for Advanced Manufacturing

2-10-3 Computational Modeling and Simulation for Advanced Manufacturing III

516C

1:00pm–2:45pm

Session Organizer: Suhasini Gururaja, *Indian Institute of Science, Karnataka, India*

Session Co-Organizer: Virginia Degiorgi, *Naval Research Laboratory, Washington, DC, United States*

1:00pm – Three Dimensional Modeling of Unfired Ceramics During Lamination

Technical Paper Publication. IMECE2014-37599

Stephanie Wimmer, Virginia Degiorgi, Ming-Jen Pan, *Naval Research Laboratory, Springfield, VA, United States*

1:17pm – Transient Analysis of In-Plane and Through Thickness Flow During VARTM in the Presence of HPM

Technical Paper Publication. IMECE2014-37628

Debabrata Adhikari, *Aerospace Engineering, Bangalore, India*, Suhasini Gururaja, *Indian Institute of Science, Karnataka, India*

1:34pm – Geometry Assurance Integrating Process Variation With Simulation of Spring-In for Composite Parts and Assemblies

Technical Paper Publication. IMECE2014-38228
Cornelia Jareteg, Christoffer Cromvik, Fredrik Edelvik,
Fraunhofer-Chalmers Research Centre, Gothenburg, Sweden,
Kristina Wärmefjord, Rikard Soderberg, Lars Lindkvist,
Stig Larsson, *Chalmers University of Technology, Gothenburg, Sweden,*
Johan S. Carlson, *Fraunhofer-Chalmers Centre, Gothenburg, Sweden*

1:51pm – Reversing Design Methodology of Ceramic Core for Hollow Turbine Blade Based on Measured Data

Technical Paper Publication. IMECE2014-38284
Yangliu Dou, Fengjun Yan, *McMaster University, Hamilton, ON, Canada,*
Kun Bu, *Northwestern Polytechnical University, Xi'an, China*

2:08pm – Flow Characteristics of Porous Metal Structures for Specified Permeability Manufactured by Laser Beam Melting Technology

Technical Paper Publication. IMECE2014-39672
Hans Josef Dohmen, Jan Sehr, Friedrich-Karl Benra, Gerd Witt, Stefan Clauss, *University of Duisburg–Essen, Duisburg, Germany*

2:25pm – Low-Frequency Vibration Consideration in Tool-Path Computation of Two-Link Serial Manipulator for Improved Accuracy

Technical Paper Publication. IMECE2014-39400
Denis Juschanin, Fisseha Alemayehu, Stephen Ekwaro-Osire, *Texas Tech University, Lubbock, TX, United States*

2-11 Machining Processes

2-11-1 Robotic Machining Processes

516D

1:00pm–2:45pm

1:00pm – Novel Ball End Magnetorheological Finishing Process

Technical Paper Publication. IMECE2014-36284
Anant Kumar Singh, *Thapar University, Patiala, Punjab, India,*
Sunil Jha, Pulak M. Pandey, *Indian Institute of Technology Delhi, New Delhi, Delhi, India*

1:26pm – Safe and Automated Tool-Path Generation for Multi-axis Production Machines

Technical Paper Publication. IMECE2014-36742
Rafiq Ahmad, Peter Plapper, *Luxembourg University, Luxembourg, Luxembourg*

1:52pm – Optimization Design for Normal Direction Measurement in Robotic Drilling

Technical Paper Publication. IMECE2014-36496
Yuhao Gao, Dan Wu, Chenggen Nan, Xinguo Ma, Ken Chen, *Tsinghua University, Beijing, Beijing, China*

2:18pm – Influence of Technological Parameters and Machining Strategy of High-Speed Milling on 3D Surface Roughness Parameters

Technical Paper Publication. IMECE2014-37436
Toms Torims, *Riga Technical University, Riga, Latvia,*
Andris Logins, *Meyer Maschinen, Ltd., Ogre, Latvia,*
Pedro Castellano Rosado, Santiago Gutiérrez, Rafael Torres, *Universitat Politècnica de València, Valencia, Spain*

2-13 Visualization, Informatics, and Digital Manufacturing Technologies

2-13-1 Visualization, Informatics, and Digital Manufacturing Technologies

513E

1:00pm–2:45pm

1:00pm – Integrated Reconfigurable Optimized Framework for Co-Evolution of Reconfigurable Process Planning and Its Kinematic Configurations

Technical Paper Publication. IMECE2014-37974

Erum Asghar, Aamer Ahmed Baqai, Sajid Ullah Butt, *National University of Sciences and Technology, Islamabad, Pakistan*

1:26pm – Virtual Commissioning by Means of an Adaptive Selection of the Modeling Depth

Technical Paper Publication. IMECE2014-37964

Tanja Schmuedderrich, Ansgar Traechtler, *Heinz Nixdorf Institute, University of Paderborn, Paderborn, NRW, Germany*

1:52pm – Toward the Development of an Ontology-Based Product Requirement Model

Technical Paper Publication. IMECE2014-38693

Omer Yaman, Bicheng Zhu, Utpal Roy, *Syracuse University, Syracuse, NY, United States*

2:18pm – Virtual Training of Assembly Tasks Using Virtual Reality Techniques and Haptic Systems

Technical Paper Publication. IMECE2014-39270

Hugo Ivan Medellin Castillo, Enrique Gallegos-Nieto, Germánico González-Badillo, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico*, **Theo Lim**, *Heriot-Watt University, Edinburgh, Scotland*

2-16 Fastening and Joining

2-16-3 Advances in Testing and Analysis

516E

1:00pm–2:45pm

Session Organizer: Thomas Whitney, *University of Dayton, Dayton, OH, United States*

Session Co-Organizer: Christoph Friedrich, *University of Siegen, Siegen, Germany*

1:00pm – 3-D FEM Stress Analysis of Screw Threads in Bolted Joints Under Static Tensile Loadings

Technical Paper Publication. IMECE2014-38089

Shunichiro Sawa, *Hardlock Industry Co. Ltd., Tokyo, Japan*, **Mitsutoshi Ishimura**, *Shonan Institute of Technology, Kanagawa, Japan*, **Yuya Omiya**, *Okayama University, Okayama, Japan*, **Toshiyuki Sawa**, *Hiroshima University, Higashi-hiroshima City, Japan*

1:17pm – Experimental Study and Numerical modeling of Friction Stir Spot Welding of Copper Lap Joint

Technical Paper Publication. IMECE2014-38033

Ahmed Mahgoub, Abdelaziz Bazoune, Fadi Al-Badour, Abdelrahman Shuaib, Gihad Karrar, *King Fahd University of Petroleum and Minerals, Dhahran, Eastern, Saudi Arabia*

1:34pm – Dimensional Analysis of Thermal Fields Surrounding Friction Stir Welding Process

Technical Paper Publication. IMECE2014-37035

Lewis Payton, Vishnu Vardhan Chandrasekaran, Wesley S. Hunko, *Auburn University, Auburn University, AL, United States*

1:51pm – Structural Properties of Similar and Dissimilar Aluminium Alloy Joints by FSW

Technical Paper Publication. IMECE2014-36960

Rangopal Varma Ramaraju, Abdullah Bin Ibrahim, Yaswanth Yattapu, Muhamad Arifpin Bin Mansor, *University Malaysia Pahang, Kuantan, Pahang, Malaysia*

2:08pm – Effects of Operating Conditions on Plastic Strain and Temperature in Ultrasonic Vibration Process

Technical Paper Publication. IMECE2014-36214

Dalong Yi, Hui Zhang, Lili Zheng, *Tsinghua University, Beijing, Beijing, China*

2:25pm – Parametric Study to Minimize Residual Stresses in Dissimilar Welds

Technical Presentation. IMECE2014-39645

Hamid Eisazadeh, Daryush Aidun, Ajit Achuthan, *Clarkson University, Potsdam, NY, United States*, **John Goldak**, *Carlton University, Ottawa, ON, Canada*

2-8 Advanced Sensing, Measurement, and Process Control in Manufacturing

2-8-1 Advanced Sensing, Measurement, and Process Control in Manufacturing

516E

3:00pm–4:45pm

Session Organizer: S.B. Jadeja, *B H Gardi College of Engineering & Technology, Rajkot, Gujarat, India*

3:00pm – Microfabrication of a Variable Range and Multidirectionally Sensitive Thermal Flow Sensor

Technical Presentation. IMECE2014-36324

Sanjeev Khanna, Milad Yarali, *University of Missouri–Columbia, Columbia, MO, United States*

3:21pm – Low-Cost, Flow-Rate-Controllable Cryogenic Cooling System for Manufacturing Processes

Technical Paper Publication. IMECE2014-36726

Louai Al Khawam, Ali Abu Haidar, Mohamad Mansour, Fadi El Dimassi, Ramsey Hamade, *American University of Beirut, Beirut, Lebanon, Ali Ammouri,* *American University of Beirut, Beirut, Riad El Solh, Lebanon*

3:42pm – Multisensor Detection and Estimation of Gaps When Drilling CFRP Composite Stacks

Technical Paper Publication. IMECE2014-38732

Eshetu Eneyew, *University of Washington, Lynnwood, WA, United States, Mamidala Ramulu,* *University of Washington, Seattle, WA, United States*

4:03pm – Surface Roughness Model for Additive Manufacturing Parts Using Finite Difference Method

Technical Presentation. IMECE2014-38754

Ahmad Barari, Saeed Jamiolahmadi, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

4:24pm – Sampling Plan for Coordinate Metrology Using Uncertainty Analysis

Technical Presentation. IMECE2014-38816

Thiago Martins, Marcos Tsuzuki, *University of São Paulo, São Paulo, São Paulo, Brazil, Ahmad Barari,* *University of Ontario Institute of Technology, Oshawa, ON, Canada*

2-10 Computational Modeling and Simulation for Advanced Manufacturing

2-10-4 Computational Modeling and Simulation for Advanced Manufacturing IV

516C

3:00pm–4:45pm

Session Organizer: Jing Shi, *North Dakota State University, Fargo, ND, United States*

Session Co-Organizer: Heng Pan, *Missouri S&T, Rolla, MO, United States*

3:00pm – Influence of Bearing Configuration on Spindle Modal Characteristics

Technical Paper Publication. IMECE2014-37430

Jun Hong, Guanghui Liu, Xiaohu Li, Wenwu Wu, Shaoke Wan, Shaohang Ma, *Xi'an Jiaotong University, Xi'an, Shaanxi, China, Dongfeng Wang,* *Luoyang Bearing Science & Technology Co., Ltd., Luoyang, China*

3:21pm – Molecular Dynamics Simulation of Shot Peening Process and Residual Stress Generation: Effects of Particle Impact Speed and Impinging Angle

Technical Paper Publication. IMECE2014-39474

Yachao Wang, Jing Shi, Xinnan Wang, *North Dakota State University, Fargo, ND, United States*

3:42pm – Crystallization in Nano-Confinement Seeded by a Nanocrystal—A Molecular Dynamics Study

Technical Paper Publication. IMECE2014-39705

Heng Pan, *Missouri S&T, Rolla, MO, United States, Costas Grigoropoulos,* *University of California, Berkeley, CA, United States*

4:03pm – Effects of Contact Conditions on the Onset of Shear Instability in Cold-spray

Technical Presentation. IMECE2014-40034

Fanchao Meng, Jun Song, *McGill University, Montréal, QC, Canada*

4:24pm – Friction Stir Butt Welding of Commercially Pure Copper Plates

Technical Paper Publication. IMECE2014-38378

Gihad Karrar, Abdelrahman Shuaib, Fadi Al-Badour, Necar Merah, Ahmed Mahgoub, *King Fahd University of Petroleum and Minerals, Dhahran, Eastern, Saudi Arabia*

2-11 Machining Processes

2-11-2 Machining Processes

516D

3:00pm–4:45pm

3:00pm – Experimental Verification of Ball-Nose End-Milling Conditions Derived From Catalog-Mining System Based on Classified Inclination Angles of Machining Surface

Technical Paper Publication. IMECE2014-36971

Hiroyuki Kodama, Koichi Okuda, University of Hyogo, Hyogo, Japan, Yui Sugaya, Toshiki Hirogaki, Eiichi Aoyama, Doshisha University, Kyoto, Japan, Keiji Ogawa, Ryukoku University, Shiga, Japan

3:17pm – Performance of Nitrogen and Liquid Nitrogen as Coolants in Orthogonal Machining of AISI 1020 Steel With Uncoated Carbide Tools

Technical Paper Publication. IMECE2014-37032

Vishnu Vardhan Chandrasekaran, Lewis Payton, Wesley S. Hunko, Auburn University, Auburn University, AL, United States

3:34pm – Orthogonal Turning of Aluminum 6061 in Liquid Nitrogen Cutting Environment

Technical Paper Publication. IMECE2014-37033

Vishnu Vardhan Chandrasekaran, Lewis Payton, Wesley S. Hunko, Auburn University, Auburn University, AL, United States

3:51pm – Study of Cutting Speed Variation in the Ultrasonic Assisted Drilling of Carbon Fibre Composites

Technical Paper Publication. IMECE2014-37046

Aniruddha Gupta, Stuart Barnes, Iain McEwen, Nadia Kourra, Mark Williams, University of Warwick, Coventry, West Midlands, United Kingdom

4:08pm – Effect of Machining Parameters on Surface Roughness in μ -EDM of Conductive SiC

Technical Paper Publication. IMECE2014-39517

Krishna Kumar Saxena, Indian Institute of Technology, Gandhinagar, Ahmedabad, India, Sanjay Agarwal, BIET Jhansi UP India, Jhansi, India, Jyoti Mukhopadhyay, Indian Institute of Technology, Gandhinagar, Ahmedabad, Ahmedabad, Gujarat, India

4:25pm – Effect of Solid Lubricant on Surface Quality in Turning of Al 6061 alloy

Technical Paper Publication. IMECE2014-39522

Anand Suman Srivastava, Sanjay Agarwal, Bundelkhand Institute of Engineering and Technology, Jhansi, Jhansi, UP, India, Krishna Kumar Saxena, Indian Institute of Technology, Gandhinagar, Ahmedabad, India

2-14 Pharmaceutical & Bio Manufacturing

2-14-1 Pharmaceutical & Biomedical-Related Processes

513E

3:00pm–4:45pm

Session Organizer: Leon Bellan, Vanderbilt University, Nashville, TN, United States

3:00pm – Surface Tribology Study Resulting by Diamondlike Carbon Coating

Technical Paper Publication. IMECE2014-38776

Ahmad Barari, Sergio Mordo, University of Ontario Institute of Technology, Oshawa, ON, Canada, Valery Popravko, Intellectual Alliance Inc., Toronto, ON, Canada

3:21pm – Application of Microforming to Create Chondrocyte Home Sites in a Natural Cartilage Matrix

Technical Paper Publication. IMECE2014-36953

Thoedore Vandenberg, Christopher Nehme, Tufts University, Medford, MA, United States, Thomas James, Tufts University, Boxford, MA, United States

3:42pm – CFD Analysis of a Fluidized Bed Reactor for Industrial Application

Technical Paper Publication. IMECE2014-37042

Anna Vaccari, Michele Pinelli, Luca Pirani, University of Ferrara–Endif, Ferrara, Italy, Nicola Gandolfi, IMA S.p.A.–IMA Active, Ozzano dell'Emilia (BO), Italy

4:03pm – Optimization of the Breaking Force and Tensile Strength Relationship of Doubly Convex Tablets Under Diametrical Compression

Technical Presentation. IMECE2014-39987

Sonia Modarres Razavi, Rutgers University, Raritan, NJ, United States, Marcial Gonzalez, Purdue University, West Lafayette, IN, United States, Alberto Cuitino, Rutgers University, Piscataway, NJ, United States

4:24pm – Effect of Process Parameters on Weld Penetration During Pulsed Nd:Yag Laser Welding

Technical Paper Publication. IMECE2014-37079

Mathew Hudon, Autocam Medical/Tufts University, Raynham, MA, United States, Anil Saigal, Tufts University, Medford, MA, United States

TRACK 3: BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING

3-1 Biomedical and Biotechnology Plenary Presentation

3-1-1: Respiratory and Cardiovascular Advancement

3-2 Biomechanics of Trauma Due to Accident, Surgery, or Weapons

3-2-1: Brain Injury Biomechanics
3-2-2: Tissue Mechanics and Injury Mechanisms
3-2-3: Musculoskeletal and Spinal Injuries

3-3 Vibration and Acoustics in Biomedical Applications

3-3-1: Diagnostics, Characterization, and Therapy-I
3-3-2: Diagnostics, Characterization, and Therapy II

3-4 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

3-4-1: Innovations in Processing, Characterization, and Applications of Bioengineered Materials—I
3-4-2: Innovations in Processing, Characterization, and Applications of Bioengineered Materials—II

3-6 Bioinspired Materials and Nanomaterials

3-6-1: Biological and Bioinspired Structures
3-6-2: Nanomaterials for Biomedical Applications

3-7 Viscoelasticity of Biological Tissues and Ultrasound Applications

3-7-1: Tissue Viscoelasticity

3-8 Dynamics and Control in Biomechanical Systems

3-8-1: Dynamics and Control in Biomechanical Systems I
3-8-2: Dynamics and Control in Biomechanical Systems II
3-8-3: Dynamics and Control in Biomechanical Systems III

3-9 Clinical Applications of Bioengineering

3-9-1: Clinical Application of Bioengineering: Biomedical Imaging
3-9-2: Clinical Application of Bioengineering: Biomechanics
3-9-3: Clinical Application of Bioengineering: Diagnostic and Therapeutic Methods

3-10 Transport Phenomena in Biomedical Applications

3-10-1: Transport Phenomena in Biomedical Applications

3-11 Computational Modeling and Device Design

3-11-1: Computational Modeling 1
3-11-2: Computational Modeling 2
3-11-3: Computational Modeling of Injury
3-11-4: Device Design 1
3-11-5: Device Design 2
3-11-6: Computational Modeling and Device Design

ACKNOWLEDGMENT

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 Karim Muci-Kuchler, *South Dakota School of Mines and Technology, USA*
 Sam Mukdadi, *West Virginia University, USA*
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 Sam Mukdadi, *West Virginia University, USA*
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 Junming Zhang, *Purdue University, USA*
 Lijie Grace Zhang, *George Washington University, USA*
 Wenjun Zhang, *University of Saskatchewan, Canada*
 Shijia Zhao, *University of Nebraska–Lincoln, USA*

TRACK 3 BIOMEDICAL & BIOTECHNOLOGY ENGINEERING

Tuesday, November 18

3-1 Biomedical and Biotechnology Plenary Presentation

3-1-1 Respiratory and Cardiovascular Advancement

522B

9:45am–11:30am

Session Organizer: Ahmed Al-Jumaily, *Auckland University of Tech, Auckland, New Zealand*

9:45am – The Dynamic Mechanical Function of the Lung as a Signature of Pulmonary Disease

Plenary Presentation. IMECE2014-40495

Jason H.T. Bates, *University of Vermont, Burlington, VT, United States*

10:37am – Mechanical Cardiovascular Assist Devices

Plenary Presentation. IMECE2014-40496

Said Jahanmir, *Mitiheart, Germantown, MD, United States*

3-11 Computational Modeling and Device Design

3-11-6 Computational Modeling and Device Design

522C

9:45am–11:30am

Session Organizer: Xiaoning Jiang, *North Carolina State University, Raleigh, NC, United States*

Session Co-Organizer: Sherif Soliman, *Harvard Apparatus Regenerative Medicine, Holliston, ME, United States*

9:45am – Mechanics of Hip Dysplasia Reduction in Infants With the Pavlik Harness Using Patient Specific Geometry

Technical Paper Publication. IMECE2014-36603

Victor Huayamave, **Christopher Rose**, **Mohammed Zwawi**, **Faissal Moslehy**, **Alain Kassab**, *University of Central Florida, Orlando, FL, United States*, **Eduardo Divo**, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*, **Charles Price**, *Orlando Health, Orlando, FL, United States*

10:06am – Developing a Physical Model of an Electromechanically Actuated Valve to Model Valve Disease In Vitro

Technical Paper Publication. IMECE2014-40268

Krishna Chaitanya Manthripragada, **Chandler P. Lagarde**, **Charles Taylor**, *University of Louisiana at Lafayette, Lafayette, LA, United States*

10:27am – Adaptive Bone Remodeling to Capture the Trabecular Bone Morphology of the Proximal Femur

Technical Paper Publication. IMECE2014-40089

Sayed Mohammad Ali Banijamali, **Ramin Oftadeh**, **Hamid Nayeb Hashemi**, *Northeastern University, Boston, MA, United States*, **Ashkan Vaziri**, *Northeastern University, Cambridge, MA, United States*

10:48am – Computational Modeling of 3D Bioprinted Tissue-on-a-Chip Microfluidic Devices as Drug Screening Platforms

Technical Paper Publication. IMECE2014-38454

Filippos Tourlomousis, **Robert C. Chang**, *Stevens Institute of Technology, Hoboken, NJ, United States*

11:09am – Error Reduction and Performance Improvement of Palpation for Human Soft Tissues Based on 3D Indentation System

Technical Paper Publication. IMECE2014-39736

Zhimeng Li, *Tokyo University of Agriculture and Technology, Tokyo, Japan*, **Atsushi Sakuma**, *Tokyo University of Agriculture and Technology, Koganei City, Tokyo, Japan*

3-2 Biomechanics of Trauma Due to Accident, Surgery, or Weapons

3-2-1 Brain Injury Biomechanics

522B

1:00pm–2:45pm

Session Organizer: Siddiq Qidwai, *U.S. Naval Research Laboratory, Washington, DC, United States*

Session Chair: Timothy Walilko, *Applied Research Associates, Inc, Littleton, CO, United States*

Session Co-Chair: Reuben Kraft, *Pennsylvania State University, University Park, PA, United States*

1:00pm – Role of Helmet Pads on Load Transfer to Head

Technical Paper Publication. IMECE2014-37143

Timothy Zhang, *TKC Global, Aberdeen Proving Ground, MD, United States*, **Sikhanda Satapathy**, *RDRL-WMP-B, Aberdeen Proving Ground, MD, United States*

1:17pm – Baseball Head Impacts to Non-Helmeted and Helmeted Hybrid III ATD

Technical Paper Publication. IMECE2014-38648

Nicholas Yang, David Dainty, *Exponent., Inc., Los Angeles, CA, United States*, **Kathleen Rodowicz**, *Exponent., Inc., Philadelphia, PA, United States*

1:34pm – Computational Analysis of Force Transmission Through Helmet Systems From a Blunt Impact

Technical Presentation. IMECE2014-40296

Alan Leung, Amit Bagchi, Siddiq Qidwai, *U.S. Naval Research Laboratory, Washington, DC, United States*, **Peter Matic**, *Materials Science and Technology Division, Washington, DC, United States*, **John O'Donnell**, *Marine Corps Systems Command, Quantico, VA, United States*

1:51pm – Effects of Directionality of Blunt Impacts on Mechanical Response of the Brain

Technical Paper Publication. IMECE2014-39338

Hesam Sarvghad-Moghaddam, Ghodrat Karami, Mariusz Ziejewski, *North Dakota State University, Fargo, ND, United States*

2:08pm – Development of an In Vitro Experimental Technique for Blunt Impact Brain Trauma

Technical Presentation. IMECE2014-39995

Stylios Koumlis, Veronica Eliasson, *University of Southern California, Los Angeles, CA, United States*, **Parijat Sengupta**, *Applied Science Laboratory, Spokane, WA, United States*

2:25pm – Lagrangian vs Eulerian Treatment of Fluids in Blast Impact Modeling of the Human Head

Technical Presentation. IMECE2014-40381

Nithyanand Kota, *Leidos, Reston, VA, United States*, **Amit Bagchi, Alan Leung, Siddiq Qidwai**, *U.S. Naval Research Laboratory, Washington, DC, United States*

3-3 Vibration and Acoustics in Biomedical Applications

3-3-1 Diagnostics, Characterization, and Therapy—I

522A

1:00pm–2:45pm

Session Organizer: Lulu Wang, *AUT University, Auckland, New Zealand*

Session Co-Organizer: Takashi Saito, *Yamaguchi University, Ube, Yamaguchi, Japan*

1:00pm – Ceramic-on-Ceramic Hip Implants: Analysis of Friction induced squeal

Technical Paper Publication. IMECE2014-36821

Mark Sidebottom, Manish Paliwal, *The College of New Jersey, Ewing, NJ, United States*, **D. Gordon Allan**, *Orthopedic Center of Illinois, Springfield, IL, United States*

1:17pm – Stability of a Cementless Hip Implant: Numerical Analysis of the Vibrational Behavior

Extended Abstract Presentation. IMECE2014-37006

Quentin Vallet, Andres Rondon, Quentin Grimal, *Laboratoire d'Imagerie Biomedicale–UPMC Sorbonne, Paris, Ile de France, France*, **Elhadi Sariali**, *l'Hôpital la Pitié Salpêtrière, Paris, Ile de France, France*

1:34pm – High-Intensity Targeted Cavitation as a More Efficient and Safer Approach to Treat Kidney Stones

Technical Paper Publication. IMECE2014-37120

Steven Dion, Louis-Philippe Riel, Michael W. Sourial, Martin Brouillette, *Université de Sherbrooke, Sherbrooke, QC, Canada*

1:51pm – Effects of Mechanical Vibration on Multilayering of Cultured Osteoblasts

Extended Abstract Publication. IMECE2014-37731

Toshihiko Shiraishi, Akinori Ishii, Shin Morishita, *Yokohama National University, Yokohama, Japan*

2:08pm – Enhancing Mucus Clearance by Superimposed Flow Oscillations During Cough

Invited Presentation. IMECE2014-40522

Cahit Evrensel, *University of Nevada Reno, Reno, NV, United States*

2:25pm – Anti-Matching Design for Wave Isolation in Dual Frequency Transducer for Intravascular Super-Harmonic Imaging

Technical Paper Publication. IMECE2014-38844

Jianguo Ma, Zhuochen Wang, Sibao Li, Xiaoning Jiang, *North Carolina State University, Raleigh, NC, United States*

3-6 Bioinspired Materials and Nanomaterials

3-6-1 Biological and Bioinspired Structures

510B

1:00pm–2:45pm

Session Organizer: Seyed Allameh, *Northern Kentucky University, Highland Heights, KY, United States*

Session Co-Organizer: Zhenhai Xia, *University of North Texas, Denton, TX, United States*

1:00pm – Combinatorial Biomimicked Structural Materials Research

Technical Presentation. IMECE2014-36360

Seyed Allameh, *Northern Kentucky University, Highland Heights, KY, United States*

1:26pm – Understanding Biofilm Growth Dynamics Within a Stagnant Culture of *Sporosarcina Pasteurii*

Technical Paper Publication. IMECE2014-36778

Swayamdipta Bhaduri, Sushanta Mitra, Alope Kumar, *University of Alberta, Edmonton, AB, Canada*

1:52pm – Development of a Self-Oscillating Mechanical Model to Investigate the Biological Response of Human Vocal Fold Fibroblasts to Phono-Mimetic Stimulation

Technical Paper Publication. IMECE2014-38970

Neda Latifi, Hossein K. Heris, Siavash Kazemirad, Luc Mongeau, *McGill University, Montreal, QC, Canada*

2:18pm – Synthesis and Characterization of Hybrid Actuator Based on Polypyrrole and SMA

Technical Paper Publication. IMECE2014-39125

Akshay Potnuru, Yonas Tadesse, *University of Texas at Dallas, Richardson, TX, United States*

3-8 Dynamics and Control in Biomechanical Systems

3-8-1 Dynamics and Control in Biomechanical Systems I

510C

1:00pm–2:45pm

Session Organizer: Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: Bogdan I. Epureanu, Ryan S. McGinnis, *University of Michigan, Ann Arbor, MI, United States*

1:00pm – Effect of Toe-Joint and Heel Height on Balancing of a Standing Biped

Technical Paper Publication. IMECE2014-38350

Ehsan Kouchaki, Lenjan Branch, *Islamic Azad University, Isfahan, Iran*, **Mohammad Jafar Sadigh**, *Isfahan University of Technology, Isfahan, Isfahan, Iran*

1:21pm – Wavelet Transform for Human Gait With an Asymmetric Load

Technical Paper Publication. IMECE2014-39751

Cosmin Berceanu, Dan Marghitu, P.K. Raju, Vikas Yadav, *Auburn University, Auburn, AL, United States*, **Maruti Ram Gudavalli**, *Palmer Center for Chiropractic Research, Davenport, IA, United States*

1:42pm – Minimal Kinematic Model for Inverse Dynamic Analysis of Gait

Technical Paper Publication. IMECE2014-39942

D.S. Mohan Varma, S. Sujatha, *Indian Institute of Technology, Madras, Chennai, Tamil Nadu, India*

2:03pm – Validation of Complementary Filter Based IMU Data Fusion for Tracking Torso Angle and Rifle Orientation

Technical Paper Publication. IMECE2014-36909

Ryan S. McGinnis, Stephen M. Cain, Steven P. Davidson, Rachel V. Vitali, Scott G. McLean, Noel Perkins, *University of Michigan, Ann Arbor, MI, United States*

3-11 Computational Modeling and Device Design

3-11-1 Computational Modeling 1

522C

1:00pm–2:45pm

Session Organizer: Shijia Zhao, *University of Nebraska–Lincoln, Lincoln, NE, United States*

Session Chair: Linxia Gu, *University of Nebraska–Lincoln, Lincoln, NE, United States*

1:00pm – Particulates Depositions in Patient-Specific Simulations of Respiratory System

Technical Paper Publication. IMECE2014-36947

Shahab Taherian, Hamid Rahai, Bernardo Z. Gomez, *California State University, Long Beach, Long Beach, CA, United States*, **Thomas Waddington,** *VA Long Beach Healthcare System, Long Beach, CA, United States*

1:17pm – Stent Expansion in Curved Vessel and Their Interactions: An In Vitro Study

Technical Paper Publication. IMECE2014-39293

Shijia Zhao, Shengmao Lin, Linxia Gu, *University of Nebraska–Lincoln, Lincoln, NE, United States*

1:34pm – Design of Bioabsorbable Polymeric Humeral Fracture Fixation Device

Technical Paper Publication. IMECE2014-39743

Lauren Hazlett, Gabriella Becker, Allyn Calvis, Mary Verzi, Manish Paliwal, *College of New Jersey, Ewing, NJ, United States*

1:51pm – Mathematical Analysis of the Motion of Fluid in Between Ceramic-on-Ceramic Total Joint Arthroplasty Bearing Surfaces

Technical Paper Publication. IMECE2014-37301

Manish Paliwal, Thulsi Wickramasinghe, *College of New Jersey, Ewing, NJ, United States*

2:08pm – Effect of Head Weight on the Biomechanics of a Cervical Spine Under Extension and Flexion Moments

Technical Paper Publication. IMECE2014-38767

Wissal Mesfar, *King Saud University, Riyadh, Saudi Arabia*, **Kodjo Moglo,** *Royal Military College of Canada, Kingston, ON, Canada*

2:25pm – Investigation of Lumbosacral Spine Anatomical Variation Effect on Load-Partitioning Under Follower Load Using Geometrically Personalized Finite Element Model

Technical Paper Publication. IMECE2014-40231

Sadegh Naserkhaki, Jacob L. Jaremko, Greg Kawchuk, Samer Adeeb, Marwan El-Rich, *University of Alberta, Edmonton, AB, Canada*

3-2 Biomechanics of Trauma Due to Accident, Surgery, or Weapons

3-2-2 Tissue Mechanics and Injury Mechanisms

522B

3:00pm–4:45pm

Session Organizer: Amit Bagchi, *U.S. Naval Research Laboratory, Washington, DC, United States*

Session Chair: Ghodrat Karami, *North Dakota State University, Fargo, ND, United States*

Session Co-Chair: Nithyanand Kota, *Leidos, Reston, VA, United States*

3:00pm – Assessment of Neuronal Cell Response to Blast Events

Technical Presentation. IMECE2014-40294

Thomas O’Shaughnessy, Amit Bagchi, Carissa Soto, *U.S. Naval Research Laboratory, Washington, DC, United States*, **Kirth Simmonds,** *Leidos Corporation, Reston, VA, United States*, **Ryan McCulloch,** *Gonzaga University, Spokane, DC, United States*

3:15pm – Anisotropic Constitutive Model of Human Brain With Intravoxel Heterogeneity of Fiber Orientation Using Diffusion Spectrum Imaging (DSI)

Technical Paper Publication. IMECE2014-39107

Harsha T. Garimella, Hao Yuan, Brian D. Johnson, Semyon M. Slobounov, Reuben Kraft, *Pennsylvania State University, University Park, PA, United States*

3:30pm – Numerical Modeling of the Porcine Brain Subjected to Blast

Technical Presentation. IMECE2014-37145

Kimberly Ziegler, *Army Research Laboratory, Aberdeen Proving Grounds, MD, United States*, **Sikhanda Satapathy,** *RDRL-WMP-B, Aberdeen Proving Ground, MD, United States*

3:45pm – Wave Propagation Through Soft Tissue: Effect of Material Nonlinearity and Nonuniform Cross Section

Technical Paper Publication. IMECE2014-38953

Marcelo Valdez, Balakumar Balachandran, *University of Maryland, College Park, MD, United States*

4:00pm – Spherical Indentation on Ballistic Gelatin and Perma-Gel

Technical Paper Publication. IMECE2014-37132

Amélie Caron-Laramée, Martin Brouillette, *Université de Sherbrooke, Sherbrooke, QC, Canada*

4:15pm – Cavitation and Stress Wave Propagation in Gelatin Subjected to Ballistic Impact

Technical Presentation. IMECE2014-37329

James Gurganus, Army Research Laboratory, Aberdeen Proving Ground, MD, United States, Sikhanda Satapathy, RDRL-WMP-B, Aberdeen Proving Ground, MD, United States

4:30pm – Mechanical Response of Elastic Structures Embedded in an Enclosed Viscoelastic Medium Subjected to a Pressure Wave

Technical Presentation. IMECE2014-38778

Sarang Dalne, Kenji Shimada, Carnegie Mellon University, Pittsburgh, PA, United States, Anirban Jana, Pittsburgh Supercomputing Center, Pittsburgh, PA, United States

3-3 Vibration and Acoustics in Biomedical Applications

3-3-2 Diagnostics, Characterization, and Therapy II

522A

3:00pm–4:45pm

Session Organizer: Toshihiko Shiraishi, Yokohama National University, Yokohama, Japan

Session Co-Organizer: Cahit Evrensel, University of Nevada Reno, Reno, NV, United States

3:00pm – Numerical Simulation of Flow-Induced Noise in CPAP Device Duct Systems

Technical Presentation. IMECE2014-37597

Xuan-Tung Vuong, Ahmed Al-Jumaily, Robert Paxton, Auckland University of Technology, Auckland, New Zealand

3:21pm – Super Imposed Length Oscillations (SILO) and Their Effect on Asthmatic Models (Acute and Chronic) During an Asthmatic Attack

Technical Paper Publication. IMECE2014-37633

Miguel Jo-Avila, Kevin Roos, Ahmed Al-Jumaily, Jun Lu, Auckland University of Technology, Auckland, New Zealand

3:42pm – Study on Detection of Epileptic Discharges Based on a Duffing Oscillator Model

Technical Paper Publication. IMECE2014-38107

Takahiro Murakami, Yasumi Ukida, Yamaguchi University, Ube, Yamaguchi, Japan, Masami Fujii, Nagato Health and Welfare Center of Yamaguchi Prefecture, Nagato, Yamaguchi, Japan, Michiyasu Suzuki, Takashi Saito, Yamaguchi University, Ube, Yamaguchi, Japan

4:03pm – Bifrequency Co-Linear Array Transducer for Biomedical Ultrasound Imaging

Technical Paper Publication. IMECE2014-38871

Zhuochen Wang, Sibao Li, Xiaoning Jiang, North Carolina State University, Raleigh, NC, United States, Ruibin Liu, Xuecang Geng, Blatek, Inc., State College, PA, United States

4:24pm – Enhancement of Ultrasonic Cavitation Yield by Dual-Frequency Sonication

Technical Paper Publication. IMECE2014-39641

Sijia Guo, Xiaoning Jiang, North Carolina State University, Raleigh, NC, United States

3-6 Bioinspired Materials and Nanomaterials

3-6-2 Nanomaterials for Biomedical Applications

510B

3:00pm–4:45pm

Session Organizer: Seyed Allameh, Northern Kentucky University, Highland Heights, KY, United States

Session Co-Organizer: Zhenhai Xia, University of North Texas, Denton, TX, United States

3:26pm – Molecular Modeling of Supramolecular Polymer-Drug Conjugates for Drug Delivery

Technical Presentation. IMECE2014-39415

Ling Liu, Lin Zhang, Utah State University, Logan, UT, United States

3:52pm – Fabricating Tissue Engineering Scaffolds by Modularity

Technical Presentation. IMECE2014-39214

Li-Hsin Han, Stanford University School of Medicine, Palo Alto, CA, United States, Xinming Tong, Fan Yang, Stanford University School of Medicine, Stanford, CA, United States

4:18pm – Self-Cleaning Mechanism of Carbon Nanotube/Polymer Composites

Technical Presentation. IMECE2014-39292

Zhenhai Xia, University of North Texas, Denton, TX, United States

3-8 Dynamics and Control in Biomechanical Systems

3-8-2 Dynamics and Control in Biomechanical Systems II

510C

3:00pm–4:45pm

Session Organizer: Bogdan I. Epureanu, *University of Michigan, Ann Arbor, MI, United States*

Session Co-Organizers: Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States*, Junming Zhang, *Purdue University, West Lafayette, IN, United States*

3:00pm – Effect of Heel to Toe Walking on Time Optimal Walking of a Biped During Single Support Phase

Technical Paper Publication. IMECE2014-38214

Tara Farizeh, Mohammad Jafar Sadigh, Isfahan University of Technology, Isfahan, Isfahan, Iran

3:17pm – Joint Impact Forces of a Biped Walking on an Uneven Ground

Technical Paper Publication. IMECE2014-38293

Marzieh Mojaddarasil, Mohammad Jafar Sadigh, Isfahan University of Technology, Isfahan, Iran

3:34pm – Adjustable Elastic Element Design for Series Elastic Actuators

Technical Paper Publication. IMECE2014-38758

Zhuohua Shen, Junming Zhang, Manish Anand, Jared Schwartzentruber, Justin Seipel, Purdue University, West Lafayette, IN, United States

3:51pm – Energy Dissipation Rate Control for Planar Biped Walking Robot Based on Property of Passive Dynamic Walking

Technical Paper Publication. IMECE2014-39628

Mohsen Azimi, Mohammad Reza Hairi Yazdi, Tehran University, Tehran, Iran

4:08pm – Novel Periodic and Turning Motions in the Simplest Passive Walking Model

Technical Paper Publication. IMECE2014-36976

Mohammad Reza Sabaapour, Mohammad Reza Hairi Yazdi, Tehran University, Tehran, Iran, B. Beigzadeh, Iran University of Science and Technology, Tehran, Iran

4:25pm – Dynamic Test for Human Knee Ligament Structure Assessment

Technical Paper Publication. IMECE2014-39414

Dumitru I. Caruntu, Eduardo Granados, University of Texas Pan American, Edinburg, TX, United States

3-11 Computational Modeling and Device Design

3-11-2 Computational Modeling 2

522C

3:00pm–4:45pm

Session Organizer: Charles Taylor, *University of Louisiana at Lafayette, Lafayette, LA, United States*

Session Co-Organizer: Yahia Al-Smadi, *Texas A&M University, Corpus Christi, TX, United States*

3:00pm – Numerical Simulations and Experimental Data to Evaluate Residual Limb-Socket Interaction

Technical Paper Publication. IMECE2014-36860

Giorgio Colombo, Politecnico di Milano, Milano, Italy, Roberto Morotti, Daniele Regazzoni, Caterina Rizzi, Università di Bergamo, Dalmine, Bergamo, Italy

3:15pm – Modeling Cell Deformation in CTC Microfluidic Filters

Technical Paper Publication. IMECE2014-37167

Zhifeng Zhang, Jie Xu, Xiaolin Chen, Washington State University Vancouver, Vancouver, WA, United States

3:30pm – Stochastic Modeling of Crevice Corrosion With Emphasis on Titanium Alloys Modular Total Joint Arthroplasty

Technical Paper Publication. IMECE2014-37300

Sandeep Rajput, Independent Consultant, Bellevue, WA, United States, Manish Paliwal, College of New Jersey, Ewing, NJ, United States

4:00pm – Shape Effect on the Dynamics of Nano and Micro Particles in a Shear Flow

Technical Paper Publication. IMECE2014-39421

Samuel Musong, Zhigang Feng, University of Texas at San Antonio, San Antonio, TX, United States, Kai Chen, Quan-wei Xu, Hangzhou Dianzi University, Hangzhou, China

4:15pm – Computer Simulation and Modeling of Passive Humidification Device Cavity for Intensive Care Patient Medical Applications

Technical Paper Publication. IMECE2014-36505

Mahmoud Shafik, University of Derby, Derby, United Kingdom, Anne Lechevretel, UK Materials Technology Research Institute, Melton Mowbray, United Kingdom

4:30pm – Applying Kane's Method to Model the Response of the Human Body to Whole Body Vibrations

Technical Paper Publication. IMECE2014-36699

Emma Gantzer, Shawn Duan, Teresa Binkley, South Dakota State University, Brookings, SD, United States

Wednesday, November 19

3-2 Biomechanics of Trauma Due to Accident, Surgery, or Weapons

3-2-3 Musculoskeletal and Spinal Injuries

523A

9:45am–11:30am

Session Organizer: Karim Muci-Kuchler, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

Session Chair: Sikhanda Satapathy, *RDRL-WMP-B, Aberdeen Proving Ground, MD, United States*

Session Co-Chair: Amit Bagchi, *U.S. Naval Research Laboratory, Washington, DC, United States*

9:45am – Effects of Common Breaching Practices on the Overpressures Recorded Within the Stack

Technical Paper Publication. IMECE2014-38399

Timothy Walilko, *Applied Research Associates, Inc., Littleton, CO, United States*

10:06am – Use of Anthropomorphic Surrogates for Evaluation of Personal Protection Equipment Performance

Technical Presentation. IMECE2014-40408

Amit Bagchi, Andrew B. Geltmacher, *U.S. Naval Research Laboratory, Washington, DC, United States*, **Kirth Simmonds**, *Leidos Corporation, Reston, VA, United States*, **David Horner**, *HTSI, Columbia, MD, United States*

10:27am – High Rate Impact to the Human Calcaneus: A Micromechanical Analysis

Technical Paper Publication. IMECE2014-38930

Rebecca A. Fielding, *Pennsylvania State University, Herndon, VA, United States*, **Reuben Kraft, Christopher D. Kozuch**, *Pennsylvania State University, University Park, PA, United States*, **Xiangguang Tan, Andrzej J. Przekwas**, *CFD Research Corporation, Huntsville, AL, United States*

10:48am – Anterior Spinal Cord Contusion on Porcine Model Extended Abstract Publication. IMECE2014-38874

Francis Cliche, Yvan Petit, *École de Technologie Supérieure, Montreal, QC, Canada*, **Jean-Marc Mac-Thiong**, *Hôpital du Sacré-Coeur de Montréal, Montréal, QC, Canada*

11:09am – Toward a Micromechanical Model of Intervertebral Disc Degeneration Under Cyclic Loading

Technical Paper Publication. IMECE2014-39174

A.R. Krishna, Anand R. Makwana, Hao Yuan, Reuben Kraft, *Pennsylvania State University, University Park, PA, United States*, **Xianlian Zhou, Andrzej J. Przekwas, Phillip Whitley**, *CFD Research Corporation, Huntsville, AL, United States*

3-8 Dynamics and Control in Biomechanical Systems

3-8-3 Dynamics and Control in Biomechanical Systems III

524B

9:45am–11:30am

Session Organizer: Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: Bogdan I. Epureanu, *University of Michigan, Ann Arbor, MI, United States*, Wenjun Zhang, *University of Saskatchewan, Saskatoon, SK, Canada*

9:45am – Development of a Dynamic Knee Actuator for a KAFO Using Superelastic Alloys

Technical Paper Publication. IMECE2014-40431

Feng Tian, Mohamed Hefzy, Mohammad Elahinia, *University of Toledo, Toledo, OH, United States*

10:06am – Effect of Combined Motion on Force Transmission of a Flexible Instrument

Technical Paper Publication. IMECE2014-40076

Jitendra P. Khatait, *Indian Institute of Technology Delhi, New Delhi, India*, **Dannis M. Brouwer, Ronald G.K.M. Aarts, Just L. Herder**, *University of Twente, Enschede, Netherlands*

10:27am – Universal Android-Based Kit for Wireless Control of Wheelchairs

Technical Paper Publication. IMECE2014-39425

Paul Mitzlaff, Robert Niznik, Redwan Alqasemi, Rajiv Dubey, *University of South Florida, Tampa, FL, United States*

10:48am – Development of a Dynamic Adaptive Driving Simulator

Technical Paper Publication. IMECE2014-40152

Sarah Tudor, Stephanie Carey, Rajiv Dubey, *University of South Florida, Tampa, FL, United States*

11:09am – Monitoring of Compliance and Alveolar Pressure to Prevent Lung Overdistension During Total Liquid Ventilation
Technical Presentation. IMECE2014-40128

Jonathan Vandamme, Raymond Robert, Mathieu Nadeau, Julien Mousseau, Olivier Avoine, Jean-Paul Praud, Hervé Walti, Philippe Micheau, Université de Sherbrooke, Sherbrooke, QC, Canada, Pamela Samanta Germim, Université de Montréal, Montréal, QC, Canada

3-9 Clinical Applications of Bioengineering

3-9-1 Clinic Application of Bioengineering: Biomedical Imaging

524A

9:45am–11:30am

Session Organizer: Thomas James, Tufts University, Medford, MA, United States

Session Co-Organizer: Karen C. Yan, College of New Jersey, Ewing, NJ, United States

9:45am – Accuracy of Surface Point Detection With an 850 nm Laser and an NDI Stereo Camera

Technical Paper Publication. IMECE2014-38225

Franziska S. Goerlach, Tobias Lueddemann, Jonas Pfeiffer, Tim C. Lueth, Technische Universität München, Garching, Germany

10:02am – Antenna Array Configuration in Holographic Microwave Imaging

Technical Paper Publication. IMECE2014-36556

Lulu Wang, Ahmed Al-Jumaily, Auckland University of Technology, Auckland, New Zealand, Ray Simpkin, Callaghan Innovation, Auckland, New Zealand

10:19am – Contact Pressure to Improve Imaging Depth of Optical Coherence Tomography

Technical Presentation. IMECE2014-39713

Andrew Gouldstone, Parnian Boloorzadeh, Charles A DiMarzio, Northeastern University, Boston, MA, United States, Hao Tang, École Polytechnique de Montréal, Montreal, QC, Canada, Olesya Motovylyak, Lawrence Technological University, Southfield, MI, United States

10:36am – 4D Mitral Valve Motion Analysis Using Multiplane Cine Cardiac MRI Reconstructions for Functional Classification of Patients With Mitral Regurgitation

Technical Paper Publication. IMECE2014-39910

Abhiram S. Rao, University of Buffalo, The State University of New York, Buffalo, NY, United States, Prahlad G. Menon, Sun Yat-sen University–Carnegie Mellon University Joint Institute of Engineering, Pittsburgh, PA, United States

10:53am – Development of an Abdominal Aortic Aneurysm Ruptures Mechanism Using a Geometric Analytical Technique
Technical Paper Publication. IMECE2014-39823

Abd Halim Embong, Andrew Lowe, Institute of Biomedical Technologies, Auckland, New Zealand, Ahmed Al-Jumaily, Auckland University of Technology, Auckland, New Zealand, Giri Mahadevan, Middlemore Hospital and South Auckland Clinical School, University of Auckland, Auckland, New Zealand, Shukei Sugita, Fostering Young and Innovative, Nagoya, Japan

11:10am – Synthesis and Characterization of High-Strength Orthopaedic Scaffolds Using Poly(para-phenylene) and Image-Based Finite-Element Analysis

Technical Presentation. IMECE2014-40502

Christopher Yakacki, R. Dana Carpenter, University of Colorado Denver, Denver, CO, United States, Carl Frick, Anthony Hoyt, Ray Fertig, University of Wyoming, Laramie, WY, United States

3-11 Computational Modeling and Device Design

3-11-3 Computational Modeling of Injury

523B

9:45am–11:30am

Session Organizer: Shijia Zhao, University of Nebraska–Lincoln, Lincoln, NE, United States

Session Co-Organizer: Linxia Gu, University of Nebraska–Lincoln, Lincoln, NE, United States

9:45am – Development of Cellular Automata Simulation Code to Predict Nerve Axonal Extension Considering Extra-cellular Environmental Stimulation Effects

Technical Presentation. IMECE2014-37005

Akie Nakayama, Daiki Miyabe, Ryo Okuda, Yuske Morita, Eiji Nakamachi, Doshisha University, Kyoto, Japan, Takehiro Yamamoto, Osaka University, Suita Osaka, Japan

10:06am – In Silico Evaluation of Effects of Swirl Direction and Intensity on Aortic Flow Patterns Induced by an Aortic Pump Using Computational Fluid Dynamics

Technical Paper Publication. IMECE2014-39711

Priti G. Albal, *Carnegie Mellon University, Pittsburgh, PA, United States*, **Prahlad G. Menon**, *Sun Yat-sen University–Carnegie Mellon University Joint Institute of Engineering, Pittsburgh, PA, United States*

10:27am – Multiscale Modeling and Hierarchical Analysis of Rat Cortical and Trabecular Bone

Technical Presentation. IMECE2014-39757

Ramin Oftadeh, *Northeastern University, Boston, MA, United States*, **Ashkan Vaziri**, *Northeastern University, Cambridge, MA, United States*, **Ara Nazarian**, *Beth Israel Deaconess Medical Center, Boston, MA, United States*

10:48am – Investigation of Upper Cervical Spine Injury Due to Frontal and Rear Impact Loading Using Finite Element Analysis

Technical Paper Publication. IMECE2014-40209

Tanvir Mustafy, **Samer Adeeb**, **Marwan El-Rich**, *University of Alberta, Edmonton, AB, Canada*, **Kodjo Moglo**, *Royal Military College of Canada, Kingston, ON, Canada*

3-4 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

3-4-1 Innovations in Processing, Characterization, and Applications of Bioengineered Materials—I

523A

1:00pm–2:45pm

Session Organizer: Sridhar Santhanam, *Villanova University, Villanova, PA, United States*

Session Co-Organizer: Anil Saigal, *Tufts University, Medford, MA, United States*

1:00pm – Study on Mechanical Behavior of Dental Hard Tissues and Dental Restorative Materials by Three-Point Bending Test

Technical Paper Publication. IMECE2014-36645

Keyoung Jin Chun, **ChoongYeon Kim**, *Korea Institute of Industrial Technology, Cheonan-si, Chungnam, Korea (Republic)*, **Jong Yeop Lee**, *Samsung Medical Center, Seoul, Korea (Republic)*

1:17pm – Understanding Folding and Unfolding Reconfiguration of DNA Origami Tiles

Technical Presentation. IMECE2014-36711

Haorong Chen, **Te-Wei Weng**, **Jong Hyun Choi**, *Purdue University, West Lafayette, IN, United States*

1:34pm – Application of Homogenization Theory to Study the Mechanics of Cortical Bone

Technical Paper Publication. IMECE2014-36427

Ilige S. Hage, **Mutasem A. Shehadeh**, **Ramsey Hamade**, *American University of Beirut, Beirut, Lebanon*

1:51pm – Surface Modification of Polydimethylsiloxane by O₂ Plasma Treatment for Early Bone Formation

Technical Presentation. IMECE2014-37838

Marin Ikkatai, **Yuske Morita**, **Eiji Nakamachi**, *Doshisha University, Kyotanabe, Kyoto, Japan*

2:08pm – Evaluation of Decalcification Induced Changes in Bone Strength Using Electrical Conductivity Measurements

Technical Paper Publication. IMECE2014-38638

Vladislav Sevostianov, *Las Cruces High School, Las Cruces, NM, United States*

2:25pm – Automatic Particle Tracking Method to Estimate Fluid Viscosity and Size of Nanoparticles Using Total Internal Reflection Fluorescence Microscopy

Technical Presentation. IMECE2014-39707

Dong Shin, **Mohammad Mamun**, **Jose Almonte**, **Chang Kyoung Choi**, *Michigan Technological University, Houghton, MI, United States*, **Charles Margraves**, *University of Tennessee at Chattanooga, Chattanooga, TN, United States*, **Seong Hyuk Lee**, *Chung-Ang University, Seoul, Korea (Republic)*

3-7 Viscoelasticity of Biological Tissues and Ultrasound Applications

3-7-1 Tissue Viscoelasticity

524B

1:00pm–2:45pm

Session Organizer: Mostafa Fatemi, *Mayo Clinic College of Medicine, Rochester, MN, United States*

Session Co-Organizer: Sam Mukdadi, *West Virginia University, Morgantown, WV, United States*

1:00pm – Biomechanical Characteristics of Soft-Embalmed Tendons

Technical Presentation. IMECE2014-36596

Sima Zakani, Amanda Martyniuk, Randy E. Ellis, *Queen's University, Kingston, ON, Canada,* **David Pichora,** *Hotel Dieu Hospital, Kingston, ON, Canada*

1:13pm – Aging in Soft Tissues: Influence of Chemical Reactions on Mechanical Response

Technical Paper Publication. IMECE2014-37801

Mytharavuni Pullela, Parag Ravindran, *Indian Institute of Technology Madras, Chennai, India*

1:26pm – Viscoelasticity Measurement of Softness by Indentation Devices for Evaluation of Human Skin

Technical Paper Publication. IMECE2014-38261

Atsushi Sakuma, Yuma Sango, *Tokyo University of Agriculture and Technology, Koganei City, Tokyo, Japan*

1:39pm – Evaluation Technique of Viscoelasticity of a Pulsatile Tube Imitating Artery

Technical Paper Publication. IMECE2014-39256

Hiroya Nakagawa, Atsushi Sakuma, Takaya Shimpo, Kazuhiko Sakai, *Tokyo University of Agriculture and Technology, Tokyo, Japan*

1:52pm – Effect of Viscoelasticity of the Uterus Tissue on Its Internal Pressure

Technical Paper Publication. IMECE2014-39723

Nariman Ashrafi, *Islamic Azad Univer, Tehran, Iran,* **Parastou Piroozram,** *Payame Noor University, Tehran, Iran*

2:05pm – Inverse Finite Element Analysis of Soft Tissue Viscoelasticity in Acoustic Radiation Force Imaging

Technical Presentation. IMECE2014-40117

Xiaodong Zhao, Assimina Pelegri, *Rutgers–The State University of New Jersey, Piscataway, NJ, United States*

2:18pm – Comb-Push Ultrasound Shear Elastography of Thyroid

Technical Presentation. IMECE2014-40340

Mohammad Mehrmohammadi, Pengfei Song, Max Denis, Robert Fazzio, Shigao Chen, Mostafa Fatemi, Azra Alizad, *Mayo Clinic, Rochester, MN, United States*

2:31pm – Application of Viscoelastic Polymers for Ultrasound Phantoms of Biological Tissues

Invited Presentation. IMECE2014-40469

Adrian Wydra, Roman Gr. Maev, *The Institute for Diagnostic Imaging Research, Windsor, ON, Canada*

3-9 Clinical Applications of Bioengineering

3-9-2 Clinic Application of Bioengineering: Biomechanics

524A

1:00pm–2:45pm

Session Organizer: Karen C. Yan, *College of New Jersey, Ewing, NJ, United States*

Session Co-Organizer: Lijie Grace Zhang, *George Washington University, Washington, DC, United States*

1:17pm – Forces Applied During Manual Assessments of Low Back Pain Patients

Extended Abstract Publication. IMECE2014-36774

Maruti Ram Gudavalli, James W. DeVocht, Ting Xia, Robert Vining, Christine Goertz, *Palmer Center for Chiropractic Research, Davenport, IA, United States,* **David Wilder,** *University of Iowa, Iowa City, IA, United States,* **William Meeker,** *Palmer College of Chiropractic-West, San Jose, CA, United States*

1:51pm – Effect of Varying Diameter of Dental Implants During Placements in Compromised Bony Ridges at Different Insertion Torques: A Finite Element Study

Technical Paper Publication. IMECE2014-38388

Imran Aziz, *National University of Science & Technology, Islamabad, Punjab, Pakistan,* **Waleed A. Khan,** *National University of Sciences and Technology, Rawalpindi, Pakistan,* **Faisal Moeen,** *Riphah International University, Islamabad, Islamabad, Pakistan,* **Imran Akhtar, Wasim Tarar,** *National University of Sciences and Technology, Islamabad, Pakistan*

2:08pm – Joint Loading Effect on Kinematics of the Natural Knee During a Range of Simulated Walking Profiles

Extended Abstract Publication. IMECE2014-38995

Fallon Fitzwater, Kim Cole, Lorin Maletsky, *University of Kansas, Lawrence, KS, United States*

2:25pm – Biomechanics of Trunk During Walking Carrying Load on One Hand Using Nonlinear Methods

Extended Abstract Publication. IMECE2014-39720

Vikas Yadav, Daniel Marghitu, Auburn University, Auburn, AL, United States, Maruti Ram Gudavalli, Palmer Center for Chiropractic Research, Davenport, IA, United States, PK Raju

3-11 Computational Modeling and Device Design

3-11-4 Device Design 1

523B

1:00pm–2:45pm

Session Organizer: Shawn Duan, South Dakota State University, Brookings, SD, United States

Session Co-Organizer: Ramjee Repaka, Indian Institute of Technology Ropar, Rupnagar, Punjab, India

1:00pm – Virtual Airway Pressure and Lung Temperature Sensors in a Total Liquid Ventilation Connector

Technical Paper Publication. IMECE2014-40070

Raymond Robert, Mathieu Nadeau, Jonathan Vandamme, Julien Mousseau, Olivier Avoine, Michael Sage, Jean-Paul Praud, Hervé Walti, Philippe Micheau, Université de Sherbrooke, Sherbrooke, QC, Canada

1:17pm – Next-Generation Cardiovascular Implants and Therapies

Technical Presentation. IMECE2014-40223

Aleksandra Fortier, Reza Mirshams, University of North Texas, Denton, TX, United States

1:34pm – Wearable Wireless Inertial Sensors for Estimation of Gait Parameters and Its Integration With Portable Harness Ambulatory System for Rehabilitation

Technical Paper Publication. IMECE2014-38028

Neelesh Kumar, Central Scientific Instruments Organisation (Council of Scientific & Industrial Research), Chandigarh, India, Sasan Haghani, Devdas Shetty, University of the District of Columbia, Washington, DC, United States

1:51pm – Semi-active Hand Orthosis

Technical Paper Publication. IMECE2014-39294

Rosa Itzel Flores-Luna, Mariano García Del Gállego, Pol Torres-Martínez, Jesus M. Dorador-González, Universidad Nacional Autónoma de México, Distrito Federal, México

2:08pm – System for Assistance on Bath of Bedridden Elderly People

Technical Paper Publication. IMECE2014-38711

Karolina Bezerra, José Machado, Vitor Carvalho, Filomena Soares, Bruno Silva, University of Minho, Guimarães, Portugal, Demétrio Matos, IPCA-EST, Barcelos, Portugal, Celina Leao, University of Minho, Maia, Portugal

2:25pm – Mimicking LVAD Pump Performance Curves in an Experimental System Through the Use of Simulink Simscape and Control Optimization

Technical Presentation. IMECE2014-40261

Charles Taylor, Jacob M. King, Felix N. Anifowose, University of Louisiana at Lafayette, Lafayette, LA, United States

3-4 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

3-4-2 Innovations in Processing, Characterization, and Applications of Bioengineered Materials—II

523A

3:00pm–4:45pm

Session Organizer: Anil Saigal, Tufts University, Medford, MA, United States

Session Co-Organizer: Sridhar Santhanam, Villanova University, Villanova, PA, United States

3:00pm – Investigation of the Effect of Roughness on Lateral Resurfacing Elbow During Contact Forces

Technical Paper Publication. IMECE2014-36006

Mohammad Hodaie, Kambiz Farhang, Southern Illinois University Carbondale, Carbondale, IL, United States

3:17pm – Analytical Models to Determine the Electric Field Characteristics of a Multielectrode Impedimetric Immunosensor in a Digital Microfluidic Device

Technical Paper Publication. IMECE2014-37571

Steffen Blume, Ridha Ben-Mrad, University of Toronto, Toronto, ON, Canada, Michael Schertzer, Rochester Institute of Technology, Rochester, NY, United States, Pierre Sullivan, University of Toronto, Toronto, ON, Canada

3:34pm – Evaluation of Frictional Property of Surface Layer for Chondrocyte-Agarose Gel Construct During Cultivation

Technical Presentation. IMECE2014-37842

Ryo Kubota, Yuske Morita, Eiji Nakamachi, Doshisha University, Kyoto, Japan,

3:51pm – Development of PLLA Porous Fiber Scaffold by Electrospinning for Tissue Engineering

Technical Presentation. IMECE2014-37848

Ryosuke Narisada, Yuske Morita, Kazuki Minamimoto, Eiji Nakamachi, Doshisha University, Kyotanabe, Kyoto, Japan

4:08pm – Monte Carlo Simulation of Backscatter Signals Through Thin Scattering Layers for Biomedical Applications

Technical Paper Publication. IMECE2014-36352

Reginald Eze, Yasser Hassebo, City University of New York, LaGuardia Community College, Long Island City, NY, United States

4:25pm – Development of a Test Bank for Fluid Dynamic Analysis of Two Prosthetic Heart Valves Using Air as the Working Fluid

Technical Paper Publication. IMECE2014-39804

Luz María Rivera, Ana Irene Crispín, Nelson Escobar, Lina Marcela Hoyos, John Bustamante, Universidad Pontificia Bolivariana, Medellín, Colombia

3-9 Clinical Applications of Bioengineering

3-9-3 Clinic Application of Bioengineering: Diagnostic and Therapeutic Methods

524A

3:00pm–4:45pm

Session Organizer: Lijie Grace Zhang, *George Washington University, Washington, DC, United States*

Session Co-Organizer: Maruti Ram Gudavalli, *Palmer Center for Chiropractic Research, Davenport, IA, United States*

3:00pm – Drug Accumulation Into Single Drug-Sensitive and Drug-Resistant Prostate Cancer Cells Measured on the Single Cell Bioanalyzer

Technical Paper Publication. IMECE2014-36166

Avid Khamenehfar, Paul C.H. Li, Simon Fraser University, Burnaby, BC, Canada, Ji Liu, Patrick Ling, Pamela Russell, Australian Prostate Cancer Research Centre, Brisbane, Australia, Jia Cai, Michael Wong, ZellChip Technologies Inc., Burnaby, BC, Canada

3:13pm – Portable Handheld Oxygen Blender—A Novel Design to Reduce Early Oxygen Toxicity

Technical Paper Publication. IMECE2014-36619

Girish Deshpande, University of Illinois College of Medicine at Peoria, Peoria, IL, United States, Derek Oswald, University of Illinois at Chicago, Elk Grove Village, IL, United States, Gautham Oroskar, University of Illinois at Chicago, Oakbrook, IL, United States

3:26pm – Characterization of Calcified Plaques Retrieved From Occluded Arteries and Comparison With Potential Artificial Analogues

Technical Paper Publication. IMECE2014-38152

Louis-Philippe Riel, Steven Dion, Martin Brouillette, Université de Sherbrooke, Sherbrooke, QC, Canada, Simon Bérubé, Marc-Antoine Despatis, Centre Hospitalier Universitaire de Sherbrooke, Sherbrooke, QC, Canada, Étienne Bousser, École Polytechnique, Montréal, QC, Canada

3:39pm – Single Molecule Analysis Tool (SMAT) for Multiplexed Label-Free Assessment of Rare Cell Populations

Technical Paper Publication. IMECE2014-40225

Anjan Panneer Selvam, Shalini Prasad, University of Texas at Dallas, Richardson, TX, United States

3:52pm – Electromyography (EMG) Controlled Assistive Rehabilitation System

Technical Paper Publication. IMECE2014-40238

Robert V. Forshaw, *Wentworth Institute of Technology, Waterford, CT, United States*, **Nicholas W. Snow, Jared M. Wolff, Mansour Zenouzi, Douglas Dow**, *Wentworth Institute of Technology, Boston, MA, United States*

4:05pm – Cancer Recovery Analysis System

Technical Paper Publication. IMECE2014-40337

Priya Balasubramanian, Archana Pradeep, Deepak Dileepkumar, John Farris, Hugh Jack, *Grand Valley State University, Grand Rapids, MI, United States*

4:18pm – Failure Prediction Algorithm for 3D Complex Adhesive Retained Ceramic Dental Restorations

Technical Presentation. IMECE2014-40298

Sadia Nasrin, Noriko Katsube, Robert R. Seghi, Stanislaw Rokhlin, *Ohio State University, Columbus, OH, United States*

4:31pm – Hand Grasping Assistance Device

Technical Paper Publication. IMECE2014-40168

Ryan P. Andrews, Alejandra P. Garcia, Logen M. Johnson, Joseph F. Santacroce, James McCusker, Douglas Dow, *Wentworth Institute of Technology, Boston, MA, United States*

3-10 Transport Phenomena In Biomedical Applications

3-10-1 Transport Phenomena in Biomedical Applications

524B **3:00pm–4:45pm**

Session Organizer: M. Erol Ulucakli, *Lafayette College, Easton, PA, United States*

Session Co-Organizer: Yaling Liu, *Lehigh University, Bethlehem, PA, United States*

3:00pm – Lumped Thermal Model of a Patient and a Liquid Ventilator in Total Liquid Ventilation

Technical Paper Publication. IMECE2014-40108

Mathieu Nadeau, Philippe Micheau, Raymond Robert, Jonathan Vandamme, Julien Mousseau, Olivier Avoine, Michael Sage, Jean-Paul Praud, Hervé Walti, *Université de Sherbrooke, Sherbrooke, QC, Canada*, **Renaud Tissier**, *INSERM, Créteil, France*, **Pamela Samanta Germim**, *Université de Montréal, Montréal, QC, Canada*

3:15pm – Inflow Conditions and the Wall Shear Stress Characteristics of a Biofluid in Separated and Reattached Flow Regions

Technical Paper Publication. IMECE2014-36428

Khaled J. Hammad, *Central Connecticut State University, Simsbury, CT, United States*

3:30pm – Temperature and Frequency Dependence of the Thermal Conductivity and Specific Heat of the Porcine Liver During Electrosurgical Procedures

Technical Presentation. IMECE2014-36911

Wafaa Karaki, Diana-Andra Borca-Tasciuc, Suvranu De, Ali Cagdas Akyildiz, *Rensselaer Polytech Institute, Troy, NY, United States*

3:45pm – Model of Drug Delivery to the Eye

Technical Paper Publication. IMECE2014-39438

Maryam Shafahi, Parham Piroozan, *California State Polytechnic University, Pomona, CA, United States*

4:00pm – Experimental Assessment of Emitted Dose From Valved Holding Chamber Devices

Technical Paper Publication. IMECE2014-38846

Ricardo F. Oliveira, Manuel Silva, Manuel Oliveira, Senhorinha Teixeira, Ana V. Machado, *University of Minho, Guimarães, Portugal*, **Helena Cabral-Marques**, *University of Lisbon, Lisbon, Portugal*, **Jose C.F. Teixeira**, *Universidade do Minho School of Engineering, Guimaraes, Portugal*

4:15pm – Observation of Thrombus Formation Process by High Shear Rate on Various Flows and CFD-Based Prediction Method for Thrombus Formation Rate

Technical Paper Publication. IMECE2014-38002

Masaaki Tamagawa, *Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan*

4:30pm – Optical Trapping in Living Cells to Investigate Motor Protein Dynamics and Cell Mechanics

Technical Presentation. IMECE2014-39535

Adam Hendricks, *McGill University, Montreal, QC, Canada*, **Erika L.F. Holzbaur, Yale E. Goldman**, *University of Pennsylvania, Philadelphia, PA, United States*

TRACK 4: DYNAMICS, VIBRATION AND CONTROL

4-1 General

- 4-1-1: Dynamics and Vibration—General
- 4-1-2: System Control and Management—General

4-2 Nonlinear Dynamics, Control, and Stochastic Mechanics

- 4-2-1: Nonlinear Dynamics, Control, and Stochastic Mechanics I
- 4-2-2: Nonlinear Dynamics, Control, and Stochastic Mechanics II
- 4-2-3: Nonlinear Dynamics, Control, and Stochastic Mechanics III

4-3 Multibody Dynamic Systems and Applications

- 4-3-1: Multibody Dynamic Systems and Applications

4-4 Dynamics Modeling, Theory, and Application

- 4-4-1: Dynamics Modeling, Theory, and Application I
- 4-4-2: Dynamics Modeling, Theory, and Application II

4-5 Design and Control of Robots, Mechanisms, and Structures

- 4-5-1: Design and Control of Robots, Mechanisms, and Structures I
- 4-5-2: Design and Control of Robots, Mechanisms, and Structures II
- 4-5-3: Design and Control of Robots, Mechanisms, and Structures III
- 4-5-4: Design and Control of Robots, Mechanisms, and Structures IV
- 4-5-5: Design and Control of Robots, Mechanisms, and Structures V
- 4-5-6: Design and Control of Robots, Mechanisms, and Structures VI

4-6 Control Theory and Applications

- 4-6-1: System Modeling Techniques
- 4-6-2: Model Predictive and Adaptive Control
- 4-6-3: Linear Multivariable Control

4-7 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems

- 4-7-1: Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems—I
- 4-7-2: Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems—II
- 4-7-3: Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems—III

4-8 Vibration, Noise Control, and Damping Technologies

- 4-8-1: Vibration, Noise Control, and Damping Technologies I
- 4-8-2: Vibration, Noise Control, and Damping Technologies II

4-9 Dynamics and Control in Micro/Nano Engineering

- 4-9-1: Dynamics and Control in Micro/Nano Engineering I

4-10 Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control

- 4-10-1: Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control I
- 4-10-2: Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control II

4-11 Novel Control of Dynamic System and Design

- 4-11-1: Novel Control of Dynamic System and Design I
- 4-11-2: Novel Control of Dynamic System and Design II

4-12 Dynamics of Structures with Contact and/or Frictional Interfaces

- 4-12-1: Dynamics of Structures with Contact and/or Frictional Interfaces

4-13 Fluid-Structure Interaction

- 4-13-1: Fluid-Structure Interaction I
- 4-13-2: Fluid-Structure Interaction II
- 4-13-3: Fluid-Structure Interaction III

4-14 Vibrations of Continuous Systems

- 4-14-1: Vibrations of Continuous Systems I

4-16 Multiphysics Dynamics and Control of Structures and Devices

- 4-16-1: Multiphysics Dynamics and Control of Structures and Devices I

4-17 Measurement and Analysis Techniques in Nonlinear Dynamic Systems

- 4-17-1: Measurement and Analysis Techniques in Dynamic Systems

4-18 Plenary Presentations

- 4-18-1: Professor Lawrence A. Bergman—Targeted Energy Transfer: Intentional Use of Strong Nonlinearity for Vibration and Shock Control
- 4-18-2: Professor Bogdan Epureanu—Dynamics of Intracellular Nanotransport: A Treadmill for Biomolecular Machines

ACKNOWLEDGMENT

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 Stefano Zucca, *Politecnico di Torino, Italy*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL

Tuesday, November 18

4-9 Dynamics and Control in Micro/Nano Engineering

4-9-1 Dynamics and Control in Micro/Nano Engineering I

524A

9:45am–11:30am

Session Organizer: Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: Bogdan I. Epureanu, *University of Michigan, Ann Arbor, MI, United States*, Pezhman A. Hassanpour, *Loyola Marymount University, Los Angeles, CA, United States*

9:45am – Nonlinear Vibrations of Nanobeam With Quadratic Rational Bezier Arc Curvature

Technical Paper Publication. IMECE2014-37986

Hassan Askari, Zia Saadatnia, Ebrahim Esmailzadeh, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

10:02am – ROM of Electrostatically Actuated MEMS Resonators Under Simultaneous Resonances

Technical Paper Publication. IMECE2014-38217

Dumitru I. Caruntu, Christian Reyes, *University of Texas Pan American, Edinburg, TX, United States*

10:19am – Signals Generated by a Sensor That Captures the Cantilever Deflection of the Atomic Force Microscope With Nonlinear Behavior

Technical Paper Publication. IMECE2014-38386

Ricardo Nozaki, Helio Aparecido Navarro, Marcelo de Assumpção Pereira da Silva, *Universidade de São Paulo, São Carlos, São Carlos, Brazil*, Reyolando M.L.R.F. Brasil, *Universidade Federal do ABC, Santo André, São Paulo, Brazil*, Angelo Marcelo Tusset, *UTFPR-Ponta Grossa, PR, Ponta Grossa, Paraná, Brazil*, Atila M. Bueno, José M. Balthazar, *Universidade Estadual Paulista, São Paulo, Brazil*

10:36am – Nonlinear Forced Vibration of a Beam-Type Resonator With Attached Mass

Technical Paper Publication. IMECE2014-38509

Pezhman A. Hassanpour, *Loyola Marymount University, Los Angeles, CA, United States*

10:53am – Application of Variational Iteration Method in Nonlinear Free Vibration Analysis of Multilayered Nanoscale Graphene Sheets

Technical Paper Publication. IMECE2014-38957

Mehran Sadri, Davood Younesian, *Iran University of Science and Technology, Tehran, Iran*, Ebrahim Esmailzadeh, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

11:10am – Modeling and Velocity Control of a-Shape Microrobot With Adaptive Neural Network Controller

Technical Paper Publication. IMECE2014-39835

Mohammad Ali Nojournian, Hassan Salarieh, Gholamreza Vossoughi, *Sharif University of Technology, Tehran, Iran*, Masoud Jahromi Shirazi, *Virginia Polytechnic Institute and State University, Blacksburg, VA, United States*

4-13 Fluid-Structure Interaction

4-13-1 Fluid-Structure Interaction I

524B

9:45am–11:30am

Session Organizer: Marco Amabili, *McGill University, Montreal, QC, Canada*

Session Co-Organizers: Kostas Karazis, *AREVA Inc., Lynchburg, VA, United States*, Farbod Alijani, *McGill University, Montreal, QC, Canada*

9:45am – Nonlinear Vibrations of Plates in Axial Pulsating Flow

Technical Paper Publication. IMECE2014-37283

Eleonora Tubaldi, Marco Amabili, Farbod Alijani, *McGill University, Montreal, QC, Canada*

10:00am – Active Vibration Control of a Hanged Rectangular Plate Partially Submerged into Fluid by Using Piezoelectric Sensors and Actuators

Technical Paper Publication. IMECE2014-37948

Moon Kwak, Dong-Ho Yang, *Dongguk University, Seoul, Korea (Republic)*

10:15am – Determination of Slung Load Divergence Speed Using Airload Measurement and Simulation

Technical Paper Publication. IMECE2014-38260

Brandon Liberi, William Kelley, Sorin Pirau, Vrishank Raghav, Narayanan Komerath, *Georgia Institute of Technology, Atlanta, GA, United States*

10:30am – Two-Way Fluid Structure Coupling in Vibration and Damping Analysis of an Oscillating Hydrofoil

Technical Paper Publication. IMECE2014-38441

Tahereh Liaghat, *École Polytechnique de Montreal, Beaconsfield, QC, Canada*, **Francois Guibault**, *École Polytechnique de Montreal, Montreal, QC, Canada*, **Bernd Nennemann**, *Andritz, Point Claire, QC, Canada*, **Lukas Allenbach**, *EPFL, Lausanne, Switzerland*

10:45am – Nonlinear Normal Modes and the Lugre Friction Model Parameter Identification

Technical Paper Publication. IMECE2014-38997

Abdallah Hadji, Njuki Mureithi, *École Polytechnique de Montréal, Montreal, QC, Canada*

11:00am – Performance and Vibration of a Double Volute Centrifugal Pump—Effect of Impeller Trimming

Technical Paper Publication. IMECE2014-36060

Atia Khalifa, *King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia*

11:15am – Liquid Spreading Characteristics Due to Substrate Modal Vibrations

Technical Paper Publication. IMECE2014-38108

Prashant Agrawal, *IITB Monash Research Academy, Mumbai, Maharashtra, India*, **Prasanna Gandhi**, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*, **Adrian Neild**, *Monash University, Melbourne, Victoria, Australia*

4-12 Dynamics of Structures With Contact and/or Frictional Interfaces

4-12-1 Dynamics of Structures With Contact and/or Frictional Interfaces

524A

1:00pm–2:45pm

Session Organizer: Andrew Dick, *Rice University, Houston, TX, United States*

Session Co-Organizer: Jeff Fike, *Sandia National Laboratories, Albuquerque, NM, United States*

1:00pm – Dynamic Modeling of Horizontal Shafts With Annular Surface Contact and Friction—Application to Oilwell Drilling

Technical Paper Publication. IMECE2014-37198

Mejbahul Sarker, Geoff Rideout, Stephen Butt, *Memorial University of Newfoundland, St. John's, NL, Canada*

1:21pm – Friction Coefficient Model of Friction Pair Composed of Automotive Brake Materials

Technical Paper Publication. IMECE2014-37407

Zhishuai Wan, Haixia Wang, Tian He, *Beijing University of Aeronautics and Astronautics, Beijing, China*, **Xiandong Liu, Yingchun Shan**, *Beihang University, Beijing, China*

1:42pm – Dynamics of Bladed Disks With Frictional Coupling and Alternate Mistuning Pattern

Technical Paper Publication. IMECE2014-38263

Sebastian Tatzko, Lars Panning-Von Scheidt, Joerg Wallaschek, *Leibniz University Hannover, Hannover, Germany*

2:03pm – Comparative Study of Evolutionary Algorithms for Parameter Identification of an Impact Oscillator

Technical Paper Publication. IMECE2014-38855

Amit Banerjee, Issam Abu Mahfouz, *Pennsylvania State University Harrisburg, Middletown, PA, United States*

2:24pm – Surface Friction Guiding Effects on Dynamics of Web/Tape Handling Systems

Technical Presentation. IMECE2014-40174

Hankang Yang, Sinan Muftu, *Northeastern University, Boston, MA, United States*

4-13 Fluid-Structure Interaction

4-13-2 Fluid-Structure Interaction II

524B

1:00pm–2:45pm

Session Organizer: Kostas Karazis, *Areva Inc., Lynchburg, VA, United States*

Session Co-Organizers: Dennis Gottuso, *Areva Inc., Forest, VA, United States*, Brett Matthews, *Areva Inc., Lynchburg, VA, United States*

1:00pm – Fluid-Structure Interaction of Slender Structures With Applications in Nuclear Engineering

Technical Presentation. IMECE2014-38573

Marco Amabili, *McGill University, Montreal, QC, Canada*, **Kostas Karazis, Joel Hartman, Brett Matthews, Victor Hatman**, *Areva Inc., Lynchburg, VA, United States*, **Dennis Gottuso**, *Areva Inc., Forest, VA, United States*

1:17pm – Multiscale Fluid-Structure Interaction Simulations Based on Mesoscopic Approaches

Technical Paper Publication. IMECE2014-38799

Todd H. Weisgraber, Stuart D.C. Walsh, *Lawrence Livermore National Laboratory, Livermore, CA, United States*, **Kostas Karazis**, *Areva Inc., Lynchburg, VA, United States*, **Dennis Gottuso**, *Areva Inc., Forest, VA, United States*

1:34pm – Fluid-Structure Interaction Within a Fuel Assembly Subjected to Seismic Excitation

Technical Paper Publication. IMECE2014-38954
Gary Chang, Yahya Modarres-Sadeghi, *University of Massachusetts, Amherst, MA, United States*, **Kostas Karazis, Gary Williams, Victor Hatman, Brett Matthews**, *Areva Inc., Lynchburg, VA, United States*

1:51pm – Streamwise Fluidelastic Instability of Tube Arrays in Two-Phase Cross Flow

Technical Paper Publication. IMECE2014-39234
Stephen Olala, Njuki Mureithi, *École Polytechnique de Montreal, Montreal, QC, Canada*

2:08pm – Validation Data and Model Development for Nuclear Fuel Assembly Response to Seismic Loading

Technical Paper Publication. IMECE2014-40200
Noah A. Weichselbaum, Morteza Abkenar, Marcos Vanella, Majid T. Manzari, Elias Balaras, Philippe Bardet, *George Washington University, Washington, DC, United States*

2:25pm – Time History Steam Hammer Analysis for Critical Hot Lines in Thermal Power Plants

Technical Paper Publication. IMECE2014-38076
Ahmed H. Bayoumy, Anestis Papadopoulos, *Power Generation Engineering and Services Company, New Cairo, Cairo, Egypt*

4-14 Vibrations of Continuous Systems

4-14-1 Vibrations of Continuous Systems I

524C **1:00pm–2:45pm**

Session Organizer: Marco Amabili, *McGill University, Montreal, QC, Canada*

Session Co-Organizers: Dumitru I. Caruntu, *University of Texas Pan American, Edinburg, TX, United States*, Troy Lundstrom, *Northeastern University, Boston, MA, United States*

1:00pm – Vibration Modelling of String-Harnessed Beam Structures Using Homogenization Techniques

Technical Paper Publication. IMECE2014-37039
Blake Martin, Armaghan Salehian, *University of Waterloo, Waterloo, ON, Canada*

1:17pm – Voltage Response of MEMS Resonators Under Simultaneous Resonances

Technical Paper Publication. IMECE2014-38239
Dumitru I. Caruntu, Christian Reyes, *University of Texas Pan American, Edinburg, TX, United States*

1:34pm – Dynamic Modeling of a Piggybacked Cantilever Beam System

Technical Paper Publication. IMECE2014-40247
Troy Lundstrom, Nader Jalili, *Northeastern University, Boston, MA, United States*

1:51pm – Active Vibration Control of a Composite Sandwich Plate

Technical Paper Publication. IMECE2014-37611
Giovanni Ferrari, Marco Amabili, *McGill University, Montreal, QC, Canada*, **Margherita Capriotti**, *Università degli Studi di Parma–McGill University, Parma, Italy*, **Rinaldo Garziera**, *Università degli Studi di Parma, Parma, Italy*

2:08pm – Modeling and Analysis of Flexible Multistage Rotor Systems With Water-Lubricated Rubber Bearings

Technical Paper Publication. IMECE2014-39841
Shibing Liu, Bingen Yang, *University of Southern California, Los Angeles, CA, United States*

2:25pm – Vibration Analysis of Machine Tool Spindle Systems: A Calibrated Finite Element Model

Technical Paper Publication. IMECE2014-39547
Seyed M. Hashemi, Hemachandran Sambandamurthy, Hamid Ghaemi, *Ryerson University, Toronto, ON, Canada*

4-17 Measurement and Analysis Techniques in Nonlinear Dynamic Systems

4-17-1 Measurement and Analysis Techniques in Dynamic Systems

525A **1:00pm–2:45pm**

Session Organizer: Ebrahim Esmailzadeh, *University of Ontario Institute of Tech, Oshawa, ON, Canada*

Session Co-Chair: Pezhman A. Hassanpour, *Loyola Marymount University, Los Angeles, CA, United States*

1:00pm – Low Cost Experimental Vibration Analysis of a Cantilever Beam Under Base Excitation

Technical Paper Publication. IMECE2014-38562
Pezhman A. Hassanpour, Andrea J. Helms, *Loyola Marymount University, Los Angeles, CA, United States*

1:15pm – Noninvasive Displacement Measurement of Lightweight Structures Under Dynamic Excitations

Technical Paper Publication. IMECE2014-37559

Lubos Kotek, Michal Holub, Jan Vetiska, Zdenek Hadas, Petr Blecha, *Brno University of Technology, Brno, Czech Republic*

1:30pm – Parallel Processing Algorithm for a Direct Solution of Customized Fourier Transforms

Extended Abstract Publication. IMECE2014-36577

HyungTae Kim, KyungChan Jin, Jongseok Kim, *KITECH, CheonAn, ChungNam, Korea (Republic)*

1:45pm – Frequency Analysis and Interpolated Spectra of Time-Limited Samples in 3D RF Imaging

Extended Abstract Publication. IMECE2014-36576

HyungTae Kim, KyungChan Jin, SeungTaek Kim, *KITECH, CheonAn, ChungNam, Korea (Republic)*

4-18 Plenary Presentations

4-18-1 Professor Lawrence A. Bergman–Targeted Energy Transfer: Intentional Use of Strong Nonlinearity for Vibration and Shock Control

524A

3:00pm–4:45pm

Session Organizer: Dumitru I. Caruntu, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizer: Dewey Hodges, *Georgia Institute of Technology, Atlanta, GA, United States*

3:00pm – Targeted Energy Transfer: Intentional Use of Strong Nonlinearity for Vibration and Shock Control

Plenary Presentation. IMECE2014-40623

Lawrence Bergman, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

Wednesday, November 19

4-1 General

4-1-1 Dynamics and Vibration–General

520A

9:45am–11:30am

Session Organizer: Massimo Rundo, *Politecnico di Torino, Italy*

Session Co-Organizer: Abolfazl Mohebbi, *Polytechnique Montreal, Montréal, QC, Canada*

9:45am – Analysis of Kinematic and Dynamic Behavior of Valve Train System

Technical Paper Publication. IMECE2014-36096

Vishnu R. Rai, *TAFE Motors and Tractors Ltd., Alwar, Rajasthan, India*, Vijay Mahangade, C.B. Remesan, *Eicher Engines, Alwar, Rajasthan, India*

10:02am – Experimental Research on Dynamic Characteristics of a Rolling Agricultural Tire (Measurement of Forces Acting on Tire Shaft)

Technical Paper Publication. IMECE2014-36451

Katsuhide Fujita, *Ube National College of Technology, Ube, Japan*, Takashi Saito, *Yamaguchi University, Ube, Yamaguchi, Japan*, Mitsugu Kaneko, *Yanmar Co., Ltd., Maibara, Shiga, Japan*

10:19am – Research on Self-Loosening Mechanism of Bolted Joints Under Transversal Vibration

Technical Paper Publication. IMECE2014-37971

Wei Wang, *Xi'an Jiaotong University, Xi'an, China*, Qingli Wang, *Air Force Engineering University, Xi'an, China*, Shuai Zheng, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*, Xiaowei Liu, Haiping Liu, *Air Force Engineering University, Xi'an, China*

10:36am – On the Dynamics of Pressure Relief Valves With External Pilot for ICE Lubrication

Technical Paper Publication. IMECE2014-37973

Massimo Rundo, *Politecnico di Torino, Torino, Italy*

10:53am – Investigation of Inducing Vibration on the Friction of Coiled Tubing in Deep Drilling Operations

Technical Paper Publication. IMECE2014-40007

Jamil Abdo, *Sultan Qaboos University, Al-Khoud, Oman*, Hamed Al Sharji, *Petroleum Development Oman, Muscat, Oman*

11:10am – Analysis of Kinematic and Dynamic Behaviour of Valve Train System

Technical Paper Publication. IMECE2014-40891

Vishnu R. Rai, *TAFE Motors and Tractors Ltd., Alwar, Rajasthan, India*

4-3 Multibody Dynamic Systems and Applications

4-3-1 Multibody Dynamic Systems and Applications

520E

9:45am–11:30am

Session Organizer: Bill Prescott, *Siemens Product Life Cycle Management, Coralville, IA, United States*

9:45am – Finite Element Solution for Fully Intrinsic Plate Theory Extended Abstract Publication. IMECE2014-36807

Zahra Sotoudeh, *Rensselaer Polytechnic Institute, Troy, NY, United States*

10:02am – Analytic Continuation Method to Integrate Constrained Multibody Dynamical Systems

Technical Paper Publication. IMECE2014-37809

Ahmad Bani Younes, *Khalifa University, Abu Dhabi, Abu Dhabi, United Arab Emir.*, **James Turner**, *Texas A&M University, College Station, TX, United States*

10:19am – Design of Visual Dynamics Software of Transfer Matrix Method for Multibody System

Technical Paper Publication. IMECE2014-37849

Xiaoting Rui, Junjie Gu, Jianshu Zhang, Qinbo Zhou, *Nanjing University of Science & Technology, Nanjing, China*, **Haigen Yang**, *Nanjing University of Posts and Telecommunications, Nanjing, China*

10:36am – Real-Time Simulation for High-Fidelity Multibody Dynamics and Mechatronic Systems

Technical Paper Publication. IMECE2014-39994

Bill Prescott, *Siemens Product Life Cycle Management, Coralville, IA, United States*

10:53am – Bond Graph Modeling and Simulating of 3 RPR Planar Parallel Manipulator

Technical Paper Publication. IMECE2014-38601

Cheng Yin, Shengqi Jian, Md Hassan Faghih, Md Toufiqul Islam, Luc Rolland, *Memorial University of Newfoundland, St. John's, NL, Canada*

11:10am – Investigation of Dynamic and Control Robot in Assembling Process

Technical Paper Publication. IMECE2014-39549

Ashkan Nourizadeh Dehkordi, Mehdi Keshmiri, *Isfahan University of Technology, Isfahan, Iran*, **Mohammad Keshmiri**, *Concordia University, Cote-st-Luc, QC, Canada*

4-5 Design and Control of Robots, Mechanisms, and Structures

4-5-1 Design and Control of Robots, Mechanisms, and Structures I

520B

9:45am–11:30am

Session Organizer: Hong Zhou, *Texas A&M University–Kingsville, Kingsville, TX, United States*

Session Co-Organizers: Yong Zhu, *Georgia Southern University, Statesboro, GA, United States*, **Mustapha Fofana**, *Worcester Polytechnic Institute, Worcester, MA, United States*

9:45am – Design and Testing of a Portable Concussion Assessment Device

Technical Paper Publication. IMECE2014-36178

Yong Zhu, Evan Thomas, *Georgia Southern University, Statesboro, GA, United States*

10:02am – Development of an Oil and Gas Refinery Inspection Robot

Technical Paper Publication. IMECE2014-36358

John P.H. Steele, Qi Han, Adewole A. Ayoade, W. Alex Yearsley, Marshall R. Sweatt, *Colorado School of Mines, Golden, CO, United States*, **Hamad Karki, Khaled Al-Wahedi**, *Petroleum Institute, Abu Dhabi, United Arab Emir.*, **Daniel P Albert**, *Qualcomm Inc, Boulder, CO, United States*

10:19am – Development of Autonomous Mobile Platform for Automated Process of Ship Hull Fabrication

Technical Paper Publication. IMECE2014-36407

Jongjun Kim, Jeomgoo Kim, *Hyundai Heavy Industries, Ulsan, Dong-gu, Korea (Republic)*

10:36am – Passive Suspension Optimization Using Teaching Learning Based Optimization and Genetic Algorithm Considering Variable Speed Over a Bump

Technical Paper Publication. IMECE2014-36564

Bhargav Gadhvi, Vimal Savsani, *Pandit Deendayal Petroleum University, Gandhinagar, Gujarat, India*

10:53am – Reactive Power-Based Performance Index for Planar Mechanisms

Technical Paper Publication. IMECE2014-39047

Juan David López, Carlos Rodriguez, *Universidad De Los Andes, Bogota, Colombia*

11:10am – Synthesis of Path Generation Compliant Mechanisms Using Variable Width Spline Curves

Technical Paper Publication. IMECE2014-36815

Hong Zhou, Nisar Ahmed, *Texas A&M University–Kingsville, Kingsville, TX, United States*

4-6 Control Theory and Applications

4-6-1 System Modeling Techniques

520C

9:45am–11:30am

Session Organizer: Majura Selekwa, *North Dakota State University, Fargo, ND, United States*

Session Co-Organizer: Dale McDonald, *Midwestern State University, Wichita Falls, TX, United States*

9:45am – Modeling of a Dynamic Knee Simulator With an Advanced Controller to Evaluate Joint Loading Conditions

Extended Abstract Publication. IMECE2014-38932

Fallon Fitzwater, Lorin Maletsky, *University of Kansas, Lawrence, KS, United States*, **Amber N. Lenz**, *Orchid Orthopedics, Memphis, TN, United States*

10:11am – Steady-State Compressor Model as a Basis for Antisurge Control Action

Technical Paper Publication. IMECE2014-40348

Daniel Dias Leister, Song Won Park, *São Paulo University, São Paulo, Brazil*

10:37am – Boundary Control of a Marine Riser Pipe Conveying Fluid

Technical Paper Publication. IMECE2014-40392

Mohammad Ali Nojournian, Hassan Salarieh, *Sharif University of Technology, Tehran, Tehran, Iran*, **Masoud Jahromi Shirazi**, *Virginia Polytechnic Institute and State University, Blacksburg, VA, United States*

11:03am – Design the High-Speed Micromotion Controller for the 3C Industry With the LuGre Friction Model

Technical Paper Publication. IMECE2014-36152

Pau-Lo Hsu, Cong-Sheng Huang, *National Chiao Tung University, Hsinchu, Taiwan*, **Syh-Shiuh Yeh**, *National Taipei University of Technology, Taipei, Taiwan*

4-13 Fluid-Structure Interaction

4-13-3 Fluid-Structure Interaction III

520D

9:45am–11:30am

Session Organizer: Marco Amabili, *McGill University, Montreal, QC, Canada*

Session Co-Organizer: Kostas Karazis, *Areva Inc., Lynchburg, VA, United States*

9:45am – 3D Dynamical Model for Liquid Motion Simulation in a Partially Filled Tank

Technical Paper Publication. IMECE2014-36211

Mohamed Bouazara, Omar Noui, *Université du Québec à Chicoutimi, Chicoutimi, QC, Canada*, **Marc J. Richard**, *Laval University, Quebec, QC, Canada*

10:00am – Dynamics and Stability of Towed Flexible Cylinders: Theory and Experiments

Technical Paper Publication. IMECE2014-36691

Mojtaba Kheiri, Michael Paidoussis, Marco Amabili, *McGill University, Montreal, QC, Canada*

10:15am – Anti-Sloshing Effects of Longitudinal Partial Baffles in a Partly Filled Container Under Lateral Excitation

Technical Paper Publication. IMECE2014-37271

Amir Kolaei, Subhash Rakheja, *Concordia University, Montreal, QC, Canada*, **Marc Richard**, *Laval University, Quebec, QC, Canada*

10:30am – On Cross Flow-Induced Vibration of a Flexible Cylinder

Technical Paper Publication. IMECE2014-38642

Haoyang Cen, David S.-K. Ting, Rupp Cariveau, *University of Windsor, Windsor, ON, Canada*

10:45am – Nonlinear Free Vibration Analysis of a Fluid-Conveying Microtube

Technical Paper Publication. IMECE2014-38937

Shamim Mashrouteh, Mehran Sadri, Davood Younesian, *Iran University of Science and Technology, Tehran, Iran*, **Ebrahim Esmailzadeh**, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

11:00am – Characteristic Analysis of Pressure Fluctuation in a Three-Stage Rotodynamic Multiphase Pump

Technical Paper Publication. IMECE2014-36092

Jinya Zhang, Shujie Cai, Hongwu Zhu, Rui Qiang, *China University of Petroleum, Beijing, China*

11:15am – Dynamical Stability Analysis of a Hose to the Sky**Technical Presentation. IMECE2014-39678****Frederick Gosselin**, *École Polytechnique de Montreal, Montreal, QC, Canada*, **Michael Paidoussis**, *McGill University, Montreal, QC, Canada***4-1 General****4-1-2 System Control and Management-General****520A** **1:00pm–2:45pm****Session Organizer:** Ilya V. Avdeev, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***Session Co-Organizer:** Richard T. Meyer, *Purdue University, West Lafayette, IN, United States***1:00pm – Threshold Selector for Fault Detection on Closed-Loop Predictor-Based Recursive System Identification****Technical Paper Publication. IMECE2014-36157****Young-Man Kim**, *University of Michigan–Flint, Flint, MI, United States***1:17pm – Subspace-Based Spectrum Estimation With Missing Values****Technical Presentation. IMECE2014-36249****Huseyin Akcay**, **Semiha Turkay**, *Anadolu University, Eskisehir, NA, Turkey***1:34pm – Concurrent Estimation of a Vehicle's Mass and Auxiliary Power****Technical Paper Publication. IMECE2014-38156****Soheil Mohageghi Fard**, **Amir Khajepour**, *University of Waterloo, Waterloo, ON, Canada***1:51pm – Hybrid Optimal Power Management of a Ship****Technical Paper Publication. IMECE2014-38181****Richard T. Meyer**, **Raymond Decarlo**, **Steve Pekarek**, *Purdue University, West Lafayette, IN, United States*, **Jing Sun**, **Hyeongjun Park**, *University of Michigan, Ann Arbor, MI, United States***2:08pm – Nonparametric Statistical Methods for Magnetometer Directions****Technical Presentation. IMECE2014-38267****Brian Rasquinha**, **Randy E. Ellis**, *Queen's University, Kingston, ON, Canada***2:25pm – Model Order Reduction for Design of Torsional Disk Couplings****Extended Abstract Publication. IMECE2014-39275****Ilya V. Avdeev**, **Alex Francis**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***4-2 Nonlinear Dynamics, Control, and Stochastic Mechanics****4-2-1 Nonlinear Dynamics, Control, and Stochastic Mechanics I****520E** **1:00pm–2:45pm****Session Organizer:** Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States***Session Co-Organizers:** Marco Amabili, *McGill University, Montreal, QC, Canada*, **Matthew Robert Brake**, *Sandia National Laboratories, Albuquerque, NM, United States***1:00pm – Nonlinear Vibration of an Aero-Thermoelastic Panel Under Periodic Actuation in Supersonic Flow****Technical Paper Publication. IMECE2014-36208****Wei Kang**, **Yang Tang**, **Min Xu**, **Xiaomin An**, *Northwestern Polytechnical University, Xi'an, Shaanxi, China*, **Jiazhong Zhang**, *Xi'an Jiaotong University, Xi'an, China***1:17pm – Nonlinear Dynamics of a Pendulum Excited by a Crank-Shaft-Slider Mechanism****Technical Paper Publication. IMECE2014-36643****Rafael Henrique Avanço**, **Helio Aparecido Navarro**, *Universidade de São Paulo, São Carlos, SP, Brazil*, **Reyolando M.L.R.F. Brasil**, *Universidade Federal do ABC, Santo André, São Paulo, Brazil, Brazil*, **José M. Balthazar**, *Universidade Estadual Paulista, Rio Claro, São Paulo, Brazil***1:34pm – Nonlinear Vibrations of Pressurized Functionally Graded Plates Using Higher-Order Thickness Stretching Theory****Technical Paper Publication. IMECE2014-37131****Farbod Alijani**, **Marco Amabili**, *McGill University, Montreal, QC, Canada***1:51pm – Using Hyper Dual Numbers to Construct Parameterized Reduced-Order Models****Technical Presentation. IMECE2014-38644****Matthew Robert Brake**, *Sandia National Laboratories, Albuquerque, NM, United States*, **J.A. Fike**, *Stanford University, Stanford, CA, United States*, **S.D. Topping**, *University of Arizona, Tucson, AZ, United States*

2:08pm – Fatigue Life Prediction of Drill-String Subjected to Random Loading

Technical Paper Publication. IMECE2014-36009
Jiahao Zheng, Hongyuan Qiu, Jianming Yang, Stephen Butt, Memorial University of Newfoundland, St. John's, NL, Canada

2:25pm – ROM of Primary Resonance of Electrostatically Actuated MEMS/NEMS Plates

Technical Paper Publication. IMECE2014-38294
Dumitru I. Caruntu, Reynaldo Oyervides, University of Texas Pan American, Edinburg, TX, United States

4-4 Dynamics Modeling, Theory, and Application

4-4-1 Dynamics Modeling, Theory, and Application I

520C 1:00pm–2:45pm

Session Organizer: Andrew Dick, Rice University, Houston, TX, United States

Session Co-Organizers: Zahra Nili Ahmadabadi, École de Technologie Supérieure, Montreal, QC, Canada, Pezhman A. Hassanpour, Loyola Marymount University, Los Angeles, CA, United States

1:00pm – Comparative Study of Passive Vibration Isolator Modeling and Analysis

Technical Paper Publication. IMECE2014-36007
Sudhir Kaul, Western Carolina University, Cullowhee, NC, United States

1:21pm – Dynamic Modeling of a Transient Engine Test Cell for Cold Engine Testing Applications

Technical Paper Publication. IMECE2014-36286
I. Souflas, A. Pezouvanis, B. Mason, K.M. Ebrahimi, University of Bradford, Bradford, United Kingdom

1:42pm – Dynamic Interaction Between Rotor and Axially Magnetized Passive Magnetic Bearing Considering Magnetic Eccentricity

Technical Paper Publication. IMECE2014-38032
Søren Enemark, Ilmar Ferreira Santos, Technical University of Denmark, Kgs. Lyngby, Denmark

2:03pm – Comparison of Ball Bearing Model Performance With and Without Centrifugal and Gyroscopic Forces

Technical Paper Publication. IMECE2014-37880
Emil Kurvinen, Jussi Sopanen, Aki Mikkola, Lappeenranta University of Technology, Lappeenranta, Finland

2:24pm – Novel Method for Calculation Gear Tooth Stiffness for Dynamic Analysis of Spur Gears With Asymmetric Teeth

Technical Paper Publication. IMECE2014-39402
Fatih Karpat, Oguz Dogan, Celalettin Yuces, Uludag University, Bursa, Turkey, **Stephen Ekwaro-Osire,** Texas Tech University, Lubbock, TX, United States

4-7 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems

4-7-1 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems—I

520D 1:00pm–2:45pm

Session Organizer: Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

Session Co-Organizer: Andrew Dick, Rice University, Houston, TX, United States

1:00pm – Design and Optimization of Multi-Modal Vibration Energy Harvesters Using Slitted Beams

Technical Paper Publication. IMECE2014-37560
Mina Dawoud, Hesham Hegazi, Cairo University, Cairo, Egypt, **Mustafa Arafa,** American University in Cairo, New Cairo, Egypt

1:21pm – Torsion Based Shear Mode Piezoelectric Energy Harvester for Wireless Sensor Networks

Technical Paper Publication. IMECE2014-37640
Vainatey Kulkarni, Ridha Ben-Mrad, Eswar Prasad, University of Toronto, Toronto, ON, Canada

1:42pm – Design and Modeling of Hydraulic Pressure Energy Harvesters for Low Dynamic Pressure Environments

Technical Paper Publication. IMECE2014-38684
Kenneth Cunefare, Ellen Skow, Alper Erturk, Georgia Institute of Technology, Atlanta, GA, United States

2:03pm – Nonlinear Dynamics of High-Dimensional Models of a Rotating Euler-Bernoulli Beam Under the Gravity Load

Technical Paper Publication. IMECE2014-37157
Jianliang Huang, Sun Yat-sen University, Guangzhou, China, **Weidong Zhu,** University of Maryland, Baltimore County, Baltimore, MD, United States

2:24pm – Detection of a Blade Crack in Bladed Disks: Methodology and Validation

Extended Abstract Presentation. IMECE2014-38491
Stefano Zucca, Politecnico di Torino, Torino, Italy, **Bogdan I. Epureanu,** University of Michigan, Ann Arbor, MI, United States

4-18 Plenary Presentations

4-18-2 Professor Bogdan Epureanu—Dynamics of Intracellular Nanotransport: A Treadmill for Biomolecular Machines

520B 1:00pm–2:45pm

Session Organizer: Dewey Hodges, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: Dumitru I. Caruntu, *University of Texas Pan American, Edinburg, TX, United States*

1:00pm – Dynamics of Intracellular Nanotransport: A Treadmill for Biomolecular Machines

Plenary Presentation. IMECE2014-40624

Bogdan I. Epureanu, *University of Michigan, Ann Arbor, MI, United States*

4-2 Nonlinear Dynamics, Control, and Stochastic Mechanics

4-2-2 Nonlinear Dynamics, Control, and Stochastic Mechanics II

520E 3:00pm–4:45pm

Session Organizer: Bogdan I. Epureanu, *University of Michigan, Ann Arbor, MI, United States*

Session Co-Organizers: Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States*, Stefano Zucca, *Politecnico di Torino, Torino, Italy*, Alexandrina Untaroiu, *University of Virginia, Charlottesville, VA, United States*

3:00pm – Component Level Bilinear Modal Reduction for Structures With Intermittent Contacts

Extended Abstract Presentation. IMECE2014-38685

Stefano Zucca, *Politecnico di Torino, Torino, Italy*, **Bogdan I. Epureanu**, *University of Michigan, Ann Arbor, MI, United States*, **Matthew P. Castanier**, *U.S. Army Tank Automotive Research, Development, and Engineering Center, Warren, MI, United States*

3:17pm – Amplitudes Decay in the Nonlinear Oscillators of Mixed Linear and Cubic Stiffness Components

Technical Paper Publication. IMECE2014-39950

Mohammad AL-Shudeifat, *Thomas Burton*, *Khalifa University of Science, Technology & Research, Abu Dhabi, United Arab Emir.*

3:34pm – Analytical Solution of Two Coupled Oscillators With a Nonlinear Coupling Resorting Force

Technical Paper Publication. IMECE2014-39971

Mohammad AL-Shudeifat, *Thomas Burton*, *Khalifa University of Science, Technology & Research, Abu Dhabi, United Arab Emir.*

3:51pm – Nonlinear Analysis of Rub Impact in a Three-Disk Rotor and Correction via Bearing and Lubricant Adjustment

Technical Paper Publication. IMECE2014-40055

Brian Weaver, *Andres Clarens*, *Alexandrina Untaroiu*, *University of Virginia, Charlottesville, VA, United States*, **Ya Zhang**, *Beijing University of Chemical Technology, Beijing, China*

4:08pm – Stochastic Robust Hybrid Observer With Applications to Automotive Slip Angle Estimation

Technical Paper Publication. IMECE2014-39436

Kaveh Merat, *Hamidreza Razavi*, *Hassan Salarieh*, *Aria Alasty*, *Ali Meghdari*, *Sharif University of Technology, Tehran, Iran*

4:25pm – Stability Determination in Turning Using Persistent Homology and Time Series Analysis

Technical Paper Publication. IMECE2014-40221

Firas A. Khasawneh, *State University of New York Institute of Technology, Utica, NY, United States*, **Elizabeth Munch**, *Institute for Mathematics and Its Applications, Minneapolis, MN, United States*

4-5 Design and Control of Robots, Mechanisms, and Structures

4-5-2 Design and Control of Robots, Mechanisms, and Structures II

520B 3:00pm–4:45pm

Session Organizer: Pierre Laroche, *Florida Institute of Technology, Melbourne, FL, United States*

Session Co-Organizers: Vimal Savsani, *Pandit Deendayal Petroleum University, Gandhinagar, India*, **Mustapha Fofana**, *Worcester Polytechnic Institute, Worcester, MA, United States*

3:00pm – Analysis and Design of the 2PRU-1PRS Manipulator for Vibration Testing

Technical Paper Publication. IMECE2014-36864

Saioa Herrero, *Charles Pinto*, *Oscar Altuzarra*, *Constantino Roldan-Paraponiaris*, *University of the Basque Country, Bilbao, Bizkaia, Spain*

3:17pm – Design of a Reconfiguration Mechanism for an Electric Stair-Climbing Wheelchair

Technical Paper Publication. IMECE2014-37055

Giuseppe Quaglia, Walter Franco, Matteo Nisi, *Politecnico di Torino, Torino, Italy*

3:34pm – Estimation of Anchor Points for Fully Constrained and Redundant Planar Cable Robots

Technical Paper Publication. IMECE2014-37057

Gokhan Gungor, Sergio J. Torres-Mendez, Baris Fidan, Amir Khajepour, *University of Waterloo, Waterloo, ON, Canada*

3:51pm – Development of Robotics Simulation Using Creo 2.0

Technical Paper Publication. IMECE2014-39545

Shubham Somani, Anshul Jain, Vimal Savsani, Poonam Savsani, *Pandit Deendayal Petroleum University, Gandhinagar, Gujarat, India*

4:08pm – Design of a Boat Simulator Using Two Parallel Manipulators

Technical Paper Publication. IMECE2014-38162

Juan David López, Carlos Rodriguez, *Universidad De Los Andes, Bogotá, Colombia*

4:25pm – Design of Graphical User Interfaces for the Synthesis of Planar RR Dyads

Technical Paper Publication. IMECE2014-38564

Jugesh Sundram, Venkatesh Venkataramanujam, Pierre Laroche, *Florida Institute of Technology, Melbourne, FL, United States*

4-6 Control Theory and Applications

4-6-2 Model Predictive and Adaptive Control

520C

3:00pm–4:45pm

Session Organizer: Dale McDonald, *Midwestern State University, Wichita Falls, TX, United States*

Session Co-Organizer: Majura Selekwa, *North Dakota State University, Fargo, ND, United States*

3:00pm – LQG Controller Design for Identified Wind Turbine Systems

Technical Paper Publication. IMECE2014-36154

Young-Man Kim, *University of Michigan–Flint, Flint, MI, United States*

3:21pm – Distributed Actuator Array Manipulation Using Low Resolution Local Sensing

Technical Paper Publication. IMECE2014-37147

Deepak Parajuli, Mark Bedillion, Randy Hoover, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

3:42pm – Output Feedback Model Predictive Control of Linear Parameter Varying Systems

Technical Paper Publication. IMECE2014-37238

Jianwei Gao, Weilin Yang, TieJun Zhang, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

4:24pm – Recent Trends in Stabilization and Control of Distributed Parameter Dynamic Systems

Technical Paper Publication. IMECE2014-37151

Verica Radisavljevic-Gajic, Dimitrios Karagiannis, *Villanova University, Villanova, PA, United States*, Meng-Bi Cheng, Wu-Chung Su, *National Chung-Hsing University, Taichung, Taiwan*

4-7 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems

4-7-2 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems—II

520D

3:00pm–4:45pm

Session Organizer: Weidong Zhu, *University of Maryland, Baltimore County, Baltimore, MD, United States*

Session Co-Organizer: Ioannis Georgiou, *National Technical University of Athens, Athens, Greece*

3:00pm – Fault Diagnosis of Li-Ion Battery Using Electrochemical Model Based Observer and Fuzzy Logic

Technical Paper Publication. IMECE2014-37134

Vinay K.S. Muddappa, *Cummins, Inc., Indianapolis, IN, United States*, Sohel Anwar, *Indiana University Purdue University Indianapolis, Indianapolis, IN, United States*

3:21pm – Evaluation of the Moving Horizon Estimation Algorithm for Online Estimation of Battery State of Charge and State of Health

Technical Paper Publication. IMECE2014-37140

Bibin Pattel, *Cummins, Inc., Indianapolis, IN, United States*, Hoseinali Borhan, *Cummins, Inc., Columbus, IN, United States*, Sohel Anwar, *Indiana University–Purdue University Indianapolis, Indianapolis, IN, United States*

3:42pm – Data-Driven Model-Based Fault Diagnosis in a Wind Turbine With Actuator Faults

Technical Paper Publication. IMECE2014-38686

Hamed Badihi, Javad Soltani Rad, Youmin Zhang, Henry Hong, *Concordia University, Montreal, QC, Canada*

4:03pm – Bearing Fault Parameter Identification Under Varying Operating Conditions Using Vibration Signals and Evolutionary Algorithms

Technical Paper Publication. IMECE2014-39124
Issam Abu Mahfouz, Amit Banerjee, *Pennsylvania State University Harrisburg, Middletown, PA, United States*

4:24pm – Dynamic Analysis of a Novel Geared Infinitely Variable Transmission

Technical Paper Publication. IMECE2014-36551
Zhuoran Li, Xuefeng Wang, Weidong Zhu, *University of Maryland, Baltimore County, Baltimore, MD, United States*

4-16 MultiPhysics Dynamics and Control of Structures and Devices

4-16-1 Multiphysics Dynamics and Control of Structures and Devices I

520A **3:00pm–4:45pm**

Session Organizer: Ioannis Georgiou, *National Tech University of Athens, Athens, Greece*

3:00pm – Mechanics of a Thin Flexible Tape Moving in Contact With a Grooved-Cylindrical Roller

Technical Presentation. IMECE2014-40186
Tugce Kasikci, Sinan Muftu, *Northeastern University, Boston, MA, United States*, **Ming-Chih Wang, Turguy Goker**, *Quantum Corporation, Irvine, CA, United States*, **Clark Jansen**, *Oracle Corporation, Louisville, CO, United States*

3:17pm – Steady-State Thermal Effect on Rotordynamics of a Rod-Fastened Rotor-Bearing System

Technical Paper Publication. IMECE2014-37366
Ming Zhuo, Lihua Yang, Lie Yu, *Xi'an Jiaotong University, Shanxi, China*

3:34pm – Kalman Filter Framework for High-Dimensional Sensor Fusion Using Stochastic Nonlinear Networks

Technical Paper Publication. IMECE2014-37834
George Lloyd, *ACTA Inc., Rancho Palos Verdes, CA, United States*

3:51pm – Design of Beam Surface Displacement Sensors

Technical Paper Publication. IMECE2014-38389
Rohan Thomas, Marcellin Zahui, *University of North Dakota, Grand Forks, ND, United States*

4:08pm – Optimal Positioning Control of IPMC Actuators

Technical Paper Publication. IMECE2014-38663
Smriti Tripathi, Majura Selekwa, Andrew Narvesen, *North Dakota State University, Fargo, ND, United States*

4:25pm – Multiphysics Chaotic Interaction in a Coupled Electro-Magneto-Mechanical System

Technical Paper Publication. IMECE2014-38714
Francesco Romeo, *Sapienza University of Rome, Rome, Italy*, **Ioannis Georgiou**, *National Technical University of Athens, Athens, Greece*

Thursday, November 20

4-2 Nonlinear Dynamics, Control, and Stochastic Mechanics

4-2-3 Nonlinear Dynamics, Control, and Stochastic Mechanics III

520F **7:45am–9:15am**

Session Organizer: Marco Amabili, *McGill University, Montreal, QC, Canada*

Session Co-Organizers: Dumitru Caruntu, *University of Texas Pan American, Edinburg, TX, United States*, **José M. Balthazar**, *Universidade Estadual Paulista, Rio Claro, São Paulo, Brazil*

7:45am – Elastic Beam Vibration Control With Phase-Locked Loop

Technical Paper Publication. IMECE2014-36647
Guilherme C. Lopes, Atila M. Bueno, José M. Balthazar, *Universidade Estadual Paulista, São Paulo, Brazil*

7:57am – Control of Slewing Motions of Flexible Structures Using Shape Memory Alloy Actuators

Technical Paper Publication. IMECE2014-37505
Frederic Conrad Janzen, Angelo Marcelo Tuset, Vinicius Piccirillo, *UTFPR–Ponta Grossa, PR, Ponta Grossa, Paraná, Brazil*, **José M. Balthazar**, *Universidade Estadual Paulista, São Paulo, Brazil*, **Bento Rodrigues De Pontes, Jr., Marcos Silveira**, *UNESP–São Paulo State University, Bauru, Bauru, SP, Brazil*, **Reyolando M.L.R.F. Brasil**, *Universidade Federal do ABC, Santo André, São Paulo, Brazil, Brazil*

8:09am – State Measurement System for Control of Soft Actuator Made by Prestressed Super Elastic Alloy

Technical Paper Publication. IMECE2014-39223
Yuya Suzuki, Atsushi Sakuma, Taichi Nozawa, *Tokyo University of Agriculture and Technology, Tokyo, Japan*

8:21am – Adaptive Fuzzy Computed Torque Controller for Bipedal Robot

Technical Paper Publication. IMECE2014-39773
Hamzeh Ansari, Ahmad Ghanbari, *University of Tabriz, Tabriz, Iran*, **Mohammad Pourgol-Mohammad**, *Sahand University of Technology, Tabriz, East Azarbaijan, Iran*

8:33am – Unscented Smooth Variable Structure Filter Application Into a Robotic Arm

Technical Paper Publication. IMECE2014-40118
Mohammad Al-Shabi, *Philadelphia University, Jarash, Jordan*, **Khaled Hatamleh**, *Jordan University of Science & Technology, Irbid, Jordan*

8:45am – Numerical Simulation of Road Roughness in Left and Right Wheelpaths Based on PSD and Coherence Function

Technical Presentation. IMECE2014-37195
Xiandong Liu, Yingchun Shan, Tian He, *Beihang University, Beijing, China*

8:57am – Chaos in Inverted Flexible Pendulum With Tip Mass

Technical Paper Publication. IMECE2014-38500
Prasanna Gandhi, Jaish Meena, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*

4-5 Design and Control of Robots, Mechanisms, and Structures

4-5-3 Design and Control of Robots, Mechanisms, and Structures III

520E **7:45am–9:15am**

Session Organizer: Wen-Fang Xie, *Concordia University, Montreal, QC, Canada*

Session Co-Organizer: Hong Zhou, *Texas A&M University–Kingsville, Kingsville, TX, United States*

7:45am – Five Bar Planar Manipulator Simulation and Analysis by Bond Graph

Technical Paper Publication. IMECE2014-37602
Shengqi Jian, Cheng Yin, Lesley James, Luc Rolland, *Memorial University of Newfoundland, St. John's, NL, Canada*

8:00am – General Method for Kinematic Retargeting: Adapting Poses Between Humans and Robots

Technical Paper Publication. IMECE2014-37700
Tarik Tosun, *University of Pennsylvania, Philadelphia, PA, United States*, **Ross Mead**, *University of Southern California, Los Angeles, CA, United States*, **Robert Stengel**, *Princeton University, Princeton, NJ, United States*

8:15am – Constraint Dynamic Equation and Dynamic Stability of 3-RPR Parallel Manipulator at Its Singularities

Technical Paper Publication. IMECE2014-37854
Yu-Tong Li, Yu-Xin Wang, *China University of Petroleum, Qingdao, China*

8:30am – Augmented Image Based Visual Servoing Using Image Moment Features

Technical Paper Publication. IMECE2014-38074
Mohammad Keshmiri, *Concordia University, Cote-st-Luc, QC, Canada*, **Wen-Fang Xie**, *Concordia University, Montreal, QC, Canada*

8:45am – Feature Extraction Algorithm Fusion for SONAR Sensor Data Based Environment Mapping

Technical Paper Publication. IMECE2014-37116
Hesham Ismail, Balakumar Balachandran, *University of Maryland, College Park, MD, United States*

9:00am – Novel Method to Model the Dynamics of an Uniball Robot

Technical Paper Publication. IMECE2014-38641
Pramod Chembrammel, Thenkurussi Kesavadas, *University at Buffalo, Buffalo, NY, United States*

4-11 Novel Control of Dynamic System and Design

4-11-1 Novel Control of Dynamic System and Design I

521A **7:45am–9:15am**

Session Organizer: Steve Suh, *Texas A&M University, College Station, TX, United States*

Session Co-Organizer: Weidong Zhu, *University of Maryland, Baltimore County, Baltimore, MD, United States*

7:45am – Comparison of Optimal Control Techniques to Modulate the Fan Speed of a Genset Cooling System

Technical Presentation. IMECE2014-36447
Alok Rege, Kamesh Subbarao, Brian H. Dennis, *University of Texas at Arlington, Arlington, TX, United States*

8:03am – Control of Autonomous Robots Using Principles of Neuromodulation in ROS Environment

Technical Paper Publication. IMECE2014-38158
Biswanath Samanta, Cameron Muhammad, *Georgia Southern University, Statesboro, GA, United States*

8:21am – Controlling Bifurcation and Dynamic Behavior in Vibro-Impact System**Technical Paper Publication. IMECE2014-38281****Chi-Wei Kuo, Steve Suh**, *Texas A&M University, College Station, TX, United States***8:39am – Human Identification for Human-Robot Interactions****Technical Paper Publication. IMECE2014-38496****Biswanath Samanta, Brian Burns**, *Georgia Southern University, Statesboro, GA, United States***8:57am – Gesture Recognition for Control in Human-Robot Interactions****Technical Paper Publication. IMECE2014-38504****Biswanath Samanta, Christopher Reid**, *Georgia Southern University, Statesboro, GA, United States***4-5 Design and Control of Robots, Mechanisms, and Structures****4-5-4 Design and Control of Robots, Mechanisms, and Structures IV****520E****9:30am–11:15am****Session Organizer:** Ho-Hoon Lee, *Southeastern Louisiana University, Metairie, LA, United States***Session Co-Organizer:** Dhafar Al-Ani, *McMaster University, Hamilton, ON, Canada***9:30am – Reduction of GPS Noise for Precision Control of Robot Navigation in Confined Areas****Technical Paper Publication. IMECE2014-38548****Andrew Narvesen, Majura Selekwa**, *North Dakota State University, Fargo, ND, United States***9:47am – Dynamics and Control of Four-Wheeled Differentially Steered UGVs****Technical Paper Publication. IMECE2014-38565****Andrew Narvesen, Majura Selekwa**, *North Dakota State University, Fargo, ND, United States***10:04am – Robust Control of Multi DOF-Cooperating Planar Robotic Manipulators Using a Tuned PID Approach****Technical Paper Publication. IMECE2014-36052****Dhafar Al-Ani, Hamed H. Afshari, Saeid Habibi**, *McMaster University, Hamilton, ON, Canada***10:21am – Adaptive Control of Electrically Driven Robot Manipulators Without Velocity/Current Measurements****Technical Paper Publication. IMECE2014-37791****Mohamadreza Homayounzade, Mehdi Keshmiri**, *Isfahan University of Technology, Isfahan, Iran*, **Mohammad Keshmiri**, *Concordia University, Cote-st-Luc, QC, Canada***10:38am – Comparison of Adaptive and Robust Controllers for Fully Constrained and Redundant Planar Cable Robots****Technical Paper Publication. IMECE2014-37043****Sergio J. Torres-Mendez, Gokhan Gungor, Baris Fidan, Amir Khajepour**, *University of Waterloo, Waterloo, ON, Canada***10:55am – Modeling and Trajectory Control of a Forklift-Like Wheeled Robot****Technical Paper Publication. IMECE2014-37081****Ho-Hoon Lee**, *Southeastern LA University, Metairie, LA, United States***4-7 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems****4-7-3 Renewable Energy, Structural Health Monitoring, and Distributed Structural Systems—III****521B****9:30am–11:15am****Session Organizer:** Weidong Zhu, *University of Maryland, Baltimore Ct, Baltimore, MD, United States***Session Co-Organizer:** Marcellin Zahui, *University of North Dakota, Grand Forks, ND, United States***9:30am – Classical Aeroelastic Stability Analysis of Large Composite Wind Turbine Blades****Technical Paper Publication. IMECE2014-37445****Touraj Farsadi**, *METUwind, Ankara, Turkey*, **S.A. Sina**, *Sharif University of Technology, Tehran, Iran*, **Altan Kayran**, *Middle East Technical University, Ankara, Turkey***9:47am – Design of Plate Surface Displacement Sensors****Technical Paper Publication. IMECE2014-37537****Jonathon Eaton, Marcellin Zahui**, *University of North Dakota, Grand Forks, ND, United States***10:04am – Numerical Analysis of Lateral Wave Propagation in Drill-Strings for Stability Monitoring****Technical Paper Publication. IMECE2014-38597****Yu Liu, Andrew Dick**, *Rice University, Houston, TX, United States*

10:21am – Properties of the Experimental Intrinsic POD Modes of a Structure Composed of Two Jointed Polymer Beams

Technical Presentation. IMECE2014-38670

Ioannis Georgiou, *National Tech University of Athens, Athens, Greece*

10:38am – Numerical Study of Nonlinear and Transient Behaviors of a Variable Electromotive-Force Generator With an Adjustable Overlap Between the Rotor and the Stator Using the Finite Element Method

Technical Paper Publication. IMECE2014-38755

James Agbormbai, Navid Goudarzi, Weidong Zhu, *University of Maryland, Baltimore County, Columbia, MD, United States*

4-8 Vibration, Noise Control, and Damping Technologies

4-8-1 Vibration, Noise Control, and Damping Technologies I

520F

9:30am–11:15am

Session Organizer: Huancai Lu, *Zhejiang University of Technology, Hangzhou, China*

Session Co-Organizer: Chin-An Tan, *Wayne State University, Detroit, MI, United States*

9:30am – Online Automatic Balancing System to Actively Reduce Vibration of Machine Tool Motorized Spindle

Technical Paper Publication. IMECE2014-36242

Hongwei Fan, Mingqing Jing, Jingjuan Zhi, Heng Liu, *Xi'an Jiaotong University, Xi'an, China*, **Wenhui Xin**, *Xi'an University of Technology, Xi'an, China*

9:56am – Global Optimal Vibration Control Using Viscoelastic Damping Phenomena

Technical Paper Publication. IMECE2014-36400

Vadiraja Krishna Upadya, *Honeywell Technonology Solutions, Bangalore, Karnataka, India*, **D. Roy Mahapatra**, *Indian Institute of Science, Bangalore, Karnataka, India*

10:22am – Numerical Analysis of Flexible Rotor With Nonlinear Bearings and Squeeze Film Dampers

Technical Paper Publication. IMECE2014-37365

Jianming Cao, *Cao Consulting, Mississauga, ON, Canada*, **Timothy Dimond**, *Rotor Bearing Solutions International, Charlottesville, VA, United States*, **Paul Allaire**, *University of Virginia, Charlottesville, VA, United States*

10:48am – Enhanced Extraction Method Based on EEMD for Processing a Bearing Vibration Signal With Multiple Vibration Sources

Technical Paper Publication. IMECE2014-38177

Wei Guo, *University of Electronic Science and Technology of China, Chengdu, Sichuan, China*

4-10 Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control

4-10-1 Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control I

523B

9:30am–11:15am

Session Organizer: Hua Li, *Zhejiang University, Hangzhou, China*

Session Co-Organizer: Kuo-Shen Chen, *National Cheng-Kung University, Tainan, Taiwan, Taiwan*

9:30am – Hybrid Model for Characterizing Preyield Properties of MR Fluids

Technical Paper Publication. IMECE2014-36785

Mehdi Eshaghi, Ramin Sedaghati, Subhash Rakheja, *Concordia University, Montreal, QC, Canada*

9:47am – Research on Constitutive Model of Hybrid Photovoltaic/Piezoelectric Actuation Mechanism

Technical Paper Publication. IMECE2014-37199

Jing Jiang, *Harbin Institute of Technology, Weihai, China*, **Hong Hao Yue**, *Harbin Institute of Technology, Harbin, China*, **Lei Wang**, *Harbin Institute of Technology at Weihai, Weihai, Shandong, China*, **Zongquan Deng**, *Harbin Institute of Technology, Harbin, Heilongjiang, China*, **Hornsen Tzou**, *Zhejiang University, Hangzhou, Hangzhou, China*

10:04am – Low-Velocity Global-Local Impact Response of Smart Composite and Sandwich Composite Plates With Piezoelectric Transducers

Technical Paper Publication. IMECE2014-37574

Theofanis Plagianakos, Evangelos Papadopoulos, *National Technical University of Athens, Athens, Greece*

10:21am – Hybrid Flexoelectric-Piezoelectric Design for Structural Sensing

Technical Paper Publication. IMECE2014-37839

Shundi Hu, Hua Li, *Zhejiang University, Hangzhou, Zhejiang, China*

10:38am – Noncontact Frequency Control of LaSMP Laminated Beams**Technical Presentation. IMECE2014-39466****Huiyu Li, Hua Li, Hornsen Tzou, Zhejiang University, Hangzhou, China****10:55am – Accurate Force Control in a Miniature Gripper With a Single SMA Wire****Technical Paper Publication. IMECE2014-40319****Ayyoub Rezaeian, University of Waterloo, Waterloo, ON, Canada, Aghil Yousefi-Koma, University of Tehran, Tehran, Iran****4-11 Novel Control of Dynamic System and Design****4-11-2 Novel Control of Dynamic System and Design II****521A****9:30am–11:15am****Session Organizer: Steve Suh, Texas A&M University, College Station, TX, United States****9:30am – Nonlinear Time-Frequency Control of Active Magnetic Bearings at High Speed****Technical Paper Publication. IMECE2014-37168****Mengke Liu, Steve Suh, Texas A&M University, College Station, TX, United States****9:56am – Wavelet-Based Filtered-X-LMS Algorithm for the Control of Permanent Magnet Synchronous Motors****Extended Abstract Publication. IMECE2014-37363****Xiaomeng Tong, Steve Suh, Texas A&M University, College Station, TX, United States****10:22am – Sliding Mode Reconfigurable Control for Cosmic Rays Faults in Flight Systems****Technical Paper Publication. IMECE2014-38118****Azeddine Ghodbane, Maarouf Saad, Jean-François Boland, Claude Thibeault, École de Technologie Supérieure, Montreal, QC, Canada****10:48am – Modeling and Control of the Electrical Actuation System of a Magnetic Hydrodynamic Bearing****Technical Paper Publication. IMECE2014-38346****Michael G. Farmakopoulos, Pantelis G. Nikolakopoulos, Chris Papadopoulos, University of Patras, Patras, Greece, Eleftherios Loghis, National Technical University of Athens, Athens, Greece, Nikolas Xiros, University of New Orleans, New Orleans, LA, United States****4-4 Dynamics Modeling, Theory, and Application****4-4-2 Dynamics Modeling, Theory, and Application II****521A****1:00pm–2:45pm****Session Organizer: Andrew Dick, Rice University, Houston, TX, United States****Session Co-Organizer: Xiangqing Tangpong, North Dakota State University, Fargo, ND, United States****1:00pm – Modeling and Numerical Analysis for High-Frequency Characteristics of Laminated Galfenol Based on Eddy Current****Technical Paper Publication. IMECE2014-37150****Yimin Tan, Jean Zu, University of Toronto, Toronto, ON, Canada, Zuguang Zhang, Advanced Mechatronics of Toronto, Inc., Mississauga, ON, Canada****1:21pm – Using Simple Structural Beam Model to Optimize Bending Stiffness and Dynamic Properties in Automotive Structures****Technical Paper Publication. IMECE2014-37992****Ian Wood, Ahmad Barari, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada****1:42pm – Dynamic Modeling and Slippage Analysis in Object Manipulation by Soft Fingers****Technical Paper Publication. IMECE2014-38498****Amin Fakhari, Mehdi Keshmiri, Isfahan University of Technology, Isfahan, Isfahan, Iran, Mohammad Keshmiri, Concordia University, Cote-st-Luc, QC, Canada****2:03pm – Dynamic Modeling of Space Electrodynamic Tether System Using the Nodal Position Finite Element and Simplicic Integration****Technical Paper Publication. IMECE2014-38568****Zheng H. Zhu, Gangqiang Li, York University, Toronto, ON, Canada****2:24pm – Approximation of Infinitesimal Rotations in the Calculus of Variations****Technical Presentation. IMECE2014-39106****Soroosh Hassanpour, Glenn Heppler, University of Waterloo, Waterloo, ON, Canada**

4-5 Design and Control of Robots, Mechanisms, and Structures

4-5-5 Design and Control of Robots, Mechanisms, and Structures V

520E

1:00pm–2:45pm

Session Organizer: Hong Zhou, *Texas A&M University–Kingsville, Kingsville, TX, United States*

Session Co-Organizer: Wen-Fang Xie, *Concordia University, Montreal, QC, Canada*

1:00pm – Redundancy Resolution for Singularity Avoidance of Wheeled Mobile Manipulators

Technical Paper Publication. IMECE2014-38639

Adel Abbaspour, Hadi Zare Jafari, K.N.Toosi University of Technology, Tehran, Iran, Mohammad Ali Askari Hemmat, Concordia University, Montreal, QC, Canada, Khalil Alipour, University of Tehran, Tehran, Iran

1:17pm – Advanced Manufacture, Characterization, and Control of an Elastomeric Aquatic Locomotor

Technical Presentation. IMECE2014-38654

Ke Yang, Eugene Kim, Xiangyu Gong, Yanjun Wang, Jingjin Xie, Chen Yang, Aaron Mazzeo, Rutgers University, Piscataway, NJ, United States

1:34pm – Semi-Active Remote Centre Compliance in Formation Control of Cooperative Wheeled Mobile Robots for Object Manipulation

Technical Paper Publication. IMECE2014-38667

Hadi Zare Jafari, Adel Abbaspour, S. Ali A. Moosavian, K.N. Toosi University of Technology, Tehran, Iran, Mohammad Ali Askari Hemmat, Concordia University, Montreal, QC, Canada

1:51pm – Robotic System for Force-Controlled Micromanipulation of *Drosophila* Larvae

Technical Presentation. IMECE2014-39014

Weize Zhang, Xianke Dong, Xinyu Liu, McGill University, Montreal, QC, Canada

2:08pm – Replacing Servos With Braking in an Omnidirectional Vehicle

Technical Paper Publication. IMECE2014-39036

Jeff McGough, Mark Bedillion, Randy Hoover, South Dakota School of Mines & Technology, Rapid City, SD, United States

2:25pm – Modeling and Workspace Analysis of Collaborative Advanced Fiber Placement Machine

Technical Paper Publication. IMECE2014-38553

Xiaoming Zhang, Wen-Fang Xie, Suong Van Hoa, Concordia University, Montreal, QC, Canada

4-8 Vibration, Noise Control, and Damping Technologies

4-8-2 Vibration, Noise Control, and Damping Technologies II

520F

1:00pm–2:45pm

Session Organizer: Chin-An Tan, *Wayne State University, Detroit, MI, United States*

Session Co-Organizer: Huancai Lu, *Zhejiang University of Technology, Hangzhou, China*

1:00pm – Synchronous Vibration Attenuation in a Power Magnetically Levitated Spindle Based on Parameter-Scheduled H_{∞} Control

Technical Paper Publication. IMECE2014-40383

Lixin Zhan, Kai Zhou, Tsinghua University, Beijing, China

1:26pm – Vibration Analysis System for a Bicycle With a Rider and Two Infant Seats

Technical Paper Publication. IMECE2014-36224

Shinichiro Ota, Shuji Nishiyama, Taiki Shinohara, Okayama Prefectural University, Okayama, Japan

1:52pm – Vibration of a Functionally Graded Timoshenko Beam on a Elastic Foundation Due to a Moving Mass

Technical Paper Publication. IMECE2014-37105

Khashayar Teimoori, Ali Sadegh, City University of New York, New York, NY, United States

2:18pm – Study on Method of Calculation and Measurement for Natural Frequency of Torsional Vibration Rubber Dampers

Technical Paper Publication. IMECE2014-37646

Wen-Bin Shangguan, Yumin Wei, Xu Zhao, Subhash Rakheja, South China University of Technology, Guangzhou, China, Ya-jie Wang, Jun-wei Rong, Tuopu Group Co. Ltd., Ningbo, Zhejiang, China

4-5 Design and Control of Robots, Mechanisms, and Structures

4-5-6 Design and Control of Robots, Mechanisms, and Structures VI

520E 3:00pm–4:45pm

Session Organizer: Mustapha Fofana, Worcester Polytechnic Institute, Worcester, MA, United States

Session Co-Organizer: Hong Zhou, Texas A&M University–Kingsville, Kingsville, TX, United States

3:00pm – Application of SMC Into a PRRR Robotic

Technical Paper Publication. IMECE2014-39136

Khaled Hatamleh, Qais Khasawneh, Jordan University of Science & Technology, Irbid, Jordan, Mohammad Al-Shabi, Philadelphia University, Jarash, Jordan, Mohammad Abo Al-Asal, Mars Robotic, Irbid, Jordan

3:21pm – Humanoid Robot Hand With SMA Actuators and Servo Motors

Technical Paper Publication. IMECE2014-39326

Lianjun Wu, Yonas Tadesse, University of Texas at Dallas, Richardson, TX, United States

3:42pm – Modeling and Position Control of a Magnetic Levitation System Calculating Eddy Current Based Damping Force

Technical Paper Publication. IMECE2014-39840

Mohammad Ali Nojournian, Mohammad Khodabakhsh, Gholamreza Vossoughi, Sharif University of Technology, Tehran, Iran

4:03pm – Rotary Actuators Based on Pneumatically Actuated Elastomeric Structures

Technical Presentation. IMECE2014-38590

Xiangyu Gong, Ke Yang, Yanjun Wang, Alexander Hobbs, Tyler Feingold, Aaron Mazzeo, Rutgers University, Piscataway, NJ, United States

4:24pm – Visual-Servo Autonomous Robotic Manipulators for Capturing Non-Cooperative Target

Technical Paper Publication. IMECE2014-38574

Zheng H. Zhu, Gangqi Dong, York University, Toronto, ON, Canada

4-6 Control Theory and Applications

4-6-3 Linear Multivariable Control

520F 3:00pm–4:45pm

Session Organizer: Majura Selekwa, North Dakota State University, Fargo, ND, United States

Session Co-Organizer: Dale McDonald, Midwestern State University, Wichita Falls, TX, United States

3:00pm – Simulation of Multi-Closed-Loop Control With Feed Forward Control of Microvibration Isolation Platform

Technical Paper Publication. IMECE2014-37253

Qianqian Wu, Hong Hao Yue, Rongqiang Liu, Liang Ding, Zongquan Deng, Harbin Institute of Technology, Harbin, China

3:21pm – Robust H-INF Hybrid Observer Controller Design With Application to Attitude Control of 2-DOF Helicopter

Technical Paper Publication. IMECE2014-37991

Hamidreza Razavi, Kaveh Merat, Hassan Salarieh, Aria Alasty, Ali Meghdari, Sharif University of Technology, Tehran, Iran

3:42pm – Parameter Optimization of a Linear-Quadratic-Gaussian Controller for a Proton Exchange Membrane Fuel Cell Using Genetic Algorithms

Technical Paper Publication. IMECE2014-39183

Jairo A. Rodriguez-Barrera, Jaime Parra-Raad, Sebastian Roa-Prada, Universidad Autónoma de Bucaramanga, Bucaramanga, Santander, Colombia

4:03pm – Torsional Vibration Control of a Hooke's Joint Driven

Technical Paper Publication. IMECE2014-40006

Samuel Asokanthan, Seung-Hoon Baik, Western University, London, ON, Canada, Xia-Hui Wang, Ainsworth Game Technology, Newington, NSW, Australia

4:24pm – Generalized State Dependent Riccati Equation Control of Continuous Time Nonlinear Systems

Technical Paper Publication. IMECE2014-37817

Xin Wang, Wen Lian, Southern Illinois University Edwardsville, Edwardsville, IL, United States, James Long, Oregon Institute of Technology, Klamath Falls, OR, United States, Wangping Sun, Oregon Institute of Technology, Wilsonville, OR, United States

4-10 Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control

4-10-2 Smart Structures and Structronic Systems: Sensing, Energy Generation, and Control II

523B

3:00pm–4:45pm

Session Organizer: Hong Hao Yue, *Harbin Institute of Technology, Harbin, China*

Session Co-Organizer: Hornsen Tzou, *Zhejiang University, Hangzhou, Hangzhou, China*

3:00pm – Vibration Control of a Cantilever Beam by Metal-Core Flexoelectric and Piezoelectric Fibers

Technical Paper Publication. IMECE2014-37772

Xufang Zhang, Hua Li, Hornsen Tzou, *Zhejiang University, Hangzhou, China*

3:26pm – Experiment on Active Vibration Isolation of a Conical Shell Isolator

Technical Paper Publication. IMECE2014-37850

Huiyu Li, Shundi Hu, Hua Li, *Zhejiang University, Hangzhou, China*, Zhaobo Chen, *Harbin Institute of Technology, Harbin, Heilongjiang, China*

3:52pm – Active Vibration Control of Aircraft Wings Modeled as Thin-Walled Composite Beams Using Piezoelectric Actuation

Technical Paper Publication. IMECE2014-38481

Kaan Yildiz, Seher Eken, Metin Orhan Kaya, *Istanbul Technical University, Istanbul, Turkey*

4:18pm – Research on Active Control for Thermal Deformation of Precise Membrane Reflector With Boundary SMA Actuators

Technical Paper Publication. IMECE2014-37343

Yifan Lu, Zongquan Deng, *Harbin Institute of Technology, Harbin, Heilongjiang, China*, Hong Hao Yue, *Harbin Institute of Technology, Harbin, China*, Hornsen Tzou, *Zhejiang University, Hangzhou, Hangzhou, China*

TRACK 5: EDUCATION AND GLOBALIZATION

5-2 Education Research Innovation and Sustainable Trends in Engineering

5-2-1: Education Research Innovation and Sustainable Trends in Engineering

5-3 Curriculum Innovations, Pedagogy, and Learning Methodologies

5-3-1: Curriculum Innovations, Pedagogy, and Learning Methodologies—I

5-3-2: Curriculum Innovations, Pedagogy, and Learning Methodologies—II

5-4 Distance/Online Engineering Education, Models, and Enabling Technologies

5-4-1: Distance/Online Engineering Education, Models, and Enabling Technologies

5-5 Globalization of Engineering

5-5-1: Globalization of Engineering

5-6 Pre-College (K-12) STEM-University, School, and Industry Alliance

5-6-1: Pre-College (K-12) STEM-University, School, and Industry Alliance

5-7 Problem Solving in Engineering Education, Research, and Practice

5-7-1: Problem Solving in Engineering Education, Research, and Practice (Session Dedicated to Professor Robert G. Jeffers)

5-8 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing

5-8-1: Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing—I

5-8-2: Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing—II

5-9 Fluid Mechanics, Heat Transfer, Experiments, and Energy Systems

5-9-1: Fluid Mechanics, Heat Transfer, Experiments, and Energy Systems

5-10 Applied Mechanics, Dynamic Systems, and Control Engineering

5-10-1: Applied Mechanics, Dynamic Systems, and Control Engineering—I

5-10-2: Applied Mechanics, Dynamic Systems, and Control Engineering—II

5-11 Engineering Accreditation, Data Collection, Assessment and ABET

5-11-1: Engineering Accreditation, Data Collection, Assessment and ABET

5-12 Plenary Presentations

5-12-1: Invited Presentations of the Education and Globalization Track

ACKNOWLEDGMENT

TRACK ORGANIZERS

Subha Kumpaty, *Milwaukee School of Engineering, USA*
 Mohammad Naraghi, *Manhattan College, USA*

TOPIC ORGANIZERS

Anabela Alves, *University of Minho, Portugal*
 Nael Barakat, *Grand Valley State University, USA*
 Zbigniew Bzymek, *University of Connecticut, USA*
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 Mohammad Mahinfalah, *Milwaukee School of Engineering, USA*
 Wael Mokhtar, *Grand Valley State University, USA*
 Mohammad Naraghi, *Manhattan College, USA*
 Devdas Pai, *North Carolina A&T State University, USA*
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SESSION ORGANIZERS

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 Nael Barakat, *Grand Valley State University, USA*
 Zbigniew Bzymek, *University of Connecticut, USA*
 Shannon Flumerfelt, *Oakland University, USA*
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 Devdas Pai, *North Carolina A&T State University, USA*
 Peter Prassinis, *NASA Retired, USA*
 Christine Taylor, *Georgia Institute of Technology, USA*

TRACK 5 EDUCATION AND GLOBALIZATION

Monday, November 17

5-2 Education Research Innovation and Sustainable Trends in Engineering

5-2-1 Education Research Innovation and Sustainable Trends in Engineering

518A

9:45am–11:30am

Session Organizer: Nael Barakat, *Grand Valley State University, Grand Rapids, MI, United States*

Session Co-Organizer: Mustapha Fofana, *Worcester Polytechnic Institute, Worcester, MA, United States*

9:45am – Sustainable and Renewable Energy Undergraduate Research

Technical Paper Publication. IMECE2014-38362

Radian Belu, Richard Chiou, *Drexel University, Philadelphia, PA, United States*, **Bill Tseng,** *University of Texas El Paso, El Paso, TX, United States*

10:06am – Advancing Sustainable Engineering Practice Through Education and Undergraduate Research Projects

Technical Paper Publication. IMECE2014-38501

Radian Belu, Richard Chiou, *Drexel University, Philadelphia, PA, United States*, **Bill Tseng,** *University of Texas El Paso, El Paso, TX, United States*, **Lucian Cioca,** *Lucian Blaga University Sibiu, Sibiu, Romania*

10:27am – Global and Practical Effects of the Decade of Education for Sustainable Development on Engineering Curricula Design

Technical Presentation. IMECE2014-38850

Ciliana Regina Colombo, *Universidade Federal do Rio Grande do Norte, Guimarães, Minho, Portugal*, **Anabela Alves,** *University of Minho, Guimaraes, Portugal*, **Natascha van Hattum-Janssen,** *Saxion University of Applied Sciences, Enschede, Netherlands*, **Francisco Moreira,** *University of Minho, Guimaraes, Portugal*

10:48am – Implementation of Similarity Flooding Algorithm to Solve Engineering Problems Using Diagnostic Skills Training Technique

Technical Paper Publication. IMECE2014-39698

Ali Shahhosseini, Haisong Ye, George Maughan, W. Tad Foster, *Indiana State University, Terre Haute, IN, United States*

11:09am – Design of a Human Powered Flour Mill for Educational and Community Events

Technical Paper Publication. IMECE2014-39922

Halsey Ostergaard, John P. Parmigiani, *Oregon State University, Corvallis, OR, United States*

5-9 Fluid Mechanics, Heat Transfer, Experiments, and Energy Systems

5-9-1 Fluid Mechanics, Heat Transfer, Experiments, and Energy Systems

518B

9:45am–11:30am

Session Organizer: Wael Mokhtar, *Grand Valley State University, Grand Rapids, MI, United States*

Session Co-Organizer: Subha Kumpaty, *Milwaukee School of Engineering, Milwaukee, WI, United States*

9:45am – Introducing CFD and Wind Tunnel Testing in an Undergraduate Fluid Mechanics Course

Technical Paper Publication. IMECE2014-36552

Wael Mokhtar, Shirley Fleischmann, *Grand Valley State University, Grand Rapids, MI, United States*

10:02am – Study of the Change of Performance of an Elastically Deformable Hydrofoil

Technical Paper Publication. IMECE2014-37125

Alexander Fuhling, Subha Kumpaty, *Milwaukee School of Engineering, Milwaukee, WI, United States*, **Chris Stack,** *Milwaukee School of Engineering, Oshkosh, WI, United States*

10:19am – Transformation of an Aviation Turboshift Engine Into a Experimental Jet Engine for Laboratory Testing Unstable Radial Compressor Work

Technical Paper Publication. IMECE2014-37298

Marian Hocko, *Technical University of Kosice, Kosice, Slovakia (Slovak Republic)*, **Jiri Polansky,** *University of West Bohemia, Plzen, Czech Republic*

10:36am – Using a Funded Capstone Project to Teach Fluid Power and Advanced Mechanical Design

Technical Paper Publication. IMECE2014-39166

James Mynderse, Selin Arslan, Liping Liu, *Lawrence Technological University, Southfield, MI, United States*

10:53am – African Boundary Crack From Fragmenting Ice Meteor Loading Poles Oblating Earth

Technical Presentation. IMECE2014-40263

Donald R. Garrett, *Northern Arizona University, Phoenix, AZ, United States*

11:10am – Utilizing Schlieren Imaging to Visualize Heat Transfer Studies

Technical Paper Publication. IMECE2014-38329
Jacob C. Kaessinger, Kramer C. Kors, Jordan S. Lum, Shannon K. Mayer, *University of Portland, Portland, OR, United States*, **Heather Dillon**, *University of Portland, Kelso, WA, United States*

5-11 Engineering Accreditation, Data Collection, Assessment, and ABET

5-11-1 Engineering Accreditation, Data Collection, Assessment, and ABET

518C **9:45am–11:30am**

Session Organizer: Amir Karimi, *University of Texas at San Antonio, San Antonio, TX, United States*
Session Co-Organizer: Mohammad Naraghi, *Manhattan College, Riverdale, NY, United States*

9:45am – Assessment and Development for Accreditation of an Innovative Mechanical and Energy Engineering Program

Technical Paper Publication. IMECE2014-36280
Reza Mirshams, Yong Tao, Xun Yu, *University of North Texas, Denton, TX, United States*, **Azize Akcayoglu**, *Mersin University, Mersin, Turkey*

10:06am – Designing a Capstone Design Course to Achieve Student Outcomes

Technical Paper Publication. IMECE2014-36749
Vincent Wilczynski, *Yale School of Engineering & Applied Science, New Haven, CT, United States*, **Andrew Foley**, *U.S. Coast Guard Academy, New London, CT, United States*

10:27am – Easily Adoptable Interactive Teaching Practices and Students Progress Monitoring Strategies

Technical Paper Publication. IMECE2014-39118
Pawan Tyagi, *University of the District of Columbia, Washington, DC, United States*

10:48am – Effect of Office Hour Participation on Student Performance

Technical Paper Publication. IMECE2014-38242
Michael Schertzer, Risa Robinson, Tim Landschoot, Alexander Liberson, Amitabha Ghosh, Edward Hensel, Jr., *Rochester Institute of Technology, Rochester, NY, United States*

11:09am – Understanding the Causes for Low Student Office Hour Attendance

Technical Paper Publication. IMECE2014-38698
Risa Robinson, Timothy Landschoot, *Rochester Institute of Technology, Rochester, NY, United States*, **Dean Culver**, *Duke University, Durham, NC, United States*, **Michael Schertzer, Edward Hensel**, *Rochester Institute of Technology, Fairport, NY, United States*

5-3 Curriculum Innovations, Pedagogy, and Learning Methodologies

5-3-1 Curriculum Innovations, Pedagogy, and Learning Methodologies—I

518A **1:00pm–2:45pm**

Session Organizer: Anabela Alves, *University of Minho, Guimaraes, Portugal*
Session Co-Organizer: Franz-Josef Kahlen, *University of Cape Town, Cape Town, South Africa*

1:00pm – Integrating Real Industrial Experiences Into the Curriculum Through Robotics Applications

Technical Paper Publication. IMECE2014-36035
Nael Barakat, *Grand Valley State University, Grand Rapids, MI, United States*

1:26pm – Implimentation of Multiyear Product Innovation Projects

Technical Paper Publication. IMECE2014-36443
Glenn Vallee, *Western New England University, Springfield, MA, United States*

1:52pm – Rule-Based Method to Construct the Mohr's Circle for Plane Stress

Technical Paper Publication. IMECE2014-36471
Swami Karunamoorthy, *Washington University in St. Louis, Saint Louis, MO, United States*

2:18pm – Integrating the Engineering Education to Make It Multidisciplinary and Industry Oriented

Technical Presentation. IMECE2014-37774
Adil Khawaja, *Center for Advanced Studies in Engineering, Islamabad, Punjab, Pakistan*

5-4 Distance/Online Engineering Education, Models, and Enabling Technologies

5-4-1 Distance/Online Engineering Education, Models, and Enabling Technologies

518B 1:00pm–2:45pm

Session Organizer: Mohammad Naraghi, *Manhattan College, Riverdale, NY, United States*

Session Co-Organizer: Hephzibah Kumpaty, *University of Wisconsin–Whitewater, Whitewater, WI, United States*

1:00pm – Algorithm Modification to Improve the Kinect's Performance in Point Cloud Processing

Technical Paper Publication. IMECE2014-37064

Mingshao Zhang, Zhou Zhang, Sven Esche, Constantin Chassapis, *Stevens Institute of Technology, Hoboken, NJ, United States*

1:17pm – An Efficient Method for Creating Virtual Spaces for Virtual Reality

Technical Paper Publication. IMECE2014-37149

Zhou Zhang, Mingshao Zhang, Yizhe Chang, Sven Esche, Constantin Chassapis, *Stevens Institute of Technology, Hoboken, NJ, United States*

1:34pm – Web-Based Online Collaboration Tool for Formulating Senior Design Projects

Technical Paper Publication. IMECE2014-37915

Sainath Varikuti, Jitesh Panchal, John Starkey, *Purdue University, West Lafayette, IN, United States*

1:51pm – Embedding Specialized Online Learning Modules in Courses

Technical Paper Publication. IMECE2014-38451

Kumar Singh, Fazeel Khan, *Miami University, Oxford, OH, United States*

2:08pm – Platform for Mechanical Assembly Education Using the Microsoft Kinect

Technical Paper Publication. IMECE2014-38606

Yizhe Chang, El-sayed Aziz, Zhou Zhang, Mingshao Zhang, Sven Esche, Constantin Chassapis, *Stevens Institute of Technology, Hoboken, NJ, United States*

2:25pm – PAIR: The Remote Industrial Automation Trainer

Technical Paper Publication. IMECE2014-38771

Mário Silva, Filipe Pereira, Filomena Soares, José Machado, Vitor Carvalho, *University of Minho, Guimarães, Portugal*, Celina Leao, *University of Minho, Maia, Portugal*

5-5 Globalization of Engineering

5-5-1 Globalization of Engineering

518C 1:00pm–2:45pm

Session Organizer: Hiroshi Honda, *Industry Frontier Research & Development Committee, Narashino, Chiba, Japan*

Session Co-Organizer: Peter Prassinis, *NASA Retired, Boyds, MD, United States*

1:21pm – Globalization of Industry, Business and Engineering Practice, and Role of Education

Technical Presentation. IMECE2014-36437

Hiroshi Honda, *Industry Frontier Research & Development Committee, Narashino, Chiba, Japan*

1:42pm – Integrating the Case Method and Design Projects in the Industry Sponsored Academic Education

Technical Paper Publication. IMECE2014-36635

Manuel Nunez, Zbigniew Bzymek, *University of Connecticut, Storrs, CT, United States*

2:03pm – Raising Global Leaders in Science and Engineering Under Trilateral Collaboration

Technical Paper Publication. IMECE2014-36755

Hiroshi Honda, *Industry Frontier Research & Development Committee, Narashino, Chiba, Japan*, Hephzibah Kumpaty, *University of Wisconsin–Whitewater, Whitewater, WI, United States*

2:24pm – Private Engineering Education Scenario in India

Technical Paper Publication. IMECE2014-39952

S.N. Sapali, *College of Engineering, Pune, India*, Sandip Kale, *Trinity College of Engineering and Research, Pune, India*

5-3 Curriculum Innovations, Pedagogy, and Learning Methodologies

5-3-2 Curriculum Innovations, Pedagogy, and Learning Methodologies- II

518A

3:00pm–4:45pm

Session Organizers: Anabela Alves, *University of Minho, Guimaraes, Portugal*, Amir Karimi, *University of Texas at San Antonio, San Antonio, TX, United States*

Session Chair: Shannon Flumerfelt, *Oakland University, Destin, FL, United States*

3:00pm – Pedagogical Experience in Engineering Education: Studying Cases of Patent Dispute as a Method for Both Innovation and Legal Education

Technical Paper Publication. IMECE2014-37004

Rong-Jer Lai, *National Kaohsiung University of Applied Sciences, Kaohsiung, Taiwan*

3:21pm – Managing PBL Difficulties in an Industrial Engineering and Management Program

Technical Presentation. IMECE2014-37499

Anabela Alves, *Rui M. Sousa*, **Francisco Moreira**, **Elisabete Cardoso**, **M. Teresa Malheiro**, **Irene Brito**, **Pedro Pimenta**, **João Nuno Oliveira**, *University of Minho, Guimaraes, Portugal*, **M. Alice Carvalho**, **Diana Mesquita**, *University of Minho, Braga, Portugal*, **Sandra Fernandes**, *University of Coimbra, Coimbra, Portugal*

3:42pm – Fostering Sustainable Development Thinking Through Lean Engineering Education

Technical Paper Publication. IMECE2014-38192

Anabela Alves, *University of Minho, Guimaraes, Portugal*, **Franz-Josef Kahlen**, *University of Cape Town, Cape Town, South Africa*, **Shannon Flumerfelt**, *Oakland University, Destin, FL, United States*, **Anna-Bella Siriban-Manalang**, *University of La Salle, Manila, Philippines*

4:03pm – Shorten the Math Gap for Pre-Engineering Students With Intensive Summer Bridge Program

Technical Paper Publication. IMECE2014-40249

Yong Zhou, **Nazmul Islam**, **Cheng-Chang (Sam) Pan**, **Sanjay Kumar**, *University of Texas at Brownsville, Brownsville, TX, United States*

4:24pm – Elements of an Undergraduate Introductory Materials Engineering Course: Successful Implementation for Students Learning

Technical Paper Publication. IMECE2014-36066

Awlad Hossain, **Jason Durfee**, *Eastern Washington University, Cheney, WA, United States*

5-12 Plenary Presentations

5-12-1 Invited Presentations of the Education and Globalization Track

518B

3:00pm–4:45pm

Session Organizer: Mustapha Fofana, *Worcester Polytechnic Institute, Worcester, MA, United States*

3:00pm – Incorporating Business in Engineering Education—A Value Proposition

Invited Presentation. IMECE2014-40659

Huong Higgins, **Fabienne Miller**, *Worcester Polytechnic Institute, Worcester, MA, United States*

3:52pm – Engineering Practice, Engineering Education, Engineering Accreditation

Invited Presentation. IMECE2014-40672

John Orr, *Worcester Polytechnic Institute, Worcester, MA, United States*

Tuesday, November 18

5-6 Pre-College (K-12) STEM-University, School, and Industry Alliance

5-6-1 Pre-College (K-12) STEM-University, School, and Industry Alliance

518A 9:45am–11:30am

Session Organizer: Devdas Pai, *North Carolina A&T State University, Greensboro, NC, United States*

Session Co-Organizer: Christine Taylor, *Georgia Institute of Technology, Atlanta, GA, United States*

9:45am – Starting a Movement: Promoting STEM and Engaging Learners, Students, and Industry Partners

Technical Paper Publication. IMECE2014-40084

Nickey Janse van Rensburg, *University of Johannesburg, Johannesburg, Gauteng, South Africa*

10:11am – Crowdfunding for Inspiring Graduate Students to Educate K12 Students About Stem

Technical Paper Publication. IMECE2014-40039

Christine Taylor, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

10:37am – Development of a Graduate Curriculum in Virtual Reality for Engineering Students

Technical Presentation. IMECE2014-38271

Thenkurussi Kesavadas, *University at Buffalo, Buffalo, NY, United States*

11:03am – Proposal of “Future-Applied Conventional Technology”

Technical Paper Publication. IMECE2014-37374

Chieko Narita, *Japan*, **Yutaro Shimode**, **Iwako Yamamoto**, **Noriyuki Kida**, **Hiroyuki Hamada**, *Kyoto Institute of Technology, Kyoto, Japan*

5-7 Problem Solving in Engineering Education, Research, and Practice

5-7-1 Problem Solving in Engineering Education, Research, and Practice (Session Dedicated to Professor Robert G. Jeffers)

518B 9:45am–11:30am

Session Organizer: Zbigniew Bzymek, *University of Connecticut, Storrs, CT, United States*

Session Co-Organizer: Richard B. Mindek, Jr., *Western New England University, Springfield, MA, United States*

9:45am – Fostering Diversity in Engineering Education

Plenary Presentation. IMECE2014-38080

Amir Faghri, *University of Connecticut, Storrs, CT, United States*

10:15am – Problem Solving Techniques Taught Through Validation of an Instantaneous Rigid Force Model

Technical Paper Publication. IMECE2014-37376

Richard B. Mindek, Jr., *Western New England University, Springfield, MA, United States*, **Joseph M. Guerrera**, *Colt’s Manufacturing Company, West Hartford, CT, United States*

10:33am – Use of Patents Documentation Information in Teaching, Academic Research, and Development of Engineering Projects

Technical Paper Publication. IMECE2014-38516

Jeziel Nunes, *National Institute of Industrial Property Academy, Rio De Janeiro, Brazil*, **M.S. Batalha**, *Federal University of Rio de Janeiro, UFRJ / COPPE, Rio de Janeiro, Rio de Janeiro, Brazil*

10:51am – Organization and Management of an Industry Sponsored Capstone Senior Design Course

Technical Paper Publication. IMECE2014-39296

Vito Moreno, **Thomas Barber**, *University of Connecticut, Storrs, CT, United States*

11:09am – Solving Conflicting Engineering Problems in Education, Research, and Practice—Enhanced Approach

Technical Paper Publication. IMECE2014-39692

Zbigniew Bzymek, *University of Connecticut, Storrs, CT, United States*

5-8 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing

5-8-1 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing – I

518B

1:00pm–2:45pm

Session Organizer: Hephzibah Kumpaty, *University of Wisconsin–Whitewater, Whitewater, WI, United States*

Session Co-Organizer: Wael Mokhtar, *Grand Valley State University, Grand Rapids, MI, United States*

1:00pm – Comparison of Different Grinding Sound During Metallographic Preparation

Technical Paper Publication. IMECE2014-36631

Takuya Sugimoto, *Koyo Netsuren Corporation, Kyoto, Japan*,
Eriko Aiba, *University of Electro-Communications, Tokyo, Japan*,
Akihiko Goto, *Osaka Sangyo University, Osaka, Japan*

1:21pm – Analyze the Rhythm of the Neck in Handmade Japanese Paper Manufacturing Movement

Extended Abstract Publication. IMECE2014-37771

Akihiko Imajo, **Takashi Yoshikawa**, *Niihama National College of Technology, Niihama, Ehime, Japan*, **Nobutaka Saeki**, *Saijo City Hall, Ehime, Japan*

1:42pm – Design, Machining, and Production Integration Problems in Manufacturing Automation

Technical Paper Publication. IMECE2014-38355

Zbigniew Bzymek, **Alicia Benjamin**, *University of Connecticut, Storrs, CT, United States*

2:03pm – Connecting Finite Element Modeling With Strengths of Materials and Vibrations Using Beam Experiments

Technical Paper Publication. IMECE2014-40014

Julian L. Davis, **Natasha Smith**, *University of Southern Indiana, Evansville, IN, United States*

2:24pm – Software for the Kinematic Analysis of a Serial Manipulator for Academic Purposes

Technical Paper Publication. IMECE2014-40099

Julio Correa, **Juan A. Ramirez-Macias**, **David Roza**, *Universidad Pontificia Bolivariana, Medellin, Antioquia, Colombia*

5-10 Applied Mechanics, Dynamic Systems, and Control Engineering

5-10-1 Applied Mechanics, Dynamic Systems, and Control Engineering – I

518A

1:00pm–2:45pm

Session Organizer: Mohammad Mahinfalah, *Milwaukee School of Engineering, Milwaukee, WI, United States*

Session Co-Organizer: Mustapha Fofana, *Worcester Polytechnic Institute, Worcester, MA, United States*

1:00pm – Effect of Structural Integrity on Acoustics Response Through a Finite Element Analysis Course Project

Technical Presentation. IMECE2014-36067

Awlad Hossain, **Megan Frederick**, *Eastern Washington University, Cheney, WA, United States*

1:26pm – Numerical Simulation as in Integral Component of Dynamics Problem Solving

Technical Paper Publication. IMECE2014-37472

Matthew Stein, *Roger Williams University, Barrington, RI, United States*

1:52pm – Stress Analysis Along Tree Branches

Technical Paper Publication. IMECE2014-37726

Allison Kaminski, **Simon Mysliwiec**, **Zahra Shahbazi**, **Lance Evans**, *Manhattan College, Riverdale, NY, United States*

2:18pm – Design and Analysis of an Example Lathe Spindle

Technical Paper Publication. IMECE2014-39665

Raghu Echempati, *Kettering University, Flint, MI, United States*,
Rupal Vyasa, *S.V. Engineering College, Ahmedabad, Gujarat, India*

5-8 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing

5-8-2 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing – II

518B 3:00pm–4:45pm

Session Organizer: Wael Mokhtar, *Grand Valley State University, Grand Rapids, MI, United States*

Session Co-Organizer: Subha Kumpaty, *Milwaukee School of Engineering, Milwaukee, WI, United States*

3:00pm – Effect of Chucking Movement With the Indentation on the Work-Piece Surface in Chuck Jaws Gripping of a Lathe Between an Expert and a Non-expert

Technical Paper Publication. IMECE2014-36196

Porakoch Sirisuwan, *Kyoto Institute of Technology, Sakyou-Ku, Japan*, **Takashi Yoshikawa**, **Masayuki Nakamura**, *Niihama National College of Technology, Niihama, Ehime, Japan*

3:21pm – Green Energy Manufacturing Laboratory Development for Student Learning Experience on Sustainability

Technical Paper Publication. IMECE2014-40110

Richard Chiou, **Radian Belu**, **Michael Mauk**, *Drexel University, Philadelphia, PA, United States*, **Bill Tseng**, *University of Texas El Paso, El Paso, TX, United States*

3:42pm – Visualization of Brushing in “Shibo” Production of Handmade Japanese Paper

Extended Abstract Publication. IMECE2014-37732

Shinji Nojima, **Takashi Yoshikawa**, **Akihiko Imajo**, *Niihama National College of Technology, Niihama, Ehime, Japan*, **Takeshi Tsujinaka**, *Saijo City, Saijo, Ehime, Japan*

4:03pm – Research of Adhesive Effect Enhanced by Pounding Brush on Second Lining Pounding Procedure for Japanese Scrolls

Technical Paper Publication. IMECE2014-37886

Yasuhiro Oka, *Oka Bokkodo Co., Ltd., Kyoto, Japan*, **Akihiko Goto**, *Osaka Sangyo University, Osaka, Japan*

4:24pm – Assessing Remote Physiological Signals Acquisition Experiments

Technical Paper Publication. IMECE2014-37927

Carla Barros, **Celina Leao**, **Filipe Pereira**, **Filomena Soares**, **José Machado**, *University of Minho, Guimaraes, Portugal*, **Demétrio Matos**, *IPCA-EST, Barcelos, Portugal*, **Vitor Carvalho**, *University of Minho, Guimarães, Portugal*

5-10 Applied Mechanics, Dynamic Systems, and Control Engineering

5-10-2 Applied Mechanics, Dynamic Systems, and Control Engineering-II

518A

3:00pm–4:45pm

Session Organizer: Mustapha Fofana, *Worcester Polytechnic Institute, Worcester, MA, United States*

Session Co-Organizer: Mohammad Mahinfalah, *Milwaukee School of Engineering, Milwaukee, WI, United States*

3:00pm – Component Centric Approach to Structural Analysis of Mechanisms

Technical Paper Publication. IMECE2014-39797

Chris Stack, *Milwaukee School of Engineering, Oshkosh, WI, United States*, **Mohammad Mahinfalah**, **Subha Kumpaty**, *Milwaukee School of Engineering, Milwaukee, WI, United States*

3:26pm – Design and Implementation of a General Control System Platform

Technical Paper Publication. IMECE2014-38536

Kyle T. Peerless, **Jasmine M. Panosian**, **Pezhman A. Hassanpour**, *Loyola Marymount University, Los Angeles, CA, United States*

3:52pm – Design of a Low-Cost Apparatus for Torsion Testing

Technical Paper Publication. IMECE2014-38676

Mohammad Mahinfalah, **Joseph Musto**, *Milwaukee School of Engineering, Milwaukee, WI, United States*

4:18pm – Development of a Laboratory Equipment for Dynamic Systems and Process Control Education

Technical Paper Publication. IMECE2014-38924

Rafael E. Vásquez, **Norha L. Posada**, **Fabio Castrillón**, **David Giraldo**, *Universidad Pontificia Bolivariana, Medellin, Antioquia, Colombia*

TRACK 6: EMERGING TECHNOLOGIES

6-1 Emerging Technologies in Mechanisms and NDE/SHM

6-1-1: Emerging Simulation and Modeling Tools in NDE/SHM

6-2 Innovative Sensor and Sensing Technologies in NDE/SHM

6-2-1: Innovative Sensors and Sensing Technologies

ACKNOWLEDGMENT

TRACK ORGANIZERS

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Minfeng Yu, *Georgia Institute of
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SESSION ORGANIZERS

Yuris Dzenis, *University of Nebraska,
USA*
Sanjeev Khanna, *University of
Missouri–Columbia, USA*
Ashok Midha, *Missouri University of
Science and Technology, USA*

TRACK 6 EMERGING TECHNOLOGIES

Monday, November 17

6-2 Innovative Sensor and Sensing Technologies in NDE/SHM

6-2-1 Innovative Sensors and Sensing Technologies

519A 9:45am–11:30am

Session Organizer: Sanjeev Khanna, *University of Missouri–Columbia, Columbia, MO, United States*

Session Co-Organizer: Yuris Dzenis, *University of Nebraska, Lincoln, NE, United States*

9:45am – Magnetostrictive Self-Diagnosing Smart Bolts

Technical Paper Publication. IMECE2014-38622

Vladislav Sevostianov, *Las Cruces High School, Las Cruces, NM, United States*

10:11am – Design Tool for Evaporative Pumps

Technical Presentation. IMECE2014-38699

Thomas Murphy, Evan Fleming, Halil Berberoglu, *University of Texas at Austin, Austin, TX, United States*

10:37am – Thermofluid Analysis of the Magnetocaloric Refrigeration

Technical Paper Publication. IMECE2014-38928

Ayyoub M. Momen, Kyle Gluesenkamp, Omar Abdelaziz, Edward Vineyard, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*, **Michael Benedict,** *General Electric, Louisville, KY, United States*

11:03am – Predictive NDE of Composite Joints

Technical Presentation. IMECE2014-40253

Yuris Dzenis, *University of Nebraska, Lincoln, NE, United States*

6-1 Emerging Technologies in Mechanisms and NDE/SHM

6-1-1 Emerging Simulation and Modeling Tools in NDE/SHM

519A

3:00pm–4:45pm

Session Organizer: Ashok Midha, *Missouri University of Science and Technology, Rolla, MO, United States*

Session Co-Organizer: Sanjeev Khanna, *University of Missouri–Columbia, Columbia, MO, United States*

3:00pm – Identification of Anomalies via Sparse Coding of Wavefield Data

Technical Presentation. IMECE2014-38413

Jeffrey M. Druce, Jarvis D. Haupt, Stefano Gonella, *University of Minnesota, Minneapolis, MN, United States*

3:26pm – On a Generalized Approach for Design of Compliant Mechanisms Using the Pseudo-Rigid-Body Model Concept

Technical Paper Publication. IMECE2014-38788

Sushrut Bapat, Ashok Midha, Ashish B. Koli, *Missouri University of Science and Technology, Rolla, MO, United States*

3:52pm – Characteristic Deflection Domain for Various Compliant Segment Types and Its Impact on Compliant Mechanism Analysis and Synthesis

Technical Paper Publication. IMECE2014-38795

Ashok Midha, Sushrut Bapat, *Missouri University of Science and Technology, Rolla, MO, United States*

4:18pm – Laser-Enabled Structural Diagnostics Using Data-Learning Algorithms

Technical Presentation. IMECE2014-39813

Jeffrey M. Druce, Jarvis D. Haupt, Stefano Gonella, *University of Minnesota, Minneapolis, MN, United States*

TRACK 7: ENERGY

7-2 Fundamentals of Thermodynamics

- 7-2-1: Fundamentals of Thermodynamics
- 7-2-2: Applied Thermodynamics

7-3 Thermoeconomics

- 7-3-1: Thermoeconomics 1
- 7-3-2: Thermoeconomics 2

7-4 Design and Analysis of Energy Conversion Systems

- 7-4-1: Natural Gas-Based Systems and Chemical Processes
- 7-4-3: Advanced Power Generation and District Heating
- 7-4-4: Design and Analysis of Energy Systems

7-5 Energy Systems Components

- 7-5-1: Energy Systems Components 1
- 7-5-2: Energy Systems Components 2

7-6 Combined Energy Cycles, CHP, & CCHP

- 7-6-1: Design and Analysis of Combined Cycles, CHP, & CCHP

7-7 Nuclear Power Plants: Design, Analysis, and Safety

- 7-7-1: ASME NED—Plenary Session
- 7-7-3: Neutronics, Fluid, Thermal
- 7-7-4: Materials and Structures
- 7-7-5: Modeling and Simulation

7-8 Integrated Building Equipment and Systems

- 7-8-1: Energy Modeling—1
- 7-8-2: Energy Systems
- 7-8-3: Efficient Design

7-9 Electrochemical Energy Conversion and Storage

- 7-9-1: Lithium Ion Batteries
- 7-9-2: Advanced Electrochemical Storage Concepts
- 7-9-3: Lithium Air Batteries

7-10 Fuel Cell Systems Design and Application

- 7-10-1: Low-Temperature Fuel Cells
- 7-10-2: High-Temperature Fuel Cells

7-12 Alternative Energy Technologies

- 7-12-1: Alternative Power Generation
- 7-12-2: Energy Harvesting, Storage, and Analysis

7-13 Heat Transfer for Green and Renewable Energy

- 7-13-1: Solar and Advanced Energy Applications

7-15 Thermal Energy Storage

- 7-15-1: Thermal Energy Storage I
- 7-15-2: Thermal Energy Storage II
- 7-15-3: Thermal Energy Storage III

7-16 Solar Applications in Buildings

- 7-16-1: Building Integrated Solar Technologies

7-18 Photovoltaic Cells and Applications

- 7-18-1: Novel Systems, Solar Cells, and Materials
- 7-18-2: Solar Tracking, Concentration for PV and Hybrid PV Modules

7-20 Fuels and Biofuels

- 7-20-4: Biofuels Production
- 7-20-5: Biofuels Combustion
- 7-20-6: Biofuels Combustion—II

7-21 Wind Energy Theory and Applications

- 7-21-1: Blade/Rotor Design & Modeling
- 7-21-2: Wind Turbine Modeling
- 7-21-3: Wind Farm Optimization

7-23 Nanomaterials and Nanostructures for Energy Applications

- 7-23-1: Energy Storage and Applications
- 7-23-2: Energy Conversion

7-24 Energy-Water Nexus

- 7-24-1: Energy-Water Nexus 1
- 7-24-2: Energy-Water Nexus 2
- 7-24-3: A Call for Better Data Collection and Stress Metrics for Integrated Resource Management

7-25 Energy and the Environment

- 7-25-1: Energy and the Environment 1

7-26 Carbon Capture and Storage

- 7-26-1: Carbon Capture

ACKNOWLEDGMENT

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 Jie Zhang, *National Renewable Energy Laboratory (NREL), USA*
 Na Zhang, *Institute Engineering Thermophysics, CAS, China*
 Yi Zheng, *University of Rhode Island, USA*

TRACK 7 ENERGY

Wednesday, November 19

7-2 Fundamentals of Thermodynamics

7-2-1 Fundamentals of Thermodynamics

516E 9:45am–11:30am

Session Organizer: Irene Koronaki, *National Technical University of Athens, Zografou, Greece*

Session Co-Organizer: Ana-Maria Blanco-Marigorta, *University of Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain*

9:45am – Polytropic Change of State Calculations

Technical Paper Publication. IMECE2014-36202

Hans E. Wettstein, *ETHZ, Fislisbach, Switzerland*

10:06am – High-Temperature Air Combustion (HiTAC) Phenomena and Its Thermodynamics

Technical Paper Publication. IMECE2014-36312

Nabil Rafidi, *Alstom Power Sweden AB, Växjö, Sweden*,

Wlodzimierz Blasiak, *KTH, Stockholm, Stockholm, Sweden*,

Ashwani Gupta, *University of Maryland, College Park, MD, United States*

10:27am – Reduction Techniques Methods for Simplifying Complex Kinetic Systems: A General Review

Technical Paper Publication. IMECE2014-36351

Ghassan Nicolas, **Fariba Seyedzadeh Khanshan**, **Hameed (Mohamad) Metghalchi**, **Richard West**, *Northeastern University, Boston, MA, United States*

10:48am – Using the Peng-Robinson Equation of State to Explore Working Fluids for Higher Temperature Organic Rankine Cycles

Technical Paper Publication. IMECE2014-37969

Vincent D. Romanin, **Alfonso Rodriguez**, **Sonia Fereres**, *Abengoa Research, Sevilla, Spain*, **Jean Toutain**, *Laboratoire I2M-Département Trefle, Pessac, France*

11:09am – Constrained-Equilibrium Modeling of Ethanol Combustion in Air

Technical Paper Publication. IMECE2014-38377

Hameed (Mohamad) Metghalchi, **Ghassan Nicolas**, *Northeastern University, Boston, MA, United States*, **Mohammad Janbozorgi**, *University of Southern California, Los Angeles, CA, United States*

7-3 Thermoconomics

7-3-1 Thermoconomics 1

518A 9:45am–11:30am

Session Organizer: George Tsatsaronis, *Technical University Berlin, Berlin, Germany*

Session Co-Organizer: Tatiana Morosuk, *Technical University Berlin, Berlin, Germany*

9:45am – Design and Thermo-economic Evaluation of a Waste Plant With an Integrated CO₂ Chemical Sequestration System for CH₄ Production

Technical Paper Publication. IMECE2014-36873

Sebastiano Luca Romano, **Claudia Toro**, *University of Rome "Sapienza," Rome, Italy*, **Enrico Sciubba**, *University of Rome, Rome, Italy*

10:11am – Cost of Crude Oil-Distillation Products Based on an Extended Exergy Accounting Analysis

Technical Paper Publication. IMECE2014-38063

Enrico Sciubba, *University of Rome, Rome, Italy*, **Jose Luis**

Gonzalez-Hernandez, *University of Guanajuato, Irapuato,*

Guanajuato, Mexico, **Abel Hernandez-Guerrero**, *University of Guanajuato, Salamanca, Guanajuato, Mexico*

10:37am – Enhancing Energy and Economic Performances of Combined Cycle Power Plants by Means of Gas-Cycle Regeneration

Technical Paper Publication. IMECE2014-38297

Roberto Carapellucci, **Lorena Giordano**, *University of L'Aquila, L'Aquila, Italy*

11:03am – Exergy, Exergoeconomic, and Exergoenvironmental Analyses of Selected Gas Turbine Power Plants in Nigeria

Technical Paper Publication. IMECE2014-40311

Richard Olayiwola Fagbenle, *Obafemi Awolowo University,*

Ile Ife, Osun, Nigeria, **Sunday Sam Adefila**, **Sunday Oyedepo**,

Covenant University, Ota, Ogun, Nigeria, **Moradeyo Odunfa**,

University of Ibadan, Ibadan, Oyo, Nigeria

7-7 Nuclear Power Plants: Design, Analysis, and Safety

7-7-1 ASME NED—Plenary Session

519B

9:45am–11:30am

Session Organizer: Hakan Ozaltun, Idaho National Laboratory, Idaho Falls, ID, United States

Session Co-Organizers: Fatih Aydogan, University of Idaho, Idaho Falls, ID, United States, Jovica Riznic, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

9:45am – BISON-MOOSE Simulation Framework

Plenary Presentation. IMECE2014-40077

Richard Williamson, Jason Hales, Benjamin Spencer, Stephen Novascone, Danielle Perez, Giovanni Pastore, Fredrick Gleicher, Russell Gardner, Idaho National Laboratory, Idaho Falls, ID, United States

10:45am – Quantitative and Qualitative Comparison of Light Water and Advanced Small Modular Reactors (SMRS)

Technical Paper Publication. IMECE2014-36415

Fatih Aydogan, University of Idaho, Idaho Falls, ID, United States

11:05am – CODAP Project on International Cooperation in the Area of Structural Integrity of NPP

Technical Presentation. IMECE2014-40106

Jovica Riznic, Canadian Nuclear Safety Commission, Ottawa, ON, Canada

7-8 Integrated Building Equipment and Systems

7-8-1 Energy Modeling—1

518B

9:45am–11:30am

Session Organizer: Essam E. Khalil, Cairo University, Cairo, Egypt

Session Co-Organizer: Jorge Gonzalez, Caribbean Thermal Technologies Inc., Mayaguez, PR, United States

9:45am – Thermal Performance Evaluation of Ventilated Slabs for Office Buildings

Technical Paper Publication. IMECE2014-36349

Benjamin Park, Moncef Krarti, University of Colorado, Boulder, CO, United States

10:06am – Tool for Hourly Energy Consumption Estimation in Existing Office Buildings

Technical Paper Publication. IMECE2014-37265

Nelson Fumo, University of Texas at Tyler, Tyler, TX, United States, Pedro Mago, Emily Ledbury, Mississippi State University, Mississippi State, MS, United States

10:27am – Large Eddy Simulation of Single-Sided Ventilated Room With Different Location of Windows

Technical Paper Publication. IMECE2014-37960

Awang Idris, Universiti Kuala Lumpur Malaysian Spanish Institute, Kulim, Kedah, Malaysia, B.P. Huynh, University of Technology Sydney, Broadway NSW, Australia

10:48am – Assessment of Sustainability for Small Municipalities

Technical Paper Publication. IMECE2014-38922

Katherine Schmid, Erin Fulton, Charles Mark Archibald, Grove City College, Grove City, PA, United States, Andrew McGuire, Grove City College, Moon Township, PA, United States

11:09am – Evaluation of Regression-Based Building Hourly Thermal Load Prediction Algorithms Under Climate Change

Technical Paper Publication. IMECE2014-39339

Riasat Sarwar, Heejin Cho, Mississippi State University, Mississippi State, MS, United States

7-9 Electrochemical Energy Conversion and Storage

7-9-1 Lithium Ion Batteries

518C

9:45am–11:30am

Session Organizer: Partha Mukherjee, Texas A&M University, College Station, TX, United States

Session Co-Organizer: Ilya V. Avdeev, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

9:45am – Stress Analysis of a Lithium-Ion Battery Cell

Technical Presentation. IMECE2014-36690

Xinran Xiao, Miao Wang, Wei Wu, Michigan State University, Lansing, MI, United States, Xiaosong Huang, General Motors Global R&D Center, Warren, MI, United States

10:06am – Effects of Multiscale Characteristics on Lithium-Ion Battery Thermal Performance

Technical Presentation. IMECE2014-38216

Carlos Lopez, Pallab Barai, Partha Mukherjee, Texas A&M University, College Station, TX, United States

10:27am – Evaluation of Thermal Management Strategies for Lithium-Ion Batteries**Technical Presentation. IMECE2014-38235****Carlos Lopez, Partha Mukherjee**, *Texas A&M University, College Station, TX, United States*, **Judith Jeevarajan**, *NASA-Johnson Space Center, Houston, TX, United States***10:48am – Comparing High-Performance Computing Techniques for Modeling Structural Impact on Battery Cells****Extended Abstract Publication. IMECE2014-39271****Ilya V. Avdeev, Mehdi Gilaki**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***11:09am – Capacity Fade Analysis for Li-Ion Batteries****Technical Presentation. IMECE2014-40206****Xianke Lin, Jonghyun Park, Wei Lu**, *University of Michigan, Ann Arbor, MI, United States***7-2 Fundamentals of Thermodynamics****7-2-2 Applied Thermodynamics****516E****1:00pm–2:45pm****Session Organizer: Irene Koronaki**, *National Technical University of Athens, Zografou, Greece***Session Co-Organizer: Ana-Maria Blanco-Marigorta**, *University of Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain***1:00pm – Mass Engine Cycle****Technical Paper Publication. IMECE2014-38570****Mostafa Sharqawy**, *KFUPM, Dhahran, Saudi Arabia***1:26pm – Finite Time Thermodynamics Model of an Absorption Chiller****Technical Paper Publication. IMECE2014-38777****David Gerlach, Xiaohong Liao**, *United Technologies Research Center, East Hartford, CT, United States***1:52pm – Thermodynamic Analysis and Working Fluid Optimization of a Combined ORC-VCC System Using Waste Heat From a Marine Diesel Engine****Technical Paper Publication. IMECE2014-39976****Ahmed Ouadha, Oumayma Bounefour**, *USTO-MB, Oran, Algeria***2:18pm – Optimization of Aqua-Ammonia Absorption Cycle Using Neural Networks****Technical Presentation. IMECE2014-40011****Hamzeh Eshraghi, Mohammad Toude Fallah, Masoud Boroomand, Seyed Reza Razavi**, *Amirkabir University of Technology, Tehran, Iran***7-4 Design and Analysis of Energy Conversion Systems****7-4-1 Natural Gas-Based Systems and Chemical Processes****518A****1:00pm–2:45pm****Session Organizer: Roberto Carapellucci**, *University of L'Aquila, L'Aquila, Italy***Session Co-Organizer: Masoud Rokni**, *Technical University of Denmark, Copenhagen, Denmark***1:00pm – Modeling and Performance Analysis of Thermochemical-Based Biorefineries for Co-Production of Hydrogen and Power****Technical Presentation. IMECE2014-39274****Robert Braun, L.G. Hanzon**, *Colorado School of Mines, Golden, CO, United States***1:17pm – Evaluation of Synthetic Natural Gas Production From Renewably Generated Hydrogen and Carbon Dioxide****Technical Paper Publication. IMECE2014-39302****W.L. Becker**, *Bright Energy Storage Technologies, Arvada, CO, United States*, **Robert Braun**, *Colorado School of Mines, Golden, CO, United States*, **M. Penev**, *National Renewable Energy Laboratory, Golden, CO, United States***1:34pm – Thermodynamic and Economic Evaluation of a Novel Mixed-Refrigerant Process for the Liquefaction of Natural Gas****Technical Paper Publication. IMECE2014-39639****Mohd Nazri Bin Omar, Tatiana Morosuk, George Tsatsaronis**, *Technical University Berlin, Berlin, Germany***1:51pm – Novel Concept for LNG Regasification in an Industrial Complex****Technical Paper Publication. IMECE2014-39640****Tatiana Morosuk, Stefanie Tesch, Marco Schult, George Tsatsaronis**, *Technical University Berlin, Berlin, Germany*

2:08pm – Exergy Analysis and Optimization of a Building Air Conditioning System in Tropical Climate.

Technical Paper Publication. IMECE2014-36764

Claudia Toro, Ricardo Salazar, *University of Rome “Sapienza,” Rome, Italy*, **Enrico Sciubba**, *University of Rome, Rome, Italy*

2:25pm – Available Systems for the Conversion of Waste Heat to Electricity

Technical Paper Publication. IMECE2014-37984

Nicolas Tauveron, Jean-Antoine Gruss, *Stéphane Colasson, CEA, Grenoble, France*

7-7 Nuclear Power Plants: Design, Analysis, and Safety

7-7-3 Neutronics, Fluid, Thermal

522A

1:00pm–2:45pm

Session Organizer: Jovica Riznic, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Organizers: Shripad Revankar, *Purdue University, West Lafayette, IN, United States*, Hakan Ozaltun, *Idaho National Laboratory, Idaho Falls, ID, United States*

1:00pm – Thermal Predictions of the AGR-3/4 Experiment With Time Varying Gas Gaps

Technical Paper Publication. IMECE2014-36943

Grant Hawkes, James W. Sterbentz, John T. Maki, *Idaho National Laboratory, Idaho Falls, ID, United States*

1:20pm – COBRA-TF Simulation of Fuel Thermal Response during Reactivity Initiated Accidents Using the NSRR Pulse Irradiation Experiments

Technical Paper Publication. IMECE2014-38513

Vefa Kucukboyaci, Liping Cao, Yixing Sung, *Westinghouse Electric Company, Cranberry Woods, PA, United States*

1:40pm – Fully Coupled Simulation of Oxygen and Heat Diffusion for (U, Pu)O₂ Fuel in Both FBR and LWR

Technical Paper Publication. IMECE2014-40212

Wenzhong Zhou, Rong Liu, *City University of Hong Kong, Kowloon Tong, Hong Kong*

2:00pm – Development of Conservative Form of RELAP5 Thermal Hydraulic Equations—Part I: Theory

Technical Paper Publication. IMECE2014-40010

Zheng Fu, Fatih Aydogan, *University of Idaho, Idaho Falls, ID, United States*, **Richard J. Wagner**, *Innovative Systems Software, Idaho Falls, ID, United States*

2:20pm – Development of Conservative Form of RELAP5 Thermal Hydraulic Equations—Part II: Numerical Approach and Code Results

Technical Paper Publication. IMECE2014-40013

Zheng Fu, Fatih Aydogan, *University of Idaho, Idaho Falls, ID, United States*, **Richard J. Wagner**, *Innovative Systems Software, Idaho Falls, ID, United States*

7-8 Integrated Building Equipment and Systems

7-8-2 Energy Systems

518B

1:00pm–2:45pm

Session Organizer: Jorge Gonzalez, *Caribbean Thermal Technologies Inc., Mayaguez, PR, United States*

Session Co-Organizer: Essam E. Khalil, *Cairo University, Cairo, Cairo, Egypt*

1:00pm – Development of a Response Factor Model for Thermally Active Building Foundations

Technical Paper Publication. IMECE2014-36350

Byung Chang Kwag, Moncef Krarti, *University of Colorado, Boulder, CO, United States*

1:17pm – Building Energy Management: Construction and Characterization of an Environmental Test Chamber

Technical Presentation. IMECE2014-36599

Rafael Chávez-Martínez, Mihir Sen, *University of Notre Dame, Notre Dame, IN, United States*

1:34pm – Building Energy Management: Thermal Modeling, CFD Simulation, and Small-Scale Experimentation

Technical Presentation. IMECE2014-36600

Na Yu, Rafael Chávez-Martínez, Saran Salakij, Mihir Sen, Samuel Paolucci, Panos Antsaklis, *University of Notre Dame, Notre Dame, IN, United States*

1:51pm – Building Energy Management: Optimization Using Smart Model-Based Control

Technical Presentation. IMECE2014-36602

Saran Salakij, Na Yu, Samuel Paolucci, Panos Antsaklis, *University of Notre Dame, Notre Dame, IN, United States*

2:08pm – Numerical Study of Heat Pipes Effects to a 3-Dimensional Room With Natural Driven Ventilation

Technical Paper Publication. IMECE2014-37705

Zulkarnaini Abdullah, B.P. Huynh, *University of Technology, Sydney, Broadway NSW, Australia*, **Awang Idris**, *Universiti Kuala Lumpur Malaysian Spanish Institute, Kulim, Kedah, Malaysia*

2:25pm – Evaluation of Passive Anti-Fouling Technology Applied to CO₂ Heat Pump Water Heaters

Technical Paper Publication. IMECE2014-37794

Portia Murray, Stephen Harrison, *Queen's University, Kingston, ON, Canada*, Ben Stinson, *QSBR Innovations Inc., Kingston, ON, Canada*

7-9 Electrochemical Energy Conversion and Storage

7-9-2 Advanced Electrochemical Storage Concepts

518C

1:00pm–2:45pm

Session Organizer: Xinran Xiao, *Michigan State University, Lansing, MI, United States*

Session Co-Organizer: Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

1:00pm – Determination of Hydraulic Power Losses in Vanadium Redox Batteries Based on Experimental Analysis of Electrolyte Flow Through Carbon Felt of Electrodes

Technical Paper Publication. IMECE2014-36295

Alex Pozin, *BG University, Dimona, Israel*, Moshe Averbukh, *Ariel University, Beer-Sheva, Israel*, Semion Sukoriansky, *BG University, Beer-Sheva, Israel*

1:26pm – Optimization of Smart Grid Renewable Energy Application

Technical Paper Publication. IMECE2014-36791

Olumide Bello, Landon Onyebueke, *Tennessee State University, Nashville, TN, United States*

1:52pm – Multifunctional Load-Bearing Energy Storage Materials

Technical Paper Publication. IMECE2014-38931

Andrew Westover, John Tian, Shiva Bernath, Landon Oakes, Rob Edwards, Farhan Shabab, Shahana Chatterjee, Amrutur Anilkumar, Cary Pint, *Vanderbilt University, Nashville, TN, United States*

2:18pm – Flexible, Dynamic Model for Economic Operational Management of Grid Battery Energy Storage

Technical Presentation. IMECE2014-36685

Robert Fares, Michael E. Webber, *University of Texas at Austin, Austin, TX, United States*

7-12 Alternative Energy Technologies

7-12-1 Alternative Power Generation

524C

1:00pm–2:45pm

Session Organizer: Armando Portoraro, *Politecnico di Torino, Torino, Italy*

1:00pm – Thermoelectric Power Generation: Material, Manufacturing, and System Costs in \$/W

Technical Presentation. IMECE2014-38060

Saniya LeBlanc, *George Washington University, Washington, DC, United States*, Shannon K. Yee, *Georgia Institute of Technology, Atlanta, GA, United States*, Matthew L. Scullin, *Alphabet Energy, Hayward, CA, United States*, Chris Dames, *University of California at Berkeley, Berkeley, CA, United States*, Kenneth Goodson, *Stanford University, Stanford, CA, United States*

1:17pm – Performance Evaluation of a Solar-Powered Organic Rankine Cycle for Residential or Small Commercial Applications

Technical Paper Publication. IMECE2014-37118

Emily Ledbury, Pedro Mago, *Mississippi State University, Mississippi State, MS, United States*

1:34pm – Large-Scale Ocean-Based or Geothermal Power Plants by Thermoelectric Effects

Technical Presentation. IMECE2014-36232

Liping Liu, *Rutgers University, Piscataway, NJ, United States*

1:51pm – Modeling of a Hybrid Energy System integrated With an Intermittent Power Grid in Developing Countries

Technical Paper Publication. IMECE2014-37084

Kehinde Oke, Landon Onyebueke, Olumide Bello, *Tennessee State University, Nashville, TN, United States*

2:08pm – Feasibility of Using More Geothermal Energy to Generate Electricity

Technical Paper Publication. IMECE2014-36751

Kaufui Wong, Nathanael Tan, *University of Miami, Coral Gables, FL, United States*

2:25pm – Alternative Energy Technologies: The Unconventional Dependable

Technical Paper Publication. IMECE2014-39667

Pulkit Batra, Raghendra Gautam, *Delhi Technological University, New Delhi, India*

7-3 Thermoeconomics

7-3-2 Thermoeconomics 2

518A

3:00pm–4:45pm

Session Organizer: George Tsatsaronis, *Technical University Berlin, Berlin, Germany*

Session Co-Organizer: Tatiana Morosuk, *Technical University Berlin, Berlin, Germany*

3:00pm – Thermoeconomic Indicators of Air Conditioning in a River Ship

Technical Paper Publication. IMECE2014-38334

Juan Fajardo, Bienvenido Sarria, *Universidad Tecnológica de Bolívar, Cartagena, Colombia*, **Mario A. Guerra,** *Cienfuegos University, Cienfuegos, Cuba*

3:26pm – Hybrid Solar Desalination and Reverse Electrodialysis Processes to Produce Fresh Water and Electrical Power

Technical Presentation. IMECE2014-39117

Gregory Kowalski, Masoud Modaresifar, *Northeastern University, Boston, MA, United States*, **Mansour Zenouzi,** *Wentworth Institute of Technology, Boston, MA, United States*

3:52pm – Exergy-Based Analysis of an Isolated Honduras Community

Technical Paper Publication. IMECE2014-37392

Andrea Micangeli, Emanuele Michelangeli, Marco Ricci, *Sapienza University of Rome, Rome, Italy*, **Enrico Sciubba,** *University of Rome, Rome, Italy*

4:18pm – Combined Cycle Power Plant Thermoeconomic Multiobjective Optimization Using Evolutionary Algorithm

Technical Paper Publication. IMECE2014-37815

Roberto Canepa, *Ansaldo Energia, Genova, Italy*, **Giulio Croce,** *University of Udine, Udine, Italy*, **Pietro Zunino,** *University of Genova, Genova, Italy*

7-7 Nuclear Power Plants: Design, Analysis, and Safety

7-7-4 Materials and Structures

516E

3:00pm–4:45pm

Session Organizer: Hakan Ozaltun, *Idaho National Laboratory, Idaho Falls, ID, United States*

Session Co-Organizers: Fatih Aydogan, *University of Idaho, Idaho Falls, ID, United States*, Jovica Riznic, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*, Shripad Revankar, *Purdue University, West Lafayette, IN, United States*

3:00pm – Modeling of U-Mo/Al Dispersion Fuel Meat Swelling

Technical Presentation. IMECE2014-36604

Yeon Soo Kim, *Argonne National Laboratory, Argonne, IL, United States*, **Gwan Yoon Jeong, D.-S. Sohn,** *Ulsan National Institute of Science and Technology, Ulsan, Korea (Republic)*

3:25pm – Fuel Assembly Bowing and Core Restraint Design in Fast Reactors

Technical Paper Publication. IMECE2014-38331

James Grudzinski, *Argonne National Laboratory, Downers Grove, IL, United States*, **Christopher Grandy,** *Argonne National Laboratory, Argonne, IL, United States*

3:50pm – Modeling Critical Flow Through Steam Generator Tube Cracks

Technical Paper Publication. IMECE2014-40338

Andrew Oussoren, Jovica Riznic, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*, **Shripad Revankar,** *Purdue University, West Lafayette, IN, United States*

4:15pm – Effects of the Foil Flatness on the Stress-Strain Characteristics of U10-Mo Alloy-Based Monolithic Miniplates

Technical Paper Publication. IMECE2014-36605

Hakan Ozaltun, Pavel Medvedev, *Idaho National Laboratory, Idaho Falls, ID, United States*

7-8 Integrated Building Equipment and Systems

7-8-3 Efficient Design

518B

3:00pm–4:45pm

Session Organizer: Antonio Bula, *Universidad del Norte, Barranquilla, Colombia*

3:00pm – On the Benefits of Forecasting Energy Demands in Very Dense Cities

Technical Presentation. IMECE2014-38044

Jorge Gonzalez, Yehisson Tibana, Estatio Guterrez, *City College of New York, New York, NY, United States*

3:26pm – Study of Performance of Attic Air Source Heat Pump in Maine

Technical Paper Publication. IMECE2014-39406

Lin Lin, Julie Doxsey, *University of Southern Maine, Gorham, ME, United States*

3:52pm – Using Infrared Thermography and Biosensors to Detect Thermal Discomfort in a Building's Inhabitants

Technical Paper Publication. IMECE2014-40269

Mihai Burzo, *University of Michigan–Flint, Ann Arbor, MI, United States*, **Mohammed Abouelenien, Rada Mihalcea,** *University of Michigan–Ann Arbor, Ann Arbor, MI, United States*, **Cakra Wicaksono, Verónica Pérez Rosas, Yong Tao,** *University of North Texas, Denton, TX, United States*

4:18pm – Designing and Installing a Retrofit Heated Green Roof Using Either Co-Gen Waste Hot Water or Municipal Waste Steam Heat as Energy Source

Technical Paper Publication. IMECE2014-39066

Robert Dell, Chih Shing Wei, William Foley, *Cooper Union for the Advancement of Science and Art, New York, NY, United States*, **Raj Parikh,** *Metropolitan Building Consulting Group, New York, NY, United States*, **Runar Unnthorsson,** *University of Iceland, Reykjavik, Iceland*

7-9 Electrochemical Energy Conversion and Storage

7-9-3 Lithium Air Batteries

518C

3:00pm–4:45pm

Session Organizer: Soumik Banerjee, *Washington State University, Pullman, WA, United States*

Session Co-Organizer: George J. Nelson, *University of Alabama in Huntsville, Huntsville, AL, United States*

3:00pm – Mathematical Model for Li-Air Battery Considering Volume Change Phenomena

Technical Paper Publication. IMECE2014-37627

Kisoo Yoo, Prashanta Dutta, Soumik Banerjee, *Washington State University, Pullman, WA, United States*

3:21pm – Pore-Scale Transport Resolved Model Incorporating Cathode Microstructure and Peroxide Growth in Lithium-Air Batteries

Technical Presentation. IMECE2014-38783

Long Zhang, Gang Qiu, Charles Andersen, Vibha Kalra, Ying Sun, *Drexel University, Philadelphia, PA, United States*

3:42pm – Experimental Performance Evaluation of a Rechargeable Lithium-Air Battery Operating at Room Temperature

Technical Paper Publication. IMECE2014-39004

Susanta Kumar Das, K. Joel Berry, *Kettering University, Flint, MI, United States*, **Salma Rahman, Jianfang Chai,** *Michigan Molecular Institute, Midland, MI, United States*, **Matthew Quast, Anja Mueller,** *Central Michigan University, Mt. Pleasant, MI, United States*, **Steven E. Keinath, Abhijit Sarkar,** *Michigan Molecular Institute, Midland, MI, United States*

4:03pm – Solubility of Oxygen in Ionic Liquid Electrolytes: A Molecular Dynamics Study

Technical Paper Publication. IMECE2014-40215

Anirudh Deshpande, Prashanta Dutta, Soumik Banerjee, *Washington State University, Pullman, WA, United States*

4:24pm – Ab Initio Modeling of the Electron Transfer Reaction Rate at the Electrode-Electrolyte Interface in Lithium-Air Batteries

Technical Paper Publication. IMECE2014-40239

Saeed Kazemiabnavi, Prashanta Dutta, Soumik Banerjee, *Washington State University, Pullman, WA, United States*

7-12 Alternative Energy Technologies

7-12-2 Energy Harvesting, Storage, and Analysis

524C

3:00pm–4:45pm

Session Organizer: Pouria Ahmadi, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

3:00pm – CFD Simulation Analysis of the Water Volumetric Fraction Distribution in the Runner of a Turgo-Type Turbine Designed With an Integrated Dimensional Methodology
Technical Paper Publication. IMECE2014-36534

Jorge Luis Clarembaux Correa, *Mechanical Energy Conversion Laboratory, Caracas, Venezuela*, **Jesús De Andrade**, **Sergio D. Croquer**, *Simon Bolivar University, Caracas, DC, Venezuela*, **Miguel Asuaje**, *Universidad Simón Bolívar, Caracas, Miranda, Venezuela*

3:21pm – Integration of Parabolic Trough Solar-Thermal Into Pulverized Coal Power Cycle

Technical Presentation. IMECE2014-37536

Amin Ghobeity, *Sheridan College, Brampton, ON, Canada*

3:42pm – Stack Design for Reverse Electrodialysis System

Technical Paper Publication. IMECE2014-40248

Sean Amaral, **Neil Franklin**, **Michael Jurkowski**, **Mansour Zenouzi**, *Wentworth Institute of Technology, Boston, MA, United States*

4:03pm – An Energy Harvester From Airflow-Induced Vibrations

Technical Paper Publication. IMECE2014-39078

Abhishek Nayyar, **Vesselin Stoilov**, *University of Windsor, Windsor, ON, Canada*

4:24pm – Thermal Transpiration-Based Propulsion

Technical Paper Publication. IMECE2014-39121

Ryan Falkenstein-Smith, **Pingying Zeng**, *Tyler Culp*, *Jeongmin Ahn*, *Syracuse University, Syracuse, NY, United States*

Thursday, November 20

7-4 Design and Analysis of Energy Conversion Systems

7-4-3 Advanced Power Generation and District Heating

518B

7:45am–9:15am

Session Organizer: Roberto Carapellucci, *University of L'Aquila, L'Aquila, Italy*

Session Co-Organizer: Lorena Giordano, *University of L'Aquila, L'Aquila, Italy*

7:45am – New Gas Path Fault Diagnostic Method of Gas Turbine Based on Support Vector Machine

Technical Paper Publication. IMECE2014-36367

Dengji Zhou, **Jiayun Wang**, **Huisheng Zhang**, **Shilie Weng**, *Shanghai Jiao Tong University, Shanghai, China*

8:00am – New Concept for Power Grid Stabilization Using a Motor-Assisted Variable Speed Gas Turbine System

Technical Paper Publication. IMECE2014-37000

Naohiro Kusumi, **Noriaki Hino**, **Aung Ko Thet**, *Hitachi, Ltd., Hitachi, Ibaraki, Japan*

8:15am – Combining Diesel Generators With Ultracapacitors to Enhance Stability and Reliability

Technical Paper Publication. IMECE2014-37930

Moshe Averbukh, **Vladimir Yuhimenko**, *Ariel University, Beer-Shava, Israel*, **Alon Kuperman**, *Ariel University, Ashdod, Israel*, **Shlomi Gadelovitch**, *Ariel University, Elkana, Israel*, **Gal Geula**, *Ariel University, Herzlia, Israel*

8:30am – Numerical Study of Regenerator Configuration in the Design of a Stirling Engine

Technical Paper Publication. IMECE2014-38529

Ana C. Ferreira, **Senhorinha Teixeira**, **Manuel L. Nunes**, **Luis Barreiros Martins**, *University of Minho, Guimarães, Portugal*

8:45am – Variation in the Thermal Load Profile of the Users of a District Heating Network for Reduction of Primary Energy Consumption

Technical Paper Publication. IMECE2014-39048

Vittorio Verda, **Giorgia Baccino**, **Sara Cosentino**, **Elisa Guelpa**, *Politecnico di Torino, Turin, Italy*, **Adriano Sciacovelli**, *Politecnico di Torino Dener, Torino, Italy*

9:00am – Optimal Operation and Sensitivity Analysis of a Large District Heating Network Through POD Modeling

Technical Paper Publication. IMECE2014-39509

Vittorio Verda, Sara Cosentino, Elisa Guelpa, *Politecnico di Torino, Turin, Italy*, Roberto Melli, Enrico Sciubba, *University of Rome, Rome, Italy*, Adriano Sciacovelli, *Politecnico Di Torino Dener, Torino, Italy*, Claudia Toro, *University of Rome “Sapienza,” Roma, Italy*

7-5 Energy Systems Components

7-5-1 Energy Systems Components 1

518A

7:45am–9:15am

Session Organizer: Roberto Capata, *University of Rome, Rome, Italy*

7:45am – Preliminary Design of Expander for a Small Organic Rankine Cycle (ORC) System (2.5–10 KW)

Technical Paper Publication. IMECE2014-36130

Roberto Capata, Gustavo Adolfo Hernandez, *University of Rome “Sapienza,” Rome, Italy*

8:03am – Cooling of Turbine Blade Surface With Extended Exit Holes: Parametric Study

Technical Paper Publication. IMECE2014-36912

Fariborz Forghan, Omid Askari, Uchiro Narusawa, Hameed (Mohamad) Metghalchi, *Northeastern University, Boston, MA, United States*

8:21am – Investigation of Aerodynamic Parameters in the Rotor Blade Horizontal-Axis Wind Turbine (HAWT) System

Technical Presentation. IMECE2014-40396

Chi-Jeng Bai, Wei-Cheng Wang, Po-Wei Chen, *National Cheng Kung University, Tainan, Taiwan*

8:39am – Thermal State Numerical Simulation and the Security Analysis to the Superheaters of the Ultra-Supercritical Boiler in FCB

Technical Paper Publication. IMECE2014-37359

Zhan Zhi-gang, *Electric Power Science Research Institute, Guangdong Power Grid Company, Guangzhou, China*, Qian Kun, Xiong Yang-heng, Chen Ya-wei, Xiong Zhan, *Wuhan University, Wuhan, China*

8:57am – Two-Stage Atmospheric Burners: Development and Verification of a New Mass-Energy Balance Model

Technical Paper Publication. IMECE2014-38820

Jose C.F. Teixeira, Luis Barreiros Martins, Manuel Lopes, Senhorinha Teixeira, Manuel E.C. Ferreira, *University of Minho, Guimarães, Portugal*

7-7 Nuclear Power Plants: Design, Analysis, and Safety

7-7-5 Modeling and Simulation

518C

7:45am–9:15am

Session Organizer: Jovica Riznic, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Organizer: Hakan Ozaltun, *Idaho National Laboratory, Idaho Falls, ID, United States*

7:45am – Core Instability Analysis Under Ocean Condition With Nuclear Coupling Based on Diffusion Models

Technical Paper Publication. IMECE2014-36282

Yun Guo, Changhong Peng, *University of Science and Technology of China, Hefei, China*, Linglan Zhou, *State Key Laboratory of Reactor System Design Technology, Nuclear Power Institute of China, Chengdu, China*

8:05am – Measurement of Local Mass Transfer Distribution in a Large Diameter S-Bend at High Reynolds Number

Technical Paper Publication. IMECE2014-37051

Dong Wang, Thuan Le, Dan Ewing, Chan Ching, *McMaster University, Hamilton, ON, Canada*

8:25am – Uncertainty Quantification of the RELAP5 Interfacial Friction Model in the Rod Bundle Geometry

Technical Paper Publication. IMECE2014-38114

Ikuo Kinoshita, Toshihide Torige, *Institute of Nuclear Safety System, Inc., Fukui, Japan*, Minoru Yamada, *MHI Nuclear Engineering Co., Ltd., Kanagawa, Japan*

8:45am – Coupling of RELAP and LabVIEW to Model a Nuclear Power Plant System Realistically

Technical Paper Publication. IMECE2014-36674

Joshua Pack, Zheng Fu, Fatih Aydogan, *University of Idaho, Idaho Falls, ID, United States*

9:05am – Simulation of a High-Temperature Modular Reactor (HTMR) for Power and Coal-to-Liquid Fuel—Cogeneration Plant

Technical Paper Publication. IMECE2014-38595
Mubenga Carl Tshamala, Stellenbosch University, Stellenbosch, Western Cape, South Africa, **Robert Dobson**, University of Stellenbosch, Matieland, South Africa

7-10 Fuel Cell Systems Design and Application

7-10-1 Low-Temperature Fuel Cells

520A **7:45am–9:15am**

Session Organizer: Abel Hernandez-Guerrero, University of Guanajuato, Salamanca, Guanajuato, Mexico
Session Co-Organizer: Susanta Kumar Das, Kettering University, Flint, MI, United States

7:45am – Water Management in Fuel Cell Stack by Using Microcontroller

Technical Paper Publication. IMECE2014-37901
Gukan Rajaram, PSG College of Technology, Coimbatore, Tamilnadu, India, **Manoj Kumar Panthalingal**, Parthasarathy Valivittan, PSG Institute of Advanced Studies, Coimbatore, Tamilnadu, India

8:07am – Role of GDL Surface Wettability and Operating Conditions in Liquid-Water Removal From NSTF Catalyst Layers

Extended Abstract Publication. IMECE2014-39856
Prodip K. Das, Newcastle University, Newcastle upon Tyne, Tyne and Wear, United Kingdom, **Anthony Santamaria**, **Adam Z. Weber**, Lawrence Berkeley National Laboratory, Berkeley, CA, United States

8:29am – Probabilistic Life Prediction of Hydrogen Steel Pressure Vessels in Industrial Electric Trucks

Technical Paper Publication. IMECE2014-38532
Constantinos Minas, **Sejalben Patel**, Plug Power, Inc., Lathan, NY, United States

8:51am – Multiobjective Optimization of Direct Coupling Photovoltaic-Electrolyzer Systems Using Imperialist Competitive Algorithm

Technical Paper Publication. IMECE2014-39765
Azadeh Maroufmashat, Sharif University of Technology, Tehran, Iran, **Farid Sayedin**, **Sourena Sattari**, Sharif Energy Research Institute, Tehran, Iran

7-13 Heat Transfer for Green and Renewable Energy

7-13-1 Solar and Advanced Energy Applications

519B **7:45am–9:15am**

Session Organizer: Roy Hogan, Sandia National Laboratories, Albuquerque, NM, United States

Session Co-Organizer: John Tencer, Sandia National Laboratories, Albuquerque, NM, United States

7:45am – Effect of Free Stream Turbulence on Air Cooling of a Surrogate PV Panel

Technical Paper Publication. IMECE2014-36560
Frantzis Iakovidis, University of Windsor, Belle River, ON, Canada, **David S.-K. Ting**, University of Windsor, Windsor, ON, Canada

8:00am – Thermal Performance of a Parabolic Trough Receiver With Perforated Conical Inserts for Heat Transfer Enhancement

Technical Paper Publication. IMECE2014-39849
Aggrey Mwesigye, Tshwane University of Technology, Pretoria, Gauteng, South Africa, **Josua Meyer**, University of Pretoria, Pretoria, South Africa, **Tunde Bello-Ochende**, University of Cape Town, Cape Town, South Africa

8:15am – Vacuum Cavity Parabolic Trough Collector

Technical Paper Publication. IMECE2014-37103
Yousef Gharbia, American University of the Middle East, Kuwait, Kuwait, **Said Grami**, **Aref Wazwaz**, Dhofar Univeristy, Salalah, Oman

8:30am – Copper Microchannel Heat Exchanger for MEMS-Based Waste Heat Thermal Scavenging

Technical Paper Publication. IMECE2014-38801
Eric Borquist, **Suvhashis Thapa**, **Debbie Wood**, **Leland Weiss**, **Ashok Baniya**, Louisiana Tech University, Ruston, LA, United States

8:45am – Design of Low Source-Temperature Fully Thermally Activated Absorption Refrigeration Systems

Technical Presentation. IMECE2014-38575
Alexander Rattner, **Hannah Oermann**, **Srinivas Garimella**, Georgia Institute of Technology, Atlanta, GA, United States

9:00am – First-Principles Analysis of Ejector Flow Field and Condensation Effects With Experimental Implementation

Technical Presentation. IMECE2014-38552
Adrienne Little, **Srinivas Garimella**, Georgia Institute of Technology, Atlanta, GA, United States, **Yann Bartosiewicz**, Université Catholique de Louvain UCL-MECA/TERM, Louvain la Neuve, Belgium

7-20 Fuels and Biofuels

7-20-4 Biofuels Production

519A 7:45am–9:15am

Session Organizer: Ben Xu, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: Seyed Allameh, *Northern Kentucky University, Highland Heights, KY, United States*

7:45am – Gasification of Bio-Waste and Biomass Products Through Exposure to High Density and Low Density Supercritical Water

Technical Paper Publication. IMECE2014-36140

Bob Desnoo, Xiao Huang, Carleton University, Ottawa, ON, Canada, Weiguo Ma, Yeong Yoo, National Research Council Canada, Ottawa, ON, Canada

8:03am – Biomass Gasification in a Pilot-Scale Gasifier

Technical Paper Publication. IMECE2014-38958

Yunye Shi, Tejasvi Sharma, Guiyan Zang, Albert Ratner, University of Iowa, Iowa City, IA, United States

8:21am – Development and Performance Analysis of a Biodiesel Batch Reactor With Improved Settling Capability

Technical Paper Publication. IMECE2014-40246

Kevin Nwaigwe, Nnamdi Ogueke, Clifford Kamalu, Emmanuel Enyioma Anyanwu, Federal University of Technology, Owerri Imo State Nigeria, West Africa

8:39am – Instrumentation of a Biofuel Production System for Household Application

Technical Presentation. IMECE2014-36361

Seyed Allameh, Miriam Kannan, Ella Beckman, Hadi Allameh, Northern Kentucky University, Highland Heights, KY, United States

8:57am – Conversion of Glucose Into 5-Hydroxymethylfurfural in DMSO as Single Organic Solvent

Technical Paper Publication. IMECE2014-37316

Ahmed Emara, Osayed S.M. Abu-Elyazeed, Helwan University, Cairo, Cairo, Egypt, Mohamed Elmously, Helwan University, Giza, Egypt

7-24 Energy-Water Nexus

7-24-1 Energy-Water Nexus 1

520B 7:45am–9:15am

Session Organizer: Kelly T. Sanders, *University of Southern California, Los Angeles, CA, United States*

7:45am – Performance of Air Gap Membrane Distillation Unit for Water Desalination

Technical Paper Publication. IMECE2014-36031

Atia Khalifa, Dahiru U. Lawal, Mohamed Antar, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

8:03am – Operational Costs Optimization in Water Distribution Systems

Technical Paper Publication. IMECE2014-36332

Dhafar Al-Ani, Hamed H. Afshari, Saeid Habibi, McMaster University, Hamilton, ON, Canada

8:21am – Climate Change Aggravates the Energy-Water-Food Nexus

Technical Paper Publication. IMECE2014-36502

Kaufui Wong, Sarmad Chaudhry, University of Miami, Coral Gables, FL, United States

8:39am – Overview of NSF-EPRI Collaboratively Funded Advanced Dry Cooling Projects

Technical Presentation. IMECE2014-36838

Jessica Shi, Sean Bushart, Robert Goldstein, Electric Power Research Institute, Palo Alto, CA, United States, Sumanta Acharya, Louisiana State University, Baton Rouge, LA, United States

8:57am – Representing the Water-Energy Nexus With Decision Matrices

Technical Paper Publication. IMECE2014-36918

Jacob Weimann, Matthew Schmidt, Marc Compere, Embry-Riddle Aeronautical University, Daytona Beach, FL, United States, Arthur Bergles, Rensselaer Polytechnic Institute, Centerville, MA, United States

7-4 Design and Analysis of Energy Conversion Systems

7-4-4 Design and Analysis of Energy Systems

518B 9:30am–11:15am

Session Organizer: Roberto Capata, *University of Rome, Rome, Italy*

Session Co-Organizer: Maura Vaccarelli, *University of L'Aquila, L'Aquila, Italy*

9:30am – Multilevel Optimization Method for the Design and Operation of Stand-Alone Hybrid Renewable Energy Systems for Multiple Remote Communities

Technical Paper Publication. IMECE2014-38973

Francisco Contreras, David A. Romero, Cristina Amon, *University of Toronto, Toronto, ON, Canada*

9:51am – Simulation-Based Grid Optimization to Enhance Renewable Energy Storage in Iceland

Technical Paper Publication. IMECE2014-36143

Michael Sugar, Runar Unnthorsson, *University of Iceland, Reykjavik, Iceland*

10:12am – Modeling of a Piezoelectric Energy Harvester Mounted on a Quick-Return Mechanism

Technical Paper Publication. IMECE2014-39397

Haileyesus Endeshaw, Fisseha Alemayehu, Stephen Ekwaro-Osire, *Texas Tech University, Lubbock, TX, United States*

10:33am – Developing a Methodology for Comparing the Energy Efficiency of Hydraulic and Traction Elevators

Technical Paper Publication. IMECE2014-38384

James Bos, James W. Bos, LLC, Plano, TX, United States, Robert Dell, Chih Shing Wei, William Foley, *The Cooper Union for the Advancement of Science and Art, New York, NY, United States, Brad Nemeth, ThyssenKrupp Elevator Americas, Frisco, TX, United States*

10:54am – Web-Accessible Robotics Monitoring System Powered by a Thermoelectric Generator Connected to a Battery

Technical Paper Publication. IMECE2014-39077

Robert Dell, Chih Shing Wei, William Foley, *The Cooper Union for the Advancement of Science and Art, New York, NY, United States, Runar Unnthorsson,* *University of Iceland, Reykjavik, Iceland*

7-5 Energy Systems Components

7-5-2 Energy Systems Components 2

518A 9:30am–11:15am

Session Organizer: Roberto Capata, *University of Rome, Rome, Italy*

9:30am – Time Domain Modeling and Power Output for a Heaving Point Absorber Wave Energy Converter

Technical Paper Publication. IMECE2014-36374

Yucheng Liu, *Mississippi State University, Mississippi State, MS, United States, Jeremiah Pastor,* *University of Louisiana–Lafayette, Lafayette, LA, United States*

9:51am – Small Hydro Plant Using Archimedes Screw: Modeling and Analysis

Technical Paper Publication. IMECE2014-37895

Julien Rohmer, Dominique Knittel, Guy Sturtzer, Damien Flieller, Jean Renaud, *INSA Strasbourg, Strasbourg, France*

10:12am – Development of a New Two-Stage Heat Pump Clothes Dryer

Technical Paper Publication. IMECE2014-36048

Tao Cao, Jiazhen Ling, Yunho Hwang, Reinhard Radermacher, *University of Maryland, College Park, MD, United States*

10:33am – Solar Thermal Power Generation Using a Double Concentration on a Dish Collector

Technical Paper Publication. IMECE2014-36937

Ramy Khalid Zakaria El Adli Imam, Mohamed Yassin, Mohamed Donia, Ahmed Atiya, *The American University in Cairo, Cairo, Cairo, Egypt*

10:54am – Optimal Design of IC Engine Cooling Fins by Using Genetic Algorithm

Technical Paper Publication. IMECE2014-39446

Terry Yan, Jason Yobby, Ravindra Vundavilli, *Southern Illinois University, Edwardsville, IL, United States*

7-10 Fuel Cell Systems Design and Application

7-10-2 High-Temperature Fuel Cells

520A 9:30am–11:15am

Session Organizer: Roberto Carapellucci, *University of L'Aquila, L'Aquila, Italy*

Session Co-Organizer: Robert Braun, *Colorado School of Mines, Golden, CO, United States*

9:30am – Technoeconomy of Different Solid Oxide Fuel Cell Based Hybrid Cycles

Technical Paper Publication. IMECE2014-36858

Masoud Rokni, *Technical University of Denmark, Copenhagen, Denmark*

9:56am – Highlights of Fuel Cell Modeling From a Lattice Boltzmann Method Point of View

Technical Paper Publication. IMECE2014-37010

Mayken Espinoza, *Lund University, Skane, Sweden*, **Bengt Sunden**, *Martin Andersson, Lund University, Lund, Sweden*

10:22am – Parametric Studies of Microstructural Performance Effects in Solid Oxide Cells

Extended Abstract Publication. IMECE2014-39021

Zachary K. van Zandt, **George J. Nelson**, *University of Alabama in Huntsville, Huntsville, AL, United States*

10:48am – Dynamic Response of a Solid Oxide Fuel Cell Stack to Changes in a University Building's Load

Technical Paper Publication. IMECE2014-39206

Michael M. Whiston, **William O. Collinge**, **Melissa M. Bilec**, **Laura A. Schaefer**, *University of Pittsburgh, Pittsburgh, PA, United States*

7-15 Thermal Energy Storage

7-15-1 Thermal Energy Storage I

518C 9:30am–11:15am

Session Organizer: Alparslan Oztekin, *Lehigh University, Bethlehem, PA, United States*

Session Co-Organizers: Ben Xu, *University of Arizona, Tucson, AZ, United States*, Subramanyaravi Annapragada, *United Technologies Research, East Hartford, CT, United States*

9:30am – Modeling Dual-Tank Molten Salt Thermal Energy Storage Systems

Technical Paper Publication. IMECE2014-36193

Mohammad Abutayeh, *University of South Florida, Palm Beach Gardens, FL, United States*

9:51am – Transient Turbulent Natural Convection in Vertical Tubes for Thermal Energy Storage

Technical Paper Publication. IMECE2014-37773

Reza Baghaei Lakeh, **Hossein Kavehpour**, **Richard Wirz**, **Adrienne Lavine**, *University of California, Los Angeles, Los Angeles, Ca, United States*

10:12am – Experimental Study of a Novel Thermal Storage System Using Sands With High-Conductive Fluids Occupying the Pores

Technical Paper Publication. IMECE2014-38999

Jingxiao Han, **Ben Xu**, **Peiwen Li**, **Anurag Kumar**, *University of Arizona, Tucson, AZ, United States*, **Yongping Yang**, *North China Electric Power University, Beijing, Beijing, China*

10:33am – Nanofluid PCMs for Thermal Energy Storage

Technical Presentation. IMECE2014-37225

Hohyun Lee, **Aitor Zabalegui**, **Dhananjay Lokapur**, *Santa Clara University, Santa Clara, CA, United States*

10:54am – High-Temperature Latent-Heat Thermal Energy Storage Module With Enhanced Combined Mode Heat Transfer

Technical Paper Publication. IMECE2014-38766

Antonio Ramos Archibold, **Muhammad Rahman**, **D. Yogi Goswami**, **Elias Stefankos**, *University of South Florida, Tampa, FL, United States*

7-20 Fuels and Biofuels

7-20-5 Biofuels Combustion

519A

9:30am–11:15am

Session Organizer: Christopher Depcik, *University of Kansas, Lawrence, KS, United States*

Session Co-Organizer: Ali M.A. Attia, *Benha University, Benha-Qalubia, Egypt*

9:30am – Fixed Bed Solid Fuel Combustor for the Purpose of Testing Solid Biomass Emissions Properties

Technical Paper Publication. IMECE2014-36543

Bob Apprill, Logan Coen, Brian Gessler, Jonathan Mattson, Christopher Depcik, University of Kansas, Lawrence, KS, United States

9:51am – Laminar Partially-Pemixed Flames of Blends of Prevaporized Jet-A Fuel and Palm Methyl Ester

Technical Paper Publication. IMECE2014-36930

Arun Balakrishnan, Ramkumar Parthasarathy, Subramanyam Gollahalli, University of Oklahoma, Norman, OK, United States

10:12am – Combustion Characteristics of Spray Flames of Diesel and Palm Methyl Ester at Lean Inlet Conditions

Technical Paper Publication. IMECE2014-36932

Michael Richichi, University of Oklahoma, Milwaukee, WI, United States, Ramkumar Parthasarathy, Subramanyam Gollahalli, University of Oklahoma, Norman, OK, United States

10:33am – Combustion Characteristics of Jojoba Methyl Ester as an Alternative Fuel for Gas Turbines

Technical Paper Publication. IMECE2014-39991

Ali M.A. Attia, Radwan M. El-Zoheiry, Hesham El-Batsh, Mohamed S. Shehata, Benha University, Benha-Qalubia, Egypt, Egypt

10:54am – Ammonia Gasoline-Ethanol/Methanol Tertiary Fuel Blends as an Alternate Automotive Fuel

Technical Paper Publication. IMECE2014-38026

Shehan Haputhanthri, Timothy Maxwell, Texas Tech University, Lubbock, TX, United States, Chad Austin, Ford Motor Company, Allen Park, MI, United States, John Fleming, Electrogen HydroFuels LLC, Lubbock, TX, United States

7-21 Wind Energy Theory and Applications

7-21-1 Blade/Rotor Design & Modeling

519B

9:30am–11:15am

Session Organizer: Jifeng Wang, *GE, Albany, NY, United States*

9:30am – Enhancement of Free Vortex Filament Method for Aerodynamic Loads on Rotor Blades

Technical Paper Publication. IMECE2014-36082

Hamidreza Abedi, Lars Davidson, Chalmers University of Technology, Göteborg, Sweden, Spyros Voutsinas, National Technical University of Athens, Athens, Greece

9:47am – General Beam Cross-Section Analysis Using a 3D Finite Element Slice

Technical Paper Publication. IMECE2014-36721

Philippe Couturier, Steen Krenk, Technical University of Denmark, Lyngby, Denmark

10:04am – Study of Load Comparison of Two- and Three-Bladed Rotor Wind Turbines

Technical Paper Publication. IMECE2014-37171

Jin Woo Lee, Brett Andersen, Musarrat Jehan, Abdollah Afjeh, Efstratios Nikolaidis, University of Toledo, Toledo, OH, United States

10:21am – Comparative Study of Two-Bladed Upwind and Downwind Turbines Using the NREL Reference Wind Turbine

Technical Paper Publication. IMECE2014-38634

Jin Woo Lee, Musarrat Jehan, Brett Andersen, Abdollah Afjeh, Efstratios Nikolaidis, University of Toledo, Toledo, OH, United States

10:38am – Dynamic and Aeroelastic Analyses of a Wind Turbine Blade Modeled as a Thin-Walled Composite Beam

Technical Paper Publication. IMECE2014-38679

Serhat Yilmaz, Seher Eken, Metin Orhan Kaya, Istanbul Technical University, Istanbul, Turkey

10:55am – Stress Analysis of Various Shaped Blades of Savonius Wind Turbine

Technical Paper Publication. IMECE2014-36307

Jobaidur Khan, University at Buffalo, Buffalo, NY, United States, Mosfequr Rahman, Georgia Southern University, Statesboro, GA, United States

7-24 Energy-Water Nexus

7-24-2 Energy-Water Nexus 2

520B

9:30am–11:15am

Session Organizer: Kelly T. Sanders, *University of Southern California, Los Angeles, CA, United States*

9:30am – Systems Analysis of Integrating Brackish Groundwater Desalination With Wind and Solar Power

Technical Presentation. IMECE2014-38419

Gary M. Gold, Michael E. Webber, *University of Texas at Austin, Austin, TX, United States*

9:51am – Impacts of Temperature Thresholds on Power Generation in the Upper Mississippi River Basin Under Different Climate Scenarios

Technical Paper Publication. IMECE2014-38908

Margaret Cook, Carey King, Michael E. Webber, *University of Texas at Austin, Austin, TX, United States*

10:12am – Pumping System Assessment in Water Treatment Plants. Case Study: Mexicali, Baja California, México

Technical Paper Publication. IMECE2014-39171

Margarita Gil Samaniego Ramos, Héctor E. Campbell Ramírez, Silvia Vanessa Medina León, Juan Ceballos Corral, *Universidad Autonoma de Baja California, Mexicali, Baja California, Mexico*

10:33am – Design Optimization of Batteryless Photovoltaic-Powered Reverse Osmosis Water Desalination in Remote Areas

Technical Paper Publication. IMECE2014-37750

Jihun Kim, Kazuhiro Saitou, *University of Michigan, Ann Arbor, MI, United States*, **Karim Hamza,** *University of Michigan, Mississauga, ON, Canada*, **Mohamed El-Morsi, Ashraf Nassef,** *American University in Cairo, New Cairo, Egypt*, **Sayed M. Metwalli,** *Cairo University, Cairo, Cairo, Egypt*

10:54am – Lake Michigan Water Resources Study

Technical Paper Publication. IMECE2014-38369

Chenguang Sheng, George Agbai Nnanna, Chandramouli Viswanathan, *Purdue University Calumet, Hammond, IN, United States*

7-15 Thermal Energy Storage

7-15-2 Thermal Energy Storage II

518C

1:00pm–2:45pm

Session Organizer: Reza Baghaei Lakeh, *University of California, Los Angeles, Los Angeles, CA, United States*

Session Co-Organizer: Mansour Zenouzi, *Wentworth Institute of Technology, Boston, MA, United States*

1:00pm – Enhanced Thermal Transport of Nanostructured Phase Change Composite for Thermal Energy Storage

Technical Paper Publication. IMECE2014-36841

Harish Sivasankaran, Yasuyuki Takata, Masamichi Kohno, *Kyushu University, Fukuoka, Fukuoka, Japan*

1:26pm – Thermal Property Prediction and Measurement of Organic Phase Change Materials in the Liquid Phase Near the Melting Point

Technical Presentation. IMECE2014-38011

William E. O'Connor, Aaron Wemhoff, Rebecca Weigand, Amy Fleischer, *Villanova University, Villanova, PA, United States*, **Ronald Warzoha,** *United States Naval Academy, Annapolis, MD, United States*

1:52pm – Experimental Investigation of a Packed-Bed Latent Heat Thermal Storage System With Encapsulated Phase Change Material

Technical Paper Publication. IMECE2014-38307

Tanvir Alam, Jaspreet Dhau, D. Yogi Goswami, Muhammad Rahman, Elias Stefankos, *University of South Florida, Tampa, FL, United States*

2:18pm – Thermal Assessment of a Latent Heat Energy Storage Module Using a High-Temperature Phase Change Material With Enhanced Radiative Properties

Technical Paper Publication. IMECE2014-38390

Antonio Ramos Archibold, D. Yogi Goswami, Muhammad Rahman, Elias Stefankos, Abhinav Bhardwaj, *University of South Florida, Tampa, FL, United States*

7-18 Photovoltaic Cells and Applications

7-18-1 Novel Systems, Solar Cells, and Materials

518A 1:00pm–2:45pm

Session Organizer: Ernesto Gutierrez-Miravete, *Rensselaer at Hartford, Hartford, CT, United States*

Session Co-Organizer: Aklilu G Giorges, *Georgia Institute of Technology, Atlanta, GA, United States*

1:00pm – Numerical Modeling of Nanostructure-Enhanced Solar Cells

Technical Paper Publication. IMECE2014-38628

Rongheng Li, Ben Q. Li, *University of Michigan–Dearborn, Dearborn, MI, United States*

1:25pm – Directly Coupled Photovoltaic-Electrolyzer System Optimization Using a Novel ICA Methodology

Technical Paper Publication. IMECE2014-39762

Farid Sayedin, Azadeh Maroufmashtat, Sourena Sattari, *Sharif Energy Research Institute, Tehran, Iran*

1:50pm – Optical Analyses of Microfluidic Tunable Liquid Prisms for Enhanced Solar Energy Collection

Technical Paper Publication. IMECE2014-37797

Abhishek Wadhwa, Sung-Yong Park, *National University of Singapore, Singapore, Singapore*

2:15pm – Numerical Study of Wind Loads on Residential Roof-Mounted Solar Photovoltaic Arrays

Technical Paper Publication. IMECE2014-40000

Aklilu G Giorges, Guillermo Amador, Joseph Goodman, *Georgia Institute of Technology, Atlanta, GA, United States*

7-20 Fuels and Biofuels

7-20-6 Biofuels Combustion—II

519A 1:00pm–2:45pm

Session Organizer: Antonio Bula, *Universidad del Norte, Barranquilla, Colombia*

Session Co-Organizer: Ning Mei, *Ocean University of China, Qingdao, Shandong, China*

1:00pm – Experimental Study of Performance and Emission on Ethanol Fuelled Pre- and Post-Injection in High-Compression Ignition Engines With Zirconia Coating

Technical Paper Publication. IMECE2014-36479

Velliangiri Murugasen, Sureshkannan Gurusamy, Krishnan Annur Srinivasan, *Coimbatore Institute of Technology, Coimbatore, Tamilnadu, India*

1:26pm – Development of Experimental Setup of Four-Stroke IC Engine With EGR System for Alternate Fuels Testing

Technical Presentation. IMECE2014-37435

Rhushi Prasad P., *Rajiv Gandhi Institute of Technology, Bangalore, Karnataka State, India*

1:52pm – Characteristics of Diesel Emulsions in a Single-Cylinder Compression Ignition Engine

Technical Paper Publication. IMECE2014-38746

Thomas Houlihan, *Alternative Petroleum Technologies, Reno, NV, United States*, **Teja Gonuguntla, Robert Raine,** *University of Auckland, Auckland, New Zealand*, **Leigh Ramsey,** *Blended Fuels New Zealand, Ltd., Wellington, New Zealand*

2:18pm – Engine Performance and Emission Products of Pure Diesel and Multi-Feedstock Blended Biodiesel

Technical Paper Publication. IMECE2014-40349

Kosgei Belion, Patrick Mensah, Stephen Akwabo, Michael Stubblefield, *Southern University and A&M College, Baton Rouge, LA, United States*, **Eyassu Woldesenbet,** *Louisiana State University, Baton Rouge, LA, United States*, **Albert Adjaottor,** *Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

7-21 Wind Energy Theory and Applications

7-21-2 Wind Turbine Modeling

519B

1:00pm–2:45pm

Session Organizer: Robi Robichaud, *National Renewable Energy Laboratory, Golden, CO, United States*

1:00pm – Stress and Displacement Analysis of a HAWT Under Time-Variable Wind

Technical Paper Publication. IMECE2014-37018

Radostina Petrova, *Technical University of Sofia, Bulgaria*, **Hirpa G. Lemu**, *University of Stavanger, Stavanger, Rogaland, Norway*

1:26pm – Design Method of Wind Turbine Blades With Low Mass and High Aerodynamic Performance

Technical Presentation. IMECE2014-37370

Yang Ke, Zhang Lei, Jian Zhong Xu, *Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing, China*

1:52pm – Urban Wind: Effects of Structural Geometry

Technical Paper Publication. IMECE2014-38658

Malika Grayson, Ephrahim Garcia, *Cornell University, Ithaca, NY, United States*

2:18pm – Study of Coanda Effect Applied to Vertical Wind Turbine Blades

Technical Paper Publication. IMECE2014-39864

Ioan Larion, *Stavanger Offshore Technical College, Stavanger, Rogaland, Norway*, **Hirpa G. Lemu**, *University of Stavanger, Stavanger, Rogaland, Norway*

7-23 Nanomaterials and Nanostructures for Energy Applications

7-23-1 Energy Storage and Applications

518B

1:00pm–2:45pm

Session Organizer: Junhong Chen, *University of Wisconsin-Milwaukee, Milwaukee, WI, United States*

Session Co-Organizers: Ganhua Lu, *University of Alaska Anchorage, Anchorage, AK, United States*, Shun Mao, *University of Wisconsin-Milwaukee, Milwaukee, WI, United States*

1:00pm – Meta-Analysis of the Specific Heat Enhancement of Nanofluids

Technical Paper Publication. IMECE2014-37951

Vincent D. Romanin, Sonia Fereres, *Abengoa Research, Sevilla, Sevilla, Spain*

1:17pm – Stretchable Pseudocapacitors for Flexible Electronics

Technical Presentation. IMECE2014-38139

Taoli Gu, Bingging Wei, *University of Delaware, Newark, DE, United States*

1:34pm – Magnetically Assembling and Soldering of Nanoscale Metal Network Into Phase Change Material

Technical Paper Publication. IMECE2014-39179

Junwei Su, Iman Mirzaee, Fan Gao, Majid Charmchi, Zhiyong Gu, Hongwei Sun, Xiao Liu, *University of Massachusetts Lowell, Lowell, MA, United States*

1:51pm – Enhancing the Storage Capacity of Supercapacitors Using PVA/CNT Nanocomposite Electrolytes

Technical Paper Publication. IMECE2014-39794

Ramazan Asmatulu, Temmuz Coskun, *Wichita State University, Wichita, KS, United States*

2:08pm – Chemical Signal Transduction in Pt/TiO₂ and Rh/TiO₂ Barrier-Layer Nanostructures Based on Mesoporous Titania

Technical Presentation. IMECE2014-40029

Eduard Karpov, Mohammad Hashemian, Nathan Ray, *University of Illinois at Chicago, Chicago, IL, United States*

2:25pm – Thermal Properties of Stationary Reaction Currents in Mesoporous Pt/TiO₂ Structures in an Oxyhydrogen Atmosphere

Technical Presentation. IMECE2014-40033

Mohammad Hashemian, Nathan Ray, Eduard Karpov, *University of Illinois at Chicago, Chicago, IL, United States*

7-24 Energy-Water Nexus

7-24-3 A Call for Better Data Collection and Stress Metrics for Integrated Resource Management

520B 1:00pm–2:45pm

Session Organizer: Kelly T. Sanders, *University of Southern California, Los Angeles, CA, United States*

7-25 Energy and the Environment

7-25-1 Energy and the Environment 1

520A 1:00pm–2:45pm

Session Organizer: Na Zhang, *Institute of Engineering Thermophysics, CAS, Beijing, China*

Session Co-Organizer: Vittorio Verda, *Politecnico di Torino, Torino, Italy*

1:00pm – Quantifying the Effect of Geographic Distribution for Mitigating Variability From High Penetrations of Renewable Generation

Technical Presentation. IMECE2014-38511

Chioke B. Harris, Joshua D. Rhodes, Wesley J. Cole, Thomas F. Edgar, Michael E. Webber, *University of Texas at Austin, Austin, TX, United States*

1:26pm – Investigation of Microclimatic Impact of Cool Coating for Buildings in Low-Latitude and Tropical Climate

Technical Paper Publication. IMECE2014-39739

Kishor Zingre Tarachand, Xingguo Yang, Man Pun Wan, *Nanyang Technological University, Singapore, Singapore, Singapore*

1:52pm – Potential Reduction of Fugitive Methane Emissions at Compressor Stations and Storage Facilities Powered by Natural Gas Engines

Technical Paper Publication. IMECE2014-38582

Derek Johnson, April Covington, *West Virginia University CAFEE, Morgantown, WV, United States*

2:18pm – Temporal Characteristics of Natural Gas Consumption at Residential Buildings in Austin, Texas

Technical Presentation. IMECE2014-39313

Kazunori Nagasawa, Michael E. Webber, *University of Texas at Austin, Austin, TX, United States*

7-6 Combined Energy Cycles, CHP, & CCHP

7-6-1 Design and Analysis of Combined Cycles, CHP, & CCHP

520A 3:00pm–4:45pm

Session Organizer: Emily Ledbury, *Mississippi State University, Mississippi State, MS, United States*

Session Co-Organizer: Heejin Cho, *Mississippi State University, Mississippi State, MS, United States*

3:00pm – Local District Heating Network With a Small-Scale Trigeneration Plant: Energetic and Economic Analysis of Optimization Strategies

Technical Paper Publication. IMECE2014-36499

Gabriele Amoruso, Marco Badami, Armando Portoraro, *Politecnico di Torino, Torino, Italy*

3:17pm – Potential and Approach of Flue Gas Waste Heat Utilization of Natural Gas for Space Heating

Technical Paper Publication. IMECE2014-36626

Xiling Zhao, Lin Fu, Xiao Wang, *Tsinghua University, Beijing, China, Feng Li, Dalian University of Technology, Beijing, China*

3:34pm – Technology Application of District Heating System With Co-Generation Based on Absorption Heat Exchange: A Renovation Project in Datong City of North China

Technical Paper Publication. IMECE2014-37355

Yan Li, Shuyan Zhang, *Yanshan University, Qinhuangdao, China, Lin Fu, Xiling Zhao, *Tsinghua University, Beijing, China**

3:51pm – Case Study of a Reliability and Time to Repair Model of a CHP System

Technical Presentation. IMECE2014-39123

Piana Umberto, *Polytechnic University of Turin, Turin, Italy, Gregory Kowalski,* *Northeastern University, Boston, MA, United States, Mansour Zenouzi,* *Wentworth Institute of Tech, Boston, MA, United States*

4:08pm – Design for Integration of a Compact Waste Energy Recovery System for Automobile Engine Exhaust Gas And Coolant

Technical Paper Publication. IMECE2014-37309

Mohammed Mayeed, Thuyen Luong, Erhan Ilksoy, *Southern Polytechnic State University, Marietta, GA, United States, Mostafa Ghiaasiaan,* *Georgia Institute of Technology, Atlanta, GA, United States*

4:25pm – Thermal Impact of Cyclic Operations on Small/ Medium Size Combined Cycle Power Plants at Low Load Factor

Technical Presentation. IMECE2014-40067

David Jeong, *Arkansas State University, Jonesboro, AR, United States*

7-15 Thermal Energy Storage

7-15-3 Thermal Energy Storage III

518C

3:00pm–4:45pm

Session Organizer: Subramanyaravi Annapragada, *United Technologies Research, East Hartford, CT, United States*

Session Co-Organizer: Scott Thompson, *Mississippi State University, Mississippi State, MS, United States*

3:00pm – Performance Analysis of a Compressed Humid Air Energy Storage System

Technical Paper Publication. IMECE2014-36366

Huisheng Zhang, Dengji Zhou, Di Huang, Xinhui Wang, *Shanghai Jiao Tong University, Shanghai, China*

3:26pm – High-Temperature Thermal Energy Storage Using EPCM-THE Effect of Void

Technical Paper Publication. IMECE2014-37306

Laura Solomon, Ali Elmozoughi, Sudhakar Neti, Alparslan Oztekin, *Lehigh University, Bethlehem, PA, United States*

3:52pm – Molten Salt Spectroscopy for Quantification of Radiative Absorption in Novel Metal Chloride-Enhanced Thermal Storage Media

Technical Paper Publication. IMECE2014-40157

Philip D. Myers, Jr., D. Yogi Goswami, Elias Stefankos, *University of South Florida, Tampa, FL, United States*

4:18pm – Numerical and Experimental Analysis of a PCM Thermal Storage System

Technical Paper Publication. IMECE2014-40395

Adriano Sciacovelli, Vittorio Verda, *Politecnico di Torino, Torino, Italy*

7-16 Solar Applications in Buildings

7-16-1 Building Integrated Solar Technologies

520D

3:00pm–4:45pm

Session Organizer: Jorge Gonzalez, *City College of New York, New York, NY, United States*

Session Co-Organizer: Andy Walker, *National Renewable Energy Laboratory, Golden, CO, United States*

3:00pm – Solar Panel Orientation Based on Building Power Consumption

Technical Paper Publication. IMECE2014-37643

Mesut Cabuk, *Manhattan College, Bronx, NY, United States*,
Mohammad Naraghi, *Manhattan College, Riverdale, NY, United States*

3:21pm – Wedge-Shaped Luminescent Solar Concentrators for Multipurpose Wall and Roof Covering

Technical Presentation. IMECE2014-36901

Michael Hughes, Diana-Andra Borca-Tasciuc, Deborah Kaminski, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:42pm – Analysis of Building Envelope Performance Effects of an Insulating Semi-Transparent Photovoltaic (STPV) Glazing Unit

Technical Paper Publication. IMECE2014-38277

Dirk V.P. McLaughlin, Livio Nichilo, Sam Siassi, *Internat Energy Solutions Canada, Toronto, ON, Canada*,
Konstantinos Kapsis, Andreas K. Athienitis, *Concordia University, Montreal, ON, Canada*

4:03pm – Design and Modeling of an Integrated CHP System With Solar Hydrogen/Methane Fueled PEM Fuel Cell for Residential Applications

Technical Paper Publication. IMECE2014-39760

Hajar Amiriran, *Islamic Azad University, Tehran, Iran*,
Farid Sayedin, *Sharif Energy Research Institute, Tehran, Iran*,
Azadeh Maroufmashat, *Sharif University of Technology, Tehran, Iran*

4:24pm – Experimental Study of a Novel Solar-Thermal System for Domestic and Commercial Applications

Technical Presentation. IMECE2014-36101

Zulfiqar Khan, Bruce Wen, Mark Hadfield, *Bournemouth University, Poole, Dorset, United Kingdom*

7-18 Photovoltaic Cells and Applications

7-18-2 Solar Tracking, Concentration for PV and Hybrid PV Modules

518A

3:00pm–4:45pm

Session Organizer: Aklilu G. Giorges, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: Ernesto Gutierrez-Miravete, *Rensselaer at Hartford, Hartford, CT, United States*

3:00pm – Mathematical Model of a Hybrid Solar Panel

Technical Paper Publication. IMECE2014-37259

Robert Collins, *General Dynamics–Electric Boat, Groton, CT, United States*, **Ernesto Gutierrez-Miravete**, *Rensselaer at Hartford, Hartford, CT, United States*

3:20pm – Comparative Analysis Between Water and Nanofluids as Working Fluids in Photovoltaic Thermal Collectors

Technical Paper Publication. IMECE2014-37503

Bahy S.A. Abdel-Mesih, *British University in Egypt, Cairo, Egypt*, **Ahmed A. Abdel-Rehim**, *Benha University, Shoubra, and British University in Egypt, Cairo, Egypt*, **Amr M.H. Khobeiz**, *British University in Egypt, Al-Sherouk City, Cairo, Egypt*

3:40pm – Design and Real-Time Simulation of Artificial Intelligent Based MPP Tracker for Photovoltaic System

Technical Paper Publication. IMECE2014-37967

Shimi Sudha Letha, *Dnyaneshwar Karanjkar, Santanu Chatterji, NITTTR, Chandigarh, India*, **Thilak Thakur, Jagdish Kumar**, *PEC University of Technology, Chandigarh, India*

4:00pm – Design and Prototyping of a Cost-Effective Sun-Tracking System for Photovoltaic Panels

Technical Paper Publication. IMECE2014-37682

Adrian Georgescu, P.A. Simionescu, *Texas A&M University Corpus Christi, Corpus Christi, TX, United States*, **Ilie Talpasanu**, *Wentworth Institute of Technology, Boston, MA, United States*

4:20pm – Analysis of a Luminescent Solar Concentrator Coupled to Ultrathin, Plasmonically Enhanced Crystalline Si Solar Cells

Technical Presentation. IMECE2014-36893

Michael Hughes, Shu-Yi Wang, Diana-Andra Borca-Tasciuc, Deborah Kaminski, *Rensselaer Polytechnic Institute, Troy, NY, United States*

7-21 Wind Energy Theory and Applications

7-21-3 Wind Farm Optimization

519B

3:00pm–4:45pm

Session Organizer: Jie Zhang, *National Renewable Energy Laboratory, Golden, CO, United States*

3:00pm – Multiobjective Energy-Noise Wind Farm Layout Optimization Under Land Use Constraints

Technical Paper Publication. IMECE2014-37063

Sami Yamanidouzisorkhabi, David A. Romero, Michelle Dao Gu, Cristina Amon, *University of Toronto, Toronto, ON, Canada*, **Gary Kai Yan**, *University of British Columbia, Vancouver, BC, Canada*, **Joaquin Moran, Michael Morgenroth**, *Hatch Ltd., Niagara Falls, ON, Canada*

3:26pm – Turbulence in Wind Turbine Wake: Effect of Atmospheric Forcings

Technical Paper Publication. IMECE2014-37637

Kiran Bhaganagar, Mithu Debnath, *University of Texas at San Antonio, San Antonio, TX, United States*

3:52pm – Novel Wake Interaction Model for Wind Farm Layout Optimization

Technical Paper Publication. IMECE2014-39073

Jim Kuo, David A. Romero, Cristina Amon, *University of Toronto, Toronto, ON, Canada*

4:18pm – Development and Field Testing of an Inclined Flanged Compact Diffuser for a Micro Wind Turbine

Technical Paper Publication. IMECE2014-37883

Sandip Kale, *Trinity College of Engineering and Research, Pune, Pune, India*, **S.N. Sapali**, *College of Engineering, Pune, Pune, India*

7-23 Nanomaterials and Nanostructures for Energy Applications

7-23-2 Energy Conversion

518B

3:00pm–4:45pm

Session Organizer: Bingging Wei, *University of Delaware, Newark, DE, United States*

Session Co-Organizers: Eduard Karpov, *University of Illinois at Chicago, Chicago, IL, United States*, Yi Zheng, *University of Rhode Island, Kingston, RI, United States*

3:00pm – Simultaneous Measurement of Seebeck Coefficient and Thermoelectric Figure of Merit in Bulk and Thin-Film Samples

Technical Presentation. IMECE2014-37068

Samuel Moran, Diana-Andra Borca-Tasciuc, Theodorian Borca-Tasciuc, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:17pm – Electrically Conductive and Semiconductive Bacterial Nanowires: Fundamentals and Applications for Energy

Technical Presentation. IMECE2014-38919

Jun Yang, *University of Western Ontario, London, ON, Canada*

3:34pm – Heteroatom-Doped Carbon Nanomaterials as Efficient Electrodes for Fuel Cells

Technical Presentation. IMECE2014-39222

Mingtao Li, Lipeng Zhang, Zhenhai Xia, *University of North Texas, Denton, TX, United States*

3:51pm – High-Performance Bi-functional Electrocatalysts of 3D Crumpled Graphene-Cobalt Oxide Nanohybrids for Oxygen Reduction and Evolution Reactions

Technical Presentation. IMECE2014-39249

Junhong Chen, Shun Mao, Zhenhai Wen, Yang Hou, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*, **Taizhong Huang,** *University of Jinan, Jinan, China*

4:08pm – Effects of Alumina Nanoparticles Additives Into Jojoba Methyl Ester-Diesel Mixture on Diesel Engine Performance

Technical Paper Publication. IMECE2014-39988

Ali M.A. Attia, Hesham El-Batsh, Mohamed S. Shehata, *Benha University, Benha-Qalubia, Egypt*, **Ahmed I. El-Seesy,** *Benha University, Benha, Egypt*

4:25pm – Absorption of Thin Silicon Films on Nanostructured Substrates

Technical Presentation. IMECE2014-36894

Diana-Andra Borca-Tasciuc, *Rensselaer Polytechnic Institute, Troy, NY, United States*

7-26 Carbon Capture and Storage

7-26-1 Carbon Capture

520B

3:00pm–4:45pm

3:00pm – Comparison and Analysis of Energy Consumption and CO₂ Emission of China and Asean

Technical Paper Publication. IMECE2014-36126

Wei Lu, *Guangxi University, Nanning City, China*, **Taide Tan,** *Hunan University, Hunan, China*, **Cong Cao,** *Guangxi University, Nanning City, Guangxi, China*

3:21pm – Reduction Behavior of Iron Oxide for Chemical-Looping Hydrogen Generation With CO₂ Capture in a Compact Fluidized Fuel Reactor

Technical Paper Publication. IMECE2014-36204

Shiyi Chen, Xiang Wang, Changchun Xu, Dong Wang, Wenguo Xiang, *Southeast University, Nanjing, Jiangsu, China*, **Zhipeng Xue,** *Huadian Electric Power Research Institute, Hangzhou, Zhejiang, China*

3:42pm – Study of CO₂ Absorption Into Aqueous Diethanolamine (DEA) Using Microchannel Reactors

Technical Paper Publication. IMECE2014-36348

Stefan Bangerth, Michael M. Ohadi, *University of Maryland, College Park, MD, United States*, **Harish Ganapathy,** *Intel Corporation, College Park, MD, United States*, **Tariq S. Khan, Mohamed Alshehhi,** *The Petroleum Institute, Abu Dhabi, United Arab Emir.*

4:03pm – Integration of a CaO-based Thermal Storage System in an IGCC Plant With Carbon Capture

Technical Paper Publication. IMECE2014-38113

Annelies Vandersickel, Randall P. Field, *Massachusetts Institute of Technology, Cambridge, MA, United States*, **Alexander Mitsos,** *RWTH Aachen University, Aachen, Germany*

4:24pm – Carbon Dioxide Capture Using Sorbent-Loaded Hollow Fiber Modules With Integrated Heat Recovery

Technical Presentation. IMECE2014-38527

Matthew Determan, *Exxon Mobil, Spring, TX, United States*, **Dhruv Hoysall, Srinivas Garimella,** *Georgia Institute of Technology, Atlanta, GA, United States*, **Richard D. Lenz,** *Exxon Mobil, Fairfax, VA, United States*, **Daniel P. Leta,** *Exxon Mobil, Annandale, NJ, United States*

TRACK 8: ENGINEERING MANAGEMENT, SAFETY, ETHICS, SOCIETY, AND EDUCATION

8-2 Engineering Management

- 8-2-1: Engineering Management I
- 8-2-2: Engineering Management II

8-3 Safety Engineering and Risk Analysis

- 8-3-1: Safety Engineering & Management and Risk Analysis
- 8-3-4: Forensic Applications & Failure Analysis I
- 8-3-5: Reliability Methods I
- 8-3-6: Forensic Applications & Failure Analysis II
- 8-3-7: Reliability Method II

8-4 Technology and Society

and Societal and Ethical Dimensions of Engineering Education, and Practice

- 8-4-1 Technology and Society and Societal and Ethical Dimensions of Engineering Education, and Practice

ACKNOWLEDGMENT

TRACK ORGANIZERS

Steve Long, *SNCL, USA*
Peter Prassinis, *NASA Retired, USA*

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John Wiechel, *Ohio State University, USA*

**TRACK 8
ENGINEERING MANAGEMENT, SAFETY,
ETHICS, SOCIETY, AND EDUCATION**

Wednesday, November 19

8-2 Engineering Management

8-2-1 Engineering Management I

522C **9:45am–11:30am**

Session Organizer: Stephen Long, *SNC-Lavalin–Houston Business Unit–O&G, Baytown, TX, United States*

Session Co-Chair: Siva Pilli, *Dassault Systemes, Providence, RI, United States*

9:45am – Antecedents of Client Satisfaction in Product Design Consulting

Technical Paper Publication. IMECE2014-39257
William Palm IV, *Roger Williams University, Bristol, RI, United States*

10:06am – UCONN's MEM Program Produces Well-Rounded Engineers

Technical Presentation. IMECE2014-39562
Diane Van Scoter, Robert Day, *University of Connecticut, Storrs, CT, United States*

10:27am – Decision Model for Selecting the Optimum Oil Production Profile Using Multicriteria Decision-Making and Social Choice Theory

Technical Paper Publication. IMECE2014-40444
Samira Keivanpour, *Laval University, Quebec, QC, Canada*,
Hassan Haleh, *Qazvin Islamic Azad University, Qazvin, Iran*,
Hamed Shakouri Ganjavi, *University of Tehran, Tehran, Iran*

10:48am – Stochastic Modeling on the Emotional Contagion

Technical Paper Publication. IMECE2014-36135
Taide Tan, *Hunan University, Hunan, China*, **Zhao Liu**, *Hunan University, Changsha, China*

11:09am – Study of Cost of Quality Behavior in Manufacturing Supply Chain Based on the Quality Maturity Status

Technical Paper Publication. IMECE2014-39694
Ehsan Ayati, Andrea Schiffauerova, *Concordia University, Montreal, QC, Canada*

8-3 Safety Engineering and Risk Analysis

8-3-1 Safety Engineering & Management and Risk Analysis

522B **9:45am–11:30am**

Session Organizer: Chimba Mkandawire, *Exponent Inc., Atlanta, GA, United States*

Session Co-Organizer: Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, East Azarbaijan, Iran*

9:45am – Pressure Safety at Argonne National Laboratory—A Compendium

Technical Presentation. IMECE2014-36010
Dejan Ristic, *Argonne National Laboratory, Lemont, IL, United States*

10:06am – The U.S. Navy's Submarine Safety Standards

Technical Presentation. IMECE2014-37082
Roger Schaffer, *U.S. Navy, Washington Navy Yard, DC, United States*

10:27am – Asset Integrity and MOC Alignment

Technical Presentation. IMECE2014-38561
Yasser Almowalad, *Saudi Aramco, Dhahran, Saudi Arabia*

10:48am – The New ANSI B101 Walkway Safety Standards: A New Era of Tribometry

Technical Presentation. IMECE2014-36765
Russell Kendzior, *National Floor Safety Institute, Southlake, TX, United States*

11:09am – Machine Learning Classification Models for More Effective Mine Safety Inspections

Technical Paper Publication. IMECE2014-38709
Jeremy Gernand, *Pennsylvania State University, University Park, PA, United States*

8-3-6 Forensic Applications & Failure Analysis II

522A

9:45am–11:30am

Session Organizer: John Wiechel, *Ohio State University, Columbus, OH, United States*

Session Co-Organizer: Juan Ramirez, *Exponent, Inc., Warrentville, IL, United States*

9:45am – BLEVE Energy and Aerosol Formation: An Exergy Analysis

Technical Paper Publication. IMECE2014-39100

Juan Ramirez, Russell A. Ogle, Suzanne A. Smyth, Exponent, Inc., Warrentville, IL, United States

10:06am – Stand-Up Forklift Egress Times as a Function of Operator Compartment Design

Technical Paper Publication. IMECE2014-38847

Ben Railsback, Richard Ziernicki, Ricky Nguyen, Stephen Knapp, William Pierce, Knott Laboratory LLC, Centennial, CO, United States

10:27am – Powergen Gas Turbine Losses and Condition Monitoring – A Loss Data Based Study

Technical Paper Publication. IMECE2014-38198

Bin Zhou, FM Global, Norwood, MA, United States

10:48am – Investigation of a 27-Fatality Road Crash Involving a Double Road Tanker Impacting the Central Barrier

Technical Paper Publication. IMECE2014-39603

Jose Antonio Romero Navarrete, Queretaro Autonomous University, Queretaro, Queretaro, Mexico, Alejandro Lozano-Guzman, National Polytechnic Institute, Queretaro, Mexico, Israel Aguilera Navarrete, National Polytechnic Institute, Villagrán, Guanajuato, Mexico

11:09am – Results From Calculating the Acceleration at an ELR Using Measured Responses From Four Steering-Induced Rollover Crashes.

Technical Paper Publication. IMECE2014-36735

Mark Arndt, Transportation Safety Technologies Inc., Mesa, AZ, United States, John Wiechel, Ohio State University, Columbus, OH, United States

8-2 Engineering Management

8-2-2 Engineering Management II

522C

1:00pm–2:45pm

Session Organizer: Stephen Long, *SNC-Lavalin–Houston Business Unit–O&G, Baytown, TX, United States*

Session Co-Chair: Siva Pilli, *Dassault Systemes, Providence, RI, United States*

1:00pm – Computerized Database Decision Management System in Production Traveler Sheet

Technical Paper Publication. IMECE2014-36395

Yangqing Dou, Mississippi State University, Starkville, MS, United States, Yucheng Liu, Mississippi State University, Mississippi State, MS, United States

1:17pm – Dominant Success Factors in Product Development Extended Abstract Publication. IMECE2014-37136

Ulrich Wörz, Dietmar Göhlich, Technische Universität Berlin, Berlin, Germany

1:34pm – Application of the Methodology TRIZ in the Innovation of the Test Equipment FRICTORQ

Technical Paper Publication. IMECE2014-37666

Eurico Seabra, Ruben Carneiro, Luís Ferreira da Silva, Anabela Alves, Mário Lima, University of Minho, Guimarães, Minho, Portugal

1:51pm – Application of Principles From the Scrum Agile Method to a Prototype Vehicle Control Development Cycle

Technical Paper Publication. IMECE2014-40018

Derek Bonderczuk, Patrick Currier, Matthew Nelson, Embry-Riddle Aeronautical University, Daytona Beach, FL, United States

2:08pm – Improvement of Energy and Exergy Efficiency of Refrigerator-Freezer

Technical Presentation. IMECE2014-40292

Niloofer Bagersani, Mohammad Pourgol-Mohammad, Sahand University of Technology, Tabriz, East Azarbaijan, Iran

2:25pm – Engineering Inspection Management Model at Saudi Aramco Yanbu NGL Fractionation Department

Technical Presentation. IMECE2014-38551

Yasser Almowalad, Saudi Aramco, Dhahran, Saudi Arabia

8-3 Safety Engineering and Risk Analysis

8-3-4 Forensic Applications & Failure Analysis I

522B 1:00pm–2:45pm

Session Organizer: Juan Ramirez, *Exponent, Inc., Warrenville, IL, United States*

Session Co-Organizer: John Wiechel, *Ohio State University, Columbus, OH, United States*

1:00pm – Detection of Tube Bundle Leak Location Using the Combination of Acoustic Emission Testing and Logic Analysis

Technical Paper Publication. IMECE2014-36633

Yanting Xu, Xiaowei Wang, *Zhejiang Provincial Special Equipment Inspection and Research Institute, Hangzhou, China,*
Yadong Wang, Jiele Xu, *Zhejiang Safety Special Equipment Inspection Limited Company, Hangzhou, China*

1:21pm – Analysis of Motorcycle ABS Effectiveness in Reducing Crash Risk

Technical Paper Publication. IMECE2014-36910

Graeme Fowler, *Exponent, Inc., and Failure Analysis Associates, Phoenix, AZ, United States,* **Rose Ray, Su-Wei Huang, Ke Zhao,** *Exponent, Inc., Menlo Park, CA, United States,* **Todd Frank,** *Exponent, Inc., Phoenix, AZ, United States*

1:42pm – Gasoline Geysering During Pressure Relief From a Heated Fuel Tank

Technical Paper Publication. IMECE2014-39527

Todd M. Hetrick, Russell A. Ogle, Juan Ramirez, Suzanne A. Smyth, *Exponent, Inc., Warrenville, IL, United States*

2:03pm – Household Cooking Range Tipover Accident Reconstruction Case Study

Technical Paper Publication. IMECE2014-36421

Dennis Brickman, *Engineering Systems Inc., Aurora, IL, United States,* **Steven Sanders,** *Engineering Systems Inc., O'Fallon, MO, United States*

2:24pm – Testing and Analysis of Autonomous Emergency Braking Systems Using the Euro NCAP Vehicle Target

Technical Paper Publication. IMECE2014-39084

Matthew Schwall, *Exponent, Inc., Menlo Park, CA, United States,* **John Neal, Charles Retallack, Robert Larson,** *Exponent, Inc., Phoenix, AZ, United States,* **Graeme Fowler,** *Exponent, Inc., and Failure Analysis Associates, Phoenix, AZ, United States*

8-3 Safety Engineering and Risk Analysis

8-3-5 Reliability Methods I

522B 3:00pm–4:45pm

Session Organizer: Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, East Azarbaijan, Iran*

Session Co-Organizer: William Byrd, *RCP Inc., Houston, TX, United States*

3:00pm – Piping Anti-Corrosion Coating Life Assessment

Technical Paper Publication. IMECE2014-36423

Bahman Modiri, Mohammad Pourgol-Mohammad, Mojtaba Yazdani, Farzin Salehpour Oskouyi, Farzad Nasirpouri, *Sahand University of Technology, Tabriz, Iran*

3:26pm – Probabilistic Assessment of Fatigue Life in Fiber-Reinforced Composites

Technical Paper Publication. IMECE2014-37434

Saeed Shiri, Mohammad Pourgol-Mohammad, Mojtaba Yazdani, *Sahand University of Technology, Tabriz, East Azarbaijan, Iran*

3:52pm – Risk Assessment of Emergency Diesel Generator Subject to Design Basis Earthquake Shaking

Technical Paper Publication. IMECE2014-39569

Patxi Uriz, *Exponent, Inc., Menlo Park, CA, United States,* **Troy A. Morgan,** *Exponent, Inc., New York, NY, United States*

4:18pm – Application of a Fuzzy Approach to the Analysis of OSH Practitioners Level of Risk Acceptance

Technical Paper Publication. IMECE2014-40069

Matilde A. Rodrigues, *School of Polytechnic Institute of Porto, Vila Nova de Gaia, Portugal,* **Celina Leao,** *University of Minho, Maia, Portugal,* **Pedro Arezes, Eusébio Nunes, Sérgio Sousa,** *University of Minho, Guimaraes, Portugal*

8-3-7 Reliability Method II

522A

3:00pm–4:45pm

Session Organizer: Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, East Azarbaijan, Iran*

3:00pm – Analysis of Influence of FCB Tests on 1000 MW Steam Turbine Safety

Technical Paper Publication. IMECE2014-36988

Danmei Xie, Yi Yang, Chang Chen, Pengfei Hu, Jie Guo, Wei Jiang, *Wuhan University, Wuhan, China*

3:26pm – Reliability Analysis of Repairable System With Multiple Fault Modes Based on GO Methodology

Technical Paper Publication. IMECE2014-36198

Xiao-Jian Yi, Hai-Ping Dong, Yue-Hua Lai, *Beijing Institute of Technology, Beijing, China*, **Jian Shi,** *Chinese Academy of Sciences, Beijing, China*

3:52pm – Reliability Evaluation for Biomechanics Transient Thermal Stresses: Case Study of Tissue Cryopreservation

Technical Paper Publication. IMECE2014-39468

Arezoo Amirpourabasi, Mohammad Pourgol-Mohammad, Hanieh Niroomand-Oscuii, *Sahand University of Technology, Tabriz, Iran*

4:18pm – Reliability Model of Gear With Correlated Failure Modes Based on Joint Distribution

Technical Paper Publication. IMECE2014-36188

Yue-Hua Lai, Hai-Ping Dong, Xiao-Jian Yi, *Beijing Institute of Technology, Beijing, China*, **Juan Ding,** *Chinese Academy of Mathematics and Systems Science Research Institute, Beijing, China*, **Hua-jin Lei,** *Hangyu Life-Saving Equipment Lim. Corp., Xiangfan, China*

8-4 Technology and Society and Societal and Ethical Dimensions of Engineering Education and Practice

8-4-1 Technology and Society and Societal and Ethical Dimensions of Engineering Education and Practice

522C

3:00pm–4:45pm

Session Organizer: Barry Hyman, *University of Washington, Seattle, WA, United States*

3:00pm – Outsourcing the Technology a Viable Option for Developing Countries

Technical Presentation. IMECE2014-36183

Anurag Gupta, *Oil India Limited, Dibrugarh, Assam, India*, **Ulfatur Rahman Borah,** *Oil India Limited, Guwahati, Assam, India*

3:21pm – Fostering Ethical, Social, Environmental, Health, and Safety Awareness in Tomorrow's Engineers and Technologists

Technical Paper Publication. IMECE2014-38264

J. Craig Hanks, Jitendra S. Tate, Robert J.C. McLean, Satyajit Dutta, Seth Barton, Zach Russell, *Texas State University, San Marcos, TX, United States*, **Dominick Esperanza Fazarro,** *University of Texas at Tyler, Tyler, TX, United States*, **Walt Trybula,** *Trybula Foundation, Inc., Austin, TX, United States*, **Fritz Allhoff,** *Western Michigan University, Kalamazoo, MI, United States*

3:42pm – Making Ethics Education Personal

Extended Abstract Publication. IMECE2014-38280

Allen Hoffman, *Worcester Polytechnic Institute, Worcester, MA, United States*

4:03pm – Toward a Functional Definition of Sustainable Development in the Practice of Engineering

Technical Paper Publication. IMECE2014-38444

Richard A. Burgess II, *Texas Tech University, Lubbock, TX, United States*

4:24pm – Ethical Roadmap for Engineering Participatory Design and Sociotechnical Participation: A Manufacturing Case Study

Technical Paper Publication. IMECE2014-38492

Victoria Townsend, Pierre Boulos, Ruth Jill Urbanic, *University of Windsor, Windsor, ON, Canada*

TRACK 9: FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES

9-1 21st Symposium on Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids

- 9-1-1: Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids I
- 9-1-2: Fluid Mechanics and Rheology of Nonlinear

9-3 12th Symposium on Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems

- 9-3-1: 12th Symposium on Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems

9-4 10th Forum on Recent Developments in Multiphase Flow

- 9-4-1: Gas-Solid and Liquid-Solid Flows
- 9-4-2: Computational Analyses and Modeling of Gas-Liquid and Liquid-Liquid Flows
- 9-4-4: Liquid-Liquid and Gas-Liquid Flows

9-5 15th Symposium on Fundamental Issues and Perspectives in Fluid Mechanics

- 9-5-1: Fundamental Issues and Perspectives in Fluid Mechanics I
- 9-5-2: Fundamental Issues and Perspectives in Fluid Mechanics II

9-6 Symposium on CFD Applications for Optimization and Controls

- 9-6-1: CFD Applications for Optimization and Controls I
- 9-6-2: CFD Applications for Optimization and Controls II
- 9-6-3: CFD Applications for Optimization and Controls III

9-7 Symposium on Wind Turbines: Aerodynamics and Control

- 9-7-1: Wind Turbines: Aerodynamic and Control I

9-8 23rd Symposium on Industrial Flows

- 9-8-1: Industrial Flows I
- 9-8-2: Industrial Flows II

9-9 Microfluidics 2014—Fluid Engineering in Micro- and Nanosystems

- 9-9-1: Microscale Multiphase Flow and Surface Interactions
- 9-9-2: Droplet/Particle/Bubble Dynamics and Capillary Flow
- 9-9-3: Novel Applications of Micro/Nanofluidics

9-10 Symposium on Fluid Measurements and Instrumentation

- 9-10-1: FMITC Session 1
- 9-10-2: FMITC Session 2

9-11 CFD/EFD Choice—A Dilemma for Industries

- 9-11-1: CFD/EFD Choice - A Dilemma for Industries
- Materials and Complex Fluids II

9-12 Young Engineer Paper (YEP) Contest Fluids Engineering Division

- 9-12-1: Young Engineer Paper (YEP) Contest

9-13 Forum on Experimental Validation of CFD Modeling in Heat Exchangers (K10 and FED)

- 9-13-1: Experimental Validation of CFD Modeling in Heat Exchangers (K10 and FED)-A

9-15 14th International Symposium on Measurement and Modeling of Environmental Flows

- 9-15-1: 14th International Symposium on Measurement and Modeling of Environmental Flows

ACKNOWLEDGMENT

TRACK ORGANIZERS

Yu-Tai Lee, *Naval Surface Warfare Center, USA*
 D.Keith Walters, *Mississippi State University, USA*

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 Judith Bamberger, *Pacific Northwest National Laboratory, USA*
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 Judith Bamberger, *Pacific Northwest National Laboratory, USA*
 Francine Battaglia, *Virginia Tech, USA*
 B. Terry Beck, *Kansas State Univ, USA*
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 Scott Thompson, *Mississippi State University, USA*
 Angel Wileman, *Southwest Research Institute, USA*
 Ben Xu, *University of Arizona, USA*
 Ning Zhang, *McNeese State University, USA*
 Zhongquan Zheng, *University of Kansas, USA*
 Zhongquan Zheng, *University of Kansas, USA*

TRACK 9 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES

Tuesday, November 18

9-3 12th Symposium on Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems

9-3-1 12th Symposium on Electric, Magnetic, and
Thermal Phenomena in Micro- and Nanoscale Systems

520F 9:45am–11:30am

Session Organizer: Dennis Siginer, *Botswana International University of Science and Technology & Universidad de Santiago de Chile, Santiago, Chile*

Session Co-Organizer: Boris Khusid, *New Jersey Institute of Technology, Newark, NJ, United States*

9:45am – Using Shear and DC Electric Fields to Manipulate and Self-Assemble Dielectric Particles on Microchannel Walls

Plenary Paper Publication. IMECE2014-37547

Minami Yoda, Necmettin Cevheri, *Georgia Institute of Technology, Atlanta, GA, United States*

10:11am – Aggregation and Effective Thermal Conductivity of Nanofluids: Dependence on Cluster Size and Morphology

Extended Abstract Publication. IMECE2014-38256

Miguel Reyes-Mata, Mauricio Zurita-Gotor, *Abengoa Research, Seville, Spain*, Jerzy Blawdziewicz, *Texas Tech University, Lubbock, TX, United States*, Eligiusz Wajnryb, *Polish Academy of Sciences, Warsaw, Poland*

10:37am – AC Electric Field-Driven Transitions in Polarized Colloids

Technical Presentation. IMECE2014-37663

Boris Khusid, Ezinwa Elele, *New Jersey Institute of Technology, Newark, NJ, United States*

11:03am – Electric Field Control of Polarized Colloids

Technical Presentation. IMECE2014-37671

Boris Khusid, *New Jersey Institute of Technology, Newark, NJ, United States*

9-7 Symposium on Wind Turbines: Aerodynamics and Control

9-7-1 Wind Turbines: Aerodynamic and Control I

521A

9:45am–11:30am

Session Organizer: Majid Rashidi, *Cleveland State University, Pepper Pike, OH, United States*

Session Co-Organizer: Jinkook Lee, *Eaton Aerospace, Cleveland, OH, United States*

9:45am – Towards Simulation of Wind Turbine Flow Using the Actuator Line Method in NEK5000

Extended Abstract Presentation. IMECE2014-36223

Murphy O'Dea, Laila Guessous, *Oakland University, Rochester, MI, United States*

10:11am – Yawed Effects on Wind Turbine Near Wake

Technical Paper Publication. IMECE2014-39531

Yuntian Ge, Xiuling Wang, *Purdue University Calumet, Hammond, IN, United States*

10:37am – Computational Study of Savonius Wind Turbines

Technical Paper Publication. IMECE2014-39595

Majid Rashidi, *Cleveland State University, Pepper Pike, OH, United States*, Jaikrishnan Kadambi, *Case Western Reserve University, Cleveland, OH, United States*, Asmita Chinchore, *Cleveland State University, Cleveland, OH, United States*

11:03am – Effects of Design Parameters on Aerodynamic Performance of Small Wind Turbines

Technical Presentation. IMECE2014-37891

Sandip Kale, *Trinity College of Engineering and Research, Pune, Pune, India*, S.N. Sapali, *College of Engineering, Pune, Pune, India*

9-12 Young Engineer Paper (YEP) Contest Fluids Engineering Division

9-12-1 Young Engineer Paper (YEP) Contest

521B

9:45am–11:30am

Session Organizer: B. Terry Beck, *Kansas State University, Manhattan, KS, United States*

Session Co-Organizers: James Liburdy, *Oregon State University, Corvallis, OR, United States*, Malcolm J. Andrews, *Los Alamos National Laboratory, Los Alamos, NM, United States*

9:45am – Numerical Investigation of an Axisymmetric Turbulent Jet

Technical Paper Publication. IMECE2014-37382

Mohammad Arif Hossain, Sarzina Hossain, *University of Texas at El Paso, El Paso, TX, United States*

10:11am – Wake Alleviating Devices for Offshore Wind Turbines

Technical Paper Publication. IMECE2014-37782

Vera Klimchenko, *University of Maryland, College Park, MD, United States*

10:37am – Pumping Speed Measurement of the Rotary Vane Vacuum Pump by Using Numerical and Experimental Approaches

Technical Paper Publication. IMECE2014-38412

M. Nadeem Azam, M. Maqsood, Imran Akhtar, Imran Aziz, *National University of Science and Technology, Islamabad, Punjab, Pakistan*, **M. Umar,** *Xpert Engineering Services, Islamabad, Punjab, Pakistan*

11:03am – Separated Turbulent Boundary Layer Under Unsteady Adverse Pressure Gradients: DNS and RANS

Technical Paper Publication. IMECE2014-39165

Junshin Park, *Pohang University of Science and Technology, Pohang, Korea (Republic)*

9-15 14th International Symposium on Measurement and Modeling of Environmental Flows

9-15-1 14th International Symposium on Measurement and Modeling of Environmental Flows

521C

9:45am–11:30am

Session Organizer: S.A. Sherif, *University of Florida, Gainesville, FL, United States*

Session Co-Organizers: Kashif Nawaz, *Johnson Controls, Norman, OK, United States*, Angel Wileman, *Southwest Research Institute, San Antonio, TX, United States*

9:45am – Influence of Internal Structure on the Performance of Steam Ejectors

Technical Paper Publication. IMECE2014-36148

Taide Tan, *Hunan University, Hunan, China*, **Wei Lu, Han Chen, Jiyun Liu,** *Guangxi University, Nanning City, China*

10:02am – Surface Texture Effect on Momentum Transfer Behavior in Ultimate Taylor-Couette Flow

Technical Paper Publication. IMECE2014-37205

Yabo Xue, Zhenqiang Yao, De Cheng, Hong Shen, Shengde Wang, *Shanghai Jiao Tong University, Shanghai, China*

10:19am – Numerical Simulation of Solid-Phase Split at Junctions in Particle Laden Pipe Flow

Technical Paper Publication. IMECE2014-38013

Nabil Kharoua, Mohamed Alshehhi, Lyes Khezzar, *Petroleum Institute, Abu Dhabi, United Arab Emir.*

10:36am – Stable Moving Particle Semi Implicit Method for Modeling Waves Generated by Submarine Landslides

Technical Paper Publication. IMECE2014-40419

Mohammad Amin Nabian, Leila Farhadi, *George Washington University, Washington, DC, United States*

10:53am – CFD Simulation of Boiling Heat Transfer Using OpenFOAM

Technical Paper Publication. IMECE2014-37585

Mehrdad Shademan, Ron Barron, Ram Balachandar, *University of Windsor, Windsor, ON, Canada*

11:10am – Eddy-Resolving Reynolds Stress Model for the Turbulent Bubbly Flow in a Square Cross-Sectioned Bubble Column

Technical Paper Publication. IMECE2014-38054
Matthias Ullrich, Benjamin Krumbein, *Technische Universität Darmstadt, Darmstadt, Germany*, **Robert Maduta**, *Outotec, Oberursel, Germany*, **Suad Jakirlic**, *Darmstadt University of Technology, Darmstadt, Germany*

9-1 21st Symposium on Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids

9-1-1 Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids I

520F **1:00pm–2:45pm**

Session Organizer: Dennis Siginer, *Botswana International University of Science and Technology & Universidad de Santiago de Chile, Santiago, Chile*
Session Co-Organizer: Mhamed Boutaous, *Institut National des Sciences Appliquées de Lyon, Villeurbanne, France*

1:00pm – Ferrofluid Rheology and Magnetic Relaxation Invited Presentation. IMECE2014-40586
Purna Kaloni, *University of Windsor, Windsor, ON, Canada*

1:21pm – Experimental Study for Clarifying the Mechanism of a Microjet in an Electro-Conjugate Fluid
Technical Paper Publication. IMECE2014-36076
Akira Satoh, *Akita Prefectural University, Honjo, Japan*

1:42pm – Solution of the Graetz Problem in Tubes of Arbitrary Cross-Section Shape for Viscoelastic Fluids
Technical Paper Publication. IMECE2014-36245
Mario Letelier, Cristian Barrera, *University of Santiago of Chile, Santiago, Chile, Chile*, **Dennis Siginer**, *Universidad de Santiago de Chile, Wichita, KS, United States*

2:03pm – Flow and Decay Characteristics of Submerged Yield-Pseudoplastic Jets
Technical Paper Publication. IMECE2014-36429
Khaled J. Hammad, *Central Connecticut State University, Simsbury, CT, United States*

2:24pm – Multiphase Modeling of Continuous Wave Laser Ablation: Contributions of the Recoil Vapor Pressure, Marangoni Effect, and External Gas Flow

Technical Presentation. IMECE2014-39280
Alexey N. Volkov, *University of Alabama, Tuscaloosa, AL, United States*, **Leonid V. Zhigilei**, *University of Virginia, Charlottesville, VA, United States*

9-5 15th Symposium on Fundamental Issues and Perspectives in Fluid Mechanics

9-5-1 Fundamental Issues and Perspectives in Fluid Mechanics I

521A **1:00pm–2:45pm**

Session Organizer: Francine Battaglia, *Virginia Tech, Blacksburg, VA, United States*
Session Co-Organizers: Francisco Diez, *Rutgers University, Piscataway, NJ, United States*, **Khaled J. Hammad**, *Central Connecticut State University, Simsbury, CT, United States*

1:15pm – Large Eddy Simulation of Round Impinging Jets With Large Stand-Off Distance
Technical Paper Publication. IMECE2014-37194
Mehrdad Shademan, Vesselina Roussinova, Ron Barron, Ram Balachandar, *University of Windsor, Windsor, ON, Canada*

1:30pm – Computational Modeling and Simulations of Isothermal Plane (Linear) Air Jet Velocity Profile for Slot Diffusers
Technical Paper Publication. IMECE2014-37317
Deify Law, Agustin Valdez, *California State University, Fresno, Fresno, CA, United States*

1:45pm – Development of the Turbulent Three-Dimensional Wall Jet With and Without a Grid Placed Over the Outlet
Technical Paper Publication. IMECE2014-38402
Sebastien Despres, *Stantec, Fredericton, NB, Canada*, **Joseph Hall**, *University of New Brunswick, Fredericton, NB, Canada*

2:00pm – Comparison of Classic and Snapshot Proper Orthogonal Decomposition on the Three-Dimensional Wall Jet Flow Field
Technical Paper Publication. IMECE2014-38602
Mahdi Hosseinali, Stephen Wilkins, Joseph Hall, *University of New Brunswick, Fredericton, NB, Canada*, **Lhendup Namgyal, Druk Green**, *Chhukha, Bhutan*

2:15pm – Characteristics of Shallow Wakes in an Open Channel
Technical Paper Publication. IMECE2014-40441

Ghassan Nasif, Ron Barron, Ram Balachandar, *University of Windsor, Windsor, ON, Canada*

2:30pm – New Parameter in Vortex Identification and Visualization: Symmetry of Vortical Flow

Technical Paper Publication. IMECE2014-39859

Katsuyuki Nakayama, Yasumasa Ohira, Shoko Yamada, *Aichi Institute of Technology, Toyota, Japan*

9-8 23rd Symposium on Industrial Flows

9-8-1 Industrial Flows I

521B

1:00pm–2:45pm

Session Organizer: Lubomir Ribarov, *United Technologies Aerospace Systems, Windsor Locks, CT, United States*

Session Co-Organizer: George Chamoun, *Eastman Chemical Company, Kingsport, TN, United States*

1:00pm – Large Eddy Simulation of Forced and Unforced Plane Jets Impinging on a Convex Surface

Technical Paper Publication. IMECE2014-37395

Nabil Kharoua, Lyes Khezzar, Mohamed Alshehhi, *Petroleum Institute, Abu Dhabi, United Arab Emir.*, **Zoubir Nemouchi**, *Universite Mentouri 1, Constantine, Algeria*

1:17pm – Discrete Phase Modeling of Droplets in the Gas Compartment of a Production Separator

Technical Paper Publication. IMECE2014-37999

Yahya Fathi Qaroot, Lyes Khezzar, Nabil Kharoua, *Petroleum Institute, Abu Dhabi, United Arab Emir.*

1:34pm – Numerical Investigations on the Aerodynamic Performance of Last Stage Bucket With Part-Span Connector

Technical Paper Publication. IMECE2014-38039

Bin Li, Jun Li, *Xi'an Jiaotong University, Xi'an, Shaanxi, Shaanxi, China*

1:51pm – Validation of URANS Simulation of Truck Cooling Fan Performance

Technical Paper Publication. IMECE2014-38383

Sassan Etemad, Peter Gullberg, *Volvo Group Trucks Technology, Göteborg, Sweden*

2:08pm – Numerical Study of Internal Flow Structures Within Hydrocyclones With Parabolic and Hyperbolic Swirl Chambers

Technical Paper Publication. IMECE2014-37190

Abdul Motin, Volodymyr V. Tarabara, Andre Benard, *Michigan State University, East Lansing, MI, United States*

2:25pm – Computational Study of Gas Separation Using Membrane Supported by a Porous Medium

Technical Paper Publication. IMECE2014-37299

Nawaf Alkhamis, Dennis E. Oztekin, Ali E. Anqi, Abdulmohsen Alsaiani, Alparslan Oztekin, *Lehigh University, Bethlehem, PA, United States*

9-10 Symposium on Fluid Measurements and Instrumentation

9-10-1 FMITC Session 1

521C

1:00pm–2:45pm

Session Organizer: Judith Bamberger, *Pacific Northwest National Laboratory, Richland, WA, United States*

Session Co-Organizers: Francisco Diez, *Rutgers University, Piscataway, NJ, United States*, Joel Park, *Naval Surface Warfare Center Carderock Division, West Bethesda, MD, United States*

1:00pm – Experimental Measurements and Flow Visualization of Water Cavitation Through a Nozzle

Technical Paper Publication. IMECE2014-40276

Jeffrey Wilms, *Grundfos, Manhattan, KS, United States*, **B. Terry Beck, Mohammad Hosni, Christopher M. Sorensen, Steven Eckels**, *Kansas State University, Manhattan, KS, United States*, **Don Tomasi**, *D&V Consulting, LLC, Stevensville, MI, United States*

1:17pm – Comparison of Shadowgraphy and X-Ray Computed Tomography in Spray Analysis

Technical Paper Publication. IMECE2014-38770

Zachary Lee, Daniel Eichner, Matthew D. Ryan, Tyler W. Sowell, Michael Benson, Bret Van Poppel, Thomas Nelson, *United States Military Academy, West Point, NY, United States*, **Pablo A. Vasquez Guzman**, *Stanford University, Stanford, CA, United States*, **Jonathan Tennis**, *United States Military Academy, Fort Mill, SC, United States*, **Rebecca Fahrig, John Eaton**, *Stanford University, Stanford, CA, United States*, **Matthew S. Kurman, Chol-Bum M. Kweon**, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

1:34pm – Calibration of a Wall-Shear-Stress Sensor Made of a Flush-Mounted Hot-Wire Over a Shallow Rectangular Slot

Technical Paper Publication. IMECE2014-39127

James I. Medvescek, Samer Afara, Laurent Mydlarski, Bantwal R. (Rabi) Baliga, *McGill University, Montreal, QC, Canada*

1:51pm – Effect of Longitudinal Core Flow on Vortex Stability

Technical Paper Publication. IMECE2014-38522

Amir Allaf-Akbari, A. Gordon L. Holloway, Joseph Hall,
University of New Brunswick, Fredericton, NB, Canada

2:08pm – Effect of Inclination on the Air-Water Flow in 4 in. Inner Diameter Pipeline

Technical Paper Publication. IMECE2014-38468

Mehaboob Basha, Syed M. Shaahid, Muhammad Mudasar Imam, Aftab Ahmad, Luai Al-Hadhrami, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia

2:25pm – Experimental Study of Twin Liquid Jets Interaction on Stationary and Moving Surfaces

Technical Paper Publication. IMECE2014-36777

Mohammad Mohsen Seraj, Mohamed Gadala, University of British Columbia, Vancouver, BC, Canada

9-1 21st Symposium on Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids

9-1-2 Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids II

520F

3:00pm–4:45pm

Session Organizer: Dennis Siginer, Botswana International University of Science and Technology & Universidad de Santiago de Chile, Santiago, Chile

Session Co-Organizer: Mhamed Boutaous, Institut National des Sciences Appliquées de Lyon, Villeurbanne, France

3:00pm – Analysis of the Process-Structure-Behavior Interaction in Bio-Sourced Polymers: Role of the Crystallization Kinetics

Technical Paper Publication. IMECE2014-39729

Mhamed Boutaous, Zakariaa Refaa, Matthieu Zinet, Shihe Xin, Patrick Bourgin, Institut National des Sciences Appliquées de Lyon, Villeurbanne, France

3:17pm – Velocity Field and Energy Dissipation in Viscoplastic Flow in Tubes of Noncircular Cross Section

Technical Paper Publication. IMECE2014-36246

Mario Letelier, University of Santiago of Chile, Santiago, Chile, Chile, Dennis Siginer, Universidad de Santiago de Chile, Wichita, KS, United States, Felipe Godoy, University of Santiago of Chile, Santiago, Chile

3:34pm – Viscoelastic Rotating Flow With Viscous Dissipation

Technical Paper Publication. IMECE2014-36880

Abbas Hazbavi, Nariman Ashrafi, Mohamad Najafi, Islamic Azad University, Tehran, Iran

3:51pm – Airflow Distribution in the Longitudinal Plan of a Boeing 767 Mockup Cabin

Technical Paper Publication. IMECE2014-40102

Maher Shehadi, Mohammad Hosni, Byron Jones, Kansas State University, Manhattan, KS, United States

4:08pm – Experimental and Numerical Investigation of Compressor Corner Stall

Technical Presentation. IMECE2014-40035

Saeed Anwar, Benha University, Benha, Egypt, Hesham El-Batsh, Ali Attia, Benha University, Benha-Qalubia, Egypt

4:25pm – N-Heptane Pool Fire Behavior in a Controlled Oxygen and Low-Pressure Environment

Technical Paper Publication. IMECE2014-37389

Quanyi Liu, Kewei Chen, Nan Wu, Jiusheng Yin, Rui Yang, Hui Zhang, Tsinghua University, Beijing, China

9-5 15th Symposium on Fundamental Issues and Perspectives in Fluid Mechanics

9-5-2 Fundamental Issues and Perspectives in Fluid Mechanics II

521A

3:00pm–4:45pm

Session Organizer: Khaled J. Hammad, Central Connecticut State University, Simsbury, CT, United States

Session Co-Organizers: Francisco Diez, Rutgers University, Piscataway, NJ, United States, Francine Battaglia, Virginia Tech, Blacksburg, VA, United States

3:00pm – Analysis of Turbulent Flow Past Bar-Racks

Technical Paper Publication. IMECE2014-38653

Samuel Paul, Sunrit Engineering and Consulting Services Inc., Winnipeg, MB, Canada, Muiywa Adaramola, Norwegian University of Life Sciences, Ås, Norway

3:17pm – Wavelets of Finite Height Grid Turbulence Over a Flat Plate

Technical Paper Publication. IMECE2014-36803

Fama Fouladi, Paul Henshaw, David S.-K. Ting, University of Windsor, Windsor, ON, Canada

3:34pm – Relation Between Sound Sources and Vortical Structures in Isotropic Compressible Turbulence

Technical Paper Publication. IMECE2014-37052

Daiki Terakado, *University of Tokyo, Sagamihara, Japan*, **Taku Nonomura**, **Makoto Sato**, **Kozo Fujii**, *JAXA, Sagamihara, Japan*

3:51pm – Numerical Simulation of Using Combined Active and Passive Stall Control Techniques in Centrifugal Compressors

Technical Paper Publication. IMECE2014-37983

Taher Halawa, **Mohamed Gadala**, *University of British Columbia, Vancouver, BC, Canada*, **Mohammed Alqaradawi**, *Qatar University, Doha, Qatar*, **Osama Badr**, *British University in Egypt, Al-Shorouk City, Egypt*

4:08pm – Pressure Drop Testing of Corrugated Stainless Steel Pliable Gas Tubing (PLT)

Technical Paper Publication. IMECE2014-36668

Bharadwaj Srinivasan, **Stephen Idem**, *Tennessee Tech University, Cookeville, TN, United States*

4:25pm – Method of Autonomous Statistical Modeling ASMTurb and Its Testing on the Example of Classical Turbulent Flows

Technical Paper Publication. IMECE2014-36355

Yuriy Nuzhnov, *Al-Farabi Kazakh National University, Almaty, Kazakhstan*

9-8 23rd Symposium on Industrial Flows

9-8-2 Industrial Flows II

521B

3:00pm–4:45pm

Session Organizer: Sandip Kale, *Trinity College of Engineering and Research, Pune, Pune, India*

Session Co-Organizer: George Chamoun, *Eastman Chemical Company, Kingsport, TN, United States*

3:00pm – Effects of Fouling and Erosion on the Blades of a Centrifugal Compressor in Two Different Thicknesses

Technical Presentation. IMECE2014-36186

Vahid Kamali, *Science and Research of Tehran University, Tehran, Iran*, **Yahya Aghayari**, *Teacher Training University Shahid Rajaei, Tehran, Iran*

3:17pm – Numerical Study of the Fluid Flow in a Cylindrical Hydrocyclone Separator

Technical Paper Publication. IMECE2014-39561

Hans E.M. Ninahuanca, **Henrique Stel**, **Rigoberto E.M. Morales**, *PPGEM/UTFPR, Curitiba, Paraná, Brazil*

3:34pm – Leveling of a Line of Paint Droplets on a Surface

Technical Paper Publication. IMECE2014-37109

Javad Esmaeelpanah, **Alireza Dalili**, **Javad Mostaghimi**, *University of Toronto, Toronto, ON, Canada*, **Sanjeev Chandra**, *University of Toronto, Mississauga, ON, Canada*

3:51pm – Universal Semi-Analytic Model for Axial Mixing in a Straight Pipe

Technical Paper Publication. IMECE2014-37351

Heng Luo, **Yun Li**, **Hai Wang**, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

4:08pm – Novel Energy Storage and Recovery Architecture for Speed-Controlled Hydraulic Actuation

Technical Paper Publication. IMECE2014-37696

Oscar Pena, **Michael Leamy**, *Georgia Institute of Technology, Atlanta, GA, United States*

4:25pm – Theoretical and Experimental Study of Hydrocyclone Performance and Equivalent Settling Area

Technical Paper Publication. IMECE2014-37482

Reza Sabbagh, **Michael G. Lipsett**, **Charles R. Koch**, **David S. Nobes**, *University of Alberta, Edmonton, AB, Canada*

9-10 Symposium on Fluid Measurements and Instrumentation

9-10-2 FMITC Session 2

521C

3:00pm–4:45pm

Session Organizer: Judith Bamberger, *Pacific Northwest National Laboratory, Richland, WA, United States*

Session Co-Organizer:s Francisco Diez, *Rutgers University, Piscataway, NJ, United States*, **Joel Park**, *Naval Surface Warfare Center Carderock Division, West Bethesda, MD, United States*

3:00pm – Efficient Airload Determination for Bluff Body Aeromechanics

Technical Paper Publication. IMECE2014-37638

Sorin Pirau, **Vrishank Raghav**, **Alex Forbes**, **Brandon Liberi**, **Narayanan Komerath**, *Georgia Institute of Technology, Atlanta, GA, United States*

3:15pm – Experimental Performance Evaluation of a Centrifugal Pump With Different Impeller Vane Geometries

Technical Paper Publication. IMECE2014-38985

Susanta Kumar Das, *Kettering University, Flint, MI, United States*

3:30pm – Effect of Viscosity on the Pressure Gradient in 4 in. Pipe

Technical Paper Publication. IMECE2014-37918
Muhammad Mudasar Imam, Mehaboob Basha, Syed M. Shaahid, Aftab Ahmad, Luai Al-Hadhrani, *King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia*

3:45pm – Development and Application of an Alternating-Color Micro-PIV System

Technical Paper Publication. IMECE2014-40440
Shenq-Yuh Jaw, Jyh-Jong Sheen, *National Taiwan Ocean University, Keelung, Taiwan,* **Robert Hwang,** *National Taiwan Ocean University, Taipei, Taiwan*

4:00pm – Experiments to Determine Salt Dissolution Rate as a Function of Brine Properties

Technical Presentation. IMECE2014-36802
Timothy O’Hern, David Lord, *Sandia National Laboratories, Albuquerque, NM, United States,* **David Rudeen,** *GRAM, Albuquerque, NM, United States*

4:30pm – Turbulence Measurements in the Corner Wall Jet

Technical Paper Publication. IMECE2014-38371
Barrett J. Poole, Joseph Hall, *University of New Brunswick, Fredericton, NB, Canada*

Wednesday, November 19

9-4 10th Forum on Recent Developments in Multiphase Flow

9-4-1 Gas-Solid and Liquid-Solid Flows

520F

9:45am–11:30am

Session Organizer: *Deborah Pence, Oregon State University, Corvallis, OR, United States*

9:45am – Study on the Solid-Liquid Mixture Flow for Oil and Gas Fields Development

Technical Presentation. IMECE2014-36950
Young Ju Kim, *Korea Institute of Geoscience and Mineral Resource, Daejeon, Korea (Republic),* **Nam Sub Woo,** *KIGAM, Daejeon, Korea (Republic),* **Sang Mok Han,** *Korea Marine Equipment Research Institute, Gunsan, Korea (Republic)*

10:06am – Coupling Particle Transport and RANS Turbulence Modeling

Technical Presentation. IMECE2014-40136
Bertrand Rollin, *University of Florida, Gainesville, FL, United States,* **Nicholas A. Denissen, Malcolm J. Andrews,** *Los Alamos National Laboratory, Los Alamos, NM, United States*

10:27am – One-Dimensional Model for Gas-Solid Heat Transfer in Pneumatic Conveying

Technical Presentation. IMECE2014-37555
Kody Smajstrla, Zhigang Feng, *University of Texas at San Antonio, San Antonio, TX, United States*

10:48am – Effect of Noncontinuous Inlet Air on Increasing the Segregation of Binary Particles in a Fluidized Bed

Technical Paper Publication. IMECE2014-37281
Maysam Saidi, Hassan Basirat Tabrizi, Sina Chaichi, Majid Dehghani, *Amirkabir University of Technology, Tehran, Iran*

11:09am – Humidity Effect on the Separation Efficiency of Cylindrical Cyclone Separator

Technical Paper Publication. IMECE2014-37284
Alireza Moallemi, Maysam Saidi, Hassan Basirat Tabrizi, *Amirkabir University of Technology, Tehran, Iran*

9-6 Symposium on CFD Applications for Optimization and Controls

9-6-1 CFD Applications for Optimization and Controls I

521A

9:45am–11:30am

Session Organizer: Zhongquan Zheng, *University of Kansas, Lawrence, KS, United States*

Session Co-Organizer: Ning Zhang, *McNeese State University, Lake Charles, LA, United States*

9:45am – Hydraulic Design of Inlet Guide Vane and Its Full Flow Passage Numerical Simulation on Centrifugal Pump

Technical Paper Publication. IMECE2014-36209

Hucan Hou, Yongxue Zhang, Zhenlin Li, Xin Zhou, Zizhe Wang, *China University of Petroleum, Beijing, Beijing, China*

10:02am – Multi-Objective Optimization for Francis Turbine Runner Using Genetic Algorithm

Technical Paper Publication. IMECE2014-36401

Koma Sato, *Hitachi Research Laboratory, Hitachinaka, Ibaraki, Japan,* **Yuta Tamura, Kiyohito Tani,** *Hitachi Mitsubishi Hydro Corporation, Hitachi, Ibaraki, Japan*

10:19am – Numerical Simulation of Flow Fields and Head Losses of Trash-Barriering Based on VOF Model

Technical Paper Publication. IMECE2014-36617

Shuquan He, Baoyun Qiu, Shiji Chu, Xiaoli Feng, *Yangzhou University, Yangzhou, Jiangsu, China*

10:36am – Parallel Offline CFD and Closed-Form Approximation Strategy for Computationally Efficient Analysis of Complex Fluid Flows

Technical Paper Publication. IMECE2014-38691

Devin Allphin, Joshua Hamel, *California State University, Long Beach, Long Beach, CA, United States*

10:53am – Optimum Runner Design for Die Casting Using CFD Simulations and Verification With Water-Model Experiments

Technical Paper Publication. IMECE2014-37419

Ken'ichi Kanazawa, Ken'ichi Yano, *Mie University, Tsu, Japan,* **Jun'ichi Ogura,** *Yamaha Motor Co., Ltd., Iwata, Shizuoka, Japan,* **Yasunori Nemoto,** *Flow Science Japan, Inc., Taito, Tokyo, Japan*

11:10am – Study on Pressure Pulsation in the Volute of a Centrifugal Pump by Large Eddy Simulation

Technical Paper Publication. IMECE2014-37233

Yuan Zhang, Yongxue Zhang, Jinya Zhang, Hucan Hou, *China University of Petroleum, Beijing, Beijing, China*

9-9 Microfluidics 2014—Fluid Engineering in Micro- and Nanosystems

9-9-1 Microscale Multiphase Flow and Surface Interactions

521B

9:45am–11:30am

Session Organizer: Rasim Guldiken, *USF, Tampa, FL, United States*

Session Co-Organizer: Michael Schertzer, *Rochester Institute of Technology, Rochester, NY, United States*

9:45am – Dynamics of Thin Liquid Bilayers Subjected to an External Electric Field

Technical Paper Publication. IMECE2014-37302

Hadi Nazaripoor, Charles R. Koch, *University of Alberta, Edmonton, AB, Canada,* **Subir Bhattacharjee,** *Water Planet Engineering, Inglewood, CA, United States*

10:11am – Electrokinetic Transport in Paper Microfluidics

Technical Paper Publication. IMECE2014-37480

Prashant Waghmare, Sushanta Mitra, *University of Alberta, Edmonton, AB, Canada,* **Craig Milne,** *Stream Technologies Inc., Edmonton, AB, Canada*

10:37am – Free Flow Isoelectric Focusing in a Microfluidic Device

Technical Paper Publication. IMECE2014-37629

Kisoo Yoo, Prashanta Dutta, Jin Liu, *Washington State University, Pullman, WA, United States*

11:03am – Enhanced Ion Transport in 2-D Graphene Nanochannels

Technical Presentation. IMECE2014-40211

Quan Xie, Chuanhua Duan, *Boston University, Boston, MA, United States*

9-11 CFD/EFD Choice—A Dilemma for Industries

9-11-1 CFD/EFD Choice—A Dilemma for Industries
521C 9:45am–11:30am

Session Organizer: B.G. Shiva Prasad, *Wright State University, Sidney, OH, United States*

Session Co-Organizers: Joel Park, *Naval Surface Warfare Center Carderock Division, West Bethesda, MD, United States*, Philipp Epple, *University of Applied Sciences Coburg, Coburg, Bavaria, Germany*

9:45am – Introduction: CFD/EFD—Need—Application Challenges

Panel Presentation. IMECE2014-40903

B.G. Shiva Prasad, *Wright State University, Sidney, OH, United States*

10:11am – CFD and Laboratory (EFD) for Mutual Validation, Calibration, and Advanced Design and Model Development
Panel Presentation. IMECE2014-40817

David Japikse, *Concepts NREC, Woolwich, ME, United States*

10:37am – CFD and EFD—The Benefit of Maintaining, Developing, and Educating Both

Panel Presentation. IMECE2014-40818

Peter Gullberg, *Volvo Group Trucks Technology, Göteborg, Sweden*

11:03am – CFD and EFD in the Design Process of Fans and Blowers

Panel Presentation. IMECE2014-40819

Philipp Epple, *University of Applied Sciences Coburg, Coburg, Bavaria, Germany*

9-4 10th Forum on Recent Developments in Multiphase Flow

9-4-2 Computational Analyses and Modeling of Gas-Liquid and Liquid-Liquid Flows
520F 1:00pm–2:45pm

Session Organizer: Deborah Pence, *Oregon State University, Corvallis, OR, United States*

1:00pm – Simulation of Viscous Fingering Phenomenon Using CFD Tools

Technical Paper Publication. IMECE2014-36896

Diana C. Gonzalez, *Simon Bolivar University, Baruta, Miranda, Venezuela*, **Miguel Asuaje**, *Universidad Simón Bolívar, Caracas, Miranda, Venezuela*

1:17pm – Numerical Modeling of Aerated Cavitation Using a Penalization Approach for Air Bubble Modeling Coupled to Homogeneous Equilibrium Model

Technical Paper Publication. IMECE2014-39844

Petar Tomov, Sofiane Khelladi, Christophe Sarraf, Farid Bakir, *Arts et Métiers ParisTech, Paris, Ile-de-France, France*

1:34pm – Study on the Multiphase Flow Characteristics Inside Subsea Separation System

Technical Paper Publication. IMECE2014-36952

Nam Sub Woo, Jae Ki Kwon, *KIGAM, Daejeon, Korea (Republic)*, **Young Ju Kim**, *Korea Institute of Geoscience and Mineral Resource, Daejeon, Korea (Republic)*, **Sang Shik Kim**, *Gyeongsang National University, Chinju, Korea (Republic)*, **Hee Hak Ahn**, *DK LoK, Gimhae, Korea (Republic)*, **Sang-Mok Han**, *Korea Marine Equipment Research Institute, Gunsan, Korea (Republic)*

1:51pm – Transient Two-Phase Flow Model for High Viscous Liquids Over Hilly Terrain

Technical Paper Publication. IMECE2014-36928

Abraham Parra, Miguel Asuaje, *Universidad Simón Bolívar, Caracas, Venezuela*

2:08pm – Genetic Algorithms Applied to Flow Estimation in a Two-Phase Flow With a Venturi Meter

Technical Paper Publication. IMECE2014-37456

Manuel Borregales, Jose Cappelletto, Gilberto Nuñez, Miguel Asuaje, *Universidad Simón Bolívar, Caracas, Miranda, Venezuela*

2:25pm – Numerical Simulation on a Gas Distributor Used in Slurry Column Reactor**Technical Paper Publication. IMECE2014-37645****Simin Wang, Shifeng Xu, Wen Jian, Jian Guanping, Xi'an Jiaotong University, Xi'an, China, Gu Xin, Wang Mengmeng, Xi'an Jiaotong University, Xi'an, Shaanxi, China****9-6 Symposium on CFD Applications for Optimization and Controls****9-6-2 CFD Applications for Optimization and Controls II****521A****1:00pm–2:45pm****Session Organizer: Zhongquan Zheng, University of Kansas, Lawrence, KS, United States****Session Co-Organizer: Philipp Epple, University of Applied Sciences Coburg, Coburg, Bavaria, Germany****1:00pm – CFD Multiphase Flow Analysis Across Diverging Manifolds: Application in the Oil-Gas Industry****Technical Paper Publication. IMECE2014-36681****Sergio Croquer, Joaquin Vieiro, Carlos Chacon, Miguel Asuaje, Universidad Simón Bolívar, Caracas, Miranda, Venezuela****1:17pm – Numerical Model of FGD Unit in Power Plant****Technical Paper Publication. IMECE2014-37720****Armin Silaen, Bin Wu, Chenn Zhou, Purdue University Calumet, Hammond, IN, United States, William Breen, NIPSCO, Wheatfield, IN, United States****1:34pm – Study of the Effect of Tangential Point Blowing on the Incompressible Boundary Layer Flow Around a Circular Cylinder****Technical Paper Publication. IMECE2014-37898****Suday Ghosh, Budge Budge Institute of Technology, Kolkata, West Bengal, India, Sujay Kumar Mukherjee, Biswanath Datta, Bengal Engineering and Science University, Howrah, West Bengal, India****1:51pm – Improving the Performance of a Two-Way Flow Control Valve, Using a 3D CFD Modeling****Technical Paper Publication. IMECE2014-38201****Emma Frosina, Adolfo Senatore, University of Naples Federico II, Naples, Italy, Dario Buono, University of Naples, Naples, IT, Italy, Micaela Olivetti, OMIQ srl, Milan, Italy, Michele Pavanetto, Ina Costin, Diplomatic Oleodinamica S.p.A., Parabiago (MI), Italy****2:08pm – CFD Analysis of Phenomena Attributed to Pigging Run in a Pipeline****Technical Paper Publication. IMECE2014-37452****Manuel Borregales, Miguel Asuaje, Universidad Simón Bolívar, Caracas, Miranda, Venezuela, Ruben Ensalsado, CTG21, Caracas, Miranda, Venezuela****2:25pm – Compact Test Rig Design for Fans and Blowers Technical Paper Publication. IMECE2014-38972****Philipp Epple, University of Applied Sciences Coburg, Coburg, Bavaria, Germany, Matthias Semel, Bettina Willinger, Antonio Delgado, Institute of Fluid Mechanics, Erlangen, Germany****9-9 Microfluidics 2014—Fluid Engineering in Micro- and Nanosystems****9-9-2 Droplet/Particle/Bubble Dynamics and Capillary Flow****521B****1:00pm–2:45pm****Session Organizer: Shaurya Prakash, Ohio State University, Columbus, OH, United States****Session Co-Organizer: Mainul Hasan, McGill University, Montreal, QC, Canada****1:00pm – Relevant Influencing Factors on Droplet Characteristics for a Piezoelectrically Driven Drop-on-Demand Printhead****Technical Paper Publication. IMECE2014-36199****Markus Kagerer, Arne Meeuw, Jan Berger, Dominik Rumschoettel, Tim C. Lueth, Franz Irlinger, Technical University of Munich, Garching, Germany****1:17pm – Effect of Surface Modification on Protein Deposition in Desiccated Droplets****Technical Paper Publication. IMECE2014-36789****Michael Schertzer, Rochester Institute of Technology, Rochester, NY, United States, Peter Lea, SQI Diagnostics, Toronto, ON, Canada, Ridha Ben-Mrad, Pierre Sullivan, University of Toronto, Toronto, ON, Canada****1:34pm – Boundary Element Simulations of Free and Forced Bubble Oscillations in Potential Flow****Technical Paper Publication. IMECE2014-36972****Yulia A. Itkulova, Olga A. Abramova, Bashkir State University, Ufa, Bashkortostan, Russia, Nail Gumerov, University of Maryland, College Park, MD, United States, Iskander Akhatov, North Dakota State University, Fargo, ND, United States****1:51pm – Molecular Dynamics Simulations of Nanobubbles Formation Near the Substrate in a Liquid With Dissolved Gas****Technical Paper Publication. IMECE2014-37050****Elena F. Moiseeva, Victor L. Malyshev, Dmitriy F. Marin, Bashkir State University, Ufa, Bashkortostan, Russia, Nail Gumerov, University of Maryland, College Park, MD, United States, Iskander Akhatov, North Dakota State University, Fargo, ND, United States**

2:08pm – Dynamics of a Micro-Bubble Between Two Spherical Particles

Technical Paper Publication. IMECE2014-37053
Mainul Hasan, McGill University, Montreal, QC, Canada

2:25pm – On the Lifetime of Non-Coalescent Levitated Droplets

Technical Paper Publication. IMECE2014-37713
Ashkan Davanlou, Ranganathan Kumar, University of Central Florida, Orlando, FL, United States

9-13 Forum on Experimental Validation of CFD Modeling in Heat Exchangers (K10 and FED)

9-13-1 Experimental Validation of CFD Modeling in Heat Exchangers (K10 and FED)-A

521C 1:00pm–2:45pm

Session Organizer: Siddharth Talapatra, HTRI Worldwide Headquarters, College Station, TX, United States
Session Co-Organizer: Ben Xu, University of Arizona, Tucson, AZ, United States

1:00pm – Experimental Validation of Numerical Simulations of a Closed-Loop Thermosyphon Operating With Slurries of a Microencapsulated Phase-Change Material

Invited Paper Publication. IMECE2014-38812
Alexandre Lamoureux, Hatch Ltd., Montreal, QC, Canada,
Bantwal R. (Rabi) Baliga, McGill University, Montreal, QC, Canada

1:15pm – Planar PIV Experiments Inside a Transparent Shell-and-Tube Exchanger

Technical Paper Publication. IMECE2014-36818
Siddharth Talapatra, Kevin Farrell, Heat Transfer Research, Inc., College Station, TX, United States

1:30pm – Turbulent Flow in a No-Tube-in-Window Shell and Tube Heat Exchanger: CFD vs. PIV

Technical Paper Publication. IMECE2014-36902
Salem Bouhairie, Siddharth Talapatra, Kevin Farrell, Heat Transfer Research, Inc., College Station, TX, United States

1:45pm – CFD-Simulation of Oscillatory Flow Around the Heat Exchangers of Thermoacoustic Devices

Technical Paper Publication. IMECE2014-37926
Olusegun M. Ilori, Xiaolan Mao, Artur J. Jaworski, University of Leeds, Leeds, West Yorkshire, United Kingdom

2:00pm – Thermal Structure and Flow Field Characteristics of a Modified Inverse Jet Diffusion Flame Burner

Technical Paper Publication. IMECE2014-38030
Ahmed Emara, Sherif H. Amin, Adel Hussien, Helwan University, Cairo, Egypt, Ibrahim Shabaka, Cairo University, Giza, Egypt

9-4 10th Forum on Recent Developments in Multiphase Flow

9-4-4 Liquid-Liquid and Gas-Liquid Flows

520F 3:00pm–4:45pm

Session Organizer: Deborah Pence, Oregon State University, Corvallis, OR, United States

3:00pm – Experimental Characterization of Horizontal Gas-Liquid Slug Flow

Technical Presentation. IMECE2014-39566
Fernando E.C. Vicencio, Fabio A. Schneider, Cristiane Cozin, Fausto A. Barbuto, Rigoberto E.M. Morales, PPGEM/UTFPR, Curitiba, Paraná, Brazil, Marco J. Da Silva, CPGEI/UTFPR, Curitiba, Paraná, Brazil

3:17pm – Development of Water Treatment Systems Using Interaction of Pressure Waves, Cavitation Bubbles, and Micro Bubbles

Technical Paper Publication. IMECE2014-38009
Masaaki Tamagawa, Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan

3:34pm – Experimental Characterization of a Modified Airlift Pump

Technical Paper Publication. IMECE2014-39899
Afshin Goharzadeh, Petroleum Institute, Abu Dhabi, United Arab Emir., Keegan Fernandes, University of Waterloo, Waterloo, ON, Canada

3:51pm – Shear-Driven Rivulet Dynamics on Surfaces With Various Wettabilities

Technical Paper Publication. IMECE2014-38665
Sara Moghtadernejad, Mehdi Jadidi, Nabil Esmail, Ali Dolatabadi, Concordia University, Montreal, QC, Canada

4:08pm – Oil Recovery from Porous Media Using Emulsion

Technical Paper Publication. IMECE2014-37248
Aleksey Baldygin, David S. Nobes, Sushanta Mitra, University of Alberta, Edmonton, AB, Canada

4:25pm – Numerical Study of Drag Forces in Gravity-Induced Separation for Water Dominated Dispersed Oil-Water

Technical Paper Publication. IMECE2014-36922

Eliónora Caldera, Miguel Asuaje, *Universidad Simón Bolívar, Caracas, Miranda, Venezuela*

9-6 Symposium on CFD Applications for Optimization and Controls

9-6-3 CFD Applications for Optimization and Controls III

521A

3:00pm–4:45pm

Session Organizer: Ning Zhang, *McNeese State University, Lake Charles, LA, United States*

Session Co-Organizer: Philipp Epple, *University of Applied Sciences Coburg, Coburg, Bavaria, Germany*

3:00pm – Diffuser Optimization for a Micro-Hydrokinetic Turbine

Technical Paper Publication. IMECE2014-37304

Jacob Riglin, William C. Schleicher, Alparslan Oztekin, *Lehigh University, Bethlehem, PA, United States*

3:15pm – Numerical Investigation of Vortex Shedding in a Square Cylinder Using RANS and LES Model

Technical Paper Publication. IMECE2014-37393

Mohammad Arif Hossain, Sarzina Hossain, *University of Texas at El Paso, El Paso, TX, United States*, Mohammad Ikhtair Hossain Soiket, *McGill University, Montreal, QC, Canada*

3:30pm – Numerical Analysis of Fluid–Fluid Interaction and Flow Through Micro Clearance to Estimate Leakages in a Fuel Injection Pump

Technical Paper Publication. IMECE2014-37411

Balasakthivel Kamaraj, Shankar C. Subramanian, *Indian Institute of Technology Madras, Chennai, Tamilnadu, India*, Baskaran Rakkiappan, *Bosch Limited, Bangalore, Karnataka, India*

3:45pm – Quantification of Cooling Fan Airflow Installation Effects Compared to Plenum to Plenum Fan Performance Testing

Technical Paper Publication. IMECE2014-37415

Peter Gullberg, *Volvo Group Trucks Technology, Göteborg, Sweden*

4:00pm – Aerodynamic Devices for Formula Student Race Cars

Technical Paper Publication. IMECE2014-39041

Philipp Epple, Tobias Essler, Gerhard Bloch, Viktor Below, Stefan Gast, *University of Applied Sciences Coburg, Coburg, Bavaria, Germany*

4:15pm – Implementation of an Adjoint-Based Optimization With Scalar Transport

Technical Paper Publication. IMECE2014-39691

Eysteinn Helgason, Sinisa Krajinovic, *Chalmers University of Technology, Gothenburg, Sweden*

4:30pm – Balanced-Force Algorithm for Two-Phase Flows

Technical Presentation. IMECE2014-39137

Hanif Montazeri, *NuPhysics, Toronto, ON, Canada*

9-9 Microfluidics 2014—Fluid Engineering in Micro- and Nanosystems

9-9-3 Novel Applications of Micro-/Nanofluidics

521B

3:00pm–4:45pm

Session Organizer: Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*

Session Co-Organizers: Mohammad Hossain, *University of Central Oklahoma, Edmond, OK, United States*, Scott Thompson, *Mississippi State University, Mississippi State, MS, United States*

3:00pm – Model Calculations on Micropump using Reciprocating Motion of Magnetic Material Ball

Technical Paper Publication. IMECE2014-36688

Hiroshige Kumamaru, Hayata Fujiwara, Yoshihisa Nomura, Kazuhiro Itoh, *University of Hyogo, Himeji, Hyogo, Japan*

3:21pm – Detection of Selected Pharmaceutical Contaminants and Removal Efficiency of Emerging Contaminants by Application of Membrane Filtration Technology

Technical Paper Publication. IMECE2014-36906

Yanghe Liu, *Purdue Water Institute, Hammond, IN, United States*, Chenguang Sheng, George Agbai Nnanna, *Purdue University Calumet, Hammond, IN, United States*

3:42pm – Particulate and Emulsion Sorting Using Microfluidics

Technical Paper Publication. IMECE2014-38298

Li Lu, Rebecca M. Irwin, Jeffrey W. Schertzer, Paul R. Chiarot, *State University of New York at Binghamton, Binghamton, NY, United States*

4:03pm – Method for Characterization of Passive Mechanical Filtration of Particles in Digital Microfluidic Devices

Technical Paper Publication. IMECE2014-38875

Peter D. Dunning, Michael Schertzer, *Rochester Institute of Technology, Rochester, NY, United States*, Pierre Sullivan, *University of Toronto, Toronto, ON, Canada*

4:24pm – Effective Viscosity Equation for the CFD Analysis of the Microflows in the Confinement Ring

Technical Paper Publication. IMECE2014-37686

Yuanhao Wu, Ling Tian, Wenbin Han, *Tsinghua University, Beijing, China*

TRACK 10: HEAT TRANSFER AND THERMAL ENGINEERING

10-2 Heat Transfer in Energy Systems: Fundamentals (K6)

10-2-2: Two-Phase Heat Transfer in Energy Systems

10-2-3: Heat Conduction and Convection in Energy Systems

10-3 Heat Transfer in Energy Systems: Applications (K6)

10-3-1: Cooling, Heating, and Power Systems I

10-3-2: Cooling, Heating, and Power Systems II

10-3-3: Cooling, Heating, and Power Systems III

10-4 Heat Transfer in Energy Systems: Design (K6)

10-4-1: Virtual Product Development in Energy Systems I

10-5 Heat Transfer in Energy Systems: Performance and Energy Conversion (K6)

10-5-1: Performance Assessment of Energy Systems

10-5-2: Waste Heat Harvesting and Energy Conversion

10-6 Panel on Advanced Solar Sub-Atmospheric M-Power Generation

10-6-1: Advanced Solar Sub-Atmospheric M-Power Generation

10-7 Thermal Management Challenges in Energy Conversion and Conservation (K10)

10-7-1: Thermal Management Challenges in Energy Conversion and Conservation

10-8 Thermophysical Properties (K7)

10-8-1: Thermophysical Properties I

10-8-2: Thermophysical Properties II

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-1: Phase Change Heat Transfer—1

10-9-2: Phase Change Heat Transfer—2

10-9-3: Phase Change Heat Transfer—3

10-9-4: Phase Change Heat Transfer—4

10-9-5: Phase Change Heat Transfer—5

10-9-6: Phase Change Heat Transfer—6

10-9-7: Phase Change Heat Transfer—7

10-10 Heat Pipes and Industrial Applications of Multiphase Heat Transfer (K13)

10-10-1: Heat Pipes and Industrial Applications of Multiphase Heat Transfer

10-11 Fundamentals of Single Phase Convection (K8)

10-11-1: Fundamentals of Single Phase Convection—1

10-11-2: Fundamentals of Single Phase Convection—2

10-11-3: Fundamentals of Single Phase Convection—3

10-12 Fundamentals of Radiative Transport Including Nanoscale Effects (K8 & K9)

10-12-1: Fundamentals of Radiative Transport Including Nanoscale Effects

10-12-2: Fundamentals of Radiative Transport Including Nanoscale Effects—2

10-13 Advances in Interfaces and Heat Sinks Including Nanoscale Conduction and Interfacial Effects (K8, K9, K16)

10-13-1: Mean Free Path Accumulation and Distributions

10-13-2: Interfaces—I

10-13-3: 2D Materials: Graphene, MoS₂, BN, etc.

10-13-4: Superlattices and Thin Films

10-13-5: Interfaces—II

10-14 Fundamentals of Multiscale Modeling (K8, K9, K20)

10-14-1: Fundamentals of Multiscale Modeling I

10-14-2: Fundamentals of Multiscale Modeling II

10-15 Thermal Conductivity Accumulation: Measurement and Prediction (K8 & K9)

10-15-1: Thermal Conductivity Accumulation: Measurement and Prediction

10-17 Nanoscale Thermal Metrology (K9)

10-17-1: Nanoscale Thermal Metrology I: Thermoreflectance-Based Techniques

10-17-2: Nanoscale Thermal Metrology II: Other Techniques

10-18 Nanoscale Heat Transfer in Systems & Devices (K9 & K6)

10-18-1: Nanofluids

10-18-2: Phase Change & Convection

10-18-3: 1D Nanomaterials & Systems: CNTs, NWs, Polymers, etc.

10-18-4: 3D Nanomaterials & Systems: Bulk and Nanocomposites

10-18-5: Thermal Transport at the Nanoscale

10-19 Advances in Enhanced Heat Transfer Equipment (K10 and PID)

10-19-1: Advances in Enhanced Heat Transfer Equipment I

10-20 Heat Exchangers in Thermal Storage Systems (K10)

10-20-1: Heat Exchangers in Thermal Storage Systems

10-21 Heat Transfer Equipment for Energy and Water (K10 and PID)

10-21-1: Heat Transfer Equipment for Energy and Water—I

10-24 Combustion and Fire Simulation, Modeling, and Experimental Techniques (K11)

10-24-1: Combustion and Fire Simulation, Modeling, & Experimental Techniques I

10-24-2: Combustion and Fire Simulation, Modeling, & Experimental Techniques II

10-24-3: Combustion and Fire Simulation, Modeling, & Experimental Techniques III

10-26 Industrial Combustion and Its Environmental Impact (K-11 & K-19)

10-26-1: Industrial Combustion and Its Environmental Impact

10-28 Heat Transfer in Gas Turbine Systems (K14)

10-28-1: Heat Transfer in Gas Turbine Systems I

10-28-2: Heat Transfer in Gas Turbine Systems II

10-29 Transport Phenomena in Manufacturing (Including Additive) and Materials Processing (K15)

10-29-1: Transport Phenomena in Manufacturing (including Additive) and Materials Processing

10-31 Thermal Management of Data Centers (K16)

10-31-1: Thermal Management of Data Centers and Computer Devices

10-35 Thermal Simulation Advances in Electronic Devices (K16)

10-35-1: Thermal Management of Electronic Devices

10-36 Nanotransport in Medicine and Biology (K17)

10-36-1: Transport in Medicine and Biology

10-38 Heat and Mass Transfer under Extreme Conditions Including Hot and Arid Climates (K18)

10-38-1: Heat Transfer under Extreme Conditions

10-38-2: Condensation Heat Transfer

10-39 Heat and Mass Transfer in Natural and Built Environment (K19)

10-39-1: Heat and Mass Transfer in Indoor Environment

10-39-2: Heat and Mass Transfer in the Ground and Buildings

10-40 Thermal Engineering, Waste Water Re-Use, and Global Climate Change

10-40-1: Thermal Systems for Energy Efficiency and Water Conservation

10-41 Inverse Problems and Optimal Design in Computational Heat Transfer (K20 & K6)

10-41-1: Inverse Problems and Optimal Design in Computational Heat Transfer I

10-42 Industrial Applications of Computational Heat Transfer (K20)

10-42-1: Applications of Natural Convection in Computational Heat Transfer

10-42-2: Computational Heat Transfer Methods and Applications

10-42-3: Applications of Computational Fluid Dynamics and Heat Transfer

10-42-4: Applications of Computational Heat Transfer

10-45 Validation, Verification, and Uncertainty Quantification in Computational Heat Transfer (K20)

10-45-1: Validation, Verification, and Uncertainty Quantification in Computational Heat Transfer I

10-47 Panel on Advances in Heat Transfer Education (K21)

10-47-1: Advances in Heat Transfer Education

10-49 Heat and Mass Transfer Photogallery (K22)

10-49-1: Visualization of Flow and Heat Transfer—I

10-49-2: Visualization of Flow and Heat Transfer—II

10-49-3: Visualization of Flow and Heat Transfer—III

10-53 Plenary

10-53-1: Heat Transfer Plenary Lecture—I

10-53-2: Heat Transfer Plenary Lecture—II

10-54 Max Jakob Lecture

10-54-1: Max Jakob Award Lecture

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TRACK 10 HEAT TRANSFER AND THERMAL ENGINEERING

Monday, November 17

10-2 Heat Transfer in Energy Systems: Fundamentals (K6)

10-2-2 Two-Phase Heat Transfer in Energy Systems

522A 9:45am–11:30am

Session Organizer: Timothy Fisher, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizer: Fatouh Al-Ragom, *Kuwait Institute for Scientific Research, Safat, Kuwait*

9:45am – Effect of Nanostructures on Meniscus Shape and Disjoining Pressure of Ultrathin Liquid Film

Technical Presentation. IMECE2014-38752

Han Hu, Ying Sun, Drexel University, Philadelphia, PA, United States

10:11am – On the Nature of Bubbles and Dry Spots in Pool Boiling of Water on Textured Surfaces

Technical Presentation. IMECE2014-40291

Navdeep Singh Dhillon, Jacopo Buongiorno, Kripa Varanasi, Massachusetts Institute of Technology, Cambridge, MA, United States

10:37am – Fully Coupled Elliptic Numerical Model for Film Condensation From Vapour-Gas Mixtures in Vertical Parallel Plate Channels

Technical Paper Publication. IMECE2014-37486

Foad Hassaninejadfarahani, Scott Ormiston, University of Manitoba, Winnipeg, MB, Canada

11:03am – Dynamics of the Nonevaporating Film in Pool Boiling and Its Role in CHF Enhancement

Technical Presentation. IMECE2014-37670

An Zou, Shalabh Maroo, Syracuse University, Syracuse, NY, United States

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/ Nanoscale Phase Change (K8, K9, K13, K16)

10-9-5 Phase Change Heat Transfer – 5

522B

9:45am–11:30am

Session Organizer: Debjyoti Banerjee, *Texas A&M University, College Station, TX, United States*

Session Co-Organizer: Mirza Shah, *Engineering Research Consultation, Redding, CT, United States*

9:45am – Increased Pool Boiling Heat Transfer Based on Hierarchical Microchanneled Copper Surfaces

Technical Presentation. IMECE2014-39215

Md Mahamudur Rahman, Jordan Pollack, Donald Fehlinger, Emre Olceroglu, Matthew McCarthy, Drexel University, Philadelphia, PA, United States

10:06am – Two-Phase Flow Control Using Wettability Gradient in Microchannel Heat Sinks

Technical Presentation. IMECE2014-40279

Navid Saneie, Yoon Jo Kim, Washington State University Vancouver, Vancouver, WA, United States, Seok Ho Yoon, Korea Institute of Machinery and Materials, Daejeon, Korea (Republic)

10:27am – Parametric Study on Transient Pool Boiling Heat Transfer Using Metal Rodlet

Technical Paper Publication. IMECE2014-40281

Chi Young Lee, Chang Hwan Shin, Dong Seok Oh, Tae-hyun Chun, Wang-kee In, Korea Atomic Energy Research Institute, Daejeon, Korea, Korea (Republic)

10:48am – Nucleate Boiling of Dielectric Liquids on Hydrophobic Patterned Surfaces

Technical Paper Publication. IMECE2014-37513

Nihal E. Joshua, Denesh K. Ajakumar, Huseyin Bostanci, University of North Texas, Denton, TX, United States

11:09am – Liquid Film Boiling Heat Transfer in the Presence and Absence of Gravity

Technical Paper Publication. IMECE2014-40352

Viral Patel, Jamal Yagoobi, Worcester Polytechnic Institute, Worcester, MA, United States, Franklin Robinson, Jeffrey Didion, National Aeronautics and Space Administration–GSFC, Greenbelt, MD, United States

10-13 Advances in Interfaces and Heat Sinks Including Nanoscale Conduction and Interfacial Effects (K8, K9, K16)

10-13-1 Mean Free Path Accumulation and Distributions

523B

9:45am–11:30am

Session Organizer: Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*

Session Co-Organizer: Thomas Beechem, *Sandia National Laboratories, Albuquerque, GA, United States*

9:45am – Quasiballistic Thermal Transport From Nanoline Arrays Studied Using Monte Carlo Simulations

Technical Presentation. IMECE2014-36984

Austin Minnich, Nicholas Dou, *California Institute of Technology, Pasadena, CA, United States*

10:02am – The Role of Phonons With Mean Free Paths in Micrometer Order on Heat Conduction in Silicon

Technical Presentation. IMECE2014-37933

Puqing Jiang, Yee Kan Koh, *National University of Singapore, Singapore, Singapore*

10:19am – How Close-Packing of Nanoscale Interfaces May Overcome Inefficiencies of Ballistic Transport in Heat Dissipation

Extended Abstract Presentation. IMECE2014-38306

Jorge Hernandez, Kathy Hoogetboom-Pot, Margaret Murnane, Henry Kapteyn, Damiano Nardi, *JILA-University of Colorado at Boulder, Boulder, CO, United States*, **Eric Anderson,** *Lawrence Berkeley National Laboratory, Berkeley, CA, United States*

10:36am – Relating Frequency Domain Thermoreflectance Thermal Conductivity Measurements to the Accumulation Function Through an Analytical Solution to the Boltzmann Transport Equation

Technical Presentation. IMECE2014-38828

Keith T. Regner, William L.C. Wei, Justin P. Freedman, Alan McGaughey, Jonathan A. Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*

10:53am – Mapping Thermal Conductivity Suppression in Metals Measured by Broadband Frequency Domain Thermoreflectance

Technical Presentation. IMECE2014-38845

Justin P. Freedman, Keith T. Regner, William L.C. Wei, Robert F. Davis, Jonathan A. Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*

11:10am – Measuring Mean Free Path Distribution Using Nanoline Arrays

Extended Abstract Presentation. IMECE2014-39163

Xiangwen Chen, Hang Zhang, Austin Minnich, *California Institute of Technology, Pasadena, CA, United States*

10-18 Nanoscale Heat Transfer in Systems & Devices (K9 and K6)

10-18-1 Nanofluids

522C

9:45am–11:30am

Session Organizer: Harish Ganapathy, *Intel Corporation, College Park, MD, United States*

Session Co-Organizers: Yanbao Ma, *University of California, Merced, Merced, CA, United States*, Ashok Ramu, *University of California, Santa Barbara, Santa Barbara, CA, United States*

9:45am – Low-Temperature Melting of Silver Nanoparticles in Subcooled and Saturated Water

Technical Paper Publication. IMECE2014-36963

Soochan Lee, Patrick Phelan, Lenore Dai, *Arizona State University, Tempe, AZ, United States*, **Robert Taylor,** *University of New South Wales, Sydney, Australia*, **Ravi Prasher,** *Sheetak Inc., Austin, TX, United States*

10:06am – Analysis of the Forced Convection in a Porous Channel Saturated by a Nanofluid: Effects of Brownian Diffusion and Thermophoresis

Technical Paper Publication. IMECE2014-39634

Eugenia Rossi di Schio, *Università di Bologna-DIN, Bologna, Italy*

10:27am – Review on Experimental and Numerical Investigations on Using Nanofluid in Volumetric Solar Energy Collectors

Technical Paper Publication. IMECE2014-40339

Siamak Mirmasoumi, *Chabahar Maritime University, Chabahar, Sistan and Baluchestan, Iran*, **Mohammad Pourgol-Mohammad,** *Sahand University of Technology, Tabriz, East Azarbaijan, Iran*

10:48am – Review on Nanofluid Heat Pipe

Technical Paper Publication. IMECE2014-39431

Maryam Shafahi, Kevin Anderson, Ali Borna, Alex Kim, Syukrirashiduhakim Subandi, Parham Khansari, Michael Lee, *California State Polytechnic University, Pomona, Pomona, CA, United States*

11:09am – Horton-Roger-Lapwood Convection in a Binary Nanofluid Saturated Porous Layer

Technical Paper Publication. IMECE2014-39814

Shilpi Agarwal, *Galgotias University, Greater Noida, Uttar Pradesh, India*, **Puneet Rana**, *Jaypee Institute of Information Technology, Noida, Uttar Pradesh, India*

10-19 Advances in Enhanced Heat Transfer Equipment (K10 and PID)

10-19-1 Advances in Enhanced Heat Transfer Equipment I

523A

9:45am–11:30am

Session Organizer: Sandra Boetcher, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*
Session Co-Organizers: Srinivasa Jeyakumar, *Suncor Energy Inc., Calgary, AB, Canada*, Tiruvadi Ravigururajan, *Wichita State University, Wichita, KS, United States*

9:45am – Visualization of FC-72 Flow Boiling in Parallel- and Counter-Flow Plate Heat Exchangers

Technical Paper Publication. IMECE2014-36689

Kohei Koyama, Yuya Nakamura, Hirofumi Arima, *Saga University, Imari, Saga, Japan*

10:11am – Numerical Simulation on Heat Transfer Enhancement of the Heat Exchanger With Helically Baffles

Technical Paper Publication. IMECE2014-37704

Huizhu Yang, Wen Jian, Simin Wang, Yulan Xue, Mengmeng Wang, *Xi'an Jiaotong University, Xi'an, China*

10:37am – Numerical Investigation on Thermal and Fluid Dynamic Behavior of Laminar Slot-Jet Impinging on a Surface at Uniform Heat Flux in a Confined Porous Medium in Local Thermal Non-Equilibrium Conditions

Technical Paper Publication. IMECE2014-39783

Bernardo Buonomo, Seconda, Oronzio Manca, Sergio Nardini, *Università degli Studi di Napoli, Aversa, Caserta, Italy*, **Guy Lauriat**, *Université Paris-Est, Marne-la-Vallée, Paris, France*

11:03am – Enhanced Convective Heat Transfer in High Porosity Metal Foams

Technical Paper Publication. IMECE2014-39982

Liwen Jin, Congfu Ma, Min Zhao, Xiangzhao Meng, Weibin Kang, Zhao Lu, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*, **Antony Wei**, *Shenzhen Envicool Technology Co., Ltd., Shenzhen, China*

10-38 Heat and Mass Transfer Under Extreme Conditions Including Hot and Arid Climates (K18)

10-38-1 Heat Transfer under Extreme Conditions

524A

9:45am–11:30am

Session Organizer: Zhixiong Guo, *Rutgers University, Piscataway, NJ, United States*

Session Co-Organizers: Qiuwang Wang, *Xi'an Jiaotong University, Xi'an, Shaanxi, Shaanxi, China*, Xuehu Ma, *Dalian University of Technology, Dalian, Liaoning, China*

9:45am – Comparison of Phase Function Normalization Techniques for Radiative Transfer Analysis Using DOM

Technical Paper Publication. IMECE2014-36756

Brian Hunter, Zhixiong Guo, Matthew Frenkel, *Rutgers University, Piscataway, NJ, United States*

10:11am – One-Dimensional Numerical Study for Thermal Performance of Intermediate Fluid Vaporizer for Liquefied Natural Gas

Technical Paper Publication. IMECE2014-37286

ZhiGuo Qu, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10:37am – Direct-Coupling Simulation of Thermal-Hydraulic and Stress Analysis in a Cross-Wave Primary Surface Heat Exchanger

Technical Paper Publication. IMECE2014-37325

Jie Zhang, Ting Ma, Min Zeng, Qiuwang Wang, *Xi'an Jiaotong University, Xi'an, Shaanxi, Shaanxi, China*, **Srinath Ekkad**, *Virginia Tech, Blacksburg, VA, United States*

11:03am – Measurement of Temperature of Chemically Non-Reacting Internal Flows Using Tunable-Diode Laser Absorption Spectrometer

Technical Paper Publication. IMECE2014-38432

Kazim Akyuzlu, *University of New Orleans, New Orleans, LA, United States*

10-49 Heat and Mass Transfer Photogallery (K22)

10-49-1 Visualization of Flow and Heat Transfer—I

524B

9:45am–11:30am

Session Organizer: Chang Kyoung Choi, *Michigan Technological University, Houghton, MI, United States*

Session Co-Organizer: David Pratt, *AFRL/RBS, WPAFB, OH, United States*

9:45am – Flow Visualization of Wax Deposition in Pipeline Flow Assurance

Poster Presentation. IMECE2014-38120

Jungho Lee, Sangho Sohn, Dong-Wook Oh, *Korea Institute of Machinery and Materials, Daejeon, Korea (Republic)*

10:02am – Flow Visualization of Bubbly Flow Driven by Static Mixer

Poster Presentation. IMECE2014-38126

Jungho Lee, Sangho Sohn, Dong-Wook Oh, *Korea Institute of Machinery and Materials, Daejeon, Korea (Republic)*

10:19am – Inconsistent Phenomena Between Rebound and Coalescence After a Drop-let Impact on a Static Droplet Deposited on a Solid Surface

Technical Presentation. IMECE2014-40307

Joo Hyun Moon, Seong Hyuk Lee, *Chung-Ang University, Seoul, Korea (Republic)*, **Chang Kyoung Choi**, *Michigan Technological University, Houghton, MI, United States*

10:36am – CFD Analysis of Transient Thermal-Hydraulic Behavior in a PWR Steam Generator During Blowdown

Technical Presentation. IMECE2014-40493

Jong Chull Jo, Bok Ki Min, *Korea Institute of Nuclear Safety, Daejeon, Korea (Republic)*

10:53am – Visualization of Multiscale Processes—Bubble Dynamics in Surface Active Colloids

Poster Presentation. IMECE2014-40644

Sanjivan Manoharan, Deepak Saagar Kalaikadal, Raj M Manglik, Milind Jog, *University of Cincinnati, Cincinnati, OH, United States*, **Eugeniya Iskrenova-Ekiert**, *UES, Inc./Air Force Research Laboratory, WPAFB, OH, United States*, **Soumya Patnaik**, *Wright Patterson Air Force Base, WPAFB, OH, United States*

11:10am – Visualization of a Fiber Supplemented Droplet Diving Into Two Liquid Layers

Poster Presentation. IMECE2014-40668

Tsung-chow Su, Alyssa Harris, *Florida Atlantic University, Boca Raton, FL, United States*

10-53 Plenary

10-53-1 Heat Transfer Plenary Lecture—I

524C

9:45am–11:30am

Session Organizer: Zhixiong Guo, *Rutgers University, Piscataway, NJ, United States*

Session Co-Organizers: Ronggui Yang, *University of Colorado, Boulder, CO, United States*, Sumanta Acharya, *Louisiana State University, Baton Rouge, LA, United States*

9:45am – Innovating Thermal Materials, Devices, and Energy Conversion Systems

Plenary Presentation. IMECE2014-40605

Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*

10-2 Heat Transfer in Energy Systems: Fundamentals (K6)

10-2-3 Heat Conduction and Convection in Energy Systems

522A

1:00pm–2:45pm

Session Organizer: Halil Berberoglu, *University of Texas at Austin, Austin, TX, United States*

Session Co-Organizer: Todd Otanicar, *University of Tulsa, Tulsa, OK, United States*

1:00pm – Two-Dimensional–Steady-State–Natural Convection During the Buoyancy-Induced Flow of CuO-Water Nanofluid Along a Vertical Channel

Technical Paper Publication. IMECE2014-37949

Irene Koronaki, Michalis Nitsas, *National Technical University of Athens, Zografou, Greece*, **Charalampos Vallianos**, *National Technical University of Athens, Athens, Greece*

1:26pm – Heat Transfer Analysis of a Buoyancy-Induced Flow of Nanofluids Along a Vertical Hot Plate—Effect of Nanoparticle Type and Diameter

Technical Paper Publication. IMECE2014-37965

Irene Koronaki, Michalis Nitsas, *National Technical University of Athens, Zografou, Greece*

1:52pm – Numerical Analysis of Heat Exchangers Used in a Liquid Piston Compressor Using a One-Dimensional Model With an Embedded Two-Dimensional Submodel

Technical Paper Publication. IMECE2014-38567

Chao Zhang, Terrence Simon, Jacob Wieberdink, Perry Li, James Van De Ven, *University of Minnesota, Minneapolis, MN, United States*, **Eric Loth**, *University of Virginia, Charlottesville, VA, United States*

2:18pm – Experimental Investigation of the Effect of Free Stream Flow on the Thermal Behavior of a Turbulent Wall Jet

Technical Paper Publication. IMECE2014-36244

Johnny Issa, *University of Balamand, Tripoli, Lebanon*, **Alfonso Ortega**, *Villanova University, Villanova, PA, United States*

10-8 Thermophysical Properties (K7)

10-8-1 Thermophysical Properties I

524C

1:00pm–2:45pm

Session Organizer: Heng Ban, *Utah State University, Logan, UT, United States*

1:00pm – Experimental Study of Phase-Changeable Water/Polyalphaolefin Nanoemulsion Fluidshaolefin Nanoemulsion Fluids

Technical Paper Publication. IMECE2014-36533

Jiajun Xu, *University of the District of Columbia, Washington, DC, United States*, **Boualem Hammouda**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Fangyu Cao, Bao Yang**, *University of Maryland, College Park, College Park, MD, United States*

1:26pm – Measurement of Thermal Conductivity of a Flexible Substrate

Technical Paper Publication. IMECE2014-39236

Vivek Vishwakarma, Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

1:52pm – Effect of Uncertainties in Physical Properties on Mixed Convection Along a Rotating Vertical Slender Cylinder With Nanofluids

Technical Paper Publication. IMECE2014-39769

Puneet Rana, Lokendra Kumar, *Jaypee Institute of Information Technology, Noida, Uttar Pradesh, India*

2:18pm – Prediction of Viscosity of Nanofluids Using Artificial Neural Networks

Technical Paper Publication. IMECE2014-40354

Ningbo Zhao, Shuying Li, Zhitao Wang, Yunpeng Cao, *Harbin Engineering University, Harbin, China*

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-1 Phase Change Heat Transfer – 1

522B

1:00pm–2:45pm

Session Organizer: Debjyoti Banerjee, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: Siddharth Talapatra, *HTRI Worldwide Headquarters, College Station, TX, United States*, Vinod Narayanan, *Oregon State University, Corvallis, OR, United States*

1:00pm – Boiling and Condensing Flow Investigations for Enabling Breakthrough Thermal and Power Systems Technologies

Invited Presentation. IMECE2014-40851

Amitabh Narain, *Michigan Technological University, Houghton, MI, United States*

1:17pm – Innovative Realizations of High Heat-Flux Boiling and Condensing Flows for Millimeter- and Micrometer-Scale Applications

Extended Abstract Publication. IMECE2014-37319

Michael Kivisalu, *Michigan Technological University, Croton-on-Hudson, NY, United States*, **Amitabh Narain, Patcharapol Gorgitrattanagul, Ranjeeth Naik**, *Michigan Technological University, Houghton, MI, United States*

1:34pm – Precise Control of Critical Heat Flux in Pool Boiling of Water

Technical Presentation. IMECE2014-40288

Navdeep Singh Dhillon, Jacopo Buongiorno, Kripa Varanasi, *Massachusetts Institute of Technology, Cambridge, MA, United States*

1:51pm – Role of Electrostatic Interactions in Disjoining Pressure of Water Thin Films on Nanostructured Alumina Substrates

Technical Presentation. IMECE2014-38773

Han Hu, Ying Sun, *Drexel University, Philadelphia, PA, United States*

2:08pm – Adiabatic Two-Phase Flow Distribution and Pressure Drop in Microchannel Heat Exchanger Headers

Technical Presentation. IMECE2014-38572

Allison J. Mahvi, Srinivas Garimella, *Georgia Institute of Technology, Atlanta, GA, United States*

2:25pm – Transitions of Phase Change Modes in Porous Wick Structures

Technical Paper Publication. IMECE2014-36138

Steve Cai, Avijit Bhunia, *Teledyne Scientific Company*

10-13 Advances in Interfaces and Heat Sinks Including Nanoscale Conduction and Interfacial Effects (K8, K9, K16)

10-13-2 Interfaces—I

523B

1:00pm–2:45pm

Session Organizer: Chris Dames, *University of California, Berkeley, Berkeley, CA, United States*

Session Co-Organizers: Ming Hu, *RWTH Aachen University, Aachen, Germany*, Souvik Pal, *University of California, Merced, Merced, CA, United States*, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*

1:00pm – Enhanced Thermal Transport Across Hard-Soft Material Interfaces by Molecular Bridge

Technical Presentation. IMECE2014-36795

Teng Zhang, *University of Notre Dame, South Bend, IN, United States*, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*

1:17pm – Effect of the Interface Mixing Layer on the Thermal Boundary Conductance of Metal-Organic Semiconductor Thin Film—Numerical Study by Lattice Boltzmann Method

Technical Paper Publication. IMECE2014-37785

Xinyu Wang, Paddy K.L. Chan, *University of Hong Kong, Hong Kong, Hong Kong*

1:34pm – Ligand Length Effect on the Thermal Conductivity of Nanocrystal Arrays

Technical Presentation. IMECE2014-38659

Geoff Wehmeyer, William B. Chang, Boris Russ, Rachel A. Segalman, Chris Dames, *University of California, Berkeley, Berkeley, CA, United States*, Jeffrey J. Urban, *Lawrence Berkeley National Laboratory, Berkeley, CA, United States*

1:51pm – Debye Temperature Effect on Thermal Conductance Across a Self-Assembled Monolayer Junction

Technical Presentation. IMECE2014-38785

Shubhaditya Majumdar, Scott N. Schifres, Jonatan A. Sierra-Suarez, Wee liat Ong, C. Fred Higgs, III, Alan McGaughey, Jonathan A. Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*

2:08pm – Thermal Conductance Across Metal/Phosphonic Acid/Sapphire Interfaces: Ballistic Versus Diffusive Vibrational Transport

Technical Presentation. IMECE2014-40104

John T. Gaskins, John C. Duda, Caroline Gorham, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*, Anuradha Bulusu, Samuel Graham, *Georgia Institute of Technology, Atlanta, GA, United States*

2:25pm – Phonon Mean Free Path-Dependence of Thermal Interface Conductance Accumulation

Technical Presentation. IMECE2014-38823

Shubhaditya Majumdar, Ankit Jain, Simon Lu, Jonathan A. Malen, Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

10-18 Nanoscale Heat Transfer in Systems & Devices (K9 and K6)

10-18-2 Phase Change & Convection

522C

1:00pm–2:45pm

Session Organizer: Sophia Haussener, *EPFL, Lausanne, Switzerland*

Session Co-Organizers: Christophe Frankiewicz, *Iowa State University, Ames, IA, United States*, Nesrin Ozalp, *Katholieke Universiteit Leuven, Leuven, Belgium*

1:00pm – Systematic Study of Pool Boiling Heat Transfer on Multiscale Structured Surfaces

Technical Paper Publication. IMECE2014-36236

Russell Rioux, Calvin Li, *Villanova University, Villanova, PA, United States*, Eric Nolan, *NAVAIR, Lakehurst, NJ, United States*

1:17pm – Evaporation and Explosive Boiling Phenomena Over a Nanoparticle Deposited Surface

Technical Paper Publication. IMECE2014-36257

Aashique Rezwan, A.K.M. Monjur Morshed, *Bangladesh University of Engineering & Technology, Dhaka, Dhaka, Bangladesh*

1:34pm – Two-Phase Convective Flow in Microchannel With Nanoporous Coating

Technical Paper Publication. IMECE2014-36752

A.K.M. Monjur Morshed, Aashique Rezwan, *Bangladesh University of Engineering & Technology, Dhaka, Dhaka, Bangladesh*, **Titan Paul**, *University of South Carolina, West Columbia, SC, United States*, **Jamil Khan**, *University of South Carolina, Columbia, SC, United States*

1:51pm – Molecular Dynamics Simulations of Nano Thermal Rectifier

Technical Presentation. IMECE2014-37257

Gisuk Hwang, *Wichita State University, Wichita, KS, United States*

2:08pm – Effect of Heated Zone Size on Micro- and Nanoscale Convective Heat Transfer

Technical Presentation. IMECE2014-37314

Raghu Pulavarthy, Tarek Alam, Md Haque, *Pennsylvania State University, University Park, PA, United States*

2:25pm – Knudsen Thermal Force Generation at the Microscale

Technical Paper Publication. IMECE2014-38724

Andrew Strongrich, Alina Alexeenko, *Purdue University, West Lafayette, IN, United States*

10-20 Heat Exchangers in Thermal Storage Systems (K10)

10-20-1 Heat Exchangers in Thermal Storage Systems

524A

1:00pm–2:45pm

Session Organizer: Gisuk Hwang, *Wichita State University, Wichita, KS, United States*

Session Co-Organizers: Raj M. Manglik, *University of Cincinnati, Cincinnati, OH, United States*, Arun Muley, *Boeing, Huntington Beach, CA, United States*

1:00pm – Evaluation of Thermal Enhancement by Metal Foams in a Shell and Tube Thermal Storage Unit

Technical Presentation. IMECE2014-37142

Evan Fleming, Shaoyi Wen, Li Shi, *University of Texas at Austin, Austin, TX, United States*, **Alexandre K. da Silva**, *Federal University of Santa Catarina, Araranguá, SC, Brazil*

1:17pm – Numerical Investigation of Porous Medium Heat Transfer

Technical Paper Publication. IMECE2014-37387

Mohammad Arif Hossain, Sarzina Hossain, *University of Texas at El Paso, El Paso, TX, United States*

1:34pm – Thermal Performance and Sizing of Moving Bed Heat Exchangers

Extended Abstract Publication. IMECE2014-38197

Pedro Isaza, Markus Bussmann, *University of Toronto, Toronto, ON, Canada*, **W. David Warnica**, *Warnica Technology Inc., Mississauga, ON, Canada*

1:51pm – Absorption Characteristics of Multilayered Thin Lithium Bromide (LiBr) Solution Film

Technical Presentation. IMECE2014-40424

Mehdi Mortazavi, Rasool Nasr Isfahani, Sajjad Bigham, Saeed Moghaddam, *University of Florida, Gainesville, FL, United States*

2:08pm – 3D Surface Microstructures for Micromixing of Lithium Bromide (LiBr) Desiccant

Technical Presentation. IMECE2014-40425

Rasool Nasr Isfahani, Sajjad Bigham, Wei Xing, Saeed Moghaddam, *University of Florida, Gainesville, FL, United States*

2:25pm – Numerical and Experimental Investigation on Thermal Management of Outdoor Battery Cabinet

Technical Paper Publication. IMECE2014-38229

Xiangzhao Meng, Zhao Lu, Leijie Su, Xilian Luo, Liwen Jin, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*, **Antony Wei**, *Shenzhen Envicool Technology Co., Ltd., Shenzhen, China*, **John C. Chai**, *Petroleum Institute, Abu Dhabi, United Arab Emir.*

10-49 Heat and Mass Transfer Photogallery (K22)

10-49-2 Visualization of Flow and Heat Transfer – II

524B

1:00pm–2:45pm

Session Organizer: Chang Kyoung Choi, *Michigan Technological University, Houghton, MI, United States*

Session Co-Organizer: David Pratt, *AFRL/RBS, WPAFB, OH, United States*

Session Co-Chair: Matthew McCarthy, *Drexel University, Philadelphia, PA, United States*

1:00pm – Dropwise Condensation on Superhydrophobic Microtextured Surfaces

Extended Abstract Presentation. IMECE2014-40916

Minhaeng Cho, *Chung-ang University, Seoul, Korea (Republic)*

1:52pm – Visualization of a Rebounding Droplet Impacting on a Static Droplet Deposited on a Solid Surface

Extended Abstract Presentation. IMECE2014-40917

Seong Hyuk Lee, *Chung-Ang University, Seoul, Korea (Republic)*

10-4 Heat Transfer in Energy Systems: Design (K6)

10-4-1 Virtual Product Development in Energy Systems I

522A

3:00pm–4:45pm

Session Organizer: Ab Hashemi, *Lockheed Martin, Chandler, AZ, United States*

Session Co-Organizers: Jennifer Batson, *Lockheed Martin, Chandler, AZ, United States*, Diane Pytel, *Lockheed Martin, Los Altos, CA, United States*

3:00pm – Review and Comparison of Ejectors Design Methods and Their Application

Technical Paper Publication. IMECE2014-36146

Taide Tan, *Hunan University, Hunan, China*, **Wei Lu**, *Jiyun Liu*, **Han Chen**, *Guangxi University, Nanning City, China*

3:17pm – Transfer and Storage of Molten Salt

Technical Paper Publication. IMECE2014-36481

Kenneth Bateman, **Matthew C. Morrison**, *Idaho National Laboratory, Idaho Falls, ID, United States*

3:34pm – Air Preheater Sealing Advances With Adaptive Brush Design.

Technical Presentation. IMECE2014-40563

Pavan Ravulaparthi, *Sealeze, A Unit of Jason, North Chesterfield, VA, United States*

3:51pm – Design of a Heat Exchanger and a Gas Sampling System for Oxy-Fuel Combustion

Technical Presentation. IMECE2014-36940

Ramy Khalid Zakaria El Adli Imam, *American University in Cairo, Cairo, Egypt*

4:08pm – Heat Transfer Enhancement for Turbulent Flows in Corrugated Tubes

Technical Paper Publication. IMECE2014-37520

Zhimin Yao, *Wuhan University of Technology, Wuhan, Hubei, China*, **Zhigang Feng**, *University of Texas at San Antonio, San Antonio, TX, United States*, **Zuoqin Qin**, **Zhizhe Chen**, *Wuhan University of Technology, Wuhan, Hubei, China*

4:25pm – Development of a Multiloop Flow and Heat Transfer Facility for Advanced Nuclear Reactor Thermal Hydraulic and Hybrid Energy System Studies

Technical Paper Publication. IMECE2014-39057

Jim O'Brien, **Piyush Sabharwall**, **SuJong Yoon**, *Idaho National Laboratory, Idaho Falls, ID, United States*

10-8 Thermophysical Properties (K7)

10-8-2 Thermophysical Properties II

524C

3:00pm–4:45pm

Session Organizer: Heng Ban, *Utah State University, Logan, UT, United States*

3:00pm – Thermal Properties of Microscale Inorganic Light-Emitting Diodes in a Pulsed Operation

Technical Presentation. IMECE2014-37252

Yuhang Li, **Yonggang Huang**, *Northwestern University, Evanston, IL, United States*, **Jizhou Song**, *Zhejiang University, Hangzhou, Zhejiang, China*, **John Rogers**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

3:21pm – Mode-Decay Molecular Dynamics for Frequency-Dependent Phonon Scattering Rates

Technical Paper Publication. IMECE2014-38914

Matthew D. Gerboth, **Greg Walker**, *Vanderbilt University, Nashville, TN, United States*

3:42pm – Thermal Characterization of IM7/8552-1 Carbon-Epoxy Composites

Technical Paper Publication. IMECE2014-40030

Messiha Saad, *Washington State University, Tri-Cities, Richland, WA, United States*, **Sandi Miller**, *NASA, Cleveland, OH, United States*, **Torrence Marunda, II**, *North Carolina A&T State University, Greensboro, NC, United States*

4:03pm – 3D Examination of the Thermal Properties of Carbon-Carbon Composites

Technical Paper Publication. IMECE2014-40146

Melanie Patrick, *North Carolina A&T State University, Greensboro, NC, United States*, **Messiha Saad**, *Washington State University, Tri-Cities, Richland, WA, United States*

4:24pm – Review on the Thermal Conductivity and Viscosity Models of Nanofluids—Impact on Convection Coefficient Calculations

Technical Paper Publication. IMECE2014-37968

Irene Koronaki, **Michalis Nitsas**, **Vasilis Papaefthimiou**, *National Technical University of Athens, Zografou, Greece*

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-2 Phase Change Heat Transfer—2

522B 3:00pm–4:45pm

Session Organizer: Amitabh Narain, *Michigan Technological University, Houghton, MI, United States*

Session Co-Organizer: Huseyin Bostanci, *University of North Texas, Denton, TX, United States*

3:00pm – Water Droplet Vaporization on Superhydrophilic Nanostructured Surfaces at High and Low Superheat

Invited Paper Publication. IMECE2014-39957

Jorge Padilla, Van Carey, *University of California, Berkeley, Berkeley, CA, United States*

3:21pm – Improved Non-Equilibrium Film Method for the Design of High-Temperature-Glide, Mini- and Microchannel Zeotropic Condensers

Technical Paper Publication. IMECE2014-38543

Brian Fronk, *Georgia Institute of Technology, Decatur, GA, United States,* **Srinivas Garimella,** *Georgia Institute of Technology, Atlanta, GA, United States*

3:42pm – Sliding Bubble-Pumped Motion Induced by Surface Microstructure in Boiling in Dielectric Fluids Under Reduced Gravity

Technical Paper Publication. IMECE2014-37714

Naveenan Thiagarajan, *GE Global Research, Niskayuna, NY, United States,* **Sushil H. Bhavnani,** *Auburn University, Auburn, AL, United States,* **Vinod Narayanan,** *Oregon State University, Corvallis, OR, United States*

4:03pm – Factors Affecting the In-Structure Motion of Condensate Droplets on Superhydrophobic Surfaces

Technical Presentation. IMECE2014-39202

Emre Olceroglu, Md Mahamudur Rahman, Matthew McCarthy, *Drexel University, Philadelphia, PA, United States*

4:24pm – Study on Dropwise Condensation by Using Functionalized Heat Transfer Surface

Technical Paper Publication. IMECE2014-37400

Yasuo Koizumi, *Shinshu University, Kanagawa, Japan,* **Shota Yoshizawa,** *Shinshu University, Ueda, Nagano, Japan*

10-13 Advances in Interfaces and Heat Sinks including Nanoscale Conduction and Interfacial Effects (K8, K9, K16)

10-13-3 2D Materials: Graphene, MoS₂, BN, etc.

523B 3:00pm–4:45pm

Session Organizer: Austin Minnich, *California Institute of Technology, Pasadena, CA, United States*

Session Co-Organizer: Yaguo Wang, *University of Texas at Austin, Austin, TX, United States*

3:00pm – Mechanism of Low Thermal Conductivity of Molybdenum Disulphide (MoS₂)

Technical Presentation. IMECE2014-36213

Xufei Wu, *University of Notre Dame, South Bend, IN, United States,* **Tengfei Luo,** *University of Notre Dame, Notre Dame, IN, United States*

3:21pm – Predicting Phonon Transport in Two-Dimensional Boron Nitride-Graphene Superlattices

Technical Paper Publication. IMECE2014-37326

Carlos da Silva, Julia Sborz, David A. Romero, Cristina Amon, *University of Toronto, Toronto, ON, Canada*

3:42pm – Phonon Transport at Molybdenum Disulfide and Metal Interface

Technical Presentation. IMECE2014-37605

Zhequan Yan, Liang Chen, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*

4:03pm – In-Plane Thermal Conductivity of Few-Quintuple-Layer Bismuth Telluride Measured by Micro-Raman Spectroscopy

Technical Presentation. IMECE2014-39682

Zhe Luo, Jifa Tian, Woongsik Nam, Yong P. Chen, Xianfan Xu, *Purdue University, West Lafayette, IN, United States*

4:24pm – Thermal Transport in Single-Layer Graphene Doped With h-BN Islands

Technical Presentation. IMECE2014-39618

Yan Wang, Rajib Paul, Timothy Fisher, Xiulin Ruan, *Purdue University, West Lafayette, IN, United States*

10-18 Nanoscale Heat Transfer in Systems & Devices (K9 and K6)

10-18-3 1D Nanomaterials & Systems: CNTs, NWs, Polymers, etc.

522C

3:00pm–4:45pm

Session Organizer: Bob Sayer, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Organizers: Xiulin Ruan, *Purdue University, West Lafayette, IN, United States*, John Tencer, *Sandia National Laboratories, Albuquerque, NM, United States*

3:00pm – Carbon Nanotube Based Solar Cells That Can Regenerate

Technical Presentation. IMECE2014-36716

Hanyu Zhang, Srijana Ghimire, Matthew Bork, Molly Riccitelli, David McMillin, Jong Hyun Choi, *Purdue University, West Lafayette, IN, United States*

3:21pm – Thermal Transport and Thermal Stability of 10 Different Polymer Fibers

Technical Presentation. IMECE2014-36798

Teng Zhang, *University of Notre Dame, South Bend, IN, United States*, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*

3:42pm – Thermal Characterization of Ultralight Multifunctional Nanotrusses

Technical Presentation. IMECE2014-36981

Nicholas Dou, Austin Minnich, *California Institute of Technology, Pasadena, CA, United States*

4:03pm – Molecular Dynamics Simulation of Interfacial Thermal Conductance at Physically Interacting Single-Wall Carbon Nanotubes

Technical Presentation. IMECE2014-37071

Ajit Roy, Jonghoon Lee, Barry Farmer, *Air Force Research Laboratory, Dayton, OH, United States*, Vikas Varshney, *Air Force Research Laboratory/Universal Technology Corporation, Dayton, OH, United States*, Joshua Brown, *Louisiana Technology University, Ruston, LA, United States*, Andrey Voevodin, *Air Force Research Laboratory, WPAFB, OH, United States*

4:24pm – Thermal Conductivity in Polymer Brushes

Technical Presentation. IMECE2014-38759

Andrew Robbins, Austin Minnich, *California Institute of Technology, Pasadena, CA, United States*

10-38 Heat and Mass Transfer Under extreme Conditions Including Hot and Arid Climates (K18)

10-38-2 Condensation Heat Transfer

524A

3:00pm–4:45pm

Session Organizer: Zhixiong Guo, *Rutgers University, Piscataway, NJ, United States*

Session Co-Organizers: Qiuwang Wang, *Xi'an Jiaotong University, Xi'an, Shaanxi, Shaanxi, China*, Xuehu Ma, *Dalian University of Technology, Dalian, Liaoning, China*

3:00pm – Thermodynamic Performance of Liquid-Vapor Separation Air-Cooled Condenser in ORC System at Low Ambient Temperature

Technical Paper Publication. IMECE2014-37231

Ying Chen, Wenxian Zheng, Tianming Zhong, Nan Hua, *Guangdong University of Technology, Guangzhou, China*

3:21pm – Numerical Investigation of Laminar Filmwise Condensation of Water Vapor in Horizontal Tube With VOF Method in the Presence of Air

Technical Paper Publication. IMECE2014-37331

Zhan Yin, Jianjun Wen, Min Zeng, *Xi'an Jiaotong University, Xi'an, China*, Qiuwang Wang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

3:42pm – Multiscale Simulations of Fluid Flow for Finned Elliptic Tube Heat Exchangers Using Porous Media APPR Multiscale OACH

Technical Paper Publication. IMECE2014-37655

Ting Qu, Ting Ma, Min Zeng, *Xi'an Jiaotong University, Xi'an, China*, Yi-tung Chen, *University of Nevada Las Vegas, Las Vegas, NV, United States*, Qiuwang Wang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

4:03pm – Visual and Numerical Study for Dropwise Condensation Heat Transfer Mechanism of Steam-Air Mixture Vapor

Technical Paper Publication. IMECE2014-39742

Xuehu Ma, Wen Rongfu, Zhong Lan, *Dalian University of Technology, Dalian, Liaoning, China*, Xingdong Zhou, *BAC Company, China, Dalian, China*

4:24pm – Condensation on Superhydrophobic TiO₂ Nanotube-Covered Titanium Surfaces

Technical Presentation. IMECE2014-37232

Mohamed Alhosani, Shaojun Yuan, Guanqiu Li, Amal Alghaferi, TieJun Zhang, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

10-49 Heat and Mass Transfer Photogallery (K22)

10-49-3 Visualization of Flow and Heat Transfer—III
524B 3:00pm–4:45pm

Session Organizer: David Pratt, *AFRL/RBS, WPAFB, OH, United States*

Session Co-Organizer: Chang Kyoung Choi, *Michigan Technological University, Houghton, MI, United States*

Tuesday, November 18

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-3 Phase Change Heat Transfer—3
525B 9:45am–11:30am

Session Organizer: Amitabh Narain, *Michigan Technological University, Houghton, MI, United States*

Session Co-Organizer: Debjyoti Banerjee, *Texas A&M University, College Station, TX, United States*

9:45am – Steady and Unsteady Simulations for Annular Internal Condensing Flows in a Channel

Technical Paper Publication. IMECE2014-38445
Ranjeeth Naik, Amitabh Narain, Soumya Mitra, *Michigan Technological University, Houghton, MI, United States*

10:06am – Scale Effect on Dropwise Condensation on Superhydrophobic Surfaces

Technical Presentation. IMECE2014-39445
Ching-Wen Lo, Ming-Chang Lu, *National Chiao Tung University, Hsinchu, Taiwan*, **Chi-chuan Wang,** *National Chiao Tung University, Hsinchu, Taiwan*

10:27am – Temperature-Dependent Adsorption of Argon on Gold: A Molecular Dynamics Study

Technical Paper Publication. IMECE2014-38629
Steven Easter, Christopher Baker, Pamela Norris, *University of Virginia, Charlottesville, VA, United States*

10:48am – Experimental Investigation on Boiling Phenomena of Bi-Layer Composite Porous Wicks Textured With Nanoporous Layer

Technical Paper Publication. IMECE2014-36833
Jeehoon Choi, *Zalman Tech, Gyeonggi-do, Korea (Republic)*, **Hwankook Kang,** *Dongjeon Advanced Thermal System, Bucheon, Korea (Republic)*, **Byungho Sung, Yunkeun Lee,** *Zalman Tech, Seoul, Korea (Republic)*, **Yongsoo Jang,** *Zalman Tech, Anyang, Gyeonggi-do, Korea (Republic)*, **Diana-Andra Borca-Tasciuc,** *Rensselaer Polytechnic Institute, Troy, NY, United States*

11:09am – High Pressure Pool Boiling on a Hydrophobic Surface

Technical Paper Publication. IMECE2014-38250
Nanxi Li, Amy Betz, *Kansas State University, Manhattan, KS, United States*

10-13 Advances in Interfaces and Heat Sinks Including Nanoscale Conduction and Interfacial Effects (K8, K9, K16)

10-13-4 Superlattices and Thin Films
524C 9:45am–11:30am

Session Organizer: Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*

Session Co-Organizer: Scott Huxtable, *Virginia Tech, Blacksburg, VA, United States*

9:45am – Effects of Focused Ion Beam Milling on the Out-of-Plane Thermal Conductivity and Boundary Conductance of Silicon

Technical Presentation. IMECE2014-40191
Seyedhamidrez Alaie, Zayd C. Leseman, *University of New Mexico, Albuquerque, NM, United States*, **Brian Donovan, Ashutosh Giri, John T. Gaskins, Patrick Hopkins,** *University of Virginia, Charlottesville, VA, United States*

10:06am – Impact of Nanovoids on the Thermal Conductivity of Heavily-Doped Nanosilicon Thin Films

Technical Presentation. IMECE2014-38624
Marc T. Dunham, Aditya Sood, Mehdi Asheghi, Kenneth Goodson, *Stanford University, Stanford, CA, United States*, **Bruno Lorenzi, Dario Narducci,** *University of Milano Bicocca, Milano, Italy*, **Rita Tonini, Giampiero Ottaviani,** *University of Modena and Reggio Emilia, Modena, Italy*

10:27am – Thickness Dependence of Kapitza Resistance at a Substrate-Thin Film Interface: Effect of Phonon Scattering at the Thin Film Surface

Technical Presentation. IMECE2014-39925

Zhi Liang, Pawel Keblinski, *Rensselaer Polytechnic Institute, Troy, NY, United States*

10:48am – Size Effects on the Thermal Conductivity of Amorphous Films

Technical Presentation. IMECE2014-39861

John T. Gaskins, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*, **Mirza Mohammad Mahbube Elahi, Duncan W. McClure, Zayd C. Leseman**, *University of New Mexico, Albuquerque, NM, United States*

11:09am – Decomposition of Coherent and Incoherent Phonon Conduction in Superlattices and the Localization of Coherent Phonons in Random Multilayers

Technical Presentation. IMECE2014-39258

Yan Wang, Haoxiang Huang, Xiulin Ruan, *Purdue University, West Lafayette, IN, United States*

10-18 Nanoscale Heat Transfer in Systems & Devices (K9 and K6)

10-18-4 3D Nanomaterials & Systems: Bulk and Nanocomposites

510A

9:45am–11:30am

Session Organizer: Amy Fleischer, *Villanova University, Villanova, PA, United States*

Session Co-Organizer: Ronald Warzoha, *United States Naval Academy, Annapolis, MD, United States*

9:45am – Prediction of Non-Equilibrium Heat Conduction Using Parallel Computation of the Phonon Boltzmann Transport Equation

Technical Paper Publication. IMECE2014-36084

Syed A. Ali, Gautham Kollu, Sandip Mazumder, P. Sadayappan, *Ohio State University, Columbus, OH, United States*

10:11am – Validation of a Unified Nondiffusive-Diffusive Phonon Transport Model for Nanoscale Heat Transfer Simulations

Technical Paper Publication. IMECE2014-38262

Ashok Ramu, *University of California Santa Barbara, Santa Barbara, CA, United States*, **Yanbao Ma**, *University of California at Merced, Merced, CA, United States*

10:37am – Effect of Long and Short Range Order on SiGe Alloy Thermal Conductivity

Technical Presentation. IMECE2014-38524

Christopher Baker, Pamela Norris, *University of Virginia, Charlottesville, VA, United States*

11:03am – Network Model for the Thermal Conductivity of Pillared-Graphene Architectures

Technical Paper Publication. IMECE2014-40170

Jingjing Shi, Yalin Dong, Timothy Fisher, Xiulin Ruan, *Purdue University, West Lafayette, IN, United States*

10-53 Plenary

10-53-2 Heat Transfer Plenary Lecture—II

510B

9:45am–11:30am

Session Organizer: Li Shi, *University of Texas at Austin, Austin, TX, United States*

Session Co-Organizers: Yuwen Zhang, *University of Missouri, Columbia, MO, United States*, Sumanta Acharya, *Louisiana State University, Baton Rouge, LA, United States*

9:45am – Ultrafast Spectroscopy for Energy Research

Plenary Presentation. IMECE2014-40606

Xianfan Xu, *Purdue University, West Lafayette, IN, United States*

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-4 Phase Change Heat Transfer—4

525B

1:00pm–2:45pm

Session Organizer: Matthew McCarthy, *Drexel University, Philadelphia, PA, United States*

Session Co-Organizer: Jun Liao, *Westinghouse Electric Company LLC, Cranberry Township, PA, United States*

1:00pm – Evaporation Momentum Force on a Bubble Under Asymmetric Temperature Conditions

Invited Paper Publication. IMECE2014-37567

Pruthvik Raghupathi, Satish Kandlikar, *Rochester Institute of Technology, Rochester, NY, United States*

1:21pm – Pool Boiling on Superhydrophobic Surfaces With Single Bubble Nucleation

Technical Presentation. IMECE2014-40204

Yinxiao Li, Ke Zhang, Chuanhua Duan, *Boston University, Boston, MA, United States*, **Ming-Chang Lu**, *National Chiao Tung University, Hsinchu, Taiwan*

1:42pm – Wettability Engineering to Control Boiling Heat Transfer

Technical Presentation. IMECE2014-40132

Daniel Attinger, *Christophe Frankiewicz*, *Iowa State University, Ames, IA, United States*, **Amy Betz**, *Kansas State University, Manhattan, KS, United States*, **Thomas M. Schutzius**, **Constantine Megaridis**, *University Illinois at Chicago, Chicago, IL, United States*, **Ranjan Ganguly**, *Jadavpur University, Kolkata, India*, **Chang-jin Kim**, *University of California, Los Angeles, Los Angeles, CA, United States*

2:03pm – Liquid-Vapor Phase Change Under Extreme Temperature Gradient

Technical Presentation. IMECE2014-39920

Zhi Liang, **Kiran Sasikumar**, **Pawel Koblinski**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

2:24pm – Study on Nucleate Boiling Heat Transfer by Measuring Detailed Surface Temperature Distribution and Variation With Infrared Radiation Camera

Technical Paper Publication. IMECE2014-37448

Kazuki Takahashi, *Shinshu University, Ueda, Nagano, Japan*, **Yasuo Koizumi**, *Shinshu University, Kanagawa, Japan*

10-18 Nanoscale Heat Transfer in Systems & Devices (K9 and K6)

10-18-5 Thermal Transport at the Nanoscale

510A

1:00pm–2:45pm

Session Organizer: *Alexander Rattner, Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: *Sang Muk Kwark, Praxair Inc., Tonawanda, NY, United States*

1:00pm – Evaluating Impacts of Nanoscale Thermal Transport Research

Invited Presentation. IMECE2014-40850

Li Shi, *University of Texas at Austin, Austin, TX, United States*

1:26pm – Phonon Transport Processes in Complex Oxide Nanostructures: Coherent Transport, Grain Scattering, and Domain Interactions

Technical Presentation. IMECE2014-40116

Patrick Hopkins, **Brian Foley**, **Ramez Cheaito**, *University of Virginia, Charlottesville, VA, United States*, **Jayakanth Ravichandran**, *Columbia University, New York, NY, United States*, **Ajay Yadav**, **Pim Rossen**, **Ramamoorthy Ramesh**, *University of California, Berkeley, Berkeley, CA, United States*, **Arunava Majumdar**, *Google, Mountain View, CA, United States*, **Doug L. Medlin**, *Sandia National Labs, Livermore, CA, United States*, **Harlan J. Brown-Shaklee**, **Jon F. Ihlefeld**, *Sandia National Labs, Albuquerque, NM, United States*

1:52pm – Thermal Conductivity of Quasi-One-Dimensional Bismuth Selenide Nanoribbons

Technical Presentation. IMECE2014-39205

Hao Tang, *École Polytechnique de Montréal, Montreal, QC, Canada*, **Xiaomeng Wang**, **Yucheng Xiong**, **Dongyan Xu**, *Chinese University of Hong Kong, Shatin, Hong Kong*, **Yang Zhao**, **Yin Zhang**, **Juekuan Yang**, *Southeast University, Nanjing, China*

2:18pm – Thermal Conductivity of Compound Semiconductors: Interplay of Density and Acoustic-Optical Phonon Dispersion Gap

Technical Presentation. IMECE2014-37635

Ankit Jain, **Alan McGaughey**, *Carnegie Mellon University, Pittsburgh, PA, United States*

10-7 Thermal Management Challenges in Energy Conversion and Conservation (K10)

10-7-1 Thermal Management Challenges in Energy Conversion and Conservation

524B 3:00pm–4:45pm

Session Organizer: Ali Khaunsary, Argonne National Laboratory, Argonne, IL, United States

Session Co-Organizer: Dereje Agonafer, Elect & Photo Packaging Center, University of Texas at Arlington, Arlington, TX, United States

Session Chair: Ali Khounsary, Argonne National Laboratory, Argonne, IL, United States

10-13 Advances in Interfaces and Heat Sinks including Nanoscale Conduction and Interfacial Effects (K8, K9, K16)

10-13-5 Interfaces—II

524C 3:00pm–4:45pm

Session Organizer: Chris Dames, University of California at Berkeley, Berkeley, CA, United States

Session Co-Organizer: Patrick Hopkins, University of Virginia, Charlottesville, VA, United States

3:00pm – Electron Contributions to the Thermal Conductance of Au/Graphene/Au Interface

Technical Presentation. IMECE2014-37675

Chunwei Zhang, Yancheng Insititute Technology, Yancheng, China, **Yunfei Chen**, Southeast University, Nanjing, Jiangsu, China

3:17pm – Modulation of Interfacial Thermal Resistance in Graphite

Technical Paper Publication. IMECE2014-39719

Chenhan Liu, **Zhiyong Wei**, **Weiyu Chen**, **Juekuan Yang**, **Yunfei Chen**, Southeast University, Nanjing, China

3:34pm – Mode-Resolved Boltzmann Transport Simulation of Electron-Phonon Coupled Thermal Transport in Metal-Dielectric Heterojunctions

Technical Presentation. IMECE2014-39241

Yan Wang, **Tianli Feng**, **Jingjing Shi**, **Zexi Lu**, **Xiulin Ruan**, Purdue University, West Lafayette, IN, United States

3:51pm – Interfacial Thermal Conductance of Epitaxial and Transferred CVD-Grown Graphene

Technical Presentation. IMECE2014-37903

Bin Huang, **Yee Kan Koh**, National University of Singapore, Singapore, Singapore

4:08pm – Simulations of Interfacial Thermal Conductance and Inelastic Phonon Transmission

Technical Presentation. IMECE2014-38332

Nam Q. Le, **Pamela Norris**, University of Virginia, Charlottesville, VA, United States

4:25pm – Experimental Study of Electron Relaxation and Electron-Phonon Coupling Dependence on Electron Distribution, Lattice Temperature, Substrate, and Interface Adhesion

Technical Presentation. IMECE2014-40202

Ashutosh Giri, **John T. Gaskins**, **Ramez Cheaito**, **Brian Foley**, **Patrick Hopkins**, University of Virginia, Charlottesville, VA, United States

10-17 Nanoscale Thermal Metrology (K9)

10-17-2 Nanoscale Thermal Metrology II: Other Techniques

525B 3:00pm–4:45pm

Session Organizer: Renkun Chen, University of California, San Diego, La Jolla, CA, United States

Session Co-Organizer: Pramod Sangi Reddy, University of Michigan, Ann Arbor, MI, United States

3:00pm – Measurement of Thermal Conduction Through Polymeric Nanowires With the Dual Cantilever Technique

Technical Paper Publication. IMECE2014-38233

Carlo Canetta, **Arvind Narayanaswamy**, Columbia University, New York, NY, United States

3:17pm – Investigation of Phonon Transport in PbTe-PbSe Alloys Using Inelastic X-Ray Scattering

Technical Presentation. IMECE2014-39232

Zhitig Tian, **Mingda Li**, **Ju Li**, **Gang Chen**, Massachusetts Institute of Technology, Cambridge, MA, United States, **Zhensong Ren**, **Stephen Wilson**, Boston College, Chestnut Hill, MA, United States, **Ahmet Alatas**, Argonne National Laboratory, Argonne, IL, United States

3:34pm – Scanning Probe Calorimeters for Probing Thermal Transport at the Atomic Scale

Technical Presentation. IMECE2014-38989

Kyeongtae Kim, Wonho Jeong, Edgar Meyhofer, Pramod Sangi Reddy, *University of Michigan, Ann Arbor, MI, United States*

3:51pm – Developing a Temperature Measurement Technique Using Electron Microscopy

Technical Presentation. IMECE2014-39135

Md. Imran Khan, Chris Dames, *University of California, Berkeley, Berkeley, CA, United States*

4:08pm – Estimation of Interfacial Thermal Resistance in Micro- and Nanoscale Systems Using Infrared Microscopy

Technical Presentation. IMECE2014-37315

Raghu Pulavarthy, *Pennsylvania State University, State College, PA, United States*, **Md. Haque**, *Pennsylvania State University, University Park, PA, United States*

4:25pm – Is Raman Spectroscopy Reliable for Measuring Thermal Conductivity of Single-Layer Graphene?

Technical Presentation. IMECE2014-39132

Ajit Vallabhaneni, Dhruv Singh, Xiulin Ruan, *Purdue University, West Lafayette, IN, United States*, **James Loy, Jayathi Murthy**, *University of Texas at Austin, Austin, TX, United States*

Wednesday, November 19

10-3 Heat Transfer in Energy Systems: Applications (K6)

10-3-1 Cooling, Heating and Power Systems I

525A

9:45am–11:30am

Session Organizer: Pedro Mago, *Mississippi State University, Mississippi State, MS, United States*

Session Co-Organizers: Laura A. Schaefer, *University of Pittsburgh, Pittsburgh, PA, United States*, S.A. Sherif, *University of Florida, Gainesville, FL, United States*

9:45am – Transient Performance of Multipass Parallel and Counterflow Cross-Flow Heat Exchangers

Technical Paper Publication. IMECE2014-37030

Karthik Silaipillayarputhur, *King Faisal University, Ahsaa, Saudi Arabia*, **Stephen Idem**, *Tennessee Tech University, Cookeville, TN, United States*

10:02am – Heat and Mass Transfer Characteristics of Absorption of R134a In DMAC and DMF for a Falling Film Horizontal Tube Absorber

Technical Paper Publication. IMECE2014-37221

Prakash Maiya Manoor, Shaligram Tiwari, Kamal Kant Yadu, *Indian Institute of Technology–Madras, Chennai, India*

10:19am – Experimental Investigation on the Performance of Vortex Tube With None-Freeze Enhancement

Technical Paper Publication. IMECE2014-37403

Ran Duan, Qitai Eri, Kexin Li, *Beihang University, Beijing, China*

10:36am – Prediction of Heat Transfer and Visualization of Temperature Field in Screw Compressors

Technical Paper Publication. IMECE2014-37439

Sham Rane, Nikola Stosic, Ashvin Dhunput, *City University London, London, United Kingdom*

10:53am – Frictional Pressure Drop Correlations for Single-Phase Flow, Condensation, and Evaporation in Microfin Tubes

Technical Paper Publication. IMECE2014-38122

Zan Wu, Bengt Sundén, *Lund University, Lund, Skane, Sweden*

11:10am – Numerical Study of the Effect of Inlet Vent Position and Size on the Velocity and Temperature Distributions in a Smaller Naturally Ventilated Theater in Canada

Technical Paper Publication. IMECE2014-36781

Patrick Oosthuizen, *Queen's University, Kingston, ON, Canada*

10-5 Heat Transfer in Energy Systems: Performance and Energy Conversion (K6)

10-5-1 Performance Assessment of Energy Systems

525B

9:45am–11:30am

Session Organizer: Nesrin Ozalp, *Katholieke Universiteit Leuven, Leuven, Belgium*

Session Co-Organizers: Sophia Haussener, *EPFL, Lausanne, Switzerland*, Mitra Sexton, *LM-Knolls Atomic Power Lab, Clifton Park, NY, United States*

9:45am – Heavy Duty Vehicle Cooling System Auxiliary Load Management Control: An Application of Linear Control Strategy (MIMO and SISO).

Technical Paper Publication. IMECE2014-39534

Salvador Sermeno, Omar Ameer, INSA de Lyon, Villeurbanne, Rhône-Alpes, France, Eric Bideaux, National Institute of Applied Sciences, Villeurbanne, Rhône-Alpes, France, Xavier Brun, Ampere Lab/INSA of Lyon, Villeurbanne, Rhône-Alpes, France

10:11am – Thermal Runaway in a Prismatic Lithium-Ion Cell Triggered by a Short Circuit

Technical Presentation. IMECE2014-38559

Malcolm MacDonald, Srinivas Garimella, Thomas F. Fuller, Georgia Institute of Technology, Atlanta, GA, United States

10:37am – Analysis of an Adsorption-Based Electric Vehicle Space Cooling System

Extended Abstract Presentation. IMECE2014-39638

Subramanyaravi Annapragada, Joshua Sheffel, Thomas Radcliff, Catherine Thibaud-Erkey, Bart van Hassel, Abdelrahman ElSherbini, United Technologies Research Center, East Hartford, CT, United States

11:03am – Energy Technology Innovation at the U.S.

Department of Energy Advanced Research Projects Agency-Energy (ARPA-E)

Invited Presentation. IMECE2014-40575

James Klausner, U.S. Department of Energy Advanced Research Projects Agency-Energy, Washington, DC, United States

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-7 Phase-Change Heat Transfer – 7

510B

9:45am–11:30am

Session Organizer: Amy Betz, *Kansas State University, Manhattan, KS, United States*

Session Co-Organizer: Sunil Mehendale, *Michigan Technological University, Houghton, MI, United States*

9:45am – Experimental Study of Marangoni Convection in Confined and Volatile Binary Liquids: The Effect of Noncondensables

Technical Paper Publication. IMECE2014-40123

Yaofa Li, Minami Yoda, Georgia Institute of Technology, Atlanta, GA, United States

10:06am – Effect of Noncondensables on the Thermocapillary-Buoyancy Convection in Confined and Volatile Fluids

Technical Paper Publication. IMECE2014-40124

Tongran Qin, Minami Yoda, Roman O. Grigoriev, Georgia Institute of Technology, Atlanta, GA, United States

10:27am – Development of Ltoff Diameter Model of Bubbles Generated on Horizontal Tube

Technical Paper Publication. IMECE2014-36826

Sung Uk Ryu, Seok Kim, Dong-Jin Euh, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

10:48am – Wettability Engineering to Control Frost Formation and Icing

Technical Presentation. IMECE2014-40095

Amy Betz, Kansas State University, Manhattan, KS, United States, Constantine Megaridis, Thomas Schutzius, University of Illinois at Chicago, Chicago, IL, United States, Ranjan Ganguly, Jadavpur University, Kolkata, India, Christophe Frankiewicz, Daniel Attinger, Iowa State University, Ames, IA, United States, Chang-jin Kim, University of California, Los Angeles, Los Angeles, CA, United States, Arindam Das, Massachusetts Institute of Technology, Cambridge, MA, United States

11:09am – Performance Enhancement of Solid/Liquid Phase-Change Thermal Energy Storage Systems

Technical Paper Publication. IMECE2014-39786

Ali Siahpush, Ferris State University, Big Rapids, MI, United States, Jim O'Brien, Piyush Sabharwall, INL, Idaho Falls, ID, United States, John Crepeau, University of Idaho, Moscow, ID, United States

10-28 Heat Transfer in Gas Turbine Systems (K14)

10-28-1 Heat Transfer in Gas Turbine Systems (I)
510A 9:45am–11:30am

Session Organizer: Srinath Ekkad, *Virginia Tech, Blacksburg, VA, United States*

Session Co-Organizer: Malak Malak, *Honeywell, Tempe, AZ, United States*

9:45am – Parametric Study of Showerhead Film Cooling Performance on a Gas Turbine Blade

Technical Paper Publication. IMECE2014-38571
Gustavo Urquiza, Jose O. Davalos, J.C. García, Laura L. Castro, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Morelos, Mexico*, **Alfredo Rodriguez, Miguel A. Basurto,** *UAEM CIICAP, Cuernavaca, Morelos, Mexico*, **Oscar De Santiago Duran,** *CIATEQ A.C., El Marques, Queretaro, Mexico*

10:11am – Transient Thermal Analysis of Gas Turbine Shutdown Physics: Normal and Forced Cooling

Technical Paper Publication. IMECE2014-38164
Kathiravan Selvam, Nageswara Rao Vanga, *GE Oil & Gas, Bangalore, India*, **Roberto De Prosperis,** *GE Oil & Gas, Florence, Italy*

10:37am – Computational Assessment of Inlet Turbulence on Boundary Layer Development and Momentum/Thermal Wakes for High-Pressure Turbine Vanes and Blade at Engine Scale Conditions

Technical Paper Publication. IMECE2014-38620
Jim Kopriva, *GE Aviation & Northeastern University, Lynn, MA, United States*, **Gregory Laskowski,** *GE Aviation, Lynn, MA, United States*, **Reza Sheikhi,** *Northeastern University, Boston, MA, United States*

11:03am – Heat Transfer Characteristics of Longitudinal Perforated and Unperforated Ribs Under Impingement Jets

Technical Paper Publication. IMECE2014-40410
Sinan Caliskan, *Hittit University, Çorum, Turkey*

10-54 Max Jakob Lecture

10-54-1 Max Jakob Award Lecture
515A 9:45am–11:30am

Session Organizer: John Bischof, *University of Minnesota, Minneapolis, MN, United States*

Session Co-Organizers: Rupak Banerjee, *University of Cincinnati, Cincinnati, OH, United States*, Sumanta Acharya, *Louisiana State University, Baton Rouge, LA, United States*

9:45am – Heat Transfer in Health and Healing – Max Jakob Award Presentation

Technical Presentation. IMECE2014-40647
Kenneth Diller, *University of Texas, Austin, TX, United States*

10-3 Heat Transfer in Energy Systems: Applications (K6)

10-3-2 Cooling, Heating, and Power Systems II
525A 1:00pm–2:45pm

Session Organizer: Pedro Mago, *Mississippi State University, Mississippi State, MS, United States*

Session Co-Organizers: Laura A. Schaefer, *University of Pittsburgh, Pittsburgh, PA, United States*, S.A. Sherif, *University of Florida, Gainesville, FL, United States*

1:00pm – Velocity-Based Defrost and Frost Inhibition of Evaporator Coils of Heat Pumps

Technical Paper Publication. IMECE2014-39003
Kamalakkannan Muthusubramanian, Serguei V. Dessiatoun, Amir H. Shooshtari, Michael M. Ohadi, *University of Maryland, College Park, MD, United States*

1:21pm – Experimental Study of Water-Cooled Condenser Made of Three-Dimensional and High Fin Density Integral-Finned Tubes

Technical Paper Publication. IMECE2014-39025
Wen-Tao Ji, Wen-Quan Tao, Chuang-Yao Zhao, Yaling He, *Xi'an Jiaotong University, Xi'an City, Shaanxi, China*, **Qi-bin Dai, Shu-heng Han,** *Chongqing Midea General Refrigeration Equipment Co., Ltd., Chongqing, China*, **Ding-Cai Zhang,** *MOE Key Laboratory of Thermo-Fluid Engineering, Xi'an, Shaanxi, China*

1:42pm – Heat Transfer on Two Grooved Cylinders in a Tandem Arrangement

Technical Paper Publication. IMECE2014-39490
Omar Ladjedel, Adjlout Lahouari, Tayeb Yahiaoui, Imine Omar, USTO MB University, Oran, Algeria

2:03pm – Investigation of Conjugate Heat Transfer in a Fin-and-Tube Heat Exchanger

Technical Paper Publication. IMECE2014-39546
Mahfoud Kadja, University of Constantine, Constantine, Algeria, Ridha Mebrouk, University of Ouargla, Ouargla, Algeria

2:24pm – Enhancement of Heat transfer Coefficients in an Automobile Radiator Using Multiwalled Carbon Nanotubes (MWCNT)

Technical Paper Publication. IMECE2014-36964
Ramgopal Varma Ramaraju, Manikantan Kota, Hadi Bin Manap, University Malaysia Pahang, Kuantan, Pahang, Malaysia, Vasudevarao Veeredhi, University of South Africa, Johannesburg, South Africa

10-5 Heat Transfer in Energy Systems: Performance and Energy Conversion (K6)**10-5-2 Waste Heat Harvesting and Energy Conversion**

525B **1:00pm–2:45pm**

Session Organizer: Alexander Rattner, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizers: Amy Fleischer, *Villanova University, Villanova, PA, United States*, Hohyun Lee, *Santa Clara University, Santa Clara, CA, United States*

1:00pm – Waste Heat Recovery From Porous LPG Burners Used for Cooking

Technical Paper Publication. IMECE2014-36115
Narayana Vijesh Ravindran, University at Buffalo–The State University of New York, Buffalo, NY, United States, ArulmozhiVarman Seetharaman, Infosys, Coimbatore, Tamilnadu, India

1:26pm – Dielectric Breakdown Process for Biomass Gasification

Technical Paper Publication. IMECE2014-36402
Andres Munoz-Hernandez, Gerardo Diaz, University of California, Merced, Merced, CA, United States

1:52pm – Computational Modeling of a Solar Thermoelectric Generator

Technical Paper Publication. IMECE2014-38095
Chukwunyere Ofoegbu, Sandip Mazumder, Ohio State University, Columbus, OH, United States

2:18pm – 1-D Model of Real Stirling Engine Calibrated by Experiments

Technical Paper Publication. IMECE2014-40271
Jiri Vavra, Libor Cervenka, Michal Takats, Czech Technical University, Prague, Czech Republic, Josef Broz, Strojírny Bohdalice a.s., Bohdalice, Czech Republic

10-6 Panel on Advanced Solar Sub-Atmospheric M-Power Generation**10-6-1 Advanced Solar Sub-Atmospheric M-Power Generation**

515A **1:00pm–2:45pm**

Session Organizer: Yaroslav Chudnovsky, *Gas Technology Institute, Des Plaines, IL, United States*

1:00pm – Fundamentals of Maisotsenko-Cycle

Panel Presentation. IMECE2014-40886
Paul Glanville, Gas Technology Institute, Des Plaines, IL, United States

1:26pm – Application of the Ejector Technologies for M-Power Cycle Optimization

Panel Presentation. IMECE2014-40887
Olexiy Buyadgie, Wilson/SRTC, Odessa, Ukraine

1:52pm – Sub-Atmospheric Inverted Brayton Cycle With Maisotsenko Heat and Mass Exchangers

Panel Presentation. IMECE2014-40887
Artem Khalatov, PBC Energy Inc./UNAS, Los Angeles, CA, United States, Valeriy Maisotsenko, Idalex, Denver, CO, United States, Peter Brodetsky, Dmitri Lastochkin, PBC Energy Inc., Encino, CA, United States

2:18pm – Technical and Economic Potential of Solar M-Power for Microturbine Market

Panel Presentation. IMECE2014-40889
B.D. To, PBC Energy, Los Angeles, CA, United States

10-9 Symposium on Phase Change Heat Transfer and Cooling and Micro-/Nanoscale Phase Change (K8, K9, K13, K16)

10-9-6 Phase Change Heat Transfer-6

510B

1:00pm–2:45pm

Session Organizer: Amy Betz, *Kansas State University, Manhattan, KS, United States*

Session Co-Organizers: Sunil Mehendale, *Michigan Technological University, Houghton, MI, United States*, Ali Siahpush, *Ferris State University, Big Rapids, MI, United States*

1:00pm – Hierarchical Micro-/Nanostructures for a New Generation Two-Phase Heat Sink

Technical Presentation. IMECE2014-40405

Abdy Fazeli, Saeed Moghaddam, University of Florida, Gainesville, FL, United States

1:21pm – Liquid Characteristics Under Melting/Solidification Conditions Using Energy Conserving Dissipative Particle Dynamics

Technical Paper Publication. IMECE2014-36729

Erik Johansson, Toru Yamada, Jinliang Yuan, Bengt Sunden, Lund University, Lund, Skane, Sweden, Yutaka Asako, Tokyo Metropolitan University, Hachioji, Tokyo, Japan, Mohammad Faghri, University of Rhode Island, Kingston, RI, United States

1:42pm – Microporous Coating by Dual-Stage Electroplating to Enhance Pool Boiling Performance of Saturated R-123 and FC-72

Technical Paper Publication. IMECE2014-36828

Sang Kwark, Joo Han Kim, Seung Mun You, University of Texas at Dallas, Richardson, TX, United States

2:03pm – Metallic Phase Change Nanocomposites With Tunable Melting Temperature and High Thermal Conductivity

Technical Presentation. IMECE2014-39945

Minglu Liu, Arizona State University, Mesa, AZ, United States, Robert Wang, Arizona State University, Tempe, AZ, United States

2:24pm – Influence of the Quench Process on Microstructure Evolution in a Landing Gear Steel

Technical Paper Publication. IMECE2014-38636

Samir Mourad Chentouf, Mohammad Jahazi, École de Technologie Supérieure, Montréal, QC, Canada, Rejean Fortin, Messier-Dowty Inc., Mirabel, QC, Canada

10-28 Heat Transfer in Gas Turbine Systems (K14)

10-28-2 Heat Transfer in Gas Turbine Systems (II)

510A

1:00pm–2:45pm

Session Organizer: Eric Ruggiero, *General Electric, Niskayuna, NY, United States*

Session Co-Organizer: Malak Malak, *Honeywell, Tempe, AZ, United States*

1:00pm – Experimental Investigation of Jet Impingement Heat Transfer in Cross-Flow Modified by a V-Shaped Rib

Technical Paper Publication. IMECE2014-36587

Bengt Sunden, Chenglong Wang, Lei Wang, Lund University, Lund, Sweden

1:26pm – Effect of the Wavy Walls on the Turbulent Flow and Heat Transfer in Rotating Two-Pass Rectangular Channels

Technical Paper Publication. IMECE2014-37563

Aounallah Mohammed, Miloud Abdelkrim, Belkadi Mustapha, Adjlout Lahouari, Imine Omar, USTO MB University, Orna, Algeria

1:52pm – Experimental and Computational Analysis of Film Cooling Hole Performance on a High-Temperature Test Rig

Technical Paper Publication. IMECE2014-38735

Sridharan Ramesh Srinath Ekkad, Virginia Tech, Blacksburg, VA, United States, Douglas Straub, U.S. DOE, Morgantown, WV, United States, Seth A. Lawson, U.S. DOE National Energy Technology Laboratory, Morgantown, WV, United States, Mary Anne Alvin, U.S. DOE National Energy Technology Laboratory, Pittsburgh, PA, United States

2:18pm – Simulations of Multiphase Particle Deposition on a Gas Turbine Endwall With Impingement and Film Cooling

Technical Paper Publication. IMECE2014-36682

Amy Mensch, Karen Thole, Pennsylvania State University, University Park, PA, United States

10-36 Nanotransport in Medicine and Biology (K17)

10-36-1 Transport in Medicine and Biology

510C

1:00pm–2:45pm

Session Organizer: Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

Session Co-Organizer: Dayong Gao, *University of Washington, Seattle, WA, United States*

1:00pm – Molecular Characterization of Electric Field and Ionic Solution Transport in the 4-nm Central Pore of the Tobacco Mosaic Virus

Technical Presentation. IMECE2014-37676

Nikolay Rodionov, Shalabh Maroo, *Syracuse University, Syracuse, NY, United States*

1:17pm – Thermal Transport in Spider Silk Protein: Insights From Molecular Simulations

Technical Presentation. IMECE2014-39417

Ling Liu, Lin Zhang, *Utah State University, Logan, UT, United States*

1:34pm – Heat Shock Protein Expression and Cryopreservability of Human Adipose-Tissue Derived Adult Stem Cells

Technical Presentation. IMECE2014-39904

Shahensha Shaik, Ram Devireddy, *Louisiana State University, Baton Rouge, LA, United States*

1:51pm – Osteoinductability of Adult Stem Cells in Poly (L-Lactic Acid) Polymer Sheets

Technical Paper Publication. IMECE2014-39906

Harish Chinnasami, Daniel Hayes, Ram Devireddy, *Louisiana State University, Baton Rouge, LA, United States*

2:08pm – Operating Rooms Infection Control Analysis

Technical Paper Publication. IMECE2014-36457

Hend E. Mohamed, Reda I. Afify, *Bana Univeristy, Banha, Egypt,* **Tarek Belal,** *Pharos University, Alexandria, Egypt,* **Osama E. Abdellatif,** *Shoubra Faculty of Engineering, Banha, Egypt*

2:25pm – Cryoprotective Agent (CPA) Removal With Dilution-Filtration Method and CPA Concentration Monitoring With Electrical Conductivity Measurements

Technical Paper Publication. IMECE2014-36538

Zhiquan Shu, Cifeng Fang, Dayong Gao, *University of Washington, Seattle, WA, United States,* **Xiaoming Zhou,** *University of Electronic Science and Technology of China, Chengdu, Sichuan, China*

10-3 Heat Transfer in Energy Systems: Applications (K6)

10-3-3 Cooling, Heating and Power Systems III

525A

3:00pm–4:45pm

Session Organizer: Pedro Mago, *Mississippi State University, Mississippi State, MS, United States*

Session Co-Organizers: Laura A. Schaefer, *University of Pittsburgh, Pittsburgh, PA, United States,* S.A. Sherif, *University of Florida, Gainesville, FL, United States*

3:00pm – Evaluation of Cooling Water Storage for Liquid-Desiccant Air-Conditioning System

Technical Paper Publication. IMECE2014-39949

Danial Salimizad, Chris McNevin, Stephen Harrison, *Queen's University, Kingston, ON, Canada*

3:17pm – Effects of Water Injection on the Power Boost of a Twin Turbocharged Vehicle

Technical Paper Publication. IMECE2014-36172

Jobaidur Khan, *University at Buffalo, Buffalo, NY, United States,* **McDonald Fawcett,** *Georgia Southern University, Statesboro, GA, United States*

3:34pm – Exergetic Analysis of a Cross-Flow Microchannel Heat Exchanger for Bleed Air Cooling in Aircraft Gas Turbine Engine

Technical Paper Publication. IMECE2014-37722

Matthew Rivera, Randall D. Manteufel, *University of Texas at San Antonio, San Antonio, TX, United States*

3:51pm – Magnetic Field Enhancement in Water-Lithium Chloride Absorption Refrigeration Systems

Technical Presentation. IMECE2014-40580

Moradeyo Odunfa, Miracle Oyewola, *University of Ibadan, Ibadan, Oyo State, Nigeria,* **Richard Olayiwola Fagbenle,** *Obafemi Awolowo University, Ile Ife, Ile-Ife, Osun, Nigeria,* **Olayinka S. Ohunakin, Sunday Oyedepo,** *Covenant University, Ota, Ota, Ogun State, Nigeria*

4:08pm – Metal-Hydride Adsorption Systems for Space Conditioning in Commercial and Residential Buildings

Technical Paper Publication. IMECE2014-39943

Yongfang Zhong, Paul Glanville, *Gas Technology Institute, Des Plaines, IL, United States*

4:25pm – Novel Absorption Cycle for Combined Water Heating, Dehumidification, and Evaporative Cooling

Technical Presentation. IMECE2014-40386

Devesh Chugh, Saeed Moghaddam, *University of Florida, Gainesville, FL, United States*

10-10 Heat Pipes and Industrial Applications of Multiphase Heat Transfer (K13)

10-10-1 Heat Pipes and Industrial Applications of Multiphase Heat Transfer

521C 3:00pm–4:45pm

Session Organizer: Hongbin Ma, *University of Missouri, Columbia, MO, United States*

Session Co-Organizer: Piyush Sabharwall, *INL, Idaho Falls, ID, United States*

3:00pm – Experimental Investigation of a Flat-Plate Oscillating Heat Pipe With Modified Evaporator and Condenser

Technical Paper Publication. IMECE2014-39188

Matthew Rhodes, John G. Monroe, Scott Thompson, *Mississippi State University, Mississippi State, MS, United States,*
Matt Taylor, *Mississippi State University, Starkville, MS, United States*

3:17pm – Dryout Avoidance Control for Multi-Evaporator Vapor Compression Cycles With Transient Heat Flux

Technical Paper Publication. IMECE2014-39398

Daniel T. Pollock, Zehao Yang, John T. Wen, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:34pm – Mass Transport Characteristics and Theoretical Performance Limits of Micropillar Wicks

Technical Presentation. IMECE2014-40385

Saitej Ravi, Saeed Moghaddam, *University of Florida, Gainesville, FL, United States,* **David Horner,** *University of Florida, Tallahassee, FL, United States*

3:51pm – Subgrid Filtering of Heat Transfer in Gas-Solid Flows With Immersed Heat Transfer Cylinders

Technical Paper Publication. IMECE2014-39964

William Lane, Emily M. Ryan, *Boston University, Boston, MA, United States,* **Avik Sarkar,** *Pacific Northwest National Laboratory, Richland, WA, United States,* **Sankaran Sundaresan,** *Princeton University, Princeton, NJ, United States*

4:08pm – Effects of Al₂O₃-Water Nanofluid and Angular Orientation on Entropy Generation and Convective Heat Transfer of an Elliptical Micro-Pin-Fin Heat Sink

Technical Paper Publication. IMECE2014-40335

Husam Rajab, Da Yin, Hongbin Ma, *University of Missouri, Columbia, MO, United States*

4:25 – Ultrathin Silicon Vapor Chamber for High Power Electronics Cooling

Technical Paper Publication. IMECE2014-36137

Steve Cai, Ya-chi Chen, Bing-Chung Chen, Avijit Bhunia, *Teledyne Scientific Company*

10-15 Thermal Conductivity Accumulation: Measurement and Prediction (K8 and K9)

10-15-1 Thermal Conductivity Accumulation: Measurement and Prediction

525B 3:00pm–4:45pm

Session Organizer: Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

Session Co-Organizer: John Duda, *Seagate Technology, Shakopee, MN, United States*

3:00pm – Introduction and Predicting Bulk Phonon Properties Panel Presentation. IMECE2014-40895

Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

3:26pm – Analytical Modeling

Panel Presentation. IMECE2014-40893

Chris Dames, *University of California, Berkeley, Berkeley, CA, United States*

3:52pm – Experiments and Analytical Modeling

Panel Presentation. IMECE2014-40894

Jonathan A. Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*

4:18pm – Experiments and Numerical Modeling

Panel Presentation. IMECE2014-40896

Austin Minnich, *California Institute of Technology, Pasadena, CA, United States*

10-21 Heat Transfer Equipment for Energy and Water (K10 and PID)

**10-21-1 Heat Transfer Equipment for Energy and Water—1
510C** **3:00pm–4:45pm**

Session Organizer: Hsiu-hung Chen, *University of Missouri, Columbia, MO, United States*

Session Co-Organizer: Scott Thompson, *Mississippi State University, Mississippi State, MS, United States*

3:00pm – Optimum Spacing of Vertical Parallel Plates Radiation Heat Transfer

Technical Paper Publication. IMECE2014-36388

Hanry Issavi, Fred Barez, Younes Shabany, Ernest Thurlow, *San Jose State University, San Jose, CA, United States*

3:15pm – Novel Heat Exchanger Design With Rectangular Shell Geometry

Technical Paper Publication. IMECE2014-36834

Vipul Patel, Rajesh Patel, Vimal Savsani, *Pandit Deendayal Petroleum University, Gandhinagar, Gujarat, India*

3:30pm – Novel Arrangements of Tube Banks With Enhanced Heat Transfer and Manageable Pressure Drop Requirement

Technical Paper Publication. IMECE2014-36862

Raed Bourisli, *Kuwait University, Safat, Kuwait*,
Meshal F. Al-Mutairi, *KISR, Safat, Kuwait*

3:45pm – Enhanced Passive Thermal Management of Grid-Scale Power Routers Utilizing Ionic Wind

Technical Paper Publication. IMECE2014-38713

Noris Gallandat, J. Mayor, *Georgia Institute of Technology, Atlanta, GA, United States*

4:00pm – Analytical Modeling of Dual-Loop Single-Phase Thermosiphons for Power Electronics Cooling

Technical Paper Publication. IMECE2014-38718

Danielle Hesse, J. Mayor, S. Andrew Semidey, *Georgia Institute of Technology, Atlanta, GA, United States*

4:15pm – Thermo-Economic Limitations of Passive Air-Cooled Ambient Heat Rejection Systems

Technical Paper Publication. IMECE2014-38719

Noris Gallandat, J. Mayor, *Georgia Institute of Technology, Atlanta, GA, United States*

4:30pm – Improved Air Cooling Methods for Transformer

Technical Paper Publication. IMECE2014-38883

Adam Fain, Pradip Majumdar, *Northern Illinois University, Dekalb, IL, United States*, **Scott Downing,** *Hamilton Sundstrand, United Technologies, Rockford, IL, United States*

10-26 Industrial Combustion and Its Environmental Impact (K-11 and K-19)

**10-26-1 Industrial Combustion and Its Environmental Impact
510B** **3:00pm–4:45pm**

Session Organizer: Ofodike A. Ezekoye, *University of Texas at Austin, Austin, TX, United States*

Session Co-Organizer: Cheng-Xian Lin, *Florida International University, Miami, FL, United States*

3:00pm – Ceramic Membrane Based Methane Combustion Reactor With Tailored Function of Simultaneous Separation of Carbon-Dioxide From Nitrogen

Technical Paper Publication. IMECE2014-38283

Pingying Zeng, Kang Wang, Ryan Falkenstein-Smith, Jeongmin Ahn, *Syracuse University, Syracuse, NY, United States*

3:26pm – NOx Reduction in Partially Premixed Flame by Flue Gas Recirculation

Technical Paper Publication. IMECE2014-39367

Yaroslav Chudnovsky, Serguei Zelepouga, Vitaly Gnatenko, *Gas Technology Institute, Des Plaines, IL, United States*, **Alexei Saveliev,** *North Carolina State University, Raleigh, NC, United States*, **John Wagner,** *Gas Technology Institute, La Grange, IL, United States*

3:52pm – Dual Fuel Concept for an Innovative Coaxial Burner, Thermal Characteristics, and Combustion Performance

Technical Paper Publication. IMECE2014-39480

Joseph Soliman, Adel Hussien, Ahmed Emara, *Helwan University, Cairo, Cairo, Egypt*

4:18pm – Foam Insulation Behavior in Void Space Under Fire Conditions

Technical Paper Publication. IMECE2014-38849

Andrew Kurzawski, Ofodike A. Ezekoye, *University of Texas at Austin, Austin, TX, United States*

10-47 Panel on Advances in Heat Transfer Education (K21)

10-47-1 Advances in Heat Transfer Education

515A

3:00pm–4:45pm

Session Organizer: Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*

Session Co-Organizers: Nesrin Ozalp, *Katholieke Universiteit Leuven, Leuven, Belgium*, Christopher J. Kobus, *Oakland University, Rochester, MI, United States*

3:00pm – Advances in Heat Transfer Education

Panel Presentation. IMECE2014-40882

S.A. Sherif, *University of Florida, Gainesville, FL, United States*

3:26pm – Perspectives in Heat Transfer Education

Panel Presentation. IMECE2014-40901

Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*

3:52pm – Advances in Heat Transfer Education

Panel Presentation. IMECE2014-40918

Patrick Oosthuizen, *Queen's University, Kingston, ON, Canada*

4:18pm – Advances in Heat Transfer Education

Panel Presentation. IMECE2014-40919

John Thome, *EPFL, Lausanne, Switzerland*

Thursday, November 20

10-11 Fundamentals of Single-Phase Convection (K8)

10-11-1 Fundamentals of Single-Phase Convection – 1

521C

7:45am–9:15am

Session Organizer: Patrick Oosthuizen, *Queen's University, Kingston, ON, Canada*

Session Co-Organizer: Christopher J. Kobus, *Oakland University, Rochester, MI, United States*

7:45am – Natural Convective Heat Transfer From a Horizontal Rectangular Isothermal Element Imbedded in a Plane Adiabatic Surface With a Parallel Adiabatic Covering Surface

Technical Paper Publication. IMECE2014-36780

Patrick Oosthuizen, *Queen's University, Kingston, ON, Canada*

8:00am – Natural Convection in a Square Enclosure With One and Two Circular Cylinders Positioned at Different Locations

Extended Abstract Presentation. IMECE2014-37717

Yong Gap Park, Man Ha, Hyun Sik Yoon, Changyoung Choi, Jaehyun Park, *Pusan National University, Busan, Korea (Republic)*

8:15am – Numerical Analysis of Convection Heat Transfer on High-Temperature Rotating Disk at Bottom Surface of Airflow Duct

Technical Paper Publication. IMECE2014-36142

Shigeki Hirasawa, Tsuyoshi Kawanami, Katsuaki Shirai, *Kobe University, Kobe, Hyogo, Japan*

8:30am – Convective Cooling in the Transitional Rarefied Flow Regime

Technical Paper Publication. IMECE2014-38727

Andrew Strongrich, Alina Alexeenko, *Purdue University, West Lafayette, IN, United States*

8:45am – Preliminary Numerical Study of Natural Convection in a Heterogeneous Horizontal Layer Heated From Below

Technical Paper Publication. IMECE2014-39169

James Romano, Silvio Junqueira, Admilson Franco, *Federal Univeristy of Technology–Parana, Curitiba-Pr, Brazil*, **José L. Lage**, *Southern Methodist University, Dallas, TX, United States*

9:00am – Periodic Horizontal Heating of Enclosed Disconnected Solid Bodies Saturated With a Fluid
Technical Paper Publication. IMECE2014-38984

S. Moussa Mirehei, *Southern Methodist University, Dallas, TX, United States*, **Admilson Franco**, *Federal Univeristy of Technology–Parana, Curitiba-Pr, Brazil*, **José L. Lage**, *Southern Methodist University, Dallas, TX, United States*

10-14 Fundamentals of Multiscale Modeling (K8, K9, K20)

10-14-1 Fundamentals of Multiscale Modeling I

522A

7:45am–9:15am

Session Organizer: Leslie Phinney, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Organizer: Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*

7:45am – Simulation of Heat Transport In Graphene Nanoribbons Using the Ab Initio Scattering Operator
Technical Paper Publication. IMECE2014-36473

Colin D. Landon, *Nicolas Hadjiconstantinou, Massachusetts Institute of Technology, Cambridge, MA, United States*

8:03am – Mesoscopic Simulations of Heat Transport in Carbon Nanotube Aerogels, Films, and Forests
Technical Presentation. IMECE2014-39291

Alexey N. Volkov, *University of Alabama, Tuscaloosa, AL, United States*, **Bernard K. Wittmaack**, **Richard N. Salaway**, **Leonid V. Zhigilei**, *University of Virginia, Charlottesville, VA, United States*

8:21am – On The Equations and Boundary Conditions Governing Phonon-Mediated Heat Transfer in the Small Mean Free Path Limit: An Asymptotic Solution of the Boltzmann Equation

Technical Paper Publication. IMECE2014-36475

Jean-Philippe Peraud, *Nicolas Hadjiconstantinou, Massachusetts Institute of Technology, Cambridge, MA, United States*

8:39am – Multiscale Modeling of the Electrocaloric Effect in a P(VDF-TrFE-CFE) Terpolymer

Technical Presentation. IMECE2014-39016

YingJu Yu, **Dongzhi Guo**, **JinSheng Gao**, **Suresh Santhanam**, **Gary K. Fedder**, **Shi-Chune Yao**, **Alan McGaughey**, *Carnegie Mellon University, Pittsburgh, PA, United States*

8:57am – Molecular Dynamics Simulations of Water Evaporation by Substrate Heating

Technical Presentation. IMECE2014-37672

Y.D. Sumith, **Shalabh Maroo**, *Syracuse University, Syracuse, NY, United States*

10-24 Combustion and Fire Simulation, Modeling, and Experimental Techniques (K11)

10-24-1 Combustion and Fire Simulation, Modeling, and Experimental Techniques I

522B

7:45am–9:15am

Session Organizer: Kwasi Foli, *Woodward FST, Greenville, SC, United States*

7:45am – Simulation Study of the Scavenging Process in a Two-Stroke Free Piston Linear Engine

Technical Paper Publication. IMECE2014-36413

Ocktaeck Lim, **Nguyen Ba Hung**, *University of Ulsan, Ulsan, Korea (Republic)*

8:07am – Computational Study of a HCCI Engine With External Mixture Formation Technique

Technical Paper Publication. IMECE2014-37211

Amba Rao, **T. Karthikeya Sharma**, **Madhu Murthy Kotha**, *National Institute of Technology Warangal, Warangal, India*

8:29am – Diesel Engine Simulations and Experiments: Fuel Variability Effects on Ignition

Technical Paper Publication. IMECE2014-37336

Mingdi Huang, **Xander Cesari**, **Sandeep Gowdagiri**, **Matthew Oehlschlaeger**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

8:51am – Study on Flow Field Characteristics of Low Swirl Injector

Technical Paper Publication. IMECE2014-37423

Yangbo Deng, **Jingming Dong**, **Xu Zhen**, *Dalian Maritime University, Dalian City, Liaoning, China*

10-35 Thermal Simulation Advances in Electronic Devices (K16)

10-35-1 Thermal Management of Electronic Devices

521B

7:45am–9:15am

Session Organizer: Vaibhav Bahadur, *University of Texas at Austin, Austin, TX, United States*

Session Co-Organizers: Karthik Bodla, *GE, NA, NY, United States*, Victor Chiriac, *Qualcomm, San Diego, CA, United States*

7:45am – Liquid Metal Alloy Based Vascular-Like Microchannel Networks for the Thermal Management of Electronics

Technical Paper Publication. IMECE2014-36528

Zhizhu He, Xu Xue, *Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, China*, Jing Liu, *Chinese Academy of Sciences, Beijing, China*

8:03am – Computational Model for Performance Prediction of a Hybrid PV/T Module

Technical Paper Publication. IMECE2014-38569

Francisco Zevallos, Cheng-Xian Lin, Robel Kiflemariam, *Florida International University, Miami, FL, United States*

8:21am – Transient Thermal Performance Prediction for Power Semiconductor Device Using Artificial Neural Network

Technical Paper Publication. IMECE2014-37910

Tohru Suwa, *Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia*

8:39am – Thermal Conductivity Enhancement in Percolating Thermal Underfills Through Necking

Invited Presentation. IMECE2014-38354

Brian R. Burg, Bruno Michel, Thomas Brunschwiler, *IBM Research–Zurich, Rüschlikon, Switzerland*, Bernd Gotsmann, Siegfried Karg, *IBM Research–Zurich, Zurich, Switzerland*, Kerry Yu, *Intrinsic Materials, Farnborough, Hampshire, United Kingdom*

8:57am – Thermal Spreading Resistance in Flux Channels With Arbitrary Heat Convection in the Sink Plane

Technical Paper Publication. IMECE2014-37364

Masood Razavi, Yuri Muzychka, Serpil Kocabiyik, *Memorial University of Newfoundland, St. John's, NL, Canada*

10-41 Inverse Problems and Optimal Design in Computational Heat Transfer (K20 and K6)

10-41-1 Inverse Problems and Optimal Design in Computational Heat Transfer I

522C

7:45am–9:15am

Session Organizer: Keith Woodbury, *University of Alabama, Tuscaloosa, AL, United States*

Session Co-Organizers: Kyle Daun, *University of Waterloo, Waterloo, ON, Canada*, Matthew Jones, *Brigham Young University, Provo, UT, United States*

7:45am – Robust and Efficient Thermographic NDE Tool Based on an Inverse VoF Meshless Method

Technical Paper Publication. IMECE2014-36758

Hussein Saad, Eduardo Divo, Sandra Boetcher, Jeff Brown, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*, Alain Kassab, *University of Central Florida, Orlando, FL, United States*

8:03am – Application of Artificial Neural Network as Digital Filter for Online Heat Flux Estimation

Technical Paper Publication. IMECE2014-38119

Hamidreza Najafi, Keith Woodbury, *University of Alabama, Tuscaloosa, AL, United States*

8:21am – Topology Optimization for Fluid Flow and Heat Transfer Applications

Technical Paper Publication. IMECE2014-38227

Ajay Vadakkepatt, Bradley L. Trembacki, Sanjay Mathur, Jayathi Murthy, *University of Texas at Austin, Austin, TX, United States*

8:39am – Dynamic Control of Radiative Surface Properties With Origami-Inspired Design

Technical Paper Publication. IMECE2014-39324

Rydge Mulford, Luke Christensen, Brian Iverson, Matthew Jones, *Brigham Young University, Provo, UT, United States*

8:57am – Accuracy of Thermocouples in Transient Surface Temperature Measurements

Technical Paper Publication. IMECE2014-38243

Kamalpreet Jhajj, Kyle Daun, Etienne Caron, Noel Chester, *University of Waterloo, Waterloo, ON, Canada*

10-42 Industrial Applications of Computational Heat Transfer (K20)

10-42-1 Applications of Natural Convection in Computational Heat Transfer

523A

7:45am–9:15am

Session Organizer: M. Ruhul Amin, *Montana State University, Bozeman, MT, United States*

Session Co-Organizer: Yanbao Ma, *University of California, Merced, Merced, CA, United States*

7:45am – Nonlinear Analysis in a Circle With an Internal Concentric Slotted Round With Different Structure Sizes
Technical Paper Publication. IMECE2014-37373

Chunyun Shen, Mo Yang, *University of Shanghai for Science and Technology, Shanghai, China*, **Yuwen Zhang**, *University of Missouri, Columbia, MO, United States*

8:03am – Numerical Investigation of the Onset of Steady Natural Convection in a Square Cavity Partially Filled With a Single Porous Block

Technical Paper Publication. IMECE2014-38621

Vinicius Daroz, *Universidade Tecnológica Federal do Paraná, Curitiba, Paraná, Brazil*, **José L. Lage**, *Southern Methodist University, Dallas, TX, United States*, **Silvio Junqueira, Admilson Franco**, *Federal Univeristy of Technology–Parana, Curitiba-Pr, Brazil*

8:21am – Study on the Heat Transfer Characteristics in Busbars With Various Shape and Arrangement for the Industrial Switchgear

Technical Paper Publication. IMECE2014-39062

Hyunsu Cho, Sung-Won Park, *Hyundai Heavy Industries Co., Ltd., Giheung-gu, Yongin-si, Gyeonggi-do, Korea (Republic)*

8:39am – Simulation of Free Convection in a Porous Enclosure Using the One-Temperature Approach

Technical Paper Publication. IMECE2014-40302

Marcelo De Lemos, Paulo H.S. Carvalho, *LCFT-IEME-ITA, São José dos Campos, Brazil*

8:57am – Electrical Resistance and Natural Convection Heat Transfer Modeling of Shape Memory Alloy Wires

Technical Paper Publication. IMECE2014-36707

Anita Eisakhani, Rob Gorbet, J. Richard Culham, *University of Waterloo, Waterloo, ON, Canada*, **Xiujie Gao**, *General Motors Research & Development, Warren, MI, United States*

10-45 Validation, Verification, and Uncertainty Quantification in Computational Heat Transfer (K20)

10-45-1 Validation, Verification, and Uncertainty Quantification in Computational Heat Transfer I

520D

7:45am–9:15am

Session Organizer: Kevin Dowding, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Organizer: A. Emery, *University of Washington, Seattle, WA, United States*

7:45am – Forced Convective Drying of a Porous Cube: Nonintrusive Temperature and Mass Transfer Measurements
Technical Paper Publication. IMECE2014-37522

Eoin Fanning, Tim Persoons, Darina B. Murray, *Trinity College Dublin, Dublin, Leinster, Ireland*

8:03am – Uncertainty Analysis in Louver Fin Brazed Aluminum Microchannel Heat Exchangers

Technical Paper Publication. IMECE2014-38411

Pradeep Shinde, Cheng-Xian Lin, *Florida International University, Miami, FL, United States*

8:21am – Using POD to Characterise Panel Backside Heat Losses

Technical Paper Publication. IMECE2014-38651

A. Emery, *University of Washington, Seattle, WA, United States*

8:39am – Validation of the Liquid Metal Heat Transfer Models of TRACE

Technical Paper Publication. IMECE2014-39892

Wadim Jaeger, Wolfgang Hering, Nerea Diez de los Rios, *Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, BW, Germany*, **Antonio Gonzalez**, *Universidad Politécnica de Madrid, Madrid, Spain*

8:57am – Heat Modeling of the Catenary's Contact Wire During the Electrical Power Supply of Trains in Station.

Technical Paper Publication. IMECE2014-36745

Thomas Bausseron, Sylvain Verschelde, *French National Railway Company (SNCF)*, **Philippe Baucour, Raynal Glises, Didier Chamagne**, *Université de Franche-Comté*

10-11 Fundamentals of Single-Phase Convection (K8)

10-11-2 Fundamentals of Single-Phase Convection—2

521C

9:30am–11:15am

Session Organizer: Patrick Oosthuizen, *Queen's University, Kingston, ON, Canada*

Session Co-Organizer: Christopher J. Kobus, *Oakland University, Rochester, MI, United States*

9:30am – Total Temperature Measurement of Micro-Gas Jet

Technical Paper Publication. IMECE2014-36965

Masataka Yamada, *Tokyo Metropolitan University, Tokyo, Japan*,

Chungpyo Hong, *Kagoshima University, Kagoshima, Japan*,

Yutaka Asako, *Tokyo Metropolitan University, Hachioji, Tokyo, Japan*

9:47am – Empirical Investigation of Aligned of Micro-Hydrofoils Arrays Under Single-Phase Cross Flow: Part 1. Nusselt Number Correlation

Technical Paper Publication. IMECE2014-38703

S. Andrew Semidey, J. Mayor, *Georgia Institute of Technology, Atlanta, GA, United States*

10:04am – Empirical Investigation of Aligned of Micro-Hydrofoils Arrays Under Single-Phase Cross Flow: Part 2. Friction Factor Correlation

Technical Paper Publication. IMECE2014-38706

S. Andrew Semidey, J. Mayor, *Georgia Institute of Technology, Atlanta, GA, United States*

10:21am – Study of Convective Heat Transfer for Turbulent Flow of Nanofluids Through Corrugated Channels

Technical Paper Publication. IMECE2014-39061

Shafi Noor, Monjurul Ehsan, A.K.M. Sadrul Islam, *Islamic University of Technology, Gazipur, Bangladesh*, **Mohammed**

Mayeed, *Southern Polytechnic State University, Marietta, GA, United States*

10:38am – Total Temperature Measurement of Gas Flow in Microtube With Constant Wall Temperature

Technical Paper Publication. IMECE2014-39660

Seiryu Matsushita, Taiki Nakamura, Chungpyo Hong, *Kagoshima University, Kagoshima, Kagoshima, Japan*, **Yutaka**

Asako, *Tokyo Metropolitan University, Hachioji, Tokyo, Japan*

10:55am – Observations on the Experimental Determination of Permeability and Forchheimer Coefficient for Fluid Flows in Porous Metal Foams

Technical Paper Publication. IMECE2014-38835

James I. Medvescek, Laurent Mydlarski, Bantwal R. (Rabi) Baliga, *McGill University, Montreal, QC, Canada*

10-12 Fundamentals of Radiative Transport Including Nanoscale Effects (K8 and K9)

10-12-1 Fundamentals of Radiative Transport Including Nanoscale Effects

522C

9:30am–11:15am

Session Organizer: Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

Session Co-Organizer: Yi Zheng, *University of Rhode Island, Kingston, RI, United States*

9:30am – Temperature and Distance Dependence of Minimum Radiative Transfer Between Two Metallic Half Spaces

Technical Paper Publication. IMECE2014-37188

Jeffrey Mayo, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

9:51am – Film Thickness Dependence of Near-Field Radiative Transport

Technical Presentation. IMECE2014-38977

Bai Song, Yashar Ganjeh, Seid Sadat, Dakotah R. Thompson,

Anthony R. Fiorino, Pramod Sangi Reddy, Edgar Meyhofer, *University of Michigan, Ann Arbor, Ann Arbor, MI, United States*

10:12am – MEMS-Based Variable Gap Device for Measuring Near-Field Radiative Heat Transfer Between Flat Surfaces

Technical Presentation. IMECE2014-38990

Michael Bernardi, Mathieu Francoeur, *University of Utah, Salt Lake City, UT, United States*

10:33am – Probing Radiative Heat Transfer in the Extreme Near Field

Technical Presentation. IMECE2014-39001

Kyeongtae Kim, Bai Song, Woochul Lee, Wonho Jeong, Edgar Meyhofer, Pramod Sangi Reddy, *University of Michigan, Ann Arbor, Ann Arbor, MI, United States*

10:54am – Nonsurface Polaritonic Peaks in Near-Field Radiative Transfer**Technical Paper Publication. IMECE2014-37192****Braden Czaplá, Yi Zheng**, *Columbia University, New York, NY, United States*, **Karthik Sasihithlu**, *University of Paris-Sud, Palaiseau, France*, **Arvind Narayanaswamy**, *Columbia University, New York, NY, United States***10-14 Fundamentals of Multiscale Modeling (K8, K9, K20)****10-14-2 Fundamentals of Multiscale Modeling II****522A****9:30am–11:15am****Session Organizer:** Gerard Jones, *Villanova University, Villanova, PA, United States***Session Co-Organizer:** Abhijit Mukherjee, *California State University, Northridge, Northridge, CA, United States***9:30am – Effect of Electrons on Heat Transfer Across Solid-Solid Interfaces****Technical Presentation. IMECE2014-36212****Xufei Wu**, *University of Notre Dame, South Bend, IN, United States*, **Tengfei Luo**, *University of Notre Dame, Notre Dame, IN, United States***9:47am – Using Finite Element Analysis to Investigate the Influence of Percolated Inclusion Networks on Nano-Enhanced Composite Conductive Thermal Transport****Technical Presentation. IMECE2014-38036****Anthony Webb, Aaron Wemhoff**, *Villanova University, Villanova, PA, United States***10:04am – Additive Semi-Implicit Runge-Kutta Method for Numerical Simulations of Ultrashort Laser Heating in Thin Films****Technical Presentation. IMECE2014-37113****Zhengxian Qu, Dadong Wang, Yanbao Ma**, *University of California, Merced, Merced, CA, United States***10:21am – Unified Ballistic-Diffusive Phonon Hydrodynamic Model for Multiscale Heat Transfer in Micro-/Nanosystems****Technical Presentation. IMECE2014-38526****Yanbao Ma**, *University of California, Merced, Merced, CA, United States***10:38am – Analytical and Experimental Study to Predict Radiated Heat Power Between a Satellite and Thermal Shroud****Technical Paper Publication. IMECE2014-37087****Daniel T. Schwendtner**, *Geoforce Inc., Bozeman, MT, United States*, **M. Ruhul Amin, David M. Klumpar**, *Montana State University, Bozeman, MT, United States***10:55am – Atomistic-Continuum Hybrid Simulation of Heat Transfer Between Argon Flow and Copper Plates****Technical Paper Publication. IMECE2014-39536****Yijin Mao, Yuwen Zhang, Chung-Lung Chen**, *University of Missouri, Columbia, MO, United States***10-24 Combustion and Fire Simulation, Modeling, and Experimental Techniques (K11)****10-24-2 Combustion and Fire Simulation, Modeling, and Experimental Techniques II****522B****9:30am–11:15am****Session Organizer:** Matthew Oehlschlaeger, *Rensselaer Polytechnic Institute, Troy, NY, United States***9:30am – Combustion Characteristics of Advanced Vortex Combustor Burning H₂ Fuel****Technical Paper Publication. IMECE2014-37475****Yangbo Deng, Xi Jiang, Fengmin Su**, *Dalian Maritime University, Dalian, Liaoning, China***9:56am – Experimental Study of the Local Response of a Low Swirl Flame to Acoustic Perturbation****Technical Paper Publication. IMECE2014-39233****Jianan Zhang, Albert Ratner**, *University of Iowa, Iowa City, IA, United States***10:22am – Modeling the Thermal Characteristics of an Eccentric Multistage Inverse Jet Diffusion Flame Burner****Technical Paper Publication. IMECE2014-39753****Sherif H. Amin, Ahmed Emara**, *Helwan University, Cairo, Cairo, Egypt*, **Adel Hussien, Ibrahim Shabaka**, *Cairo University, Giza, Egypt***10:48am – Method for Calculation of Direct Exchange Areas in the Presence of a Participating Medium****Technical Paper Publication. IMECE2014-36983****Vladimir Lisienko, German Malikov, Alexander Titaev**, *Ural Federal University, Ekaterinburg, Russia*, **Raymond Viskanta**, *Purdue University, West Lafayette, IN, United States*

10-42 Industrial Applications of Computational Heat Transfer (K20)

10-42-2 Computational Heat Transfer Methods and Applications

523A 9:30am–11:15am

Session Organizer: Xiuling Wang, *Purdue University Calumet, Hammond, IN, United States*

Session Co-Organizer: Abhijit Mukherjee, *California State University, Northridge, Northridge, CA, United States*

9:30am – POD Analysis Method for Multimedia Heat Conduction Problems

Technical Paper Publication. IMECE2014-36561
Xiao-Wei Gao, Jin-Xiu Hu, Shi-Zhang Huang, *Dalian University of Technology, Dalian, Liaoning, China*

9:51am – Using a Smoothed Particle Hydrodynamics Method for Solving Convective Heat Transfer Problems

Technical Paper Publication. IMECE2014-37524
Zhigang Feng, Miguel Ponton, *University of Texas at San Antonio, San Antonio, TX, United States*

10:12am – Higher Order Finite Elements for the Accurate Prediction of Temperature Gradients in Heat Conduction Problems

Technical Paper Publication. IMECE2014-39948
Donovan A. Aguirre-Rivas, Karim Muci-Kuchler, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

10:33am – Thermal Spreading Resistance Characteristics of a High Power Light Emitting Diode Module

Technical Paper Publication. IMECE2014-36624
Ming-Tsang Lee, *National Chung Hsing University, Taichung, Taiwan*, Kai-Shing Yang, *Industrial Technology Research Institute, Hsinchu, Taiwan*

10:54am – Application of the MSMD Framework in the Simulation of Lithium-Ion Battery Packs

Technical Paper Publication. IMECE2014-39882
Genong Li, Shaoping Li, *Ansys Inc., Lebanon, NH, United States*, Jing Cao, *Ansys Inc., Sheffield, United Kingdom*

10-11 Fundamentals of Single-Phase Convection (K8)

10-11-3 Fundamentals of Single-Phase Convection—3

521C 1:00pm–2:45pm

Session Organizer: Christopher J. Kobus, *Oakland University, Rochester, MI, United States*

Session Co-Organizer: Patrick Oosthuizen, *Queen's University, Kingston, ON, Canada*

1:00pm – Effects of Agitator Blade Geometry and Configuration for Augmenting Heat Transfer by Agitation in Channel Flows

Technical Paper Publication. IMECE2014-37303
Smita Agrawal, Taiho Yeom, Terrence Simon, Tianhong Cui, *University of Minnesota, Minneapolis, MN, United States*, Youmin Yu, *Qualcomm Technologies, Inc., San Diego, CA, United States*, Mark North, *Thermacore Inc., Lancaster, PA, United States*

1:17pm – Heat Transfer Enhancement of Channel Flow Via Vortex-Induced Vibration of Flexible Cylinder

Technical Paper Publication. IMECE2014-37594
Junxiang Shi, Chung-Lung Chen, Steven R. Schafer, *University of Missouri–Columbia, Columbia, MO, United States*

1:34pm – Simplified “Effective Circuit” Fluid Flow Model for Forced Convection in Oblique Fin Configuration

Technical Paper Publication. IMECE2014-37825
Nasi Mou, P.S. Lee, Saif A. Khan, *National University of Singapore, Singapore, Singapore*

1:51pm – Transient Exergetic Efficiency of a Forced Convection Drying Process With and Without Electrohydrodynamic (EHD) Enhancement

Technical Paper Publication. IMECE2014-38169
Erik Bardy, *Grove City College, Grove City, PA, United States*, Merouane Hamdi, Michel Havet, Olivier Rouaud, *ONIRIS, UMR GEPEA, Nantes, France*

2:08pm – Experimental Investigation of Temperature Uniformity in an Open Cavity of Buoyancy-Assisted Mixed Convection Heat Transfer With Multiple Discrete Inlet and Outlet Ports

Technical Paper Publication. IMECE2014-39515
Guang Yang, Jingyi Wu, Yiwei He, Lu Yan, *Shanghai Jiao Tong University, Shanghai, China*

2:25pm – Heat Transfer Enhancement of Reactor Utilizing Taylor Vortex Flow

Technical Paper Publication. IMECE2014-39854

Li Ye, Huajun Peng, Bo Zhou, Mo Yang, Zheng Li, *University of Shanghai for Science and Technology, Shanghai, China*, Yuwen Zhang, *University of Missouri–Columbia, Columbia, MO, United States*

10-12 Fundamentals of Radiative Transport including Nanoscale Effects (K8 and K9)

10-12-2 Fundamentals of Radiative Transport including Nanoscale Effects—2

522C

1:00pm–2:45pm

Session Organizer: Arvind Narayanaswamy, *Columbia University, New York City, NY, United States*

Session Co-Organizer: Yi Zheng, *University of Rhode Island, Kingston, RI, United States*

1:00pm – Investigation of Solar Trees for Effective Sunlight Capture Using Monte Carlo Simulations of Solar Radiation Transport

Technical Paper Publication. IMECE2014-36085

Navni N. Verma, Sandip Mazumder, *Ohio State University, Columbus, OH, United States*

1:26pm – Numerical Simulations of Natural Convection With Radiation in an Open Cavity Containing a Conducting and Centered Solid Body

Technical Paper Publication. IMECE2014-38258

Alan Lugarini de Souza, Admilson Franco, Silvio Junqueira, *Federal University of Technology–Parana, Curitiba-Pr, Brazil*, José L. Lage, *Southern Methodist University, Dallas, TX, United States*

1:52pm – Experimental Measurements in Determining the Spectral Emissivity of Usibor® 1500 P Undergoing Rapid Heating

Technical Paper Publication. IMECE2014-38375

Noel Chester, Kyle Daun, Mary Wells, *University of Waterloo, Waterloo, ON, Canada*

2:18pm – Spectral Absorptance of Tandem Grating and Its Application for Solar Energy Harvesting

Technical Presentation. IMECE2014-36694

Sunwoo Han, Bong Jae Lee, *Korea Advanced Institute of Science and Technology, Daejeon, Korea (Republic)*

10-17 Nanoscale Thermal Metrology (K9)

10-17-1 Nanoscale Thermal Metrology I: Thermoreflectance-Based Techniques

521B

1:00pm–2:45pm

Session Organizer: Jonathan A. Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*

Session Co-Organizer: Austin Minnich, *California Institute of Technology, Pasadena, CA, United States*

1:00pm – Influence of Laser Wavelength in Transient Reflectance Measurement of Gold

Extended Abstract Publication. IMECE2014-38103

Liang Guo, Xianfan Xu, *Purdue University, West Lafayette, IN, United States*

1:26pm – Using Time-Resolved Laser-Induced Incandescence for Sizing Aerosolized Iron Nanoparticles

Technical Paper Publication. IMECE2014-38515

Timothy Sipkens, Nigel Singh, Kyle Daun, David Bizmark, Marios Ioannidis, Mikko Karttunen, *University of Waterloo, Waterloo, ON, Canada*, John T. Titantah, *Western University, London, ON, Canada*

1:52pm – Thermoreflectance Measurements of Materials With Non-Radially Symmetric Thermal Conductivity Tensors

Technical Presentation. IMECE2014-39156

Joseph Feser, *University of Delaware, Newark, DE, United States*, David Cahill, *University of Illinois, Urbana, IL, United States*

2:18pm – Omega Method to Measure an Arbitrary Anisotropic Thermal Conductivity Tensor

Technical Presentation. IMECE2014-38652

Vivek Mishra, Chris Dames, *University of California, Berkeley, Berkeley, CA, United States*

10-24 Combustion and Fire Simulation, Modeling, and Experimental Techniques (K11)

10-24-3 Combustion and Fire Simulation, Modeling, and Experimental Techniques III

522B 1:00pm–2:45pm

Session Organizer: Aaron Brundage, Sandia National Laboratories, Albuquerque, NM, United States

Session Co-Chair: W.K. Chow, Hong Kong Polytechnic University, Hong Kong, Hong Kong

1:00pm – CFD Study of a Fire Whirl of Huge Oil Tank – Burning Rate, Flame Length, Distributions of Fuel and Oxygen in a Fire Whirl

Technical Paper Publication. IMECE2014-37276

Koyu Satoh, Naian Liu, Xiaodon Xie, Wei Gao, USTC/SKLFS, Hefei, Anhui, China

1:26pm – Numerical Study of Characteristics of Burning Phenomena in Equidistant Square Arrayed N-Heptane Fires

Technical Paper Publication. IMECE2014-37278

Koyu Satoh, Naian Liu, Xiaodon Xie, Wei Gao, USTC/SKLFS, Hefei, Anhui, China

1:52pm – Impact of Reference Frame Orientation on Discrete Ordinates Solutions in the Presence of Ray Effects and a Related Mitigation Technique

Technical Paper Publication. IMECE2014-40445

John Tencer, Sandia National Laboratories, Albuquerque, NM, United States

2:18pm – Investigation of Methane Combustion in a Rectangular Shaped Meso Chamber

Technical Paper Publication. IMECE2014-39810

Mahbub Ahmed, Scott McKay, Southern Arkansas University, Magnolia, AR, United States, **Cheng Zhang,** Georgia Southern University, Statesboro, GA, United States, **Vivek Shirsat,** University of Texas at El Paso, Alexandria, VA, United States, **Jobaidur Khan,** University at Buffalo, Buffalo, NY, United States

10-39 Heat and Mass Transfer in Natural and Built Environment (K19)

10-39-1 Heat and Mass Transfer in Indoor Environment

522A 1:00pm–2:45pm

Session Organizer: Cheng-Xian Lin, Florida International University, Miami, FL, United States

Session Co-Organizers: S.A. Sherif, University of Florida, Gainesville, FL, United States, Goran Simeunovic, Czech Technical University in Prague, Prague, Czech Republic

1:00pm – Optimization of Thermal Environment in Enclosed Environments by Using the Adjoint Method Based on Computational Fluid Dynamics

Invited Presentation. IMECE2014-36677

Qingyan Chen, Purdue University, West Lafayette, IN, United States

1:26pm – Natural Ventilation of a Solar House in Hot and Humid Climate – A Study Using Building Energy Simulation Method

Technical Paper Publication. IMECE2014-38290

Elise Belleil, CESI, Saint-Nazaire, France, **Long Phan, Cheng-Xian Lin,** Florida International University, Miami, FL, United States, **Mirko Schaefer,** Imtech Deutschland GmbH & Co. KG, Hamburg, Hamburg, Germany, **Johannes Wagner,** University of Kassel, Kassel, Germany

1:52pm – Jet Interaction in Cross Flow: Experimental and Numerical Model

Technical Paper Publication. IMECE2014-38993

Jose C.F. Teixeira, Pedro Lobarinhas, Senhorinha Teixeira, Antonio Nunes, Celso Almeida, University of Minho, Guimaraes, Portugal

2:18pm – Free Convection Film Condensation of Steam in the Presence of Noncondensing Gases Using CFD-Based Approach in a Room Filled With Humid Air

Technical Paper Publication. IMECE2014-37273

Alihsan Koca, Mir Arastirma ve Gelistirme A.S., Istanbul, Turkey, **Sevket Ozgur Atayilmaz, Ozden Agra,** Yildiz Technical University, Istanbul, Turkey

10-42 Industrial Applications of Computational Heat Transfer (K20)

10-42-3 Applications of Computational Fluid Dynamics and Heat Transfer

523A

1:00pm–2:45pm

Session Organizer: Laila Guessous, *Oakland University, Rochester, MI, United States*

Session Co-Organizer: Aaron Wemhoff, *Villanova University, Villanova, PA, United States*

1:00pm – Effects of Kitchen Hood System on Thermal Comfort and Carbon Dioxide Gas Emission From an Urban Residential Kitchen in Developing Countries

Technical Paper Publication. IMECE2014-36484

Md Hamidur Rahman, A.K.M. Sadrul Islam, *Islamic University of Technology, Gazipur, Bangladesh*, **M. Ruhul Amin,** *Montana State University, Bozeman, MT, United States*

1:21pm – Numerical Modeling of the Frosting Process on a Cold Finned Surface With Variable Fin Spacing

Technical Paper Publication. IMECE2014-37578

Assem El Zaabalawy, Aya Diab, Zakaria Ghoneim, *Ain Shams University, Cairo, Egypt, Egypt*

1:42pm – Modeling of Cavitation Bubble Motion in a Microtube

Technical Paper Publication. IMECE2014-39871

Bin Liu, Xin Liu, *Beijing Society of Thermophysics and Energy Engineering, Beijing, China*, **Jun Cai, Xiulan Huai,** *Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing, China*

2:03pm – Numerical Analysis on Cooling Performance for FET Heat Sink

Technical Paper Publication. IMECE2014-39220

KyungMin Jang, JunYoung Kim, Kwang-sun Kim, *Korea University of Technology & Education, Cheonan, Korea (Republic)*, **Cholongi Eum,** *Onegene Electronics Inc., Hwaseong, Korea (Republic)*

2:24pm – Numerical Treatment of Flow With Large Density Changes

Technical Presentation. IMECE2014-39433

Yit Fatt Yap, Afshin Goharzadeh, John C. Chai, *Petroleum Institute, Abu Dhabi, United Arab Emir.,* **Xiangzhao Meng, Liwen Jin,** *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10-29 Transport Phenomena in Manufacturing (Including Additive) and Materials Processing (K15)

10-29-1 Transport Phenomena in Manufacturing (Including Additive) and Materials Processing

522B

3:00pm–4:45pm

Session Organizer: Yuwen Zhang, *University of Missouri, Columbia, MO, United States*

Session Co-Organizers: Milind Jog, *University of Cincinnati, Cincinnati, OH, United States*, Patrick Mensah, *Southern University, Baton Rouge, LA, United States*

3:00pm – Thermal Transport Challenges in Additive Manufacturing/Laser Sintering/3D Printing

Invited Presentation. IMECE2014-40879

Jyotirmoy Mazumder, *University of Michigan, Ann Arbor, MI, United States*

3:30pm – Experimental Study of Buckling Behavior of Octagonal Thin-Walled Silicon Tube Grown by Edge-Defined Film-Fed Method

Technical Paper Publication. IMECE2014-38434

Guanghua Wei, *Shanghai Jiao Tong University, Shanghai, China*, **Hui Zhang, Lili Zheng,** *Tsinghua University, Beijing, China*, **Ronghui Ma,** *University of Maryland, Baltimore, MD, United States*

3:45pm – Effects of Solid Shield and Shroud on Plasma Jet Flame in APS Process

Technical Paper Publication. IMECE2014-37766

Ting Liu, Lili Zheng, Guanzhong Zhang, Hui Zhang, *Tsinghua University, Beijing, China*

4:00pm – Modeling Gas Microporosity Formation During Solidification Of Metallic Alloys Using Lattice Boltzmann Method

Technical Presentation. IMECE2014-38041

Mohammad Moasherziad, Mohsen Eshraghi, Sergio Felicelli, *University of Akron, Akron, OH, United States*

10-31 Thermal Management of Data Centers (K16)

10-31-1 Thermal Management of Data Centers and Computer Devices

521B 3:00pm–4:45pm

Session Organizer: Monem Beitelmal, *Qatar Foundation, NA, Qatar*

Session Co-Organizers: Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*, Kashif Nawaz, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

3:00pm – Computer Room Air Handler Subfloor Airflow Analysis for Data Centers

Technical Paper Publication. IMECE2014-36269

Dongmei Zhou, Brian Barrie, *California State University, Sacramento, Sacramento, CA, United States*

3:26pm – Thermodynamic Analysis of Hybrid Liquid-Air-Based Data Center Cooling Strategies

Invited Paper Publication. IMECE2014-38359

Anish Bhalerao, Alfonso Ortega, Aaron Wemhoff, *Villanova University, Villanova, PA, United States*

3:52pm – Optimization of Data Center Cooling Efficiency Using Reduced-Order Flow Modeling Within a Flow Network Modeling Approach

Technical Paper Publication. IMECE2014-39558

Kamran Fouladi, Aaron Wemhoff, Luis Silva-Llanca, Alfonso Ortega, *Villanova University, Villanova, PA, United States*

4:18pm – Numerical Simulation and Parametric Analysis of Multistage Ionic Wind Pump for Enhanced Air-Cooling

Technical Paper Publication. IMECE2014-38368

Robel Kiflemariam, Cheng-Xian Lin, Francisco Zevallos, *Florida International University, Miami, FL, United States*

10-39 Heat and Mass Transfer in Natural and Built Environment (K19)

10-39-2 Heat and Mass Transfer in the Ground and Buildings

522A 3:00pm–4:45pm

Session Organizer: Michael Pate, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: Sandra Beotcher, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*, Patrick Phelan, *Arizona State University, Tempe, AZ, United States*, Cheng-Xian Lin, *Florida International University, Miami, FL, United States*

3:00pm – Investigation of Building Passive Thermal Storage for Optimal Heating System Design

Technical Paper Publication. IMECE2014-37128

Oluwaseyi Ogunsola, Li Song, *University of Oklahoma, Norman, OK, United States*

3:26pm – Multiobjective Fire Safety and Sustainability Screening Tool for Specifying Insulation Materials

Technical Paper Publication. IMECE2014-38593

Bonnie C. Roberts, Michael E. Webber, Ofodike A. Ezekoye, *University of Texas, Austin, TX, United States*

3:52pm – Flow Simulation of Radiant Floor Heating System Using Hele-Shaw Analogy

Technical Paper Publication. IMECE2014-38733

Chean Chin Ngo, Christopher G. Peinder, *California State University, Fullerton, Fullerton, CA, United States*

4:18pm – Investigation on Moisture and Salt Transport in Heterogeneous Porous Media of Relics-Soil in Archaeology Museum

Technical Paper Publication. IMECE2014-39488

Xilian Luo, Zhaolin Gu, *Xi'an Jiaotong University, Xi'an, China*, **John C. Chai,** *Petroleum Institute, Abu Dhabi, United Arab Emir.*, **Xiangzhao Meng, Zhao Lu, Bingxu Zhu,** *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10-40 Thermal Engineering, Waste Water Re-Use, and Global Climate Change

10-40-1 Thermal Systems for Energy Efficiency and Water Conservation

522C

3:00pm–4:45pm

Session Organizer: Goran Simeunovic, *Czech Technical University in Prague, Prague, Czech Republic*

Session Co-Organizers: Cheng-Xian Lin, *Florida International University, Miami, FL, United States*, Sunita Kruger, *University of Johannesburg, Johannesburg, Gauteng, South Africa*, Yaroslav Chudnovsky, *Gas Technology, Des Plaines, IL, United States*

3:00pm – Localized Climatization of Perishable Products—Solutions for Increasing Energy Efficiency

Technical Paper Publication. IMECE2014-36750

Johannes Wagner, Jens Hesselbach, *University of Kassel, Kassel, Germany*, **Mirko Schaefer**, *Imtech Deutschland GmbH & Co. KG, Hamburg, Hamburg, Germany*, **Long Phan, Cheng-Xian Lin**, *Florida International University, Miami, FL, United States*, **Alexander Schlüter**, *Institute decentralised Energy Technologies GmbH, Kassel, Germany*, **Michele Rosano**, *Curtin University, Perth, WA, Australia*

3:20pm – Characterization of Fouled Flat-Sheet Membranes by Infrared Thermography

Technical Paper Publication. IMECE2014-36761

Kennethrex Ndukaife, George Agbai Nnanna, *Purdue University Calumet, Hammond, IN, United States*

3:40pm – Exergy Analysis of an Industrial Baking Process

Technical Paper Publication. IMECE2014-39198

Helen Skop, *Smart Heat Inc., Skokie, IL, United States*, **Tatiana Morosuk**, *Technical University Berlin, Berlin, Germany*

4:00pm – Numerical Modeling of the Moisture Transfer Through Wooden Desk and Hygro-Mechanical Coupling by Linking Ansys and Matlab Software

Technical Paper Publication. IMECE2014-39492

Goran Simeunovic, Tomas Vyhldal, *Czech Technical University in Prague, Prague, Czech Republic*

4:20pm – Natural Convection Heat Transfer Phenomena in Packed Bed Systems

Extended Abstract Publication. IMECE2014-38694

Olugbenga O. Noah, Johan F. Slabber, Josua Meyer, *University of Pretoria, Pretoria, Gauteng, South Africa*

10-42 Industrial Applications of Computational Heat Transfer (K20)

10-42-4 Applications of Computational Heat Transfer

523A

3:00pm–4:45pm

Session Organizer: Essam Khalil, *Islamic Azad University, Ahvaz, Iran*

Session Co-Organizer: Gerard Jones, *Villanova University, Villanova, PA, United States*

3:00pm – Stability Analysis of Non-Newtonian Rotational Flow With Hydromagnetic Effect

Technical Paper Publication. IMECE2014-36547

Nariman Ashrafi, Essam Khalil, *Islamic Azad University, Ahvaz, Iran*

3:17pm – Numerical Study of a Direct Chill Slab Caster Fitted With a Porous Filter for Aluminum Alloy AA-2024

Technical Paper Publication. IMECE2014-36748

Mainul Hasan, *McGill University, Montreal, QC, Canada*

3:34pm – Comparison Between 3-D Thermal Model and 3-D CFD Model for Vertical DC Casting of Rolling Ingots of Aluminum Alloy 7050

Technical Paper Publication. IMECE2014-36763

Mainul Hasan, Latifa Begum, *McGill University, Montreal, QC, Canada*

3:51pm – Predictions of Temperature and Pressure Fields Due to Collapse of a Bubble in Sulfuric Acid Solution Under Ultrasound

Technical Paper Publication. IMECE2014-37595

Ali Alhelfi, Bengt Sunden, *Lund University, Lund, Sweden*

4:08pm – Model and Computer Program for Heat Transfer Analysis in Strip Brush Protected Railroad Switch Systems

Technical Presentation. IMECE2014-40562

Pavan Ravulaparthi, Sealeze, *North Chesterfield, VA, United States*, **Ernesto Gutierrez-Miravete**, *Rensselaer at Hartford, Hartford, CT, United States*

4:25pm – High Weissenberg Number Stress Boundary Layer for the Upper Convected Maxwell Fluid

Technical Paper Publication. IMECE2014-36544

Nariman Ashrafi, Meysam Mohamadali, Mohamad Najafi, *Islamic Azad Univer, Tehran, Iran*

TRACK 11: MATERIALS: GENETICS TO STRUCTURES

11-2 Nanostructured Materials

11-2-1: Nanostructured Materials

11-6 Bioinspired Materials and Structures

11-6-1: Biomimetic Materials

11-8 Modeling of Multifunctional Materials

11-8-1: Modeling of Multifunctional Materials

11-8-2: Modeling of Multifunctional Materials

11-12 Processing-Structure-Property Relationships of Polymers and Composites

11-12-1: Processing-Structure-Property Relationships of Polymers and Composites 1

11-12-2: Processing-Structure-Property Relationships of Polymers and Composites 2

11-13 Nanomaterials for Energy

11-13-1: Nanomaterials for Energy

11-14 Nanoengineered, Hierarchical, and Multiscale Materials

11-14-1: Experimental Methods and Processing in Hierarchical and Multiscale Materials

11-14-2: Innovative Modeling and Simulations

11-14-3: Hierarchical Composite Material Systems

11-14-4: Innovative Hierarchical Composite Materials

11-17 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

11-17-1: Innovations in Processing, Characterization, and Applications of Bioengineered Materials I

11-17-2: Innovations in Processing, Characterization, and Applications of Bioengineered Materials II

11-18 Computational Modeling of Microstructural Evolution II

11-18-1: Phase Transformation and Microstructural Evolution

11-18-2: Phase Transformation, Solidification, and Casting

11-19 Materials Processing and Characterization

11-19-1: Materials Processing and Characterization—1

11-19-2: Materials Processing and Characterization—2

11-19-3: Materials Processing and Characterization—3

11-22 Modeling and Experiments in Nanomechanics and Nanomaterials

11-22-1: Modeling and Experiments in Nanomechanics and Nanomaterials 1

11-22-2: Modeling and Experiments in Nanomechanics and Nanomaterials 2

11-22-3: Modeling and Experiments in Nanomechanics and Nanomaterials 3

11-25 Modeling and Experimental Characterization for the Behavior of the Micro-/Nanostructured Thin Films

11-25-1: Modeling and Experimental Characterization for the Behavior of the Micro-/Nanostructured Thin Films I

11-33 Fatigue and Fracture of Joining Methods for Lightweight Materials

11-33-1: Fatigue and Fracture of Joining Methods for Lightweight Materials I

11-33-2: Fatigue and Fracture of Joining Methods for Lightweight Materials II

ACKNOWLEDGMENT

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 Jeffrey Kysar, *Columbia University, USA*
 Ling Liu, *Utah State University, USA*
 Marriner H. Merrill, *U.S. Naval Research Laboratory, USA*
 Yozo Mikata, *Bechtel, USA*
 Ram Mohan, *North Carolina A&T State University, USA*
 Devdas Pai, *North Carolina A&T State University, USA*
 Raghu Prakash, *Indian Institute of Technology Madras, India*
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 Donggang Yao, *Georgia Institute of Technology, USA*
 Yeoheung Yun, *North Carolina A&T State University, USA*

TRACK 11 MATERIALS: GENETICS TO STRUCTURES

Tuesday, November 18

11-13 Nanomaterials for Energy

11-13-1 Nanomaterials for Energy

515A 9:45am–11:30am

9:45am – Energy Mitigation Using Nanoporous Materials and Functional Liquids

Technical Presentation. IMECE2014-36390
Xi Chen, Columbia University, New York, NY, United States, **Jun Xu**, Beihang University, Beijing, China

10:06am – Experimental Investigation Into the Deformation and Fracture of Metal Anodes in Lithium-Ion Batteries

Technical Presentation. IMECE2014-38756
Ali Ghahremaninezhad, University of Miami, Coral Gables, FL, United States

10:27am – Polymer Nanocomposite Electrolytes for Flexible Lithium-Ion Batteries

Technical Presentation. IMECE2014-38945
Qin Li, Eric Wood, Mejdi Kammoun, Haleh Ardebili, University of Houston, Houston, TX, United States

10:48am – High-Performance Nafion/Coconut Shell Activated Carbon Proton Exchange Membrane and the Mechanisms of Ion Conduction

Technical Presentation. IMECE2014-38948
Mejdi Kammoun, Rushan Wasim, Haleh Ardebili, University of Houston, Houston, TX, United States, **Lauren Lundquist**, Colorado School of Mines, Colorado, TX, United States

11:09am – Efficient Analysis of Hydrogen Segregation Along Grain Boundaries via Space Tessellation

Technical Presentation. IMECE2014-39782
Xiao Zhou, Daniel Marchand, Jun Song, McGill University, Montréal, QC, Canada

11-19 Materials Processing and Characterization

11-19-1 Materials Processing and Characterization – 1

519A 9:45am–11:30am

Session Organizer: Raghu Prakash, Indian Institute of Technology Madras, Chennai, India

Session Co-Organizer: Devdas Pai, North Carolina A&T State University, Greensboro, NC, United States

Session Chair: Patricia Iglesias Victoria, Rochester Institute of Technology, Rochester, NY, United States

Session Co-Chair: Mahesh Hosur, Tuskegee University, Tuskegee, AL, United States

9:45am – Durability Studies of Hybrid Composite of E-Glass/Carbon Fibers in Different Solvent Media for Bridge Deck Panel Application

Technical Paper Publication. IMECE2014-36175
Peter Owuor, Alfred Tcherbi-Narteh, Mahesh Hosur, Shaik Jeelani, Tuskegee University, Tuskegee, AL, United States

10:06am – Comparison of Hardness and Microstructures Produced Using GMAW and Hot-Wire TIG Mechanized Welding of High-Strength Steels

Technical Paper Publication. IMECE2014-36482
Abdelbaset R.H. Midawi, Adrian Gerlich, Meysam Haghshenas, University of Waterloo, Waterloo, ON, Canada, **E.B.F. Santos**, Federal University of Pará, Belém, Pará, Brazil, **Robert Pistor**, Liburdi Automation Company, Dundas, ON, Canada

10:27am – Interface Integrity Evaluation of Explosively Welded Metallic Structures

Technical Paper Publication. IMECE2014-36796
Jikai Du, Christopher Jerred, Katrina Ladd, Fereidoon Delfanian, South Dakota State University, Brookings, SD, United States

10:48am – Microstructural Characterization of Sm-Co Magnets

Technical Paper Publication. IMECE2014-37106
Patricia Iglesias Victoria, Surendra Gupta, Rochester Institute of Technology, Rochester, NY, United States, **Weimin Yin, Steve Constantinides**, Arnold Magnetic Technologies, Rochester, NY, United States

11:09am – Factors Affecting Systems for Managing Materials Information, Modeling Predations, and Experimental Results

Technical Paper Publication. IMECE2014-37048

Will Marsden, Beth Cope, Dave Cebon, Granta Design, Cambridge, United Kingdom

11-22 Modeling and Experiments in Nanomechanics and Nanomaterials

11-22-1 Modeling and Experiments in Nanomechanics and Nanomaterials 1

518C

9:45am–11:30am

Session Organizer: Yozo Mikata, Bechtel, Niskayuna, NY, United States

Session Co-Organizer: Jeffrey Kysar, Columbia University, New York, NY, United States

Session Chair: Reaz A. Chaudhuri, University of Utah, Salt Lake City, UT, United States

Session Co-Chair: Scott Price, GE Global Research Center, Niskayuna, NY, United States

9:45am – Refinement of a Force Method for a CNT Self-Folding Problem

Technical Presentation. IMECE2014-36554

Yozo Mikata, Bechtel, Niskayuna, NY, United States

10:06am – Mechanical Deformations of Boron Nitride Nanotubes in Crossed Junctions

Technical Presentation. IMECE2014-38583

Yadong Zhao, Xiaoming Chen, Changhong Ke, State University of New York at Binghamton, Binghamton, NY, United States, Cheol Park, Catharine C. Fay, NASA Langley Research Center, Hampton, VA, United States, Stanislaw Stupkiewicz, Institute of Fundamental Technological Research, Warsaw, Poland

10:27am – Interface Dislocation in Anisotropic Dissimilar Materials With Interface Stress and Interface Elasticity

Technical Presentation. IMECE2014-36046

Hideo Koguchi, Nobuyasu Suzuki, Nagaoka University of Technology, Nagaoka, Niigata, Japan

10:48am – Probing Graphene Folding on Flat Substrates

Technical Presentation. IMECE2014-40038

Xiaoming Chen, Yadong Zhao, Changhong Ke, State University of New York at Binghamton, Binghamton, NY, United States, Liuyang Zhang, Xianqiao Wang, University of Georgia, Athens, GA, United States

11:09am – Curvature-Dependent Surface Stress Model for Nanostructured Materials

Technical Presentation. IMECE2014-36939

Xiang Gao, Zhuping Huang, Daining Fang, Peking University, Beijing, China

11-17 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

11-17-1 Innovations in Processing, Characterization, and Applications of Bioengineered Materials I

519B

1:00pm–2:45pm

Session Organizer: Devdas Pai, North Carolina A&T State University, Greensboro, NC, United States

Session Co-Organizers: Jagannathan Sankar, Yeoheung Yun, North Carolina A&T State University, Greensboro, NC, United States, Prashant N. Kumta, University of Pittsburgh, Pittsburgh, PA, United States

1:00pm – Design Strategy for Mg-Based Alloys for Biodegradable Implants

Technical Presentation. IMECE2014-39921

Yongjun Chen, Zhigang Xu, Christopher E. Smith, Jagannathan Sankar, North Carolina A&T State University, Greensboro, NC, United States

1:15pm – Physical and Structural Properties of Pulsed-DC Sputtered Al₂O₃, MgO, and ZrO₂ Coating for Mg Corrosion Control

Technical Paper Publication. IMECE2014-39573

Ruben Kotoka, Svitlana Fialkova, Sergey Yarmolenko, Devdas Pai, Jagannathan Sankar, North Carolina A&T State University, Greensboro, NC, United States

1:30pm – Tribological Study of Magnesium Alloys for Implant Applications

Technical Paper Publication. IMECE2014-39568

Paul McGhee, Devdas Pai, Sergey Yarmolenko, Zhigang Xu, Yongjun Chen, North Carolina A&T State University, Greensboro, NC, United States, Sudheer Neralla, Jet-Hot LLC, Burlington, NC, United States

1:45pm – In Situ AFM Corrosion Study of Ti and Mg Thin Films

Technical Paper Publication. IMECE2014-39571

Svitlana Fialkova, Ruben Kotoka, Sergey Yarmolenko, Jagannathan Sankar, North Carolina A&T State University, Greensboro, NC, United States

11-19 Materials Processing and Characterization

11-19-2 Materials Processing and Characterization—2

519A

1:00pm–2:45pm

Session Organizer: Mahesh Hosur, *Tuskegee University, Tuskegee, AL, United States*

Session Co-Organizer: Raghu Prakash, *Indian Institute of Technology Madras, Chennai, India*

Session Chair: Alexander T. Bikmeyer, *Ufa State Aviation Technical University, Ufa, Bashkortostan, Russia*

1:00pm – Experimental Determination of the Tensile Strength of Fused Deposition Modelling Parts

Technical Paper Publication. IMECE2014-37553

Konstantinos Savvakis, Markos Petousis, Achilles Vairis, Nektarios Vidakis, *Technological Education Institute of Crete, Heraklion, Crete, Greece, Alexander T. Bikmeyer, Ufa State Aviation Technical University, Ufa, Bashkortostan, Russia*

1:21pm – Biomechanical Effects of Kaempferol Treatments on the Bone Healing Process of Murine Tibia

Technical Paper Publication. IMECE2014-37810

Hanjong Kim, Changwan Han, Seonghun Park, *Pusan National University, Busan, Korea (Republic), Otgonbayar Maidar, Sang-Soo Lee,* *Hallym University, Chuncheon, Korea (Republic)*

1:42pm – Evaluation of Mechanical Properties of Microstructure in as-Cast Magnesium Alloy

Technical Presentation. IMECE2014-37837

Akio Yonezu, Shoichi Fujisawa, *Chuo University, Tokyo, Japan*

2:03pm – Centrifugal Coating of Liquids on Solid Substrates

Technical Presentation. IMECE2014-38337

Chen Yang, Saugata Dutt, Koundinya Kuppa, Steven Chen, Adithya Ramachandran, Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States, Wonjae Choi,* *University of Texas at Dallas, Richardson, TX, United States*

2:24pm – Dielectric Properties and Microwave Heating of Date Palm Biomass

Technical Presentation. IMECE2014-37405

Hani Sait, *King Abdulaziz University, Jeddah, Saudi Arabia, Arshad Salema,* *University of New Brunswick, Fredericton, NB, Canada*

11-22 Modeling and Experiments in Nanomechanics and Nanomaterials

11-22-2 Modeling and Experiments in Nanomechanics and Nanomaterials 2

518C

1:00pm–2:45pm

Session Organizer: Yozo Mikata, *Bechtel, Niskayuna, NY, United States*

Session Chair: Nicholas Triantafyllidis, *École Polytechnique, Palaiseau, France*

Session Co-Organizer: Jeffrey Kysar, *Columbia University, New York, NY, United States*

Session Co-Chair: Changhong Ke, *State University of New York at Binghamton, Binghamton, NY, United States*

1:00pm – Effect of Temperature on the Resistivity in a 1D Heat Transfer Problem Coupled With Field Emission: CNT as an Electron Emitter

Technical Presentation. IMECE2014-36555

Yozo Mikata, *Bechtel, Niskayuna, NY, United States, Scott Price,* *GE Global Research Center, Niskayuna, NY, United States*

1:17pm – Field Emitter Lifetime-Limiting Mechanisms

Technical Presentation. IMECE2014-39510

Scott Price, *GE Global Research Center, Niskayuna, NY, United States, Yozo Mikata,* *Bechtel, Niskayuna, NY, United States*

1:34pm – Piezo-Resistivity of Thin Film Semiconductors Under Mechanical Strain

Technical Presentation. IMECE2014-37493

Dennis Lange, *Laboratoire de Mécanique des Solides, Palaiseau, France, Pere Roca i Cabarrocas,* *Thin Films Laboratory, Palaiseau, France, Nicholas Triantafyllidis,* *École Polytechnique, Palaiseau, France*

1:51pm – In Situ SEM and TEM Testing of Thin Films at High Temperatures

Technical Presentation. IMECE2014-38296

Baoming Wang, Tarek Alam, Md Haque, *Pennsylvania State University, University Park, PA, United States*

2:08pm – Crack Path Instabilities in Diamond Cubic Mono-Crystalline Materials: Crack Turning vs Step/Ridge/Texture Formation

Technical Presentation. IMECE2014-37788

Reaz A. Chaudhuri, *University of Utah, Salt Lake City, UT, United States*

2:25pm – Fundamental Effects in Nanoscale Thermocapillary Flow

Technical Presentation. IMECE2014-37249

Sung Hun Jin, *Seoul National University, Seoul, Korea (Republic)*,
Jizhou Song, *Zhejiang University, Hangzhou, Zhejiang, China*,
Yonggang Huang, *Northwestern University, Evanston, IL, United States*,
John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

11-17 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

11-17-2 Innovations in Processing, Characterization, and Applications of Bioengineered Materials II

519B

3:00pm–4:45pm

Session Organizer: Devdas Pai, *North Carolina A&T State University, Greensboro, NC, United States*

Session Co-Organizers: Jagannathan Sankar, *Yeoheung Yun*, *North Carolina A&T State University, Greensboro, NC, United States*,
Prashant N. Kumta, *University of Pittsburgh, Pittsburgh, PA, United States*

3:00pm – Applications of X-Ray CT Imaging to Biodegradable Metal Studies

Technical Presentation. IMECE2014-38538

Boyce Collins, *North Carolina A&T State University, Greensboro, NC, United States*

3:35pm – In Vivo and In Vitro Convergence of Biodegradable Magnesium Implant

Technical Paper Publication. IMECE2014-39262

Yeoheung Yun, **Yongseok Jang**, **Juan Wang**, **Youngmi Koo**,
Boyce Collins, **Jagannathan Sankar**, **Leon White**, *North Carolina A&T State University, Greensboro, NC, United States*,
Zhongyun Dong, **Vesselin Shanov**, *University of Cincinnati, Cincinnati, OH, United States*

4:10pm – Bone Regenerative Ability of New Mg-Zn-Zr Alloys: In Vitro Assessment of Second-Phase Precipitate Distribution, Microhardness, and Degradation

Technical Presentation. IMECE2014-39306

Daeho Hong, **Da-Tren Chou**, **Partha Saha**, **Prashant N. Kumta**, *University of Pittsburgh, Pittsburgh, PA, United States*,
Yongjun Chen, **Zhigang Xu**, **Boyce Collins**, *North Carolina A&T State University, Greensboro, NC, United States*

11-19 Materials Processing and Characterization

11-19-3 Materials Processing and Characterization—3

515A

3:00pm–4:45pm

Session Organizer: Ajit Kelkar, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

Session Co-Organizer: Marwan Azzi, *Notre Dame University–Louize, Zouk-Mosbeh, Lebanon*

Session Chair: Joana Carvalho, *University of Minho, Guimarães, Braga, Portugal*

Session Co-Chair: Raghu Prakash, *Indian Institute of Technology Madras, Chennai, India*

3:00pm – Development of an Integrated Process for Eggshell Valorization

Technical Paper Publication. IMECE2014-38836

Joana Carvalho, **Candida Vilarinho**, *University of Minho, Guimarães, Braga, Portugal*, **André Ribeiro**, **Jorge Araújo**, *CVR–Center for Waste Valorization, Guimarães, Braga, Portugal*

3:26pm – Material and Energetic Valorization of Tetra Pak® Packaging

Technical Paper Publication. IMECE2014-38880

Joana Carvalho, **Candida Vilarinho**, *University of Minho, Guimarães, Braga, Portugal*, **Alexandra Castro**, **Jorge Araújo**, *CVR–Center for Waste Valorization, Guimarães, Braga, Portugal*

3:52pm – Development and Characterization of Poly lactide Based Bio-Composites

Technical Paper Publication. IMECE2014-39261

Muhammad A.S. Anwer, **Hani E. Naguib**, *University of Toronto, Toronto, ON, Canada*, **Alain Celzard**, *Institut Jean Lamour–UMR Université de Lorraine, Nancy and Metz, France*, **Vanessa Fierro**, *Institut Jean Lamour, Epinal Cedex, France*

4:18pm – Design of New Multifunctional Galling-Corrosion Testing Apparatus

Technical Paper Publication. IMECE2014-39404

Marwan Azzi, *Notre Dame University–Louize, Zouk-Mosbeh, Lebanon*, **Elie Bitar-Nehme**, **Jolanta-Ewa Klemberg-Sapieha**, *École Polytechnique de Montreal, Montreal, QC, Canada*

11-22 Modeling and Experiments in Nanomechanics and Nanomaterials

11-22-3 Modeling and Experiments in Nanomechanics and Nanomaterials 3

518C

3:00pm–4:45pm

Session Organizer: Yozo Mikata, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: Jeffrey Kysar, *Columbia University, New York, NY, United States*

Session Chair: Jun Song, *McGill University, Montréal, QC, Canada*

Session Co-Chair: Huanyu Cheng, *Northwestern University, Evanston, IL, United States*

3:00pm – Nanostructure and Properties of High-Strength Aramid Fibers

Technical Presentation. IMECE2014-39012

Korhan Sahin, Jan K. Clawson, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, **James Q. Zheng, Suzanne Horner,** *U.S. Army, Fort Belvoir, VA, United States*, **Assimina Pelegri,** *Rutgers University, Piscataway, NJ, United States*, **Ioannis Chasiotis,** *University of Illinois, Urbana, IL, United States*

3:17pm – Energetics and Core Structures of Dislocations in GaN Through Atomistic Simulations

Technical Presentation. IMECE2014-39909

Cheng Chen, Jun Song, *McGill University, Montréal, QC, Canada*

3:34pm – Experimental Analysis and Atomistic Simulation of Pile-Up Formation in Nanoindentation

Technical Presentation. IMECE2014-38873

Reza Mirshams, Zhiqiang Wang, *University of North Texas, Denton, TX, United States*

3:51pm – First-Principle Study of Dislocation Slips in Nitrogen or Boron Doped Graphene

Technical Presentation. IMECE2014-40048

Fanchao Meng, Jun Song, *McGill University, Montréal, QC, Canada*

4:08pm – Critical Separation Distance Needed to Form Weak Menisci Between the Head and the Disk—Effect of Polar Interaction

Technical Presentation. IMECE2014-39717

Mohammed Mayeed, *Southern Polytechnic State University, Marietta, GA, United States*

4:25pm – Nanomechanical Cutting of Boron Nitride Nanotubes by Atomic Force Microscopy: Experiments and Modeling

Technical Presentation. IMECE2014-38796

Meng Zheng, Xiaoming Chen, Changhong Ke, *State University of New York at Binghamton, Binghamton, NY, United States*, **Cheol Park, Catharine C. Fay,** *NASA Langley Research Center, Hampton, VA, United States*, **Stefano Signetti, Nicola M. Pugno,** *University of Trento, Trento, Italy*

Thursday, November 20

11-2 Nanostructured Materials

11-2-1 Nanostructured Materials

523B

7:45am–9:15am

7:45am – Overcoming the Brittleness of Glass Through Bio-Inspiration and Microarchitecture

Technical Presentation. IMECE2014-39443

Mohammad Mirkhalaf, Ahmad Khayer Dastjerdi, Francois Barthelat, *McGill University, Montreal, QC, Canada*

8:03am – Defiltration Behavior of Zeolite Beta: Loading Rate and Sodium Ion Effect

Technical Presentation. IMECE2014-36467

Jun Xu, *Beihang University, Beijing, China*, **Yueting Sun,** *Tsinghua University, San Diego, CA, United States*, **Yibing Li,** *Tsinghua University, Beijing, China*, **Xi Chen,** *Columbia University, New York, NY, United States*

8:21am – Mechanical Properties of Tobacco Mosaic Virus Superlattice

Technical Presentation. IMECE2014-36942

Xinnan Wang, *North Dakota State University, Fargo, ND, United States*, **Tao Li,** *ANL, Lemont, IL, United States*, **Byeongdu Lee,** *RNL, Lemont, IL, United States*

8:39am – Heterogeneous Silver-Epoxy Coatings for Low Resistivity Applications

Technical Presentation. IMECE2014-40183

Xavier Cauchy, Jolanta-Ewa Klemberg-Sapieha, Daniel Therriault, *École Polytechnique de Montréal, Montréal, QC, Canada*

8:57am – Role of Length Scale and Temperature in Indentation-Induced Creep Behavior of Polycrystalline Al

Technical Presentation. IMECE2014-36621

Sudipta Biswas, Jonathan Marsh, Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

11-6 Bioinspired Materials and Structures

11-6-1 Biomimetic Materials

514C

7:45am–9:15am

Session Organizer: Francois Barthelat, *McGill University, Montreal, QC, Canada*

Session Co-Organizer: Frederick Gosselin, *École Polytechnique de Montreal, Montreal, QC, Canada*

7:45am – Pneumatically Actuated Elastomeric Larynx

Technical Presentation. IMECE2014-37538

Rohith Dronadula, Yanjun Wang, Ananth Rao, Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

8:00am – Creation of Sacrificial Bonds by Viscous Flow Instability

Technical Paper Publication. IMECE2014-38877

Renaud Passieux, Daniel Therriault, Frederick Gosselin, *École Polytechnique de Montreal, Montreal, QC, Canada*

8:15am – Characterization of Nitinol as a Servo-Biomimetic for Facial Muscles

Technical Paper Publication. IMECE2014-37684

Oliver Mestre, Jose Riofrio, Moochul Shin, *Western New England University, Springfield, MA, United States*

8:30am – Viscoelastic Evaluation of Soft Materials at Subsonic Level by Ball Impact Test

Technical Paper Publication. IMECE2014-39245

Katsuya Igarashi, Naoki Torii, Atsushi Sakuma, *Tokyo University of Agriculture and Technology, Tokyo, Japan*

8:45am – Strain Rate Hardening in Biological and Biomimetic Composites: A Critical Ingredient to Mechanical Performance

Technical Presentation. IMECE2014-39447

Ravi Chintapalli, Ahmad Khayer Dastjerdi, Francois Barthelat, *McGill University, Montreal, QC, Canada*

9:00am – Fabrication, Testing, and Modeling of a New Flexible Armor Inspired From Natural Fish Scales and Osteoderms

Technical Presentation. IMECE2014-40297

Ravi Chintapalli, Francois Barthelat, *McGill University, Montreal, QC, Canada*

11-14 Nanoengineered, Hierarchical, and MultiScale Materials

11-14-1 Experimental Methods and Processing in Hierarchical and Multiscale Materials

514A

7:45am–9:15am

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Chair: Shing-Chung Wong, *University of Akron, Akron, OH, United States*

Session Co-Chair: Junlan Wang, *University of Washington, Seattle, WA, United States*

7:45am – Using Electrospinning to Create Adhesive Nanofibers by Polymer Blending

Technical Presentation. IMECE2014-36382

Shing-Chung Wong, *University of Akron, Akron, OH, United States*

8:07am – Influence of Na Diffusion on VO₂ Films and Prevention Through Mixed-Alkali Effect

Technical Presentation. IMECE2014-39444

Mark J. Miller, Junlan Wang, *University of Washington, Seattle, WA, United States*

8:29am – Synthesis and Mechanical Characterization of Nickel Nanowires—Effect of External Magnetic Field on the Elastic Stiffness Modulus

Technical Presentation. IMECE2014-40413

Mahendran Samykano, Ram Mohan, Shyam Aravamudhan, *North Carolina A&T State University, Greensboro, NC, United States*

8:51am – Liquid Metal Printing for Manufacturing Large-Scale Flexible Electronic Circuits

Technical Paper Publication. IMECE2014-37763

Yi Zheng, Jun Yang, *Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, China*, **Zhizhu He,** *Technical Institute of Physics and Chemistry, Beijing, China*, **Jing Liu,** *Chinese Academy of Sciences, Beijing, China*

11-18 Computational Modeling of Microstructural Evolution II

11-18-1 Phase Transformation and Microstructural Evolution

514B

7:45am–9:15am

Session Organizer: Mohsen Asle Zaeem, *Missouri University of Science and Technology, Rolla, MO, United States*

Session Co-Organizer: Long-Qing Chen, *Pennsylvania State University, State College, PA, United States*

7:45am – Phase Field Modeling of Phase Transformations in Multicomponent Alloys

Invited Presentation. IMECE2014-36563

Peter Voorhees, *Northwestern University, Evanston, IL, United States*, **Thomas Philippe**, *U. Rouen, Rouen, France*

8:00am – Microstructural Evolution of Crystalline Solid Materials Under Severe Plastic Deformations

Technical Presentation. IMECE2014-37176

Mattia Bacca, *University of California Santa Barbara, Santa Barbara, CA, United States*, **Robert McMeeking**, *University of California, Santa Barbara, CA, United States*, **David Hayhurst**, *University of Manchester, Manchester, United Kingdom*

8:15am – Microstructure Evolution and Bond Formation at the Contact Interface During Ultrasonic Consolidation Process

Technical Paper Publication. IMECE2014-37203

Song Zhang, **Lili Zheng**, **Hui Zhang**, *Tsinghua University, Beijing, China*

8:30am – High-Performance Computing for Large-Scale Simulation to Self-Assembly of Crystalline Nanostructures

Technical Presentation. IMECE2014-37822

Zhen Guan, **John Lowengrub**, *University of California, Irvine, Irvine, CA, United States*, **Katsuyo Thornton**, **Victor Chan**, *University of Michigan, Ann Arbor, MI, United States*

8:45am – Prediction of Transformation-Induced Residual Stresses During Gas Nitriding of H13 Steels Using Phase Field Approach

Technical Paper Publication. IMECE2014-37945

Syed Sohail Akhtar, **Abba A. Abubakar**, **Abul Fazal M. Arif**, *King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia*

9:00am – Process Simulation Role in the Development of New Alloys Based on Integrated Computational Material Science and Engineering

Invited Paper Publication. IMECE2014-37982

Adrian Sabau, **Wallace Porter**, **Shibayan Roy**, **Amit Shyam**, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*

11-25 Modeling and Experimental Characterization for the Behavior of the Micro-/Nanostructured Thin Films

11-25-1 Modeling and Experimental Characterization for the Behavior of the Micro-/Nanostructured Thin Films I

513D

7:45am–9:15am

Session Organizer: George Voyiadjis, *Louisiana State University, Baton Rouge, LA, United States*

Session Co-Organizer: Danial Faghihi, *University of Texas at Austin, Austin, TX, United States*

7:45am – Thermomechanical Responses of Metallic Thin Films on the Fast Transient Process

Technical Presentation. IMECE2014-36205

Danial Faghihi, *University of Texas at Austin, Austin, TX, United States*, **George Voyiadjis**, *Louisiana State University, Baton Rouge, LA, United States*

7:57am – Structural-Nanomechanical Property Correlation of Exoskeleton of Shallow Water Shrimp (*Penaeus SPP*) at Elevated Temperatures

Technical Presentation. IMECE2014-36627

Devendra Verma, **Vikas Tomar**, *Purdue University, West Lafayette, IN, United States*

8:09am – Mechanical Property Size Effects in Submicron and Nanometer Thick Textured Pt Films

Technical Presentation. IMECE2014-37823

Debashish Das, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, **Ronald G. Polcawich**, *U.S. Army Research Laboratory, Adelphi, MD, United States*, **Ioannis Chasiotis**, *University of Illinois, Urbana, IL, United States*

8:21am – Selection, Calibration, and Validation of Coarse-Grained and Macro Models of Atomic Systems

Technical Presentation. IMECE2014-39508

Kathryn Farrell, **J. Tinsley Oden**, **Danial Faghihi**, *University of Texas at Austin, Austin, TX, United States*

8:33am – Computer Modeling Applied in Nanoindentation Testing for Micro-/Nanoscale Material Characterization

Technical Presentation. IMECE2014-39655

Zhong Hu, *South Dakota State University, Brookings, SD, United States*

8:45am – Quantification of Scratch and Mar Damage on Polymeric Thin Films

Technical Presentation. IMECE2014-40384

Hung-Jue Sue, Marouen Hamdi, *Texas A&M University, College Station, TX, United States*

8:57am – Mechanical, Tribological, and Corrosion Properties of 316/STELLITE 6 and Inconel/Colmonoy 88 Substrate/Coating Systems

Technical Paper Publication. IMECE2014-39372

Marwan Azzi, *Notre Dame University–Louize, Zouk-Mosbeh, Lebanon*, **Luc Vernhes, Velan**, *Montreal, QC, Canada*, **Étienne Bousser, Jolanta-Ewa Klemberg-Sapieha**, *École Polytechnique de Montreal, Montreal, QC, Canada*

11-33 Fatigue and Fracture of Joining Methods for Lightweight Materials

11-33-1 Fatigue and Fracture of Joining Methods for Lightweight Materials I

512E

7:45am–9:15am

7:45am – Impact Response of an Adhesively Bonded Lap Joint

Technical Paper Publication. IMECE2014-36252

Jack Chiu, Feridun Delale, Niell Elvin, *City College of New York, New York, NY, United States*

8:00am – Intermetallic Compound Formation in Al/Mg Friction Stir Welded (FSW) Butt Joints

Technical Paper Publication. IMECE2014-37213

Zeina El Chlouk, Ramsey Hamade, *American University of Beirut, Beirut, Lebanon*, **Georges Ayoub**, *Texas A&M University at Qatar, Doha, Qatar*, **Ghassan Kridli**, *University of Michigan Dearborn, Bloomfield Hills, MI, United States*

8:15am – Efficient Augmented Finite Element Method (A-FEM) for Arbitrary Cracking and Crack Interaction in Solids

Technical Presentation. IMECE2014-36268

Wei Liu, *China University of Petroleum, Beijing, China*, **Qingda Yang**, *University of Miami, Coral Gables, FL, United States*

8:30am – Decade of Experience With Small Specimen Testing to Evaluate Mechanical Properties of Materials

Technical Paper Publication. IMECE2014-37356

Raghu Prakash, *Indian Institute of Technology Madras, Chennai, India*

8:45am – Static Analysis of Advanced Composites for the Optimal Design of an Experimental Lightweight Solar Vehicle Suspension System

Technical Paper Publication. IMECE2014-40042

W.S. Hurter, Nickey Janse van Rensburg, D.M. Madyira, G.A. Oosthuizen, *University of Johannesburg, Johannesburg, Gauteng, South Africa*

9:00am – Fatigue and Fretting of Mixed Metal Self-Piercing Riveted Joint

Technical Paper Publication. IMECE2014-40107

Li Huang, Haiding Guo, *Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China*, **John Lasecki, Xuming Su**, *Ford Motor Company, Dearborn, MI, United States*

11-8 Modeling of Multifunctional Materials

11-8-1 Modeling of Multifunctional Materials

514C

9:30am–11:15am

Session Organizer: Zhenhai Xia, *University of North Texas, Denton, TX, United States*

Session Co-Chairs: Xin-Lin Gao, *Southern Methodist University, Dallas, TX, United States*, **Ling Liu**, *Utah State University, Logan, UT, United States*

9:30am – Protective Multifunctional Battery System for Electric Vehicles

Technical Presentation. IMECE2014-36393

Xi Chen, *Columbia University, New York, NY, United States*

9:56am – Growth Mechanism and Mechanical Properties of 3D Carbon Nanotube-Graphene Nanostructures

Technical Presentation. IMECE2014-39298

Jianbing Niu, Zhenhai Xia, *University of North Texas, Denton, TX, United States*

10:22am – Mechanics of Self-Assembled Filamentous Drug Delivery Vehicles

Technical Presentation. IMECE2014-39621

Ling Liu, Lin Zhang, *Utah State University, Logan, UT, United States*

10:48am – Protective Performance of 1-D C60 Alignment at High Impact Speed Loading

Technical Presentation. IMECE2014-39710

Jun Xu, *Beihang University, Beijing, China*, **Xi Chen**, *Columbia University, New York, NY, United States*

11-12 Processing-Structure-Property Relationships of Polymers and Composites

11-12-1 Processing Structure Property Relationships of Polymers and Composites 1

513D

9:30am–11:15am

Session Organizer: Shing-Chung Wong, *University of Akron, Akron, OH, United States*

Session Co-Organizer: Donggang Yao, *Georgia Institute of Technology, Atlanta, GA, United States*

9:30am – Comparative Study of Properties of Cellulose Nanofibers From Wheat Straw Obtained by Chemical and Chemi-Mechanical Treatments

Technical Paper Publication. IMECE2014-36174

Md. Nuruddin, Mahesh Hosur, Eldon Triggs, Shaik Jeelani, *Tuskegee University, Tuskegee, AL, United States*

9:51am – Dynamic Response of Polyvinyl Alcohol(PVA)-Hydrogel With Different PVA Concentrations

Technical Paper Publication. IMECE2014-37811

Changwan Han, Hanjong Kim, Seonghun Park, *Pusan National University, Busan, Korea (Republic)*

10:12am – Lateral Compressive Properties of Paper Tube

Technical Paper Publication. IMECE2014-37923

Mitsunori Suda, *Daisankogyo Co., Ltd, Kashiwara, Japan*, **Jiahui Yang, Yuqiu Yang**, *Donghua University, Shanghai, China*, **Takanori Kitamura, Hiroyuki Hamada**, *Kyoto Institute of Technology, Kyoto, Japan*, **Kanta Ito, Kenji Wada, Zhiyuan Zhang**, *Daiwa Itagami Co. Ltd., Kashiwara, Japan*

10:33am – Influence of Polymer-CNT Interphase Growth and Structure on Carbonization Processes toward Low-Temperature Graphitization

Technical Presentation. IMECE2014-40105

Yiyang Zhang, Heng Li, Navid Tajaddod, Marilyn Minus, *Northeastern University, Boston, MA, United States*

10:54am – In-Plane Thermal Conductivities of CFRP Composites Interleaved With Dissimilar Conductive Media

Technical Paper Publication. IMECE2014-38923

Alaina M. Bever, Benjamin L. Levy-Wendt, Vittorio del Rosario, James A. Pentz, Yen-Lin Han, Frank J. Shih, *Seattle University, Seattle, WA, United States*

11-14 Nanoengineered, Hierarchical, and Multiscale Materials

11-14-2 Innovative Modeling and Simulations

514A

9:30am–11:15am

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Chair: Samit Roy, *University of Alabama, Tuscaloosa, AL, United States*

Session Co-Chair: Ashfaq Adnan, *University of Texas Arlington, Arlington, TX, United States*

9:30am – Multiscale Modeling of Fracture Properties for Nanoparticle Reinforced Polymers Using Atomistic J-Integral

Technical Paper Publication. IMECE2014-36419

Samit Roy, Avinash Akepati, *University of Alabama, Tuscaloosa, AL, United States*

9:56am – Effect of Chirality and Geometry on the Young's Modulus of Graphene Structure Using Spring-Based Finite Element Approach

Technical Paper Publication. IMECE2014-37972

Moosa S.M. Al-Kharusi, *Sultan Qaboos University, Muscat, Muscat, Oman*, **Tasneem Pervez, Khalid Alzebdeh**, *Sultan Qaboos University, Al-Khouth, Oman*

10:22am – Mechanical Behavior of Carbon Nanotube Reinforced LDPE/Nylon 6 Hybrid Polymer Nanocomposites: A Molecular Simulation Study

Technical Presentation. IMECE2014-40255

Ashfaq Adnan, Sheikh Ferdous, *University of Texas at Arlington, Arlington, TX, United States*, **Mujibur Khan**, *Georgia Southern University, Statesboro, GA, United States*

10:48am – Influence of Magnesium Exchange on the Mechanical Stiffness and Deformation Behavior of Cement C-S-H Jennite—A Material Chemistry Level Material Modeling Analysis

Technical Presentation. IMECE2014-40403

Ram Mohan, Babatunde Adebisi, John Rivas-Murillo, Ahmed Mohamed, North Carolina A&T State University, Greensboro, NC, United States, **Wayne D. Hodo**, U.S. Army Engineering Research and Development Center, Vicksburg, MS, United States

11-18 Computational Modeling of Microstructural Evolution II

11-18-2 Phase Transformation, Solidification, and Casting
514B 9:30am–11:15am

Session Organizer: Mohsen Asle Zaeem, Missouri University of Science and Technology, Rolla, MO, United States

Session Co-Organizer: Sergio Felicelli, University of Akron, Akron, OH, United States

Session Chair: Mohsen Eshraghi, University of Akron, Akron, OH, United States

9:30am – Phase Transformations: Geometrically Nonlinear Phase Field Approach With Interface Stresses

Invited Presentation. IMECE2014-37065

Valery I. Levitas, Iowa State University, Ames, IA, United States

9:47am – Numerical Study of the Microstructural Evolution During Homogenization of 6xxx and 7xxx Series Aluminum Alloys

Technical Presentation. IMECE2014-37180

Pikee Priya, Matthew J.M. Krane, David R. Johnson, Purdue University, West Lafayette, IN, United States

10:04am – Numerical Study Comparing Effects of Forced and Buoyancy Convection on Columnar Dendrite Growth Using Lattice Boltzmann Method

Technical Presentation. IMECE2014-38035

Mohammad Hashemi, Mohsen Eshraghi, Sergio Felicelli, University of Akron, Akron, OH, United States

10:21am – 3D Stochastic Modeling of Columnar-to-Equiaxed Transition During the Solidification of Alloy 718

Invited Paper Publication. IMECE2014-39761

Laurentiu Nastac, Daojie Zhang, University of Alabama, Tuscaloosa, AL, United States

10:38am – Elasticity and Grain Growth of Fe, Al, Cu, and Ni Using Phase-Field Crystal Modeling Integrated With Molecular Dynamics

Technical Presentation. IMECE2014-40359

Ebrahim Asadi, Mohsen Asle Zaeem, Missouri University of Science and Technology, Rolla, MO, United States

10:55am – Computational Evaluation of Incomplete Coating Coverage

Technical Paper Publication. IMECE2014-37952

Virginia Degiorgi, Siddiq Qidwai, U.S. Naval Research Laboratory, Washington, DC, United States, **Nithyanand Kota**, Leidos, Reston, VA, United States

11-8 Modeling of Multifunctional Materials

11-8-2 Modeling of Multifunctional Materials

514C 1:00pm–2:45pm

Session Organizer: Ling Liu, Utah State University, Logan, UT, United States

Session Co-Chairs: Dong Qian, University of Texas at Dallas, Dallas, TX, United States, **Marriner H. Merrill**, U.S. Naval Research Laboratory, Washington, MD, United States

1:00pm – Thermal Properties of Spider Silk Beta-Sheets

Technical Presentation. IMECE2014-39622

Lin Zhang, Ling Liu, Utah State University, Logan, UT, United States

1:26pm – Effect of Scratch on the Mechanical Property of Injection Moldings

Technical Paper Publication. IMECE2014-38301

Mengyuan Liao, Masuo Murakami, Hiroyuki Inoya, Hiroyuki Hamada, Kyoto Institute of Technology, Kyoto, Japan, **Yuqiu Yang**, Donghua University, Shanghai, China

1:52pm – Torque and Thrust Force Prediction Model for Drilling Of CFRC Composites.

Technical Paper Publication. IMECE2014-37471

Kuravi Venkata Krishna Sastry, AVIT, Chennai, Tamilnadu, India, **Vaddi Seshagiri Rao, M. Senthil Kumar**, Anna University, Chennai, Tamilnadu, India, **A. Velayudham**, CVRDE, Chennai, Tamilnadu, India

2:18pm – Development of Alumina-Nickel/Chrome Cermet Composite Based HVOF Thermal Spray Coatings for High-Temperature Erosive Wear Applications

Technical Presentation. IMECE2014-36914

Gobinda C. Saha, University of Calgary, Calgary, AB, Canada, **Tahir I. Khan**, University of Qatar, Doha, Qatar

11-12 Processing-Structure-Property Relationships of Polymers and Composites

11-12-2 Processing-Structure-Property Relationships of Polymers and Composites 2

513D 1:00pm–2:45pm

Session Organizer: Shing-Chung Wong, *University of Akron, Akron, OH, United States*

Session Co-Organizer: Donggang Yao, *Georgia Institute of Technology, Atlanta, GA, United States*

1:00pm – Mechanical Properties of Paper/Thermosetting Resin Composites by Various Paper Materials

Technical Paper Publication. IMECE2014-37798

Takanori Kitamura, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, **Qianjin Zhang,** *Donghua University, Shanghai, China*, **Kanta Ito, Suguru Teramura, Zhiyuan Zhang,** *Daiwa Itagami Co. Ltd., Kashiwara, Japan*, **Yuqiu Yang,** *Donghua University, Shanghai, China*

1:26pm – Vacuum Infusion for Processing Thermosetting Composites Containing High Loading Solid Fillers

Technical Paper Publication. IMECE2014-38142

Xudong Fang, Yifeng Hong, Donggang Yao, *Georgia Institute of Technology, Atlanta, GA, United States*, **Chao Bi,** *Beijing University of Chemical Technology, Chaoyang District, Beijing, China*

1:52pm – Polymer Reinforcement by Polymer Extended-Chain Interphase Structures in Nano-Carbon Chip Composite Fibers

Technical Presentation. IMECE2014-40101

Kenan Song, Marilyn Minus, *Northeastern University, Boston, MA, United States*

2:18pm – Evaluation of Mechanical Properties at the Knit Lines Interface in a Complex Multicell PVC Extrusion

Technical Paper Publication. IMECE2014-40217

James Grudzinski, *Argonne National Laboratory, Downers Grove, IL, United States*, **Richard Fischer, Richard Talaga, Victor Guarino,** *Argonne National Laboratory, Argonne, IL, United States*, **Anna Pla-Dalmau,** *Fermi National Accelerator Laboratory, Batavia, IL, United States*, **James Fagan,** *Fermi National Accelerator Laboratory, Batavia, IL, United States*, **Charles Grozis,** *Extrutech Plastics, Inc., Manitowoc, IL, United States*

11-14 Nanoengineered, Hierarchical and MultiScale Materials

11-14-3 Hierarchical Composite Material Systems

514A 1:00pm–2:45pm

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Chair: Mahesh Hosur, *Tuskegee University, Tuskegee, AL, United States*

Session Co-Chair: Ajit Kelkar, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

1:00pm – Low Velocity Impact Characterization of MMT/MWCNT Hybrid Nanoparticles Modified Carbon/Epoxy Composites Subjected to Marine Environmental Conditioning

Technical Paper Publication. IMECE2014-36173

Md. Ekramul Islam, Tanjheel Mahdi, Mahesh Hosur, Alfred Tcherbi-Narteh, Shaik Jeelani, *Tuskegee University, Tuskegee, AL, United States*

1:26pm – Mechanical Properties of the Multilayer Laminated Intra-Hybrid Woven Fabric Composites

Technical Paper Publication. IMECE2014-37864

Daiki Ichikawa, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, **Masayuki Kitamura,** *Hokuriku Fiber Glass Co., Ltd., Komatsu, Japan*, **Yuqiu Yang,** *Donghua University, Shanghai, China*

1:52pm – Flexural Behavior of Fiber Glass Polymer Composites With and Without Electrospun Glass Nanofibers

Technical Paper Publication. IMECE2014-38304

Dattaji Shinde, Fatima T. White, Ajit Kelkar, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

2:18pm – Investigation of the Interfacial Properties of Carbon Fiber Reinforced Thermoplastic and Thermosetting Composites

Technical Paper Publication. IMECE2014-37757

Toshi Sugahara, *Kyoto Institute of Technology, Fukui, Japan*, **Yan Ma, Yuqiu Yang,** *Donghua University, Shanghai, China*, **Suchaline Mathurosemontri, Hiroyuki Hamada,** *Kyoto Institute of Technology, Kyoto, Kyoto, Japan*

11-33 Fatigue and Fracture of Joining Methods for Lightweight Materials

11-33-2 Fatigue and Fracture of Joining Methods for Lightweight Materials II

512E

1:00pm–2:45pm

1:00pm – Microstructure Evolution and Mechanical Performance of Friction Stir Welded Dissimilar AA6061-AA7050 Joints

Technical Presentation. IMECE2014-40345

Rogie Rodriguez, Robert McCullough, Cody Rickard, Brian Jordon, *University of Alabama, Tuscaloosa, AL, United States*

1:17pm – Structure-Property Relationships of 6061-T6 Aluminum Alloy Thermomechanically Bonded With Varying Temperatures

Technical Presentation. IMECE2014-40471

Kiran Solanki, Scott Turnage, *Arizona State University, Tempe, AZ, United States*, Wilburn Whittington, *Mississippi State University, Starkville, MS, United States*, Kristopher Darling, M.A. Tschopp, *Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

1:34pm – Fatigue and Fracture Behavior of Friction Stir Welded Al and Mg Alloys

Technical Presentation. IMECE2014-40472

Wei Yuan, Harsha Badarinarayan, Lili Zheng, *Hitachi America Ltd., Farmington Hills, MI, United States*

1:51pm – Fatigue of Magnesium Joints: Recent Progress and Future Directions

Technical Presentation. IMECE2014-40473

Seyed Behzad Behravesh, Hamid Jahed, *University of Waterloo, Waterloo, ON, Canada*

2:08pm – Microstructure Characterization of Friction Stir Welds Using Spatially Correlated Nanoindentation/SEM/EDX

Technical Presentation. IMECE2014-36810

Paul Allison, *U.S. Army ERDC, Brandon, MS, United States*, R.D. Moser, T.W. Rushing, J.S. Tingle, *U.S. Army ERDC, Vicksburg, MS, United States*, J.G. Rivera-Almeyda, *University of Puerto Rico at Mayaguez, Vicksburg, MS, United States*, J.B. Jordon, *University of Alabama, Tuscaloosa, AL, United States*

2:25pm – Fatigue Life Prediction of Joints in Automotive Structures

Technical Presentation. IMECE2014-40474

Hong-tae Kang, *University of Michigan-Dearborn, Novi, MI, United States*

11-14 Nanoengineered, Hierarchical, and Multiscale Materials

11-14-4 Innovative Hierarchical Composite Materials

514A

3:00pm–4:45pm

Session Organizer: Ram Mohan, *North Carolina A&T State University, Greensboro, NC, United States*

Session Co-Chair: Nassibeh Hosseini, *North Dakota State University, Fargo, ND, United States*

Session Chair: Frank J. Shih, *Seattle University, Seattle, WA, United States*

3:00pm – Effect of Adding Boron Nitride Nanoparticles on Carbon Composite Mechanical Behavior

Technical Paper Publication. IMECE2014-38342

Mahdi Ghazizadeh, Joseph Estevez, Evan Kimbro, Ajit Kelkar, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

3:26pm – Interlaminar Tensile Strength of CFRP Composites Reinforced With Interleaved Carbon Nanotube Sheets

Technical Paper Publication. IMECE2014-38876

Benjamin L. Levy-Wendt, Alaina M. Bever, Nicholas C. Wright, Tim J. Venable, John P. Dally, Frank J. Shih, *Seattle University, Seattle, WA, United States*

3:52pm – Utilization of Flax Fibers and Glass Fibers in a Bio-Based Resin

Technical Paper Publication. IMECE2014-39393

Nassibeh Hosseini, Chad Ulven, Fardad Azarmi, Dean Webster, Thomas Nelson, *North Dakota State University, Fargo, ND, United States*

4:18pm – Characterization of Mechanical and Viscoelastic Properties of SC-15 Epoxy Nanocomposites Reinforced With Multiwalled Carbon Nanotubes, Nanoclay, and Hybrid Nanoparticles

Technical Paper Publication. IMECE2014-36176

Tanjheel Mahdi, Md. Ekramul Islam, Mahesh Hosur, Alfred Tcherbi-Narteh, Shaik Jeelani, *Tuskegee University, Tuskegee, AL, United States*

TRACK 12: MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS

12-1 General

- 12-1-1: General Topics I
- 12-1-2: General Topics II
- 12-1-3: General Topics III

12-2 Mechanics of Adhesion and Friction

- 12-2-1: Mechanics of Adhesion and Friction I
- 12-2-2: Mechanics of Adhesion and Friction II
- 12-2-3: Mechanics of Adhesion and Friction III

12-3 Hybridization of Materials for Functional Structures, Devices, and Systems: Mechanics, Materials, and Manufacturing

- 12-3-1: Mechanics, Materials, and Manufacturing of Soft Electronics

12-4 Symposium on Multiphysics Simulations and Experiments for Solids

- 12-4-1: Multiphysics in Solids and Material Failure Analysis
- 12-4-2: Multiphysics Study of Biological and Soft Materials
- 12-4-3: Coupled Phenomena in Nanomaterials
- 12-4-4: Multiphysical Applications

12-7 Response of Composite Materials under Extreme Loading Conditions: Experimental and Computational Investigations

- 12-7-1: Response of Composite Materials under Extreme Loading Conditions

12-8 Time-Dependent Materials and Their Composites: Experimental, Theoretical, and Numerical Studies

- 12-8-1: Time-Dependent Materials and Their Composites
- 12-8-2: Time-Dependent Materials and Their Composites

12-10 Mechanics and Design of Cellular Materials

- 12-10-1: Mechanics and Design of Cellular Materials I
- 12-10-2: Mechanics and Design of Cellular Materials II
- 12-10-3: Mechanics and Design of Cellular Materials III

12-11 Damage and Failure of Composites

- 12-11-1: Damage and failure of composites I
- 12-11-2: Damage and failure of composites II
- 12-11-3: Damage and failure of composites III
- 12-11-4: Damage and failure of composites IV

12-12 Multifield Studies in Heterogeneous Materials: Experimental, Theoretical, and Numerical Approaches

- 12-12-1: Multifield Studies in Heterogeneous Materials Part 1
- 12-12-2: Multifield Studies in Heterogeneous Materials Part 2

12-15 Polymer Nanocomposites and Nanostructured Materials: Simulations and Experiments

- 12-15-1: Polymer Nanocomposites and Nanostructured Materials: Simulations and Experiments

12-16 Processing and Performance of Nanocomposites

- 12-16-1: Processing and Performance of Nanocomposites

12-17 Polymer Nanocomposites: Simulations and Experiments

- 12-17-1: Polymer Nanocomposites: Simulations and Experiments

12-18 Materials and Metamaterials at Varying Length Scales and Frequency Ranges

- 12-18-1: Materials and Metamaterials at Varying Length Scales and Frequency Ranges

12-22 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization

- 12-22-1: Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (I)
- 12-22-2: Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (II)
- 12-22-3: Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (III)
- 12-22-4: Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (IV)

12-26 Effects of Defects, Damage Tolerance, and Repair of Composites

- 12-26-1: Effects of Defects, Damage Tolerance, and Repair of Composites

12-27 Multiscale Modeling of Textile Composites

- 12-27-1: Multiscale Modeling of Textile Composites

12-28 Fatigue and Fracture of Engineering Materials and Structures

- 12-28-1: Fatigue Failure I
- 12-28-2: Fatigue Failure II
- 12-28-3: Fatigue Failure III
- 12-28-4: Fracture Mechanics

12-29 Multiscale Computations in Fluids, Structures, and Materials

- 12-29-1: Multiscale Computations in Fluids, Structures, and Materials 1
- 12-29-2: Multiscale Computations in Fluids, Structures, and Materials 2
- 12-29-3: Multiscale Computations in Fluids, Structures, and Materials 3

12-31 Computational Engineering and Simulation

- 12-31-1: Engineering Research Innovation and Computation
- 12-31-2: Computational Engineering and Validation Simulations I
- 12-31-3: Computational Engineering and Validation Simulations II

12-32 Modeling Materials with Morphological Complexities and Evolving Microstructures

- 12-32-1: Modeling Materials with Morphological Complexities and Evolving Microstructures

12-33 Symposium on Mechanics of Soft Materials

- 12-33-1: Soft Active Materials
- 12-33-2: Gels and Soft Machines
- 12-33-3: Instability, Damage, and Degradation in Soft Materials
- 12-33-4: Computation and Modeling of Soft Materials
- 12-33-5: Bioinspired and Biological Materials
- 12-33-6: Structure-Interface-Property Relations in Soft Materials
- 12-33-7: Morphogenesis of Soft and Living Matter

12-34 Instability In Solids And Structures

- 12-34-1: Instability in Solids and Structures I
- 12-34-2: Instability in Solids and Structures II
- 12-34-3: Instability in Solids and Structures III
- 12-34-4: Instability in Solids and Structures IV
- 12-34-5: Instability in Solids and Structures V

12-35 Mechanics and Materials in the Oilfield

- 12-35-1: Hydraulic Fracturing
- 12-35-2: Mechanical Systems
- 12-35-3: Elastomeric Materials

12-36 Young Investigator Awards Presentations

- 12-36-1: Young Investigator Awards Presentations

12-37 Drucker Medalist Symposium

- 12-37-1: Drucker Medalist Symposium
- 12-37-2: Drucker Medalist Symposium

12-39 Multiscale Fracture and Fatigue of Materials

- 12-39-1: Multiscale Fracture and Fatigue of Materials

12-40 Full-Field Experimental Techniques for Quantifying Fracture and Failure

- 12-40-1: Full-Field Experimental Techniques for Quantifying Fracture and Failure

12-41 Failure Mechanics of Advanced Materials and Structures

- 12-41-1: Experiments and Simulations

12-42 Peridynamics for Failure Prediction

- 12-42-1: Peridynamics for Failure Prediction I
- 12-42-2: Peridynamics for Failure Prediction II

12-43 Medalist Symposium

- 12-43-1: Medalist Symposium

12-44 Mechanics in Biology and Medicine

- 12-44-1: Mechanics in Biology and Medicine
- 12-44-2: Mechanics of Single Cell/Cluster I
- 12-44-3: Mechanics of Single Cell/Cluster II

12-45 Plenary

- 12-45-1: Plenary

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TRACK 12 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS

Monday, November 17

12-4 Symposium on Multiphysics Simulations and Experiments for Solids

12-4-1 Multiphysics in Solids and Material Failure
Analysis

512A 9:45am–11:30am

Session Organizer: Dong Qian, *University of Texas at Dallas, Dallas, TX, United States*

Session Co-Organizer: Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

9:45am – Coupling Manufacturing, Mechanics, and Materials
Design in Additive Manufacturing Applications Part I

Technical Presentation. IMECE2014-39851

Wing Kam Liu, *Northwestern University, Evanston, IL, United States*

10:00am – Coupling Manufacturing, Mechanics, and Materials
Design in Additive Manufacturing Applications
Part 2

Technical Presentation. IMECE2014-39852

Wing Kam Liu, *Northwestern University, Evanston, IL, United States*

10:15am – An Ab Initio Analysis of the Influence of Knock-on-
Atom Induced Damage on the Peak Tensile Strength of 3C-SiC
Grain Boundaries

Technical Presentation. IMECE2014-36625

YouSung Han, Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

10:30am – Path-Independent Integral for Fracture of Solids
Under Combined Electrochemical and Mechanical Loadings

Technical Presentation. IMECE2014-37740

Hamed Haftbaradaran, Jianmin Qu, *Northwestern University, Evanston, IL, United States*

10:45am – Multiphysical Dislocation Dynamics Models With
XFEM

Technical Presentation. IMECE2014-40169

Robert Gracie, Oxana Skiba, *University of Waterloo, Waterloo, ON, Canada*

11:00am – Mesh-Free Modeling of Shock-Structural Interaction
in Fragment-Impact Processes

Technical Presentation. IMECE2014-40232

Jiun-Shyan Chen, *University of California, San Diego, La Jolla, CA, United States*, Jason Roth, *U.S. Army Corps of Engineers, Vicksburg, MS, United States*

11:15am – Environmental and Mechanical Coupling for Failure
Assessment of Composite Bonded Joints

Technical Presentation. IMECE2014-40303

Jim Lua, Xiaohu Liu, Eugene Fang, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

12-28 Fatigue and Fracture of Engineering Materials and Structures

12-28-1 Fatigue Failure I

512B 9:45am–11:30am

Session Organizer: Gbadebo Owolabi, *Howard University, Washington, DC, United States*

Session Co-Organizer: Olanrewaju Aluko, *University of Michigan–Flint, Grand Blanc, MI, United States*

9:45am – High Cycle Fatigue Strength of Modified 9Cr-1Mo
Steel at Elevated Temperatures

Technical Paper Publication. IMECE2014-36865

Motoyuki Ochi, Ken Suzuki, Isamu Nonaka, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

10:00am – Experimental and Numerical Study on the Fretting
Fatigue Mechanism of the V Type Engine

Technical Paper Publication. IMECE2014-37340

Xin Li, Zhengxing Zuo, Wenjie Qin, *Beijing Institute of Technology, Beijing, China*

10:15am – Evaluation of Fatigue Strength of AISI 4340 Steel
Under Hydrostatic Pressure

Technical Paper Publication. IMECE2014-37391

Raghu Prakash, *Indian Institute of Technology Madras, Chennai, India*, Deepak C. Raphael, *National Institute of Ocean Technology, Chennai, Tamilnadu, India*

10:30am – Behavior of NPS30 Pipe Subject to Denting Load

Technical Paper Publication. IMECE2014-37598

Hossein Ghaednia, Kyle Gerard, Sudip Bhattacharjee, Sreekanta Das, *University of Windsor, Windsor, ON, Canada*

10:45am – Crystallographic Approach to Life Prediction Analysis of a Turbine Engine Blade to Disk Attachment Technical Paper Publication. IMECE2014-40208
Samir Naboulsi, *DRC Inc., Reston, VA, United States*

11:00am – Fracture of 2D Crystalline Nanomaterials: Effect of Hydrogen Functionalization and Complex Loading Technical Presentation. IMECE2014-40734
Siva Nadimpalli, *New Jersey Institute of Technology, Newark, NJ, United States*, **Dibakar Datta**, *Brown University, Providence, RI, United States*, **Yinfeng Li**, *SJTU, Shanghai, China*, **Vivek Shenoy**, *University of Pennsylvania, Philadelphia, PA, United States*

12-29 MultiScale Computations in Fluids, Structures, and Materials

12-29-1 Multiscale Computations in Fluids, Structures, and Materials 1
512C **9:45am–11:30am**

Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: **Glaucio Paulino**, *University of Illinois, Urbana, IL, United States*

Session Chair: **Mohammed Zikry**, *North Carolina State University, Raleigh, NC, United States*

Session Co-Chair: **Caglar Oskay**, *Vanderbilt University, Nashville, TN, United States*

9:45am – Peridynamic Analysis on Wave Propagation and Dispersion Curves Technical Presentation. IMECE2014-36553
Yozo Mikata, *Bechtel, Niskayuna, NY, United States*

10:02am – Multiscale Analysis of Two-Phase Materials at Elevated Temperatures Technical Presentation. IMECE2014-38598
Masoud Ghorbani Moghaddam, **Ajit Achuthan**, *Clarkson University, Potsdam, NY, United States*, **Brett Bednarczyk**, **Steven. M. Arnold**, **Evan Pineda**, *NASA Glenn Research Center, Cleveland, OH, United States*

10:19am – Molecular Dynamics Studies of Nano-Indentation for Various Boundary Conditions Technical Presentation. IMECE2014-37677
George Voyiadjis, **Mohammadreza Yaghoobi**, *Louisiana State University, Baton Rouge, LA, United States*

10:36am – Mechanics Analysis and Design of Fractal Interconnects for Stretchable Batteries Technical Presentation. IMECE2014-38050
Yonggang Huang, *Northwestern University, Evanston, IL, United States*

10:53am – Multiscale, Continuum-Level Modeling and Computation of Dense Granular Flows Technical Presentation. IMECE2014-40050
David Henann, *Brown University, Providence, RI, United States*, **Ken Kamrin**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

11:10am – Multiscale Crystal Defect Dynamics: A Dual-Lattice Process Zone Model Technical Presentation. IMECE2014-37335
Shaofan Li, *University of California-Berkeley, Berkeley, CA, United States*

12-33 Symposium on Mechanics of Soft Materials

12-33-1 Soft Active Materials
512E **9:45am–11:30am**

Session Chairs: **Chris Yakachi**, *University of Colorado, Denver, Denver, CO, United States*, **Soo Jin Adrian Koh**, *National University of Singapore, Singapore, Singapore, Singapore*

9:45am – Transition to Wrinkles in a Viscoelastic Dielectric Elastomer Technical Presentation. IMECE2014-37420
Matthias Kolloosche, *University of Potsdam, Potsdam, Germany*, **Guggi Kofod**, *InMold Biosystems A/S, Taastrup, Denmark*, **Zhigang Suo**, *Harvard University, Cambridge, MA, United States*, **Jian Zhu**, *National University of Singapore, Singapore, Singapore*

10:02am – Powering the Performance of Soft Elastomeric Transducers by a Simple Physical Process Technical Presentation. IMECE2014-37742
Soo Jin Adrian Koh, *National University of Singapore, Singapore, Singapore, Singapore*, **Zhigang Suo**, *Harvard University, Cambridge, MA, United States*, **Siegfried Bauer**, *Johannes-Kepler University, Linz, Austria*

10:19am – Dielectric Elastomer Composites: The Critical Role of Interphasial Phenomena Technical Presentation. IMECE2014-38068
Oscar Lopez-Pamies, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10:36am – Fabrication and Characterization of Magneto-Rheological Elastomers

Technical Presentation. IMECE2014-39045

Laurence Bodelot, Kostas Danas, Nicholas Triantafyllidis, Kostas Danas, *École Polytechnique, Palaiseau, France*, Tobias Possinger, Christian Bolzmacher, *CEA, Gif-sur-Yvette, France***10:53am – Characterization of Thiol-Acrylate Main-Chain Liquid Crystalline Elastomers**

Technical Presentation. IMECE2014-39992

Christopher Yakacki, *University of Colorado Denver, Denver, CO, United States***11:10am – Electrets in Soft Materials**

Technical Presentation. IMECE2014-38485

Fateme Ahmadpoor, Pradeep Sharma, *University of Houston, Houston, TX, United States*, Liping Liu, *Rutgers University, Piscataway, NJ, United States***12-34 Instability in Solids and Structures****12-34-1 Instability in Solids and Structures I**

514A

9:45am–11:30am

Session Organizer: Kostas Danas, *CNRS, École Polytechnique, Palaiseau, France*Session Co-Organizer: Dennis Kochmann, *California Institute of Technology, Pasadena, CA, United States***9:45am – Nonlinear Dynamics of Structures Containing Bistable Elements**

Technical Presentation. IMECE2014-36977

Neel Nadkarni, Dennis Kochmann, *California Institute of Technology, Pasadena, CA, United States*, Chiara Daraio, *ETH Zurich, Zurich, Switzerland***10:06am – Shape Programmable Structures**

Technical Presentation. IMECE2014-37129

Katia Bertoldi, Sung Hoon Kang, Sicong Shan, Francisco Candido, *Harvard University, Cambridge, MA, United States***10:27am – Harnessing Instability in Soft Actuators**

Technical Presentation. IMECE2014-37497

Johannes T.B. Overvelde, Katia Bertoldi, *Harvard University, Cambridge, MA, United States***10:48am – Mapping the Stochastic Response of Nanostructures**

Technical Presentation. IMECE2014-38904

Ryan Elliott, Ellad Tadmor, Subrahmanyam Pattamatta, *University of Minnesota, Minneapolis, MN, United States***11:09am – Molecular Dynamics (MD) Based Investigation on the Dislocation Dynamics Under Nanoindentation**

Technical Presentation. IMECE2014-39145

Ajith Ukwattage, Ajit Achuthan, *Clarkson University, Potsdam, NY, United States***12-39 Multiscale Fracture and Fatigue of Materials****12-39-1 Multiscale Fracture and Fatigue of Materials**

513D

9:45am–11:30am

Session Organizer: Huck Beng Chew, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*Session Co-Organizer: Amnaya Awasthi, *University of Illinois at Urbana, Urbana-Champaign, Urbana, IL, United States***9:45am – Governing Cracking Laws of Cracking in Two Layers of Sandwiched Glass Plate**

Technical Presentation. IMECE2014-36492

Jun Xu, *Beihang University, Beijing, China***10:06am – Contact Fracture Study With Cohesive Zone Modeling in Finite Element Analysis**

Technical Presentation. IMECE2014-37830

Akio Yonezu, Michihiro Niwa, *Chuo University, Tokyo, Japan***10:27am – Explicit and Implicit Lifetime Assessment Methods of 9Cr-1Mo Steel Under Combined Creep and Fatigue Loads Using a Strip Yield Model**

Technical Paper Publication. IMECE2014-39658

Benjamin Andrews, *University of Idaho, Troy, NY, United States*, Gabriel Potirniche, *University of Idaho, Moscow, ID, United States***10:48am – Dynamic In-Plane Cracking in Laminated Glass Plates Experimental Investigation and Numerical Simulation**

Technical Presentation. IMECE2014-40046

Xiaoqing Xu, Yibing Li, *Tsinghua University, Beijing, China*

11:09am – Micro Tensile Test for Measuring the Strength of Grain Boundaries

Technical Presentation. IMECE2014-39591

Hideo Miura, Ken Suzuki, Takahiro Nakanishi, *Tohoku University, Sendai, Miyagi, Japan*

12-42 Peridynamics for Failure Prediction

12-42-1 Peridynamics for Failure Prediction I

514B

9:45am–11:30am

Session Organizer: Erdogan Madenci, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: Erkan Oterkus, *University of Strathclyde, Glasgow, United Kingdom*

9:45am – Peridynamics and Continuum Damage Mechanics

Technical Presentation. IMECE2014-38560

Stewart Silling, *Sandia National Laboratories, Albuquerque, NM, United States*

10:06am – Peridynamics Simulations of Soil Fragmentation by Blast Loads

Technical Presentation. IMECE2014-37330

Shaofan Li, *University of California-Berkeley, Berkeley, CA, United States*

10:27am – Improved Quadrature Algorithms for Peridynamic Models

Technical Presentation. IMECE2014-39184

Pablo Seleson, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*, David Littlewood, *Sandia National Laboratories, Albuquerque, NM, United States*

10:48am – Peridynamic Modeling of Damage Induced by Corrosion

Technical Presentation. IMECE2014-37689

Ziguang Chen, Florin Bobaru, *University of Nebraska-Lincoln, Lincoln, NE, United States*

11:09am – Failure Prediction in Electronic Packages by Using Peridynamics

Technical Presentation. IMECE2014-37566

Selda Oterkus, Erdogan Madenci, *University of Arizona, Tucson, AZ, United States*, Erkan Oterkus, *University of Strathclyde, Glasgow, United Kingdom*

12-43 Medalist Symposium

12-43-1 Medalist Symposium

514C

9:45am–11:30am

Session Organizer: Arun Shukla, *University of Rhode Island, Kingston, RI, United States*

Session Co-Chair: Pradeep Sharma, *University of Houston, Houston, TX, United States*

9:45am – Plasticity of Metallic Glasses and Granular Materials: Constitutive Equations and Strain Localization

Invited Presentation. IMECE2014-40885

Lallit Anand, *Massachusetts Institute of Technology, Cambridge, MA, United States*

10:20am – Polygonal Finite Elements for Dynamic Cohesive Fracture Simulations

Invited Presentation. IMECE2014-40847

Glaucio Paulino, *University of Illinois, Urbana, IL, United States*

10:55am – Intentional Nonlinearity for Targeted Energy Transfer and Passive Energy Management in Mechanical and Structural Systems

Invited Presentation. IMECE2014-40521

Alexander Vakakis, *University of Illinois, Urbana, IL, United States*

12-4 Symposium on Multiphysics Simulations and Experiments for Solids

12-4-2 Multiphysics Study of Biological and Soft Materials

512A

1:00pm–2:45pm

Session Organizer: Harold Park, *Boston University, Boston, MA, United States*

Session Co-Organizer: Tingge Xu, *University of Texas at Dallas, Richardson, TX, United States*

1:00pm – Potential Energy Surface-Based Atomistic Model for the Unfolding of Protein at Experimental Time Scales

Technical Presentation. IMECE2014-36743

Harold Park, *Boston University, Boston, MA, United States*

1:17pm – Directionally Dependent Adhesion for Use in Transfer Printing

Technical Presentation. IMECE2014-38138

Huanyu Cheng, Yonggang Huang, *Northwestern University, Evanston, IL, United States*, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

1:34pm – Study on the Piezoelectric Properties of Collagen Microfibrils**Technical Presentation. IMECE2014-39392****Dong Qian**, *University of Texas at Dallas, Dallas, TX, United States*, **Zhong Zhou, Majid Minary**, *University of Texas at Dallas, Richardson, TX, United States***1:51pm – Mechanics of Aerogels—Modeling and Simulations of Multifunctionalities: Part I****Technical Presentation. IMECE2014-40427****Tingge Xu, Gitogo Churu, Alison Lee, Huiyang Luo, Hongbing Lu**, *University of Texas at Dallas, Richardson, TX, United States*, **Chrikia Sotiriou-Leventis, Nicholas Leventis**, *Missouri University of Science and Technology, Rolla, MO, United States*, **Ning Xiang**, *Rensselaer Polytechnic Institute, Troy, NY, United States***2:08pm – Mechanics of Aerogels—Modeling and Simulations of Multifunctionalities: Part II****Technical Presentation. IMECE2014-40428****Tingge Xu, Gitogo Churu, Alison Lee, Huiyang Luo, Hongbing Lu**, *University of Texas at Dallas, Richardson, TX, United States*, **Chrikia Sotiriou-Leventis, Nicholas Leventis**, *Missouri University of Science and Technology, Rolla, MO, United States*, **Ning Xiang**, *Rensselaer Polytechnic Institute, Troy, NY, United States***2:25pm – Large Deformation Analysis of Gel Using the Complex Variable Element-Free Galerkin Method****Technical Presentation. IMECE2014-40464****Dong Ming Li**, *City University of Hong Kong, Hong Kong, Hong Kong*, **Kim Meow Liew**, *City University of Hong Kong, Kowloon, Hong Kong***12-28 Fatigue and Fracture of Engineering Materials and Structures****12-28-2 Fatigue Failure II****512B****1:00pm–2:45pm****Session Organizer:** Gbadebo Owolabi, *Howard University, Washington, DC, United States***Session Co-Organizer:** Olanrewaju Aluko, *University of Michigan–Flint, Grand Blanc, MI, United States***1:00pm – Computational Modeling of the Effect of Heterogeneous Microstructures on Strength and Ductility of Dual Phase Steels****Technical Presentation. IMECE2014-37730****Najmul Abid, Rashid K. Abu Al-Rub**, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.***1:17pm – Inversed End-Loaded-Split Test for Steady-State Fracture Mode II Characterization of Adhesive Joints****Technical Presentation. IMECE2014-37875****Michal Budzik**, *Aarhus University, Aarhus, DK, Denmark*, **Julien Jumel**, *University Bordeaux, Talence, France***1:34pm – Nanotexture Change Caused by Strain-Induced Anisotropic Diffusion During Creep of Ni-Base Superalloy****Technical Paper Publication. IMECE2014-39430****Ken Suzuki, Motoyuki Ochi, Hideo Miura**, *Tohoku University, Sendai, Miyagi, Japan***1:51pm – Advanced Fatigue Damage Prediction Toolkit for Welded Aluminum Structures****Technical Presentation. IMECE2014-40332****Xiaohu Liu, Alireza Sadeghirad, Jim Lua**, *Global Engineering and Materials, Inc., Princeton, NJ, United States***2:08pm – Necessary Conditions to Have a Cone Crack in Soda-Lime Glass Panel Impacted by a Sphere Projectile****Technical Presentation. IMECE2014-40620****Guodong Chen**, *Eaton Aerospace, Broomfield, CO, United States***2:25pm – Fatigue Response of Notched Laminated Orthotropic Plate****Technical Presentation. IMECE2014-36240****Olanrewaju Aluko**, *University of Michigan–Flint, Grand Blanc, MI, United States*

12-29 Multiscale Computations in Fluids, Structures, and Materials

12-29-2 Multiscale Computations in Fluids, Structures, and Materials 2

512C

1:00pm–2:45pm

Session Organizer: Yozo Mikata, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: Glaucio Paulino, *University of Illinois, Urbana, IL, United States*

Session Chair: Shaofan Li, *University of California-Berkeley, Berkeley, CA, United States*

Session Co-Chair: Ajit Achuthan, *Clarkson University, Potsdam, NY, United States*

1:00pm – Phase Field Based Nonlocal Elastoplastic Damage Model

Technical Presentation. IMECE2014-38580

George Voyiadjis, Navid Mozaffari, *Louisiana State University, Baton Rouge, LA, United States*

1:17pm – Reduced-Order Homogenization of Polycrystal Plasticity

Technical Presentation. IMECE2014-38860

Xiang Zhang, Caglar Oskay, *Vanderbilt University, Nashville, TN, United States*

1:34pm – Fully Coupled and Highly Scalable Finite Strain Multiscale Solver for Simulating Failure of Heterogeneous Interfaces

Technical Presentation. IMECE2014-38447

Matthew Mosby, *University of Notre Dame, Mishawaka, IN, United States*, **Karel Matou,** *University of Notre Dame, Notre Dame, IN, United States*

1:51pm – Microstructural Modeling of Failure Modes in Energetic Materials

Technical Presentation. IMECE2014-38424

Judith Brown, Darrell Labarbera, Mohammed Zikry, *North Carolina State University, Raleigh, NC, United States*

2:08pm – Characterization and Modeling of the Quasi-Static Behavior of Polycrystalline Molybdenum

Technical Presentation. IMECE2014-36793

Jeremy Kleiser, Benoit Revil, Oana Cazacu, *University of Florida, Shalimar, FL, United States*

2:25pm – Constitutive Model Development to Address Anisotropic Inelasticity and Failure

Technical Presentation. IMECE2014-38839

Jake Ostien, Wei-yang Lu, *Sandia National Laboratories, Livermore, CA, United States*, **Bill Scherzinger,** *Sandia National Laboratories, Albuquerque, NM, United States*

12-33 Symposium on Mechanics of Soft Materials

12-33-2 Gels and Soft Machines

512E

1:00pm–2:45pm

Session Organizer: Xuanhe Zhao

Session Chair: Christian Linder, *Stanford University, Stanford, CA, United States*

Session Co-Chair: Zishun Liu, *Xian Jiaotong University, Singapore, Singapore*

1:00pm – Photothermal Mechanics of Deformation of Temperature Sensitive Hydrogels

Technical Presentation. IMECE2014-36990

Zishun Liu, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

1:17pm – Hydrogels as Soft Conductors for Dielectric Elastomer Actuators

Technical Presentation. IMECE2014-37178

Jinxiong Zhou, *Xi'an Jiaotong University, Xi'an, China*

1:34pm – Model of Ideal Elastomeric Gels for Polyelectrolyte Gels: Theory and Experiment

Technical Presentation. IMECE2014-37321

Jianyu Li, Joost Vlassak, *Harvard University, Cambridge, MA, United States*

1:51pm – Materials for Soft Machines I

Technical Presentation. IMECE2014-37601

Zhigang Suo, *Harvard University, Cambridge, MA, United States*

2:08pm – Materials for Soft Machines II

Technical Presentation. IMECE2014-37603

Zhigang Suo, *Harvard University, Cambridge, MA, United States*

2:25pm – Multiscale Multimechanism Design of Tough and Bioactive Hydrogels

Technical Presentation. IMECE2014-37652

Xuanhe Zhao, *Duke University, Durham, NC, United States*

12-34 Instability in Solids and Structures

12-34-2 Instability In Solids and Structures II

514A 1:00pm–2:45pm

Session Organizer: Ryan Elliott, *University of Minnesota, Minneapolis, MN, United States*

Session Co-Organizer: Oscar Lopez-Pamies, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

1:00pm – Electromechanical Theory for Nematic Continua With an Application to Freedericksz Instability in Liquid Crystals

Technical Presentation. IMECE2014-37488

Nicholas Triantafyllidis, École Polytechnique, Palaiseau, France

1:21pm – Some Simple Explicit Results for the Elastic Dielectric Properties and Stability of Layered Composites

Technical Presentation. IMECE2014-38061

Stephen Spinelli, Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign, Urbana, IL, United States

1:42pm – Active Magnetorheological Elastomers: Numerical Simulations and Instabilities

Technical Presentation. IMECE2014-38541

Kostas Danas, École Polytechnique, Palaiseau, France

2:03pm – Instabilities in Magneto- and Electroactive Layered Elastomers

Technical Presentation. IMECE2014-39352

Stephan Rudykh, Massachusetts Institute of Technology, Cambridge, MA, United States, Kaushik Bhattacharya, California Institute of Technology, Pasadena, CA, United States, Gal deBotton, BGU, Beer-Sheva, Negev, Israel

2:24pm – Buckling of a Thin Film on a Curved Soft Substrate

Technical Presentation. IMECE2014-39157

Francisco Lopez Jimenez, Romain Lagrange, Pedro Reis, Massachusetts Institute of Technology, Cambridge, MA, United States

12-37 Drucker Medalist Symposium

12-37-1 Drucker Medalist Symposium

514C 1:00pm–2:45pm

Session Organizer: Surya Kalidindi, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: David Henann, *Brown University, Providence, RI, United States*

1:00pm – Crystal Plasticity Finite Element Simulations Using a Database of Discrete Fourier Transforms

Technical Presentation. IMECE2014-40564

Surya Kalidindi, Georgia Institute of Technology, Atlanta, GA, United States, Hamad Alharbi, King Saud University, Riyadh, Saudi Arabia

1:21pm – Dynamic Deformation Behavior of Magnesium Alloys

Technical Presentation. IMECE2014-40592

Dipankar Ghosh, Guruswami Ravichandran, California Institute of Technology, Pasadena, CA, United States

1:42pm – Effect of Porosity and Its Anisotropic Evolution on the Macroscopic Response of Plastically Deforming Metals

Technical Presentation. IMECE2014-40618

Michalis Agoras, Dawei Song, Pedro Ponte-Castaneda, University of Pennsylvania, Philadelphia, PA, United States

2:03pm – Propagation of Phase Fronts in Polycrystalline NiTi

Technical Presentation. IMECE2014-40634

Qunli Liu, Krishnaswamy Ravi Chandar, University of Texas at Austin, Austin, TX, United States

2:24pm – Viewpoint for a Continuum Theory of Defect Dynamics in Metallic Glasses

Technical Presentation. IMECE2014-40635

Amit Acharya, Carnegie Mellon University, Pittsburgh, PA, United States

12-40 Full-Field Experimental Techniques for Quantifying Fracture and Failure

12-40-1 Full-Field Experimental Techniques for Quantifying Fracture and Failure

519A

1:00pm–2:45pm

Session Organizer: Leslie Lamberson, *Drexel University, Philadelphia, PA, United States*

Session Co-Organizer: Veronica Eliasson, *University of Southern California, Los Angeles, CA, United States*

1:00pm – Multiaxial Ductile Failure of Aluminum Alloys

Technical Presentation. IMECE2014-36816

Wei-yang Lu, Helena (Huiqing) Jin, *Sandia National Laboratories, Livermore, CA, United States*

1:21pm – Miniature Bulge Test for Measuring HIPed Aluminum/Aluminum Interfacial Fracture Toughness

Technical Presentation. IMECE2014-38202

Cheng Liu, Manuel L. Lovato, Kester D. Clarke, David J. Alexander, William R. Blumenthal, *Los Alamos National Laboratory, Los Alamos, NM, United States*

1:42pm – Environmental Degradation Behavior of Kenaf Fiber Mat Composite

Technical Paper Publication. IMECE2014-38248

Mengyuan Liao, Toshihiko Hojo, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, **Umaru Semo Ishiaku,** *Ahmadu Bello University, Zaria, Nigeria*, **Zainal Arifin Mohd Ishak,** *Universiti Sains Malaysia, Penang, Malaysia*, **Guijun Xian,** *Harbin Institute of Technology, Harbin, China*, **Yuqiu Yang,** *Donghua University, Shanghai, China*

2:03pm – Blister Test of Thermal Shock Cycles in Photovoltaic Cells With Ethylene Vinyl Acetate Coating on Glass

Technical Presentation. IMECE2014-39276

David Chan, Kai-tak Wan, *Northeastern University, Boston, MA, United States*, **Xiaohong Gu,** *National Institute of Standards and Technology, Gaithersburg, MD, United States*

2:24pm – Influence of Humidity on Fracture Behavior Under Dynamic Loading

Technical Presentation. IMECE2014-40333

Orlando Delpino Gonzales, Veronica Eliasson, *University of Southern California, Los Angeles, CA, United States*

12-42 Peridynamics for Failure Prediction

12-42-2 Peridynamics for Failure Prediction II

514B

1:00pm–2:45pm

Session Organizer: Erdogan Madenci, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: Erkan Oterkus, *University of Strathclyde, Glasgow, United Kingdom*

1:00pm – Two-Dimensional Peridynamic Model for Thin Plates

Technical Presentation. IMECE2014-39702

Michael Taylor, *Harvard University, Cambridge, MA, United States*, **David Steigmann,** *University of California, Berkeley, CA, United States*

1:21pm – Local-Nonlocal Coupling for Modeling Fracture

Technical Presentation. IMECE2014-38887

David Littlewood, Stewart Silling, *Sandia National Laboratories, Albuquerque, NM, United States*, **Pablo Seleson,** *Oak Ridge National Laboratory, Oak Ridge, TN, United States*

1:42pm – Development of a Peridynamic Solution of an Elastoplastic Plate With Failure

Technical Presentation. IMECE2014-39937

Michael Miraglia, *Naval Surface Warfare Center Carderock Division, West Bethesda, MD, United States*, **Erwin Moyer,** *Naval Surface Warfare Center Carderock Division, Poolesville, MD, United States*

2:03pm – Regularizing Numerical Simulations of Shear-Banding Using a Peridynamics-Based Plasticity Formulation

Technical Presentation. IMECE2014-40177

John T. Foster, Md. Imran Kahn, *University of Texas at San Antonio, San Antonio, TX, United States*

2:24pm – Peridynamics for Damage Prediction in Composites Due to Compression After Multiple Impacts

Technical Presentation. IMECE2014-37575

Erdogan Madenci, Atila Barut, *University of Arizona, Tucson, AZ, United States*, **Nam Phan,** *Naval Air Systems Command (NAVAIR), Patuxent River, MD, United States*

12-45 Plenary

12-45-1 Plenary

513D 1:00pm–2:45pm

Session Organizer: Arun Shukla, *University of Rhode Island, Kingston, RI, United States*

1:00pm – Composite Materials Research for Marine Applications—Current Efforts and Future Directions
Plenary Presentation. IMECE2014-40375

Yapa Rajapakse, *Office of Naval Research, Arlington, VA, United States*

1:35pm – Effects of Polyurea Coatings on the UNDEX Response of Composite Plates: Experiments and Computational Simulations

Technical Presentation. IMECE2014-37031
James LeBlanc, *NUWC Newport, Newport, RI, United States*,
Arun Shukla, *University of Rhode Island, Kingston, RI, United States*

2:10pm – Dynamic Hydrostatic Implosion of Carbon/Epoxy Composite Tubes: Shock Energy and Failure Modes
Technical Presentation. IMECE2014-37107

Michael Pinto, *University of Rhode Island, Kingston, RI, United States*

12-4 Symposium on Multiphysics Simulations and Experiments for Solids

12-4-3 Coupled Phenomena in Nanomaterials

512A 3:00pm–4:45pm

Session Organizer: Caglar Oskay, *Vanderbilt University, Nashville, TN, United States*

Session Co-Organizer: Hanchen Huang, *Northeastern University, Boston, MA, United States*

3:00pm – Nonlinear Finite Temperature Multiscale Dynamic Analysis of Nanostructures Using Component Mode Synthesis
Extended Abstract Presentation. IMECE2014-38462

Jun Lan, *Clemson University, Clemson, SC, United States*

3:17pm – Numerical Modeling on Thermoelastic Damping of Single-Crystal Silicon Nano-Resonator Using Non-Gray BTE
Extended Abstract Presentation. IMECE2014-38480

Ying Yu, *Clemson University, Clemson, SC, United States*

3:34pm – Interaction Effects Between Aggressive Agent Transport and Mechanical Deformation in Metals at High Temperatures

Technical Presentation. IMECE2014-38787
Hao Yan, *Caglar Oskay*, *Vanderbilt University, Nashville, TN, United States*

3:51pm – Making Nanomechanics Simulations Physical—Response EAM Potentials, Part 1

Technical Presentation. IMECE2014-39774
Hanchen Huang, *Northeastern University, Boston, MA, United States*

4:08pm – Making Nanomechanics Simulations Physical—Response EAM Potentials, Part 2

Technical Presentation. IMECE2014-39781
Hanchen Huang, *Northeastern University, Boston, MA, United States*

4:25pm – Size, Temperature, and Strain Effects on Thermal Conductivity of Graphene Doped With Hydrogen Patterns
Technical Presentation. IMECE2014-40227

Chengjian Li, *Gang Li*, *Huijuan Zhao*, *Clemson University, Clemson, SC, United States*

12-7 Response of Composite Materials Under Extreme Loading Conditions: Experimental and Computational Investigations

12-7-1 Response of Composite Materials Under Extreme Loading Conditions

513D 3:00pm–4:45pm

Session Organizer: James LeBlanc, *NUWC Newport, Newport, RI, United States*

Session Co-Organizer: Erin Gauch, *NUWC Newport, Newport, RI, United States*

3:00pm – Improving Damage Tolerance Thresholds and Energy Absorption Capacities in Laminated Woven Composites Using Crimp Imbalance and Crimp Imbalance Gradients

Technical Presentation. IMECE2014-37115
Paul Cavallaro, *Naval Undersea Warfare Center, Newport, RI, United States*

3:21pm – Simulations of Composite Cylinder Implosion

Technical Presentation. IMECE2014-40499

Erin Gauch, *NUWC Newport, Newport, RI, United States*,
Michael Pinto, Arun Shukla, *University of Rhode Island, Kingston, RI, United States*

3:42pm – Full Field Study of Fracture and Failure of Woven Composites Subjected to Combined In-Plane and Out-of-Plane Loading

Technical Presentation. IMECE2014-38965

Addis Kidane, Behrad Koohbor, Silas Mallon, *University of South Carolina, Columbia, SC, United States*

4:03pm – Short-Term Seawater Effects on Dynamic Compression of Polymer Matrix Composites

Technical Presentation. IMECE2014-40433

Leslie Lamberson, Logan Shannahan, Steven Pagano, *Drexel University, Philadelphia, PA, United States*

4:24pm – Mechanical Characterization of Fiber-Reinforced Polymer Composite

Technical Presentation. IMECE2014-37852

Helena (huiqing) Jin, Wei-yang Lu, *Sandia National Laboratories, Livermore, CA, United States*

12-16 Processing and Performance of Nanocomposites

12-16-1 Processing and Performance of Nanocomposites

513E

3:00pm–4:45pm

Session Organizer: Davood Askari, *Wichita State University, Wichita, KS, United States*

Session Co-Organizer: Vinod Veedu, *Oceanit, Houston, TX, United States*

3:00pm – Electrospinning of Cisplatin-Loaded Cellulose Nanofibers for Cancer Drug Delivery

Technical Paper Publication. IMECE2014-37182

Saheem Absar, Mujibur Khan, Kyle Edwards, David Calamas, *Georgia Southern University, Statesboro, GA, United States*

3:21pm – Processing of Hybrid Nanocomposite High Performance Fibers (UHMWPE+Nylon 6+CNT+MA) Using Solution Spinning Technique

Technical Paper Publication. IMECE2014-37183

Saheem Absar, Mujibur Khan, Kyle Edwards, *Georgia Southern University, Statesboro, GA, United States*

3:42pm – Enhanced Charge Carrier Concentration of SiC/CNT Composites With N and P Type Doping Agents

Technical Paper Publication. IMECE2014-38123

Kyle Edwards, Mujibur Khan, Rafael Quirino, Saheem Absar, *Georgia Southern University, Statesboro, GA, United States*,
Brenda Beckler, *Georgia Southern University, Atlanta, GA, United States*

4:03pm – Fabrication and Experimental Study of Carbon Nanofiber Impregnated Semi-Rigid Composite

Technical Presentation. IMECE2014-39923

Aniruddha Mitra, Mujibur Khan, Sirajus Salekeen, Mosfequr Rahman, *Georgia Southern University, Statesboro, GA, United States*,
Joseph Richter, *Southern Company, Rincon, GA, United States*

4:24pm – Lattice Thermal Conductivity of Fe-Cr Alloys With Tilt Boundaries: An Atomistic Study

Technical Paper Publication. IMECE2014-38408

Ishraq Shabib, Mohammad Abu-Shams, *Central Michigan University, Mount Pleasant, MI, United States*,
Mujibur Khan, *Georgia Southern University, Statesboro, GA, United States*

12-22 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization

12-22-1 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (I)

514B

3:00pm–4:45pm

Session Organizer: Xin-Lin Gao, *Southern Methodist University, Dallas, TX, United States*

Session Co-Organizer: Jun Yang, *University of Western Ontario, London, ON, Canada*

3:00pm – Wetting Behavior of TiO₂ Nanotube Arrays With Perfluorinated Surface Functionalization

Technical Paper Publication. IMECE2014-39395

Samira Farsinezhad, Prashant Waghmare, Benjamin D. Wiltshire, Sushanta Mitra, *University of Alberta, Edmonton, AB, Canada*,
Saeid Amiri, *Wave Control Systems Ltd., Edmonton, AB, Canada*,
Karthik Shankar, *University of Alberta & National Research Council, Edmonton, AB, Canada*

3:21pm – Coexistence of Left-Handedness and Right-Handedness in Strained Helical Nanoribbons

Technical Presentation. IMECE2014-40098

Zi Chen, *Washington University In St. Louis, Saint Louis, MO, United States*

3:42pm – New Developments of Atomic Force Microscopy for Characterizations of Properties and Functions of Nanomaterials

Technical Presentation. IMECE2014-38859
Jun Yang, *University of Western Ontario, London, ON, Canada*

4:03pm – Heterogeneous Nanoparticles Structures With Gradient Material Properties by Self-Assembly

Technical Presentation. IMECE2014-40213
Jonghyun Park, Wei Lu, *University of Michigan, Ann Arbor, MI, United States*

4:24pm – Grain Boundary Deformation in a Bimodal Grain Size Al-Mg Alloy

Technical Presentation. IMECE2014-40002
Andrew Magee, Leila Ladani, *University of Connecticut, Storrs, CT, United States*

12-28 Fatigue and Fracture of Engineering Materials and Structures

12-28-3 Fatigue Failure III

512B **3:00pm–4:45pm**

Session Organizer: Olanrewaju Aluko, *University of Michigan–Flint, Grand Blanc, MI, United States*

Session Co-Organizer: Gbadebo Owolabi, *Howard University, Washington, DC, United States*

3:00pm – Drop Tests and Simulations of a Glass on a Cellular Phone

Technical Presentation. IMECE2014-37935
Choongryeong Lee, Hyun-Yong Jeong, *Sogang University, Seoul, Korea (Republic)*

3:17pm – Influence of the Specimen Dimensions on the Stress-Strain Evaluation of an Aluminum Alloy by Compression Tests

Technical Paper Publication. IMECE2014-38335
Alexandre Scari, Bruno Pockszevnicki, Pedro Magalhães, Jr., János Landre, Jr., *Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil*

3:34pm – Improved Compliance Solutions for C(T), SE(B) and Clamped SE(T) Specimens Including Side-Grooves, Varying Thicknesses, and 3-D Effects

Technical Paper Publication. IMECE2014-39513
Gustavo H.B. Donato, Felipe C. Moreira, *FEI University, Sao Bernardo do Campo, Sao Paulo, Brazil*

3:51pm – New Model for Fatigue Notch Factor for Titanium Alloy Components

Technical Paper Publication. IMECE2014-40404
Oluwamayowa Okeyoyin, Gbadebo Owolabi, *Howard University, Washington, DC, United States*

4:08pm – Two-Parameter Fatigue Crack Growth Correlation using \sqrt{K} and K_{max} Parameters

Technical Paper Publication. IMECE2014-40032
Phani Chandar Sree, Daniel Kujawski, *Western Michigan University, Kalamazo, MI, United States*

4:25pm – Role of Multiscale Strain Localizations in Fatigue of Magnesium Alloys

Technical Paper Publication. IMECE2014-40203
Jefferson Cuadra, Michael Cabal, Antonios Kontsos, *Drexel University, Philadelphia, PA, United States*, **Kavan Hazeli**, *Johns Hopkins University, Baltimore, MD, United States*

12-29 Multiscale Computations in Fluids, Structures, and Materials

12-29-3 Multiscale Computations in Fluids, Structures, and Materials 3

512C **3:00pm–4:45pm**

Session Organizer: Yozo Mikata, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: Glaucio Paulino, *University of Illinois, Urbana, IL, United States*

Session Chair: Georges L. Chahine, *Dynaflow, Inc., Jessup, MD, United States*

Session Co-Chair: Sinan Keten, *Northwestern University, Evanston, IL, United States*

3:00pm – Shock Wave Propagation in a Bubbly Medium: A Multiscale Modeling Approach

Technical Paper Publication. IMECE2014-36772
Anil Kapahi, Chao-Tsung Hsiao, Georges L. Chahine, *Dynaflow, Inc., Jessup, MD, United States*

3:21pm – Multiple Grid Lattice Boltzmann Model for Three-Dimensional Dendritic Solidification Under Convection

Technical Presentation. IMECE2014-38037
Amirreza Hashemi, Mohsen Eshraghi, Sergio Felicelli, *University of Akron, Akron, OH, United States*

3:42pm – Theoretical and Numerical Analysis of the Erosion in Steam Turbine Blades**Technical Presentation. IMECE2014-36522****Ravin Naik**, *M S University of Baroda, Vadodara, Gujarat, India*, **Arvind Mohite**, *Maharaja University of Baroda, Vadodara, Gujarat, India*, **Chirayu Shah**, *Siemens Ltd., Vadodara, Gujarat, India***4:03pm – Approximation of Reaction Rate Constants From Free Energy Calculations****Technical Presentation. IMECE2014-39056****Yead Jewel**, **Prashanta Dutta**, **Jin Liu**, *Washington State University, Pullman, WA, United States***4:24pm – Understanding Sorption and Swelling With MD and Poromechanics****Technical Presentation. IMECE2014-37012****Jan Carmeliet**, *ETHZ, Zürich Hönggerberg, Switzerland*, **Karol Kulasinski**, *Empa, Duebendorf, Switzerland*, **Robert Guyer**, *University of Nevada, Reno, NV, United States*, **Sinan Keten**, *Northwestern University, Evanston, IL, United States*, **Sergey Churakov**, *PSI, Villigen, Switzerland*, **Dominique Derome**, *Empa, Duebendorf, ZH, Switzerland***12-33 Symposium on Mechanics of Soft Materials****12-33-3 Instability, Damage, and Degradation in Soft Materials****512E****3:00pm–4:45pm****Session Organizer:** Oscar Lopez-Pamies, *University of Illinois at Urbana–Champaign, Urbana, IL, United States***Session Chair:** Shawn Chester, *New Jersey Institute of Technology, North Caldwell, NJ, United States***3:00pm – Post Cavitation Behavior of Soft Materials****Technical Presentation. IMECE2014-36673****Toshio Nakamura**, *State University of New York at Stony Brook, Stony Brook, NY, United States*, **Oscar Lopez-Pamies**, *University of Illinois at Urbana–Champaign, Urbana, IL, United States***3:17pm – Modeling Degradation in Soft Materials****Technical Presentation. IMECE2014-37516****Shawn Chester**, *New Jersey Institute of Technology, North Caldwell, NJ, United States***3:34pm – Compliant Coatings Under Cavitation Erosion Loadings****Technical Presentation. IMECE2014-38418****Alireza Amirkhizi**, *University of Massachusetts, Lowell, Lowell, MA, United States*, **Zhanzhan Jia**, *University of California, San Diego, La Jolla, CA, United States***3:51pm – Phase Separation and Damage in Polymeric Gels (I)****Technical Presentation. IMECE2014-39556****Wei Hong**, *Iowa State University, Ames, IA, United States***4:08pm – Phase Separation and Damage in Polymeric Gels (II)****Technical Presentation. IMECE2014-39557****Wei Hong**, *Iowa State University, Ames, IA, United States***4:25pm – Buckling of Stiff Thin Film on a Prestrained Bilayer Substrate****Technical Presentation. IMECE2014-37769****Huanyu Cheng**, **Yonggang Huang**, *Northwestern University, Evanston, IL, United States*, **John Rogers**, *University of Illinois at Urbana–Champaign, Urbana, IL, United States***12-34 Instability in Solids And Structures****12-34-3 Instability in Solids and Structures III****514A****3:00pm–4:45pm****Session Organizer:** Nicholas Triantafyllidis, *École Polytechnique, Palaiseau, France***Session Co-Organizer:** Francisco Lopez Jimenez, *Massachusetts Institute of Technology, Cambridge, MA, United States***3:00pm – Liner Shell Plastic Buckling Under Axial Compression****Technical Presentation. IMECE2014-39069****Lin Yuan**, **Stelios Kyriakides**, *University of Texas at Austin, Austin, TX, United States***3:21pm – Necking Instabilities of Pressurized Thin-Walled Microtubes Under Tension****Technical Presentation. IMECE2014-39745****Ioannis (Yannis) Korkolis**, *University of New Hampshire, Durham, NH, United States***3:42pm – Numerical Simulation of the Combined Bending, Stretching, and Wrinkling of Thin Bodies****Technical Presentation. IMECE2014-39983****Michael Taylor**, **Katia Bertoldi**, *Harvard University, Cambridge, MA, United States*, **David Steigmann**, *University of California, Berkeley, Berkeley, CA, United States***4:03pm – Dynamic Buckling-Induced Debonding in Sandwich Columns Under Uniaxial Impact Loading****Technical Presentation. IMECE2014-40462****Wooseok Ji**, *UNIST, Ulsan, Korea (Republic)*, **Anthony Waas**, *University of Michigan, Ann Arbor, MI, United States*

4:24pm – Macroscopic Response of Nematic Elastomers: Instability and Post-Bifurcation Behavior

Technical Presentation. IMECE2014-36606

Reza Avazmohammadi, Pedro Ponte-Castaneda, *University of Pennsylvania, Philadelphia, PA, United States*

12-37 Drucker Medalist Symposium

12-37-2 Drucker Medalist Symposium

514C **3:00pm–4:45pm**

Session Organizer: Surya Kalidindi, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: David Henann, *Brown University, Providence, RI, United States*

3:00pm – Polymer Gels for Nontraditional Applications

Technical Presentation. IMECE2014-40678

Zhigang Suo, *Harvard University, Cambridge, MA, United States*

3:26pm – Magic of Deciphering High Strain-Rate and High-Pressure Properties of Elastomeric Composites, Using Low-Frequency Measurements

Technical Presentation. IMECE2014-40723

Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

3:52pm – Dynamics of Twinning and the High-Strain Rate Behavior of Magnesium

Technical Presentation. IMECE2014-40864

K.T. Ramesh, Neha Dixit, *Johns Hopkins University, Baltimore, MD, United States*

4:18pm – Aggregation of Nanostructures

Technical Presentation. IMECE2014-40874

John Bassani, *University of Pennsylvania, Philadelphia, PA, United States*

Tuesday, November 18

12-2 Mechanics of Adhesion and Friction

12-2-1 Mechanics of Adhesion and Friction I

512B **9:45am–11:30am**

Session Organizer: Frank DelRio, *National Institute of Standards and Technology, Boulder, CO, United States*

Session Co-Organizer: Jianliang Xiao, *University of Colorado, Boulder, Boulder, CO, United States*

9:45am – Interfacial Adhesion of Graphene by Multiscale Models – 1

Technical Presentation. IMECE2014-39010

Rui Huang, *University of Texas at Austin, Austin, TX, United States*

10:02am – Interfacial Adhesion of Graphene by Multiscale Models – 2

Technical Presentation. IMECE2014-39013

Rui Huang, *University of Texas at Austin, Austin, TX, United States*

10:19am – Characterizing Large Area Hydrophilic Interactions

Technical Presentation. IMECE2014-40550

Seung-Ryul Na, Daniel Sarceno, Kenneth Liechti, *University of Texas at Austin, Austin, TX, United States*

10:36am – Raman Spectroscopy and 3D Asymptotic Analysis for Assessment of Interfacial Bonding/Debonding Between Carbon Fibers and Epoxy Matrices

Technical Presentation. IMECE2014-37760

Reaz A. Chaudhuri, *University of Utah, Salt Lake City, UT, United States*, **Sanwat N. Chaudhuri**, *Chemical and Environmental Services, Taylorsville, UT, United States*

10:53am – Demystifying Lifshitz' Theory of van der Waals Adhesion

Technical Paper Publication. IMECE2014-38353

Arvind Narayanaswamy, Yi Zheng, *Columbia University, New York, NY, United States*

11:10am – Micropatterned Stamps for Transfer Printing

Technical Presentation. IMECE2014-37341

Xue Feng, Hang Chen, *Tsinghua University, Beijing, China*, **Yonggang Huang**, *Northwestern University, Evanston, IL, United States*

12-3 Hybridization of Materials for Functional Structures, Devices, and Systems: Mechanics, Materials, and Manufacturing

12-3-1 Mechanics, Materials, and Manufacturing of Soft Electronics

510C 9:45am–11:30am

Session Organizer: Cunjiang Yu, *University of Houston, Houston, TX, United States*

Session Co-Organizer: Jianliang Xiao, *University of Colorado, Boulder, Boulder, CO, United States*

9:45am – Materials for High-Performance Biodegradable Semiconductor Devices

Technical Presentation. IMECE2014-37767

Huanyu Cheng, Yonggang Huang, *Northwestern University, Evanston, IL, United States*, **John Rogers,** *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10:02am – Mechanical Design and Fabrication Techniques for Bio-Electronic Systems

Technical Presentation. IMECE2014-39931

Shuodao Wang, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10:19am – Balloon Transfer Printing for 3D Electronics Manufacturing

Technical Presentation. IMECE2014-40161

Cunjiang Yu, Song Chen, *University of Houston, Houston, TX, United States*, **Jianliang Xiao,** *University of Colorado, Boulder, Boulder, CO, United States*

10:36am – Artificial Camouflage Skins

Technical Presentation. IMECE2014-40164

Cunjiang Yu, *University of Houston, Houston, TX, United States*

10:53am – Electronically Programmable, Reversible Shape Change in 3D Hydrogel Structures

Technical Presentation. IMECE2014-40165

Cunjiang Yu, *University of Houston, Houston, TX, United States*

11:10am – Stress-Dependent Ginsberg-Landau Kinetics Under Large Deformation for Silicon Electrodes in Lithium-Ion Batteries

Technical Presentation. IMECE2014-39455

Hanqing Jiang, *Arizona State University*

12-4 Symposium on Multiphysics Simulations and Experiments for Solids

12-4-4 Multiphysical Applications

512C

9:45am–11:30am

Session Organizer: Dong Qian, *University of Texas at Dallas, Dallas, TX, United States*

Session Co-Organizer: Wei Hong, *Iowa State University, Ames, IA, United States*

9:45am – Analysis of Diesel Engine Exhaust Manifold

Technical Paper Publication. IMECE2014-37606

Yiran Yang, Miao He, Masoud Mojtahed, *Purdue University Calumet, Hammond, IN, United States*

10:02am – Analytical Modeling of Residual Stress in Railroad Rails Using Critically Refracted Longitudinal Ultrasonic Waves With COMSOL Multiphysics Module

Technical Paper Publication. IMECE2014-38619

Lakshmi Divya Manchem, Malur Srinivasan, Jiang Zhou, *Lamar University, Beaumont, TX, United States*

10:19am – Study on Structural Safety Evaluation Technology for Lead Support Structure in Transformer With Considerations on Short-Circuit Failure

Technical Paper Publication. IMECE2014-39053

Minok Yun, Changwook Kim, Myungjun Choi, Youngchul Kim, *Hyundai Heavy Industries, Youngin-si, Korea (Republic)*

10:36am – Structured Acoustic Metamaterial With Broadband Attenuation

Technical Presentation. IMECE2014-39217

Dong Qian, *University of Texas at Dallas, Dallas, TX, United States*, **Hongbing Lu,** *University of Texas at Dallas, Richardson, TX, United States*

10:53am – Kinetic Model for Anisotropic Reactions in Amorphous Solids

Technical Presentation. IMECE2014-39560

Wei Hong, *Iowa State University, Ames, IA, United States*

11:10am – Design of Nano Silicon Electrode With Anisotropic Interface Reaction for Lithium-Ion Batteries

Technical Presentation. IMECE2014-39457

Hanqing Jiang, *Arizona State University*

12-11 Damage and Failure of Composites

12-11-1 Damage and Failure of Composites I

512E

9:45am–11:30am

Session Organizer: Xinran Xiao, *Michigan State University, Lansing, MI, United States*

Session Co-Organizer: Chandra Veer Singh, *University of Toronto, Toronto, ON, Canada*

9:45am – Assessment of Composite Failure Theories

Invited Presentation. IMECE2014-36610

Ramesh Talreja, *Texas A&M University, College Station, TX, United States*

10:25am – Synergistic Damage Mechanics Model for Predicting Damage Behavior in Structural Hybrid Bio-composites

Technical Presentation. IMECE2014-38534

Thomas J. Berton, Chandra Veer Singh, *University of Toronto, Toronto, ON, Canada*

10:45am – Development of a Synergistic Damage Mechanics-Based Model for Predicting Multiaxial Effects in Progressive Failure of Composite Structures

Extended Abstract Publication. IMECE2014-38109

John Montesano, Chandra Veer Singh, *University of Toronto, Toronto, ON, Canada*

11:05am – Micromechanics of Damage Development in Polymer Composites

Technical Paper Publication. IMECE2014-36580

Trupti Arabatti, Aswathi Sudhir, *Indian Institute of Science, Bangalore, India*, **Suhasini Gururaja**, *Indian Institute of Science, Karnataka, India*

11:25am – Semi-Analytical Model Based on Generalized Plane Strain Assumption for Unidirectional Composites With Matrix Micro Cracks

Technical Paper Publication. IMECE2014-36846

Farrukh Hafeez, Fahad Almaskari, *Petroleum Institute, Abu Dhabi, United Arab Emir.*

11:45am – 3D A-FEM for High-Fidelity Fracture Analyses of Complex Heterogeneous Materials

Technical Presentation. IMECE2014-36270

Mehdi Naderi, Qingda Yang, *University of Miami, Coral Gables, FL, United States*, **Derek Schesser**, *University of Miami, South Miami, FL, United States*

12-22 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization

12-22-2 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (II)

514A

9:45am–11:30am

Session Organizer: Xin-Lin Gao, *Southern Methodist University, Dallas, TX, United States*

Session Co-Organizer: Lifeng Wang, *Stony Brook University, Stony Brook, NY, United States*

9:45am – Effective Elastic Properties of 3-D Printable Interpenetrating Phase Composites

Technical Presentation. IMECE2014-37540

Li Ai, *University of Texas at Dallas, Richardson, TX, United States*, **Xin-Lin Gao**, *Southern Methodist University, Dallas, TX, United States*

10:02am – Elastic Wave Propagation in Periodic Composite Materials

Technical Presentation. IMECE2014-39537

Lifeng Wang, Yanyu Chen, *Stony Brook University, Stony Brook, NY, United States*

10:19am – Mechanical Properties of Monolayer Molybdenum Disulfide

Technical Paper Publication. IMECE2014-37358

Alireza Tabarraei, Xiaonan Wang, Shohreh Shadalou, *University of North Carolina Charlotte, Charlotte, NC, United States*

10:36am – Rate Dependent Fracture of a Double Cantilever Beam With Combined Bulk and Interfacial Viscoelasticity

Technical Presentation. IMECE2014-37135

Shawn Lavoie, Rong Long, Tian Tang, *University of Alberta, Edmonton, AB, Canada*

10:53am – New Timoshenko Beam Model Incorporating Microstructure and Surface Energy Effects

Technical Presentation. IMECE2014-36944

Xin-Lin Gao, *Southern Methodist University, Dallas, TX, United States*

11:10am – Composite Snowboard Material Testing and Analysis
Technical Presentation. IMECE2014-40492

Hussien Zughaer, *Nova Scotia Community College, Dartmouth, NS, Canada*, **John O’Leary**, **Mike Knox**, **Chris Knox**, **Kevin Young**, *College of the North Atlantic, St. John’s, NL, Canada*

12-26 Effects of Defects, Damage Tolerance, and Repair of Composites

12-26-1 Effects of Defects, Damage Tolerance, and Repair of Composites

520A

9:45am–11:30am

Session Organizer: Naveen Rastogi, *Gulfstream Aerospace Corporation, Pooler, GA, United States*

Session Co-Organizer: Rani Elhajjar, *University of Wisconsin-Milwaukee, Milwaukee, WI, United States*

9:45am – Performance of a Composite Repair System for Externally Corroded Metallic Pipe Using Numerical Model
Technical Paper Publication. IMECE2014-36483

Abul Fazal M. Arif, **M. Anis**, **Ahmad Al-Omari**, *King Fahd University of Petroleum & Minerals (KFUPM), Dhahran, Saudi Arabia*

10:05am – Size Effects of Scratches and the Influence on Failure of Composite Laminates

Technical Presentation. IMECE2014-39951

Sayedmohammad Shams, **Laio Andrade**, **Rani Elhajjar**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

10:25am – Numerical and Analytical Models for Using a Modified Open Hole Compression Test in the Presence of Waviness Defects

Technical Presentation. IMECE2014-39927

Rani Elhajjar, **Sayedmohammad Shams**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

10:45am – Comparison of Repair Methods for Composite Sandwich Structures

Technical Presentation. IMECE2014-37076

Grey Rowell, *Gulfstream Aerospace Corporation, Savannah, GA, United States*, **Naveen Rastogi**, *Gulfstream Aerospace Corporation, Pooler, GA, United States*

11:05am – Fatigue Damage Assessment and Evaluation of Composite Patch Repair of Aluminum Structures

Technical Presentation. IMECE2014-40334

Eugene Fang, **Xiaodong Cui**, **Xiaohu Liu**, **Jim Lua**, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

11:25am – Effect of Microvoids on Anomalous Moisture Absorption of Quartz/BMI Composite Laminates

Technical Paper Publication. IMECE2014-38407

Keith R. Hurdelbrink II, **Gorkem E. Guloglu**, **Zahed Siddique**, **M. Cengiz Altan**, *University of Oklahoma, Norman, OK, United States*, **Jacob Anderson**, *University of Oklahoma, Cameron, OK, United States*, **Landon Grace**, *University of Miami, Miami, FL, United States*

12-27 Multiscale Modeling of Textile Composites

12-27-1 Multiscale Modeling of Textile Composites

520B

9:45am–11:30am

Session Organizer: Brett Bednarczyk, *NASA Glenn, Cleveland, OH, United States*

Session Co-Organizer: Evan Pineda, *NASA Glenn, Cleveland, OH, United States*

9:45am – Multiscale Microplane Model for Fracturing Damage of Woven Composites

Technical Presentation. IMECE2014-38975

Kedar Kirane, **Marco Salviato**, **Zdenek Bazant**, *Northwestern University, Evanston, IL, United States*

10:06am – Real Scale Numerical Simulation of Ballistic Tests for Multilayer Fabric Body Armors

Extended Abstract Publication. IMECE2014-39538

Mario Dippolito, **Youqi Wang**, **Ying Ma**, *Kansas State University, Manhattan, KS, United States*, **Chian Fong Yen**, *Army Research Laboratory, Aberdeen Proving Ground, MD, United States*, **Virginia Halls**, **James Q. Zheng**, *U.S. Army, Fort Belvoir, VA, United States*

10:27am – Tortuous and Twist Dependency of Kevlar Yarn Structural Response

Technical Presentation. IMECE2014-40325

Stephen Recchia, **Assimina Pelegri**, *Rutgers University, Piscataway, NJ, United States*, **Suzanne Horner**, **James Q. Zheng**, *U.S. Army, Fort Belvoir, VA, United States*, **Ioannis Chasiotis**, *University of Illinois, Urbana, IL, United States*

10:48am – Analysis and Simulation of Delamination on a Single Glass-Fiber Bundle

Technical Presentation. IMECE2014-40330

Max Tenorio, **Assimina Pelegri**, *Rutgers–The State University of New Jersey, Piscataway, NJ, United States*

11:09am – Modeling Damage in Textile Composites Using Meso- and Microscale Approaches

Technical Presentation. IMECE2014-40637

Brett Bednarczyk, *NASA Glenn, Cleveland, OH, United States*, **Bertram Stier**, **Jaan Simon**, **Stefanie Reese**, *RWTH Aachen University, Aachen, Germany*, **Evan Pineda**, *NASA Glenn, Cleveland, OH, United States*

12-28 Fatigue and Fracture of Engineering Materials and Structures

12-28-4 Fracture Mechanics

514B

9:45am–11:30am

Session Organizer: Olanrewaju Aluko, *University of Michigan–Flint, Grand Blanc, MI, United States*

Session Co-Organizer: Gbadebo Owolabi, *Howard University, Washington, DC, United States*

9:45am – Four Points Bending Tests on Large-Scale Welded Pipes Containing a Through-Wall Defect: Fatigue and Fracture Analysis

Technical Paper Publication. IMECE2014-36731

Myriam Bourgeois, *French Alternative Energies and Atomic Energy Commission, Gif-sur-Yvette, France*, **Thierry Legrasse**, **Yann Kayser**, *CEA, Gif-sur-Yvette, France*

10:02am – Constitutive Damage Model for Subcritical Fatigue Crack Growth and Size Effect in Isotropic Quasibrittle Materials

Technical Presentation. IMECE2014-37177

Kedar Kirane, **Zdenek Bazant**, *Northwestern University, Evanston, IL, United States*

10:19am – Validation on the Relationship Between J Integral and CTOD for Offshore Structural Steel Weldments by Experimental and Numerical Analyses

Technical Paper Publication. IMECE2014-37660

Dong Hyun Moon, **Myung-Hyun Kim**, **Jae Myung Lee**, *Pusan National University, Busan, Korea (Republic)*, **Jeong Soo Lee**, *Total Marine Service Co., Ltd., Busan, Korea (Republic)*

10:36am – In Situ SEM Testing for Transient Fatigue Crack Growth Behavior Investigation Subjected to a Single Tensile Overload

Technical Paper Publication. IMECE2014-37703

Wei Zhang, *Beihang University, Beijing, Beijing, China*, **Yongming Liu**, *Arizona State University, Tempe, AZ, United States*

10:53am – Effect of Reverse Bending Method on Pre-crack Straightness in CTOD Test of Welded Thick Steel Plates

Technical Paper Publication. IMECE2014-37909

Sehwan Jeong, **Hyun-su Kim**, **Sang-Beom Shin**, **Tae-jong Park**, *Hyundai Heavy Industries Co. Ltd., Ulsan, Korea (Republic)*

11:10am – Applicability of Pre-cracked Charpy Specimens for Determining Fatigue Crack Growth and J-R Properties: Experiments and Assessment of K and J Dominance

Technical Paper Publication. IMECE2014-39514

Gustavo H.B. Donato, **Rodrygo F. Moço**, **Tatiane R. Merlo**, *FEI University, Sao Bernardo do Campo, Sao Paulo, Brazil*

12-33 Symposium on Mechanics of Soft Materials

12-33-4 Computation and Modeling of Soft Materials

514C

9:45am–11:30am

Session Organizer: David Henann, *Brown University, Providence, RI, United States*

Session Co-Organizers: Stephan Rudykh, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Shawn Chester, *New Jersey Institute of Technology, North Caldwell, NJ, United States*

9:45am – Analytical Stiffness Modeling and Experimental Validation for a Pneumatic Artificial Muscle

Technical Paper Publication. IMECE2014-36917

Justin Leclair, **Marc Doumit**, *Greg McAllister, University of Ottawa, Ottawa, ON, Canada*

10:02am – Modeling and Design of Fiber-Reinforced Soft Actuators

Technical Presentation. IMECE2014-37507

Fionnuala Connolly, **Katia Bertoldi**, **Conor Walsh**, *Harvard University, Cambridge, MA, United States*

10:19am – Nonlinear Finite Element Method for Transient Behaviors of Hydrogels

Technical Presentation. IMECE2014-39033

Nikolaos Bouklas, **Chad Landis**, **Rui Huang**, *University of Texas at Austin, Austin, TX, United States*

10:36am – Numerical Simulation of Reaction-Diffusion Processes in Deforming Soft Materials

Technical Presentation. IMECE2014-39437

Shawn Chester, *New Jersey Institute of Technology, North Caldwell, NJ, United States*

10:53am – Modeling Elasto-Capillarity: The Interplay Between Surface Energy and Elasticity in Soft Materials

Technical Presentation. IMECE2014-40028

David Henann, *Brown University, Providence, RI, United States*

11:10am – Shape Transition and Multistability in Chiral Ribbons

Technical Presentation. IMECE2014-38807

Zi Chen, *Washington University in St. Louis, Saint Louis, MO, United States*, **Qiaohang Guo**, *Fuzhou University, Fuzhou, China*, **Anil Mehta**, **David G. Lynn**, *Emory University, Atlanta, GA, United States*, **Martha Grover**, *Georgia Institute of Technology, Atlanta, GA, United States*, **Wenzhe Chen**, *Fujian University of Technology, Fujian, China*

12-34 Instability in Solids And Structures

12-34-4 Instability in Solids And Structures IV

512A

9:45am–11:30am

Session Organizer: **Pedro Reis**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

Session Co-Organizer: **Stelios Kyriakides**, *University of Texas at Austin, Austin, TX, United States*

9:45am – Cavitation in Rubber: An Elastic Instability or a Fracture Phenomenon?

Technical Presentation. IMECE2014-38057

Victor Lefevre, **Oscar Lopez-Pamies**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10:02am – Post-Bifurcation Analysis of Hierarchical Honeycombs

Technical Presentation. IMECE2014-38896

Ryan Elliott, **Christelle Combescure**, *University of Minnesota, Minneapolis, MN, United States*

10:19am – Crushing and Energy Absorption of Open-Cell Metal Foams

Technical Presentation. IMECE2014-39076

Stavros Gaitanaros, **Stelios Kyriakides**, *University of Texas at Austin, Austin, TX, United States*, **Andrew Kraynik**, *Independent Consultant, Albuquerque, NM, United States*

10:36am – Plastic Buckling of Circular Plates on Elastic Foundations

Technical Presentation. IMECE2014-39120

Suresh Shrivastava, **Andre Bahous**, *McGill University, Montreal, QC, Canada*

10:53am – Shape selection and Multistability in Strained Multilayer Composites

Technical Presentation. IMECE2014-38854

Zi Chen, *Washington University in St. Louis, Saint Louis, MO, United States*, **Qiaohang Guo**, *Fuzhou University, Fuzhou, China*, **Kevin T. Chu**, *Serendipity Research, Mount view, CA, United States*, **Wenzhe Chen**, *Fujian University of Technology, Fujian, China*

11:10am – Bioinspired Transformative Skin: From Instability to Function

Technical Presentation. IMECE2014-37657

Xuanhe Zhao, *Duke University, Durham, NC, United States*

12-2 Mechanics of Adhesion and Friction

12-2-2 Mechanics of Adhesion and Friction II

512B

1:00pm–2:45pm

Session Organizer: **Jianliang Xiao**, *University of Colorado, Boulder, Boulder, CO, United States*

Session Co-Organizers: **Frank DelRio**, *National Institute of Standards and Technology, Boulder, CO, United States*, **Shu Yang**, *University of Pennsylvania, Philadelphia, PA, United States*

1:00pm – Interlocking and Directional Adhesion Between Polymeric Micropillar Arrays, Part 1

Technical Presentation. IMECE2014-39265

Shu Yang, *University of Pennsylvania, Philadelphia, PA, United States*

1:17pm – Interlocking and Directional Adhesion Between Polymeric Micropillar Arrays, Part 2

Technical Presentation. IMECE2014-39269

Shu Yang, *University of Pennsylvania, Philadelphia, PA, United States*

1:34pm – Frictional Properties of Native and Functionalized Type I Collagen Thin Films

Technical Presentation. IMECE2014-36474

Frank DelRio, *National Institute of Standards and Technology, Boulder, CO, United States*, **Robert Cook**, **Brian Bush**, **Antony Chen**, **Chris Anderton**, **Kiran Bhadriraju**, **Anne Plant**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Koo-Hyun Chung**, *University of Ulsan, Ulsan, Korea (Republic)*

1:51pm – Viscoelastic Contact and Friction of a Half-Plane Sliding Over a Slightly Wavy Rigid Surface

Technical Paper Publication. IMECE2014-37917

Nicola Menga, **Carmine Putignano**, **Tommaso Contursi**, **Giuseppe Carbone**, *Politecnico di Bari, Bari, Italy*

2:08pm – Microtextured Surfaces With Parallel Wall-Like Structures: “Modulation” of Adhesion Properties With the Direction of the Applied External Moment

Technical Paper Publication. IMECE2014-39845
Luciano Afferrante, Gioacchino Grimaldi, Giuseppe Carbone, Giuseppe Demelio, Politecnico di Bari, Bari, Italy

2:25pm – Finite Element Modeling of the Effect of Wear Scars on Load-Carrying Capacity of Plain Journal Bearings

Technical Presentation. IMECE2014-37256
Marc Desjardins, Electric Boat, Groton, CT, United States, Ernesto Gutierrez-Miravete, Rensselaer at Hartford, Hartford, CT, United States

12-11 Damage and Failure of Composites

12-11-2 Damage and Failure of Composites II

512E 1:00pm–2:45pm

Session Organizer: Xinran Xiao, Michigan State University, Lansing, MI, United States

Session Co-Organizer: Reza Vaziri, University of British Columbia, Vancouver, BC, Canada

1:00pm – Damage Modeling of Composite Structures Under Crash Loading

Invited Presentation. IMECE2014-40892
Reza Vaziri, University of British Columbia, Vancouver, BC, Canada

1:20pm – Constitutive Models for the Prediction of Energy Absorption of Composite Structures

Technical Presentation. IMECE2014-36592
Xinran Xiao, Danghe Shi, Michigan State University, Lansing, MI, United States

1:40pm – Spectral Stiffness Decomposition Microplane Model: Prediction of Crashworthiness of a Woven Composite Crash Can

Technical Presentation. IMECE2014-38981
Marco Salviato, Gianluca Cusatis, Zdenek Bazant, Northwestern University, Evanston, IL, United States

2:00pm – Comparison of Manufacturing Techniques for Composites Subject to High-Speed Impact

Technical Paper Publication. IMECE2014-39677
Kenneth Gollins, Jack Chiu, Feridun Delale, Benjamin Liaw, City College of New York, New York, NY, United States, Ali Gursel, Duzce University, Duzce, Turkey

2:20pm – Effective Finite Element Modeling of Mode III Failure in Composites

Technical Paper Publication. IMECE2014-36376
Levi J. Suryan, Atanas Atanasov, Mitchell A. Daniels, John P. Parmigiani, Oregon State University, Corvallis, OR, United States

12-12 Multifield Studies in Heterogeneous Materials: Experimental, Theoretical, and Numerical Approaches

12-12-1 Multifield Studies in Heterogeneous Materials Part 1

512C 1:00pm–2:45pm

Session Organizer: Anastasia Muliana, Texas A&M University, College Station, TX, United States

Session Co-Organizers: Rani Elhajjar, University of Wisconsin–Milwaukee, Milwaukee, WI, United States, Valeria La Saponara, University of California, Davis, Davis, CA, United States, Wahyu Lestari, Embry-Riddle Aeronautical University, Prescott, AZ, United States, Arun Srinivasa, Texas A&M University, College Station, TX, United States

1:00pm – Thermomechanical Behavior of Spray-on Nanocomposite Sensors Applied to CFRP Composites

Technical Presentation. IMECE2014-36820
Wahyu Lestari, Embry-Riddle Aeronautical University, Prescott, AZ, United States, Brian Pinto, Valeria La Saponara, Jennifer Yasui, Kenneth J. Loh, University of California, Davis, Davis, CA, United States

1:17pm – Wave Propagation and Creep Behavior of Smart GFRP Sandwich Composites

Technical Presentation. IMECE2014-36832
Valeria La Saponara, University of California, Davis, Davis, CA, United States, Anais Farrugia, École des Mines d’Albi-Carmaux, Albi, CT Cedex, France, Wahyu Lestari, Embry-Riddle Aeronautical University, Prescott, AZ, United States

1:34pm – Ultrasound Characterization of IM7/PEEK Composite Materials

Technical Paper Publication. IMECE2014-36887
Jikai Du, Katrina Ladd, Fereidoon Delfanian, South Dakota State University, Brookings, SD, United States

1:51pm – Exact 3-D Stress and Stiffness Analysis of Functionally Graded Sandwich Plates Using Sampling Surfaces Method

Technical Paper Publication. IMECE2014-38400
Mehdi Darabi, Rajamohan Ganesan, Concordia University, Montreal, QC, Canada

2:08pm – Nonlinear Deformations of Cantilever Beams With Piezoelectric Patches

Extended Abstract Publication. IMECE2014-39688
Vahid Tajeddini, Anastasia Muliana, Texas A&M University, College Station, TX, United States

2:25pm – Multiphysics Finite Element Simulation of the Effects of a Graphene Coating on a Carbon-Fiber Composite for Lightning Strike Protection

Technical Presentation. IMECE2014-40329
Daniel Sullivan, Stephen Tse, Bernard Kear, Assimina Pelegri, Rutgers–The State University of New Jersey, Piscataway, NJ, United States

12-18 Materials and Metamaterials at Varying Length Scales and Frequency Ranges

12-18-1 Materials and Metamaterials at Varying Length Scales and Frequency Ranges

515A 1:00pm–2:45pm

Session Organizer: Emmanuel Ayorinde, Wayne State University, Detroit, MI, United States

Session Co-Organizer: Joon Sang Lee, Yonsei University, Seoul, Korea (Republic)

1:00pm – Lattice Boltzmann Approach for Transporting of Droplets Using Tapered-Heterogeneous Surface Roughness

Technical Presentation. IMECE2014-40300
Jung Shin Lee, Joon Sang Lee, Yonsei University, Seoul, Korea (Republic)

1:35pm – Realization of Plate Structure Metamaterial for Vibration Application

Technical Presentation. IMECE2014-40264
Emmanuel Ayorinde, Mehmet Akif Dunder, Wayne State University, Detroit, MI, United States, Mohammad AL Zubi, Tafila Technical University, Tafila, Jordan, Fouad Mohammad, Wayne State University, Windsor, ON, Canada

2:10pm – Impact Profile of an Industrial Plastic Plate

Technical Presentation. IMECE2014-40312
Mehmet Akif Dunder, Emmanuel Ayorinde, Wayne State University, Detroit, MI, United States, Mohammad AL Zubi, Tafila Technical University, Tafila, Jordan, Fouad Mohammad, Wayne State University, Windsor, ON, Canada

12-22 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization

12-22-3 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (III)

514A 1:00pm–2:45pm

Session Organizer: Xin-Lin Gao, Southern Methodist University, Dallas, TX, United States

Session Co-Organizer: Vinu Unnikrishnan, University of Alabama, Tuscaloosa, AL, United States

1:00pm – Soft Systems of Sensors, Circuits, and Radios for the Skin

Technical Presentation. IMECE2014-38127
Yonggang Huang, Northwestern University, Evanston, IL, United States

1:21pm – Mechanics of Compliant Multifunctional Robotic Structures

Technical Presentation. IMECE2014-36327
Hugh Bruck, University of Maryland, College Park, MD, United States

1:42pm – Effectiveness of Combat Helmets Against Nonpenetrating Traumatic Brain Injuries Induced by Blast and Ballistic Impacts

Technical Presentation. IMECE2014-37173
Sahil Kulkarni, Dassault Systemes Simulia Corporation, Providence, RI, United States, Xin-Lin Gao, Southern Methodist University, Dallas, TX, United States, Suzanne Horner, James Q. Zheng, U.S. Army, Fort Belvoir, VA, United States

2:03pm – Multiscale Simulation of Ballistic Composites for Blast-Induced Traumatic Brain Injury Mitigation

Technical Paper Publication. IMECE2014-40262
Daniel Jensen, Vinu Unnikrishnan, University of Alabama, Tuscaloosa, AL, United States

2:24pm – Multitemporal Scale Method for Continuum and Nanomechanics

Technical Presentation. IMECE2014-39229

Dong Qian, *University of Texas at Dallas, Dallas, TX, United States*

12-31 Computational Engineering and Simulation

12-31-1 Engineering Reserach Innovation and Computation

514B

1:00pm–2:45pm

Session Organizer: Mustapha Fofana, *Worcester Polytechnic Institute, Worcester, MA, United States*

Session Co-Organizer: Justine Johannes, *Sandia National Laboratories, Albuquerque, NM, United States*

1:00pm – Mesh Selection for Progressive Failure Modeling of Carbon Fiber Panels in Mode III Shear Using an Explicit Finite Element Solver

Technical Paper Publication. IMECE2014-36489

Mitchell A. Daniels, Levi J. Suryan, Imran Hyder, John P. Parmigiani, *Oregon State University, Corvallis, OR, United States*

1:17pm – Elastic-Viscoplastic Anisotropic Modeling of High-Purity Titanium and Validation Using the Taylor Cylinder Impact Test

Technical Presentation. IMECE2014-36892

Philip Flater, Jeremy Kleiser, *Air Force Research Laboratory, Eglin AFB, FL, United States*, Benoit Revil, Oana Cazacu, *University of Florida, Shalimar, FL, United States*

1:34pm – Unsteady Stokes Flow for a Vibrating Cantilever Under a Free-Surface

Technical Paper Publication. IMECE2014-36929

Iskender Sahin, Giovanni Di Ilio, Angelantonio Tafuni, *NYU Polytechnic School of Engineering, Brooklyn, NY, United States*

1:51pm – Applications of Simplified Method for Implementation of Structural Contact in Finite Element Methods

Technical Paper Publication. IMECE2014-38669

James Grudzinski, *Argonne National Laboratory, Downers Grove, IL, United States*, Michael Gosz, *Illinois Institute of Technology, Chicago, IL, United States*

2:08pm – Forced Convection Thermal Boundary Layer Transfer For Non-Isothermal surfaces Using the Modified Merk Series

Technical Presentation. IMECE2014-40452

Falana Ayodeji, *University of Ibadan, Ibadan, Nigeria, Ibadan, Oyo State, Nigeria*, Richard Olayiwola Fagbenle, *Obafemi Awolowo University, Ile Ife, Ile-Ife, Osun, Nigeria*

2:25pm – Analysis of Contact Area Between an Elastoplastic Rough Body and a Flat Body Under Different Working Mode

Technical Paper Publication. IMECE2014-37443

Jianmeng Huang, Chenghui Gao, Youxi Lin, Xiezhao Lin, *Fuzhou University, Fuzhou, Fujian, China*

12-33 Symposium on Mechanics of Soft Materials

12-33-5 Bioinspired and Biological Materials

514C

1:00pm–2:45pm

Session Organizer: Zi Chen, *Washington University In St. Louis, Saint Louis, MO, United States*

Session Co-Organizers: Stephan Rudykh, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Pradeep Sharma, *University of Houston, Houston, TX, United States*

1:00pm – Measuring Cell-Generated Mechanical Forces Within Living Embryonic Tissues

Technical Presentation. IMECE2014-38591

Otger Campas, *University of California, Santa Barbara, Santa Barbara, CA, United States*

1:17pm – Insights Into the Mechanics of Cytokinetic Ring Assembly Using 3D Modeling

Extended Abstract Publication. IMECE2014-39006

Tamara Bidone, Haosu Tang, Dimitrios Vavylonis, *Lehigh University, Bethlehem, PA, United States*

1:34pm – Soft Robotic Concepts in the Design of Active Antifouling Coatings

Technical Presentation. IMECE2014-40068

Xuanhe Zhao, *Duke University, Durham, NC, United States*

1:51pm – Shape Memory Behavior of Polymer Micro- and Nanoparticles

Technical Presentation. IMECE2014-38361

Lewis Cox, Zhengwei Li, Zheng Zhang, Mark Stoykovich, Jianliang Xiao, Yifu Ding, *University of Colorado, Boulder, Boulder, CO, United States*, Jason P. Killgore, Donna C. Hurley, *National Institute of Standards and Technology, Boulder, CO, United States*

2:08pm – Origami: Mechanics and Devices (I)

Invited Presentation. IMECE2014-39452

Hanqing Jiang, Hongyu Yu, Zeming Song, Rui Tang, Arizona State University

2:25pm – Origami: Mechanics and Devices (II)

Invited Presentation. IMECE2014-39453

Hanqing Jiang, Hongyu Yu, Zeming Song, Rui Tang, Arizona State University

12-34 Instability in Solids and Structures

12-34-5 Instability In Solids And Structures V

512A

1:00pm–2:45pm

Session Organizer: Katia Bertoldi, *Harvard University, Cambridge, MA, United States*

Session Co-Organizer: Zi Chen, *Washington University in St. Louis, Saint Louis, MO, United States*

1:00pm – Buckling-Induced Patterning for Aerodynamic Drag Reduction

Technical Presentation. IMECE2014-36396

Pedro Reis, Massachusetts Institute of Technology, Cambridge, MA, United States

1:21pm – Stability of Carotid Artery Under Steady-State and Pulsatile Blood Flow: A Fluid-Structure Interaction Study

Technical Presentation. IMECE2014-38674

Seyed Saeid Khalafvand, Hai-Chao Han, University of Texas at San Antonio, San Antonio, TX, United States

1:42pm – Necking of a Metallic Thin Sheet Followed by Speckle Pattern Interferometry

Technical Presentation. IMECE2014-40324

Chengheri Bao, Manuel Francois, Lea Le Joncour, Universite de Technologie de Troyes, Troyes, France

2:03pm – Evolutionary Electromechanical Stability in Viscoelastic Dielectrics Under Constant Loads

Technical Presentation. IMECE2014-40569

Bo Li, H.L. Chen, S.H. Jia, Xi'an Jiaotong University, Xi'an, China

2:24pm – Multiscale Experimental Investigation of Deformation and Failure in Polycrystalline Alloys Under Shear Loading

Technical Presentation. IMECE2014-38768

Ali Ghahremaninezhad, University of Miami, Coral Gables, FL, United States

12-2 Mechanics of Adhesion and Friction

12-2-3 Mechanics of Adhesion and Friction III

512B

3:00pm–4:45pm

Session Organizer: Cheng Liu, *Los Alamos National Lab, Los Alamos, NM, United States*

Session Co-Organizers: Frank DelRio, *National Institute of Standards and Technology, Boulder, CO, United States*, Jianliang Xiao, *University of Colorado, Boulder, Boulder, CO, United States*

3:00pm – Multiscale Moving Contact Line Theory

Technical Presentation. IMECE2014-39208

Shaofan Li, University of California, Berkeley, Berkeley, CA, United States

3:15pm – Peeling of an Elastic Membrane Tape Adhered to a Substrate by a Uniform Cohesive Traction

Technical Presentation. IMECE2014-39009

Robert McMeeking, Rachel Collino, Matthew Begley, University of California, Santa Barbara, CA, United States

3:30pm – Directional Evaluation of Surface Topography Parameters and Dry Friction

Extended Abstract Publication. IMECE2014-38848

Matthias Wengenheim, Leibniz University Hannover, Hannover, Germany

3:45pm – Bonding Energy of Sylgard on Fused Quartz: An Experimental Investigation

Technical Presentation. IMECE2014-38188

Cheng Liu, John D. Yeager, Kyle J. Ramos, Los Alamos National Laboratory, Los Alamos, NM, United States

4:00pm – Static and Dynamic Friction Characteristics of a Steel on Polyoxymethylene Interface Under Dry and Lubricated Contact Conditions

Technical Paper Publication. IMECE2014-38345

Matthew G. Larson, Shannon J. Timpe, Bradley University, Peoria, IL, United States

4:15pm – Axisymmetric Thermomechanical Analysis of Laser-Driven Noncontact Transfer Printing

Technical Presentation. IMECE2014-38049

Yonggang Huang, Northwestern University, Evanston, IL, United States

4:30pm – Numerical Simulation and Analysis of the Formation of the Subsurface Damage of Optical Lenses

Technical Presentation. IMECE2014-40609

Zhiying Ren, Chenghui Gao, Weiping Chen, Fuzhou University, Fuzhou, China

12-10 Mechanics and Design of Cellular Materials

12-10-1 Mechanics and Design of Cellular Materials I

512A 3:00pm–4:45pm

Session Organizer: Jongmin Shim, *University at Buffalo, Buffalo, NY, United States*

3:00pm – Three-Dimensional Compliant Cellular Materials: A Mechanism Based Material Design

Technical Paper Publication. IMECE2014-36567

Kwangwon Kim, *Korean Aerospace University, Goyang-city, Korea (Republic)*, **Jaehyung Ju**, *University of North Texas, Denton, TX, United States*, **Doo-Man Kim**, *KCIS, Co. Ltd., Goyang, Gyeonggi-Do, Korea (Republic)*

3:21pm – Analysis of Mechanical Response of Aluminium Honeycomb Subjected to Indentation

Technical Paper Publication. IMECE2014-36620

Asm Ayman Ashab, **Dong Ruan**, **Yat Choy Wong**, *Swinburne University of Technology, Melbourne, Australia*, **Guoxing Lu**, *Nanyang Technological University, Singapore, Singapore*

3:42pm – Experimental Study of Energy Absorption of Fluid-Filled Honeycomb Structure

Technical Paper Publication. IMECE2014-37580

Muhammad Ali, **Khairul Alam**, **Sean Jenson**, *Ohio University, Athens, OH, United States*, **Jeffrey Hoffman**, *University of Alaska Anchorage, Anchorage, AK, United States*

4:03pm – Adaptable Mechanical Properties of Geometrically Reconfigurable Magneto-Elastic Meta-Structures

Technical Presentation. IMECE2014-38508

Marshall Schaeffer, **Massimo Ruzzene**, *Georgia Institute of Technology, Atlanta, GA, United States*

4:24pm – Continuum Model for Effective Properties of Orthotropic Octet-Truss Lattice Materials

Technical Paper Publication. IMECE2014-38925

Adithya Challapalli, **Jaehyung Ju**, *University of North Texas, Denton, TX, United States*

12-11 Damage and Failure of Composites

12-11-3 Damage and Failure of Composites III

512E 3:00pm–4:45pm

Session Organizer: Xinran Xiao, *Michigan State University, Lansing, MI, United States*

Session Co-Organizers: Abbasali Saboktakin-Rizi, *Weebly, Montreal, QC, Canada*, Danial Faghihi, *University of Texas at Austin, Austin, TX, United States*

3:00pm – Coupled Discrete Crack Network and Continuum Damage Prediction of Laminated Composite Structures Under Static and Fatigue Loading

Technical Presentation. IMECE2014-40309

Eugene Fang, **Neethi Simon**, **Jim Lua**, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

3:20pm – Detachment of Facesheet From Sandwich Composites Under Cyclic Loading

Technical Paper Publication. IMECE2014-38465

Manjinder Singh Warriach, **Golam Newaz**, *Wayne State University, Detroit, MI, United States*

3:40pm – Real-Time Monitoring of Stochastic Damage in Composite Materials

Technical Presentation. IMECE2014-36251

Danial Faghihi, **Ernesto Prudencio**, **Paul Bauman**, **Krishnaswamy Ravi-Chandar**, **J. Tinsley Oden**, *University of Texas at Austin, Austin, TX, United States*

4:00pm – Effects of Thickness, Material Nonlinearity, and Fiber Misalignment on Localization, Delocalization, and Compression Fracture in Thick Cross-Ply Long Cylindrical Shells Under External Pressure

Technical Presentation. IMECE2014-36957

Reaz A. Chaudhuri, *University of Utah, Salt Lake City, UT, United States*

4:20pm – Sensitivity of the Post-Localization Response of an Externally Pressurized Thick Cross-Ply Imperfect Long Cylindrical Shell to Transverse Young's Modulus Nonlinearity

Technical Presentation. IMECE2014-36955

Reaz A. Chaudhuri, *University of Utah, Salt Lake City, UT, United States*

4:40pm – Stochastic Size Effects in the Response of a Multidirectional Laminate Subject to Through-Thickness Loading

Technical Presentation. IMECE2014-37943

Andreas Schiffer, *Khalifa University (KUSTAR), Abu Dhabi, United Arab Emir.*, **Vito L. Tagarielli**, *Imperial College London, London, London, United Kingdom*

12-12 Multifield Studies in Heterogeneous Materials: Experimental, Theoretical, and Numerical Approaches

12-12-2 Multifield Studies in Heterogeneous Materials Part 2

512C

3:00pm–4:45pm

Session Organizer: Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: Rani Elhajjar, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*, Valeria La Saponara, *University of California, Davis, Davis, CA, United States*, Wahyu Lestari, *Embry-Riddle Aeronautical University, Prescott, AZ, United States*, Arun Srinivasa, *Texas A&M University, College Station, TX, United States*

3:00pm – Investigation on Polypropylene-Based Nanocomposites for Improved Toughness and Damage Sensing

Technical Presentation. IMECE2014-36951

Md. Mahbubul Hasan, Ricardo H.R. Castro, Serena Ferraro, Valeria La Saponara, Brian Pinto, *University of California, Davis, Davis, CA, United States*, **Omar Rodríguez-Uicab, Alejandro May-Pat, Francis Aviles, Pedro Ivan Gonzalez Chi**, *Centro de Investigación Científica de Yucatán, Merida, Yucatan, Mexico*

3:17pm – Thermomechanical Modeling of Scanning Joule Expansion Microscopy Imaging of Single-Walled Carbon Nanotube Devices

Technical Presentation. IMECE2014-37246

Jizhou Song, *Zhejiang University, Hangzhou, Zhejiang, China*, **Xu Xie**, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*, **Yonggang Huang**, *Northwestern University, Evanston, IL, United States*, **John Rogers**, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

3:34pm – Modeling of Ferromagnetic-Ferroelectric-Substrate Multilayer Composites: Optimization of Volume Ratio Effect

Technical Paper Publication. IMECE2014-40059

Davresh Hasanyan, *Virginia Tech, Blacksburg, VA, United States*, **Satenik Harutyunyan, Robert B. Davis**, *Bechtel National, Inc., Richland, WA, United States*

3:51pm – Numerical Simulation of the Structural Response of Al/Graphite Composites Using Unit Cell Models and Different Interface Conditions

Technical Paper Publication. IMECE2014-37083

Jose Luis Hernandez-Rivera, Hugo Ivan Medellin Castillo, Dirk Frederik De Lange, Gilberto Mejia Rodríguez, *Universidad Autónoma de San Luis Potosí, San Luis Potosi, San Luis Potosí, Mexico*

4:08pm – Magnetomechanical Behavior of Magnetostrictive Composite Based Sensors

Technical Presentation. IMECE2014-40347

Chiu Tai Law, Rani Elhajjar, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

4:25pm – Hygro-thermomechanical Performance of Monolithic and Sandwich Fiber-Reinforced Polymer Composites With Viscoelastic Behavior

Technical Presentation. IMECE2014-38868

Antonio Gomez, Serena Ferraro, Destiny Garcia, Valeria La Saponara, *University of California, Davis, Davis, CA, United States*, **Bentolhoda Davoodi, Anastasia Muliana**, *Texas A&M University, College Station, TX, United States*

12-22 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization

12-22-4 Multifunctional and Micro-/Nanostructured Materials—Modeling and Characterization (IV)

514A

3:00pm–4:45pm

Session Organizer: Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

Session Co-Organizer: Xin-Lin Gao, *Southern Methodist University, Dallas, TX, United States*

3:00pm – Modeling Interactions Between Large Area Graphene and Silicon

Technical Presentation. IMECE2014-40549

Seung-Ryul Na, Rodney Ruoff, Rui Huang, Kenneth Liechti, *University of Texas at Austin, Austin, TX, United States*, **Ji Won Suk**, *Sungkyunkwan University, Suwon, Gyeonggi, Korea (Republic)*

3:21pm – Computational Modeling of Nondestructive Detection by Multifunctional Metal Particle Embedded Ceramics

Technical Presentation. IMECE2014-40230

Huijuan Zhao, *Clemson University, Clemson, SC, United States*

3:42pm – Shape Control With Smart 3D Truss Structure**Extended Abstract Presentation. IMECE2014-39380****Amir Sohrabi Mollayousef, Anastasia Muliana, Texas A&M University, College Station, TX, United States****4:03pm – New Discrete Dislocation Algorithms for Modeling Rate Effects in Plastic Deformation****Technical Presentation. IMECE2014-38266****Run Zhu, Northeastern University, Malden, MA, United States, Srinath Chakravarthy, Northeastern University, Boston, MA, United States****4:24pm – Modeling of Twinning Based Plasticity Phenomenon in Austenite Dominated Steels Under Combined Loading****Technical Paper Publication. IMECE2014-37014****Rashid Khan, Tasneem Pervez, Sultan Qaboos University, Al-Khoudh, Oman, Omar Al-Abri, Majid Al-Maharbi, Sultan Qaboos University, Muscat, Oman****12-31 Computational Engineering and Simulation****12-31-2 Computational Engineering and Validation Simulations I****514B****3:00pm–4:45pm****Session Organizer: Mustapha Fofana, Worcester Polytechnic Institute, Worcester, MA, United States****Session Co-Organizer: Justine Johannes, Sandia National Laboratories, Albuquerque, NM, United States****3:00pm – Comparison of Computed Deflections of Symmetric Angle-Ply Laminate Plates by the Ritz Method and the Finite Element Method****Technical Paper Publication. IMECE2014-37254****Kenneth Carroll, Sikorsky Aircraft, Shelton, CT, United States, Ernesto Gutierrez-Miravete, Rensselaer at Hartford, Hartford, CT, United States****3:15pm – Influence of Multiple Inclusions on the Cauchy Stress of a Spherical Particle-Reinforced Composite Under Uniaxial Loading****Technical Paper Publication. IMECE2014-38542****Ke Niu, Zengtao Chen, University of New Brunswick, Fredericton, NB, Canada, Armin Abedini, University of Waterloo, Waterloo, ON, Canada****3:30pm – Environment Analysis Near a Highway Using Computational Fluid Dynamics****Technical Paper Publication. IMECE2014-38717****Xinwei Zhuang, Xiuling Wang, Purdue University Calumet, Hammond, IN, United States****3:45pm – Stress Analysis of Breast Implant****Extended Abstract Presentation. IMECE2014-38940****Guohua Ma, Wentworth Institute of Technology, Boston, MA, United States****4:00pm – Application of Load Transfer Index (U*) in Structural Analysis in Comparison With Conventional Stress Analysis****Technical Paper Publication. IMECE2014-38974****Khashayar Pajhen, Christine Wu, Igor Telichev, University of Manitoba, Winnipeg, MB, Canada****12-33 Symposium on Mechanics of Soft Materials****12-33-6 Structure-Interface-Property Relations in Soft Materials****514C****3:00pm–4:45pm****Session Organizer: Kevin Long, Sandia National Laboratories, Albuquerque, NM, United States****Session Co-Organizers: Christopher Yakacki, University of Colorado Denver, Denver, CO, United States, Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign, Urbana, IL, United States****3:00pm – Deformation Mechanisms in Layered Soft Composites****Technical Presentation. IMECE2014-39341****Stephan Rudykh, Massachusetts Institute of Technology, Cambridge, MA, United States, Mary Boyce, Columbia University, New York, NY, United States****3:17pm – Effects of Manufacturing on the Dimensional Stability of Chemically Blown Polyurethane Foams****Technical Presentation. IMECE2014-39364****Kevin Long, Rekha Rao, Lisa Mondy, Sandia National Laboratories, Albuquerque, NM, United States****3:34pm – Structurally Motivated Constitutive Model for Bat Wing Skin****Technical Paper Publication. IMECE2014-39525****Alyssa Skulborstad, Nakhiah Goulbourne, University of Michigan, Ann Arbor, MI, United States**

3:51pm – Orientation Effects in Short Fiber-Reinforced Elastomers**Technical Paper Publication. IMECE2014-40430****Jacopo Ciambella, David Stanier**, *University of Bristol, Bristol, United Kingdom***4:08pm – Interphasial Effects on Dielectric, Mechanical, and Electromechanical Properties of TiO₂-PDMS Composites****Technical Presentation. IMECE2014-40449****Amira Meddeb, Zoubeida Ounaies**, *Pennsylvania State University, State College, PA, United States*, **Oscar Lopez-Pamies**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***4:25pm – Role of Percolation in Hygro-mechanical Behavior of a Soft Matter Highlighted by MD****Extended Abstract Presentation. IMECE2014-37011****Dominique Derome, Karol Kulasinski**, *Empa, Duebendorf, ZH, Switzerland*, **Sinan Ketten**, *Northwestern University, Evanston, IL, United States*, **Sergey Churakov**, *PSI, Villigen, Switzerland*, **Jan Carmeliet**, *ETHZ, Zürich Hönggerberg, Switzerland***Wednesday, November 19****12-1 General****12-1-1 General Topics I****512B****9:45am–11:30am****Session Organizer: Pinaki Pal**, *University of Michigan, Ann Arbor, MI, United States***9:45am – Knudsen Compressor Applying as Refrigerants Compressor****Technical Presentation. IMECE2014-36151****Wei Lu, Lin Yang**, *Guangxi University, Nanning City, China*, **Taide Tan**, *Hunan University, Hunan, China***10:11am – Effect of Weber Number on Disintegration of Liquid Sheet With Co-Flowing Gas****Technical Paper Publication. IMECE2014-36241****Mohammad Ali**, **Md. Quamrul Islam**, *Bangladesh University of Engineering and Technology, Dhaka, Bangladesh*, **Mohammed Mayeed**, *Southern Polytechnic State University, Marietta, GA, United States*, **A.K.M. Sadrul Islam**, *Islamic University of Technology, Gazipur, Bangladesh***10:37am – Optimization of a Laminated Composite Cylindrical Shell With Curvilinear Fibre Paths Using a Surrogate-Based Approach****Technical Paper Publication. IMECE2014-36285****Marco A. Luersen**, *Federal University of Technology-Parana, Curitiba, Parana, Brazil*, **Craig A. Steeves, Prasanth B. Nair**, *University of Toronto Institute for Aerospace Studies, Toronto, ON, Canada***11:03am – Efficient Determination of Naval High-Speed Craft Shock Mitigation Seat Modal Parameters From Drop-Test Data****Technical Presentation. IMECE2014-40663****Fred Afagh, Robert G. Langlois**, *Carleton University, Ottawa, ON, Canada*, **Zuneid Alam**, *Chrysler, Brampton, ON, Canada***12-11 Damage and Failure of Composites****12-11-4 Damage and Failure of Composites IV****512E****9:45am–11:30am****Session Organizer: Xinran Xiao**, *Michigan State University, Lansing, MI, United States***Session Co-Organizers: Hiroyuki Hamada**, *Kyoto Institute of Technology, Kyoto, Japan*, **Mehdi Hojjati**, *Concordia University, Montreal, QC, Canada***9:45am – Effect of Waviness in the Strength Characteristics of Carbon/Aramid Fiber Composites****Technical Presentation. IMECE2014-40653****Saibhargav Pottavathri, Rajeev Nair**, *Wichita State University, Wichita, KS, United States***10:05am – Toward Enhancement of Mechanical Properties of Bamboo Fiber-Reinforced Thermoplastic Composites****Technical Presentation. IMECE2014-40640****Meisam Kouhi Habibi, Mihaela Banu**, *University of Michigan, Ann Arbor, MI, United States***10:25am – Microcapsules Containing Phenylacetate Solvent and Epoxy With Multiwalled Carbon Nanotubes for Self-Healing****Extended Abstract Publication. IMECE2014-38040****Paul Phamduy**, *Polytechnic Institute of New York University, Brooklyn, NY, United States*, **Byungki Kim**, *Korea University of Technology and Education, Chungnam, Korea (Republic)***10:45am – Effect of Hygrothermal Aging on Glass Transition Temperature of a Bismaleimide/Quartz Laminate****Technical Paper Publication. IMECE2014-38825****Luis Rodriguez, Mauro Fittipaldi**, *University of Miami, Coral Gables, FL, United States*, **Landon Grace**, *University of Miami, Miami, FL, United States*

11:05am – New Paper Tube Laminated by Plastics

Technical Paper Publication. IMECE2014-38112

Mitsunori Suda, *Daisankogyo Co., Ltd., Kashiwara, Japan*,
Defang Zhao, Yuqiu Yang, *Donghua University, Shanghai, China*,
Takanori Kitamura, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*,
Kanta Ito, Kenji Wada, Zhiyuan Zhang, *Daiwa Itagami Co. Ltd., Kashiwara, Japan*

11:25am – Fabrication and Fracture Test of Functionalized

Graphene-PETI 5 Composite

Extended Abstract Publication. IMECE2014-38018

Adam McLaughlin, *Applied Materials, Gloucester, MA, United States*,
Byungki Kim, *Korea University of Technology and Education, Chungnam, Korea (Republic)*

12-32 Modeling Materials With Morphological Complexities and Evolving Microstructures

12-32-1 Modeling Materials With Morphological Complexities and Evolving Microstructures

514A

9:45am–11:30am

Session Organizer: Soheil Soghrati, *Ohio State University, Columbus, OH, United States*

Session Co-Chair: James Sobotka, *SouthWest Research Institute, San Antonio, TX, United States*

9:45am – Multiscale Computational Model for the Growth of the Cranial Vault in Craniosynostosis

Technical Paper Publication. IMECE2014-38728

Chanyoung Lee, Joan T. Richtsmeier, Reuben Kraft, *Pennsylvania State University, University Park, PA, United States*

10:02am – Computing Effective Thermomechanical Properties of Polydisperse Particulate Composites Using Well Resolved Higher-Order Statistics

Technical Presentation. IMECE2014-39112

Andrew Gillman, Karel Matou, *University of Notre Dame, Notre Dame, IN, United States*

10:19am – Sharp Interface Model for Morphological Equilibrium During Phase Transformation in Elastically Stressed Solids

Technical Presentation. IMECE2014-39519

Xujun Zhao, Jianmin Qu, *Northwestern University, Evanston, IL, United States*

10:36am – Numerical Modeling of Braided Composites Using Energy Method

Technical Paper Publication. IMECE2014-39619

Xiuli Shen, Longdong Gong, *Beijing University of Aeronautics and Astronautics, Beijing, China*

10:53am – Efficient Microstructural Shape Optimization Scheme for Complex Heterogeneous Materials

Technical Presentation. IMECE2014-39893

Ahmad R. Najafi, Masoud Safdari, Philippe H. Geubelle, *University of Illinois, Urbana, IL, United States*

11:10am – Hysteresis and Heterogeneous Response of Materials With Microcrack

Technical Presentation. IMECE2014-40581

Zhanjun Gao, *Corning Inc., Corning, NY, United States*,
Mark Kachanov, *Tufts University, Medford, MA, United States*

12-33 Symposium on Mechanics of Soft Materials

12-33-7 Morphogenesis of Soft and Living Matter

514B

9:45am–11:30am

Session Organizer: Zi Chen, *Washington University in St. Louis, Saint Louis, MO, United States*

Session Co-Organizer: Victor Varner, *Princeton University, Princeton, NJ, United States*

9:45am – Evolutionary Conservation of Early Mesoderm Specification by Mechanotransduction in Bilateria

Invited Presentation. IMECE2014-37028

Emmanuel Farge, *Institut Curie/INSERM, Paris, France*

10:02am – Mechanical Origins of Brain Torsion in Chick Embryo

Technical Presentation. IMECE2014-37349

Zi Chen, Eric Dai, Nickolas Forsch, Larry Taber, *Washington University in St. Louis, Saint Louis, MO, United States*,
Qiaohang Guo, *Fuzhou University, Fuzhou, China*

10:19am – Airway Branching Morphogenesis Driven by a Growth-Induced Mechanical Instability

Technical Presentation. IMECE2014-39701

Victor Varner, Jason Gleghorn, Celeste Nelson, *Princeton University, Princeton, NJ, United States*

10:53am – Drosophila Eggshells as Models for Three-Dimensional Epithelial Morphogenesis

Technical Presentation. IMECE2014-37165

Miriam Osterfield, XinXin Du, Mahim Misra, Stanislav Shvartsman, Princeton University, Princeton, NJ, United States

11:10am – Large Passive Deformation of an Elastic Rod Subjected to Fluid Flow

Technical Presentation. IMECE2014-38318

Masoud Hassani, Frederick Gosselin, Njuki Mureithi, École Polytechnique de Montreal, Montreal, QC, Canada

12-35 Mechanics and Materials in the Oilfield

12-35-1 Hydraulic Fracturing

512C

9:45am–11:30am

Session Organizer: Nathan Wicks, Schlumberger, Cambridge, MA, United States

Session Co-Organizer: Pedro Reis, Massachusetts Institute of Technology, Cambridge, MA, United States

9:45am – Pressurized Fluids in the Subsurface: Hydraulic Fractures, Induced Seismicity, Part 1

Technical Presentation. IMECE2014-37723

James Rice, Harvard University, Cambridge, MA, United States

10:06am – Pressurized Fluids in the Subsurface: Hydraulic Fractures, Induced Seismicity, Part 2

Technical Presentation. IMECE2014-38540

James Rice, Harvard University, Cambridge, MA, United States

10:27am – Phase-Field Model for Hydraulic Fracture

Technical Presentation. IMECE2014-38584

Zachary Wilson, Chad Landis, University of Texas at Austin, Austin, TX, United States

10:48am – Universal Meshes for the Simulation of Hydraulic Fracture Problems

Technical Presentation. IMECE2014-40065

Adrian Lew, Stanford University, Stanford, CA, United States

11:09am – Bottom-Up Model of Adsorption and Transport in Multiscale Porous Media

Technical Presentation. IMECE2014-36876

Benoit Coasne, CNRS/MIT, Cambridge, France, Franz-Josef Ulm, Roland J.-M. Pellenq, Alexandru Botan, Massachusetts Institute of Technology, Cambridge, MA, United States

12-36 Young Investigator Award Presentations

12-36-1 Young Investigator Awards Presentations

512A

9:45am–11:30am

Session Organizer: Arun Shukla, University of Rhode Island, Kingston, RI, United States

Session Co-Organizer: Balakumar Balachandran, University of Maryland, College Park, MD, United States

9:45am – Exploiting “Pseudo-Entropic” Unfolding at the Macroscale

Technical Presentation. IMECE2014-37062

Steven Cranford, Northeastern University, Boston, MA, United States

10:06am – Harnessing Instabilities in Soft Structures to Enhance Performance

Technical Presentation. IMECE2014-37127

Katia Bertoldi, Harvard University, Cambridge, MA, United States

10:27am – Multiscale Modeling of Mechanoresponsive Glassy Polymers

Technical Presentation. IMECE2014-37665

Meredith Silberstein, Jaewoo Kim, Meenakshi Sundaram, Cornell University, Ithaca, NY, United States

10:48am – Thermodynamically Consistent Finite Deformation Enhanced Strain Formulation for the Coupled Diffusion in Gels

Technical Presentation. IMECE2014-38617

Christian Linder, Stanford University, Stanford, CA, United States

11:09am – Novel 3D Full-Field Deformation Measurement at a Temperature Higher Than 1000°C

Technical Presentation. IMECE2014-38832

Addis Kidane, University of South Carolina, Columbia, SC, United States

12-44 Mechanics in Biology and Medicine

12-44-1 Mechanics in Biology and Medicine

514C 9:45am–11:30am

Session Organizer: Kai-tak Wan, *Northeastern University, Boston, MA, United States*

Session Co-Organizer: Daminano Pasini, *McGill University, Montreal, QC, Canada*

9:45am – Multiscale Model to Determine the Stiffness of Collenchyma Tissue in Rheim Rhabarbarum

Technical Paper Publication. IMECE2014-39676

Tanvir R. Faisal, *Bangladesh University of Engineering & Technology, Dhaka, Bangladesh*, **Nicolay Hristozov**, **Tamara L. Western**, **Alejandro Rey**, **Damiano Pasini**, *McGill University, Montreal, QC, Canada*

10:11am – Multiscale Mechanics of Lung Under Different Inhaled Gases

Technical Presentation. IMECE2014-40166

Parnian Boloori Zadeh, **Maricris R. Silva**, **Andrew Gouldstone**, *Northeastern University, Boston, MA, United States*

10:37am – Mechano-Sensing of Subsurface Inclusion in Soft Gel: Palpation to Detect Breast Cancer

Technical Presentation. IMECE2014-40515

Shengchen Liu, **Kaizhen Zhang**, **James Papadopoulos**, **Cameron Chaput**, **Kai-tak Wan**, *Northeastern University, Boston, MA, United States*, **Richard Moore**, **Daniel Kopans**, *Massachusetts General Hospital, Boston, MA, United States*

11:03am – Single Cell Force Spectroscopy on Hydrogel Contact Lens Materials

Technical Presentation. IMECE2014-40517

Michael Robitaille, **Monica Susilo**, **Jeff Ruberti**, **Kai-tak Wan**, *Northeastern University, Boston, MA, United States*

12-1 General

12-1-2 General Topics II

512B 1:00pm–2:45pm

Session Organizer: Soroosh Hassanpour, *University of Waterloo, Waterloo, ON, Canada*

1:00pm – Mechanics of Growing Solids: New Track in Mechanical Engineering

Technical Paper Publication. IMECE2014-36712

Alexander V. Manzhurov, *Institute for Problems in Mechanics, Moscow, Russia*

1:21pm – Verification Study of an FEA Hydroelastic Modeling Method

Technical Paper Publication. IMECE2014-38132

Seth Cunningham, *Southwest Research Institute, San Antonio, TX, United States*

1:42pm – Turbulence Scales Based on the Turbulent Kinetic Energy and Normalized Mean Kinematic Tensors for Linear and Nonlinear Eddy-Viscosity Turbulence Models

Technical Paper Publication. IMECE2014-38309

Felipe A.V.B. Alves, **Roney L. Thompson**, **Luiz E.B. Sampaio**, *Universidade Federal Fluminense, Niterói, Rio de Janeiro, Brazil*, **Gilmar Mompean**, *University of Lille Nord de France, Lille, France*

2:03pm – Analysis of the Residual Stress and Deformation in a Steel Tube Due to Quenching Process Using Different Media

Technical Paper Publication. IMECE2014-38701

Pratik Sarker, **Uttam Chakravarty**, *University of New Orleans, New Orleans, LA, United States*

2:24pm – Step-by-Step Simplification of the Micropolar Elasticity Theory to the Couple-Stress and Classical Elasticity Theories

Technical Paper Publication. IMECE2014-39216

Soroosh Hassanpour, **Glenn Heppler**, *University of Waterloo, Waterloo, ON, Canada*

12-8 Time-Dependent Materials and Their Composites: Experimental, Theoretical, and Numerical Studies

12-8-1 Time-Dependent Materials and Their Composites

514A

1:00pm–2:45pm

Session Organizer: Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: Ioannis Chasiotis, *University of Illinois, Urbana, IL, United States*, Martin Leveque, *École Polytechnique Montreal, Montreal, QC, Canada*, Daniel Tscharnuter, *Polymer Competence Center Leoben GmbH, Leoben, Austria*

Session Chair: Kenneth Liechti, *University of Texas, Austin, TX, United States*

Session Co-Chair: Brian Bush, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

1:00pm – Homogenization-Based Models for Elastoviscoplastic Composites Under Finite Deformation

Technical Presentation. IMECE2014-36607

Reza Avazmohammadi, Pedro Ponte-Castaneda, *University of Pennsylvania, Philadelphia, PA, United States*

1:21pm – Nonlinear Viscoelastic-Degradation Model for Polymeric Based Materials

Technical Presentation. IMECE2014-38913

Bentolhoda Davoodi, Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

1:42pm – Viscoelastic-Elastoplastic Finite Strain Framework for Modeling Polymers

Technical Paper Publication. IMECE2014-36831

Ireneusz Lapczyk, Juan Hurtado, *Dassault Systemes Simulia Corporation, Providence, RI, United States*

2:03pm – Anisotropic Viscoelastic Properties of Short Fiber-Reinforced Polyphthalamide

Technical Presentation. IMECE2014-38180

Daniel Tscharnuter, Michael Berer, *Polymer Competence Center Leoben GmbH, Leoben, Austria*, **Jürgen Grosser,** *University of Leoben, Polymer Competence Center Leoben GmbH, Leoben, Austria*, **Gerald Pinter,** *University of Leoben, Leoben, Austria*

2:24pm – Three-Dimensional Architected Interpenetrating Polymer Phase Composites With Superior Thermal Conductivity

Technical Presentation. IMECE2014-37409

Diab W. Abueidda, Ahmed S. Dalaq, Rashid K. Abu Al-Rub, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

12-10 Mechanics and Design of Cellular Materials

12-10-2 Mechanics and Design of Cellular Materials II

512A

1:00pm–2:45pm

Session Organizer: Jaehyung Ju, *University of North Texas, Denton, TX, United States*

1:00pm – Effects of Environmental Factors on the Mechanical Properties of Metallic Foam Struts

Technical Presentation. IMECE2014-36362

Seyed Allameh, Hassan Khosheim, *Northern Kentucky University, Highland Heights, KY, United States*

1:17pm – Modeling of the Mechanical Properties of a Polymer-Metal Foam Interpenetrating Phase Composite

Technical Paper Publication. IMECE2014-37608

Jiayun Gao, Nassif Rayess, *University of Detroit Mercy, Warren, MI, United States*

1:34pm – Analysis of Effective Mechanical Properties and Anisotropy of Structured Porous Materials

Technical Paper Publication. IMECE2014-39005

Efraín De la Rosa Dávila, Dirk Frederik De Lange, Hugo Ivan Medellín Castillo, Gilberto Mejía Rodríguez, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico*

1:51pm – Elastodynamic Behavior of a 2D Square Lattice With Entrained Fluid

Technical Presentation. IMECE2014-40482

Vladimir Dorodnitsyn, Alessandro Spadoni, *École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

2:08pm – Energy Absorption of Thin Walled Members Under Axial Compressive Loading

Technical Paper Publication. IMECE2014-37581

Muhammad Ali, Khairul Alam, Eboreime Ohioma, *Ohio University, Athens, OH, United States*

2:25pm – Delamination Behavior of Laminated Paper**Technical Paper Publication. IMECE2014-38099**

Mitsunori Suda, *Daisankogyo Co., Ltd., Kashiwara, Japan*,
Wei Wang, Yuqiu Yang, *Donghua University, Shanghai, China*,
Takanori Kitamura, Hiroyuki Hamada, *Kyoto Institute of
 Technology, Kyoto, Japan*, **Kanta Ito, Kenji Wada, Zhiyuan
 Zhang**, *Daiwa Itagami Co. Ltd., Kashiwara, Japan*

12-31 Computational Engineering and Simulation**12-31-3 Computational Engineering and Validation Simulations II****514B****1:00pm–2:45pm****Session Organizer:** Mustapha Fofana, *Worcester Polytechnic Institute, Worcester, MA, United States***Session Co-Organizer:** Justine Johannes, *Sandia National Laboratories, Albuquerque, NM, United States***1:00pm – Combined Computational and Analytical Study of Lateral Impact Behavior of Pressurized Pipelines**
Technical Paper Publication. IMECE2014-36371

Yucheng Liu, *Mississippi State University, Mississippi State, MS, United States*, **Yangqing Dou**, *Mississippi State University, Starkville, MS, United States*

1:35pm – Investigation of Stress And Displacement Distribution in the Tractor Clutch Finger by Using Finite Element Method
Technical Paper Publication. IMECE2014-39230

Fatih Karpaz, Oguz Dogan, Celalettin Yuce, Necmettin Kaya, *Uludag University, Bursa, Turkey*, **Goksel Cengiz**, *Valeo, Bursa, Turkey*

2:10pm – Numeric Investigation of Fluid Solid Interaction and Performance Analysis of Prebend Wind Turbine Blade
Technical Paper Publication. IMECE2014-37396

Mohammad Arif Hossain, Shakerur Ridwan, Sarzina Hossain, *University of Texas at El Paso, El Paso, TX, United States*,
Mohammad Ikthair Hossain Soiket, *McGill University, Montreal, QC, Canada*

12-35 Mechanics and Materials in the Oilfield**12-35-2 Mechanical Systems****512C****1:00pm–2:45pm****Session Organizer:** Katia Bertoldi, *Harvard University, Cambridge, MA, United States***Session Co-Organizer:** Agathe Robisson, *Schlumberger, Cambridge, MA, United States***1:00pm – Acoustic and Mechanical Resonance Management for Smart Surface Pressure Pumping Equipment****Technical Presentation. IMECE2014-37091**

Sandeep Verma, Kashif Rashid, *Schlumberger-Doll Research Center, Cambridge, MA, United States*

1:17pm – Modeling, Experiments, and Field Trials of Axial Vibration Tools**Technical Presentation. IMECE2014-38455**

Nathan Wicks, Jahir Pabon, James Miller, *Schlumberger, Cambridge, MA, United States*, **Shunfeng Zheng**, *Schlumberger, Sugar Land, TX, United States*

1:34pm – Buckling of a Thin Rod Under Cylindrical Constraint**Technical Presentation. IMECE2014-38870**

Pedro Reis, Connor G. Mulcahy, *Massachusetts Institute of Technology, Cambridge, MA, United States*, **Tianxiang Su, James Miller, Jahir Pabon, Nathan Wicks**, *Schlumberger, Cambridge, MA, United States*, **Katia Bertoldi**, *Harvard University, Cambridge, MA, United States*

1:51pm – Deployable Structures: Mechanical Advantage**Technical Presentation. IMECE2014-39593**

Julio Guerrero, *Draper, Cambridge, MA, United States*

2:08pm – Combined Effects of Transformation and Twinning Induced Plasticity on Mechanical Properties of High-Mn Austenitic Steels**Technical Presentation. IMECE2014-37504**

Tasneem Pervez, Rashid Khan, Omar S. Al-Abri, Sayyad Zahid Qamar, *Sultan Qaboos University, Al-Khoudh, Muscat, Oman*

2:25pm – Chemo-Poro-Mechanical Behavior of Hydrating Cement: The Integrity of Wellbore Sheaths at Early Ages**Technical Presentation. IMECE2014-38840**

Thomas Petersen, Franz-Josef Ulm, *Massachusetts Institute of Technology, Cambridge, MA, United States*

12-41 Failure Mechanics of Advanced Materials and Structures

12-41-1 Experiments and Simulations

512E

1:00pm–2:45pm

Session Organizer: Luoyu Roy Xu, *New Mexico State University, El Paso, TX, United States*

Session Co-Organizers: H. Eliot Fang, *Sandia National Laboratories, Albuquerque, NM, United States*, Andrew Gouldstone, *Northeastern University, Boston, MA, United States*

1:00pm – Failure Mechanics of Notch and Interface Interaction in Adhesive Joints

Technical Presentation. IMECE2014-39775

Luoyu Roy Xu, *New Mexico State University, El Paso, TX, United States*

1:11pm – Strain Rate Intensity Factor in Plasticity

Technical Presentation. IMECE2014-36235

Sergei Alexandrov, *Institute for Problems in Mechanics, Moscow, Russia*

1:22pm – Porosity in Rapidly Quenched Droplets Impacted on Substrates

Technical Presentation. IMECE2014-40160

Leily Majidi, Ali Alavian, Anthony Maiorano, Andrew Gouldstone, *Northeastern University, Boston, MA, United States*, **Helge Gonnermann**, *Rice University, Houston, TX, United States*

1:33pm – Finite Element Based Failure Analysis of Blowout Preventer (BOP) Used in Oil and Gas Applications

Technical Presentation. IMECE2014-39162

Shiyan Jayanath, Ajit Achuthan, *Clarkson University, Potsdam, NY, United States*

1:44pm – Predict Low-Speed Impact Behaviors of Polymers and Composites Using Nanoindentation

Technical Presentation. IMECE2014-39776

Luoyu Roy Xu, *New Mexico State University, El Paso, TX, United States*

1:55pm – Modeling of Metal Cutting as Purposeful Fracture of Work Materials

Technical Presentation. IMECE2014-40326

Yalla Abushawashi, *Engineering Technology Associates Inc., Troy, MI, United States*, **Xinran Xiao**, *Michigan State University, Lansing, MI, United States*, **Viktor Astakhov**, *Production Service Management Inc., Saline, MI, United States*

2:06pm – Modeling and Simulation of Ductile Crack Branching in Welded Thin-Walled Metallic Structures

Technical Presentation. IMECE2014-40341

Tingting Zhang, Phillip Liu, Eugene Fang, Xiaohu Liu, Jim Lua, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

2:17pm – Stress Analysis in 3D-Joints With a Small Crack at a Vertex in an Interface

Technical Presentation. IMECE2014-37212

Hideo Koguchi, Naoki Kimura, *Nagaoka University of Technology, Nagaoka, Niigata, Japan*

2:28pm – Effect of Geometric Projections on Plate Subjected to Impact

Technical Presentation. IMECE2014-38008

Harshal Zalke, Hemant Jawale, Nilesh Bhajan, Abhilash Bire, *Visvesvaraya National Institute of Technology, Nagpur, Maharashtra, India*

12-44 Mechanics in Biology and Medicine

12-44-2 Mechanics of Single Cell/Cluster I

514C

1:00pm–2:45pm

Session Organizer: Sinan Keten, *Northwestern University, Evanston, IL, United States*

Session Co-Organizer: Kai-tak Wan, *Northeastern University, Boston, MA, United States*

1:00pm – Interaction Between Lipid Bilayer Rafts and Their Stability

Technical Presentation. IMECE2014-38393

Sana Krichen, Matthew Zelisko, Pradeep Sharma, *University of Houston, Houston, TX, United States*

1:21pm – How and Why Does HIV Fusion Peptide Soften the Bending Elastic Modulus of T-Cell Membrane?

Technical Presentation. IMECE2014-38426

Himani Agrawal, Matthew Zelisko, Pradeep Sharma, *University of Houston, Houston, TX, United States*

1:42pm – Mechanics of Clathrin-Mediated Endocytosis

Technical Presentation. IMECE2014-40500

Nikhil Walani, Jennifer Torres, Ashutosh Agrawal, *University of Houston, Houston, TX, United States*

2:03pm – Adhesion, Deformation, and Fusion Mechanics of Drug Delivery Liposomes

Technical Presentation. IMECE2014-40518

David Chan, Sinan Muftu, Kai-tak Wan, *Northeastern University, Boston, MA, United States*, **Robert Campbell**, *Massachusetts College of Pharmacy and Health Sciences, Worcester, MA, United States*

2:24pm – Erythrocyte Adhesion to Laminin

Technical Presentation. IMECE2014-40545

Jamie Maciaszek, *St. Jude Children's Research Hospital, Memphis, TN, United States*, **Kostyantyn Partola, Jing Zhang, George Lykotrafitis**, *University of Connecticut, Storrs, CT, United States*, **Biree Andemariam**, *University of Connecticut Health Center, Farmington, CT, United States*

12-1 General

12-1-3 General Topics III

512B **3:00pm–4:45pm**

Session Organizer: Andrew Gouldstone, *Northeastern University, Boston, MA, United States*

3:00pm – Planar and Cylindrical Electrostatic Separators for Enhanced Separation of Fine Liquid Particles From High-Velocity Air Streams

Technical Paper Publication. IMECE2014-39335

Ning Yang, Amir H. Shooshtari, Serguei V. Dessiatoun, Michael M. Ohadi, *University of Maryland, College Park, MD, United States*

3:26pm – Generic Steel Vehicle Front Bumper and Crush Can Assemblies Subjected to a Rigid High-Speed Offset Frontal Impact

Technical Paper Publication. IMECE2014-39646

Ali Seyed Yaghoubi, Paul Begeman, Golam Newaz, *Wayne State University, Detroit, MI, United States*, **Derek Board, Yijung Chen, Omar Faruque**, *Ford Motor Company, Dearborn, MI, United States*

3:52pm – Geometric Contribution to Gauge Factor of Patterned Lines on Substrates

Technical Presentation. IMECE2014-39704

Christopher Gouldstone, *Mesoscribe Technologies, Stony Brook, NY, United States*, **Yuhong Wu**, *Stony Brook University, Stony Brook, NY, United States*, **Andrew Gouldstone**, *Northeastern University, Boston, MA, United States*

4:18pm – Contact Based Methods to Measure Plastic Anisotropy

Technical Presentation. IMECE2014-40163

Salmon Kalkhoran, Andrew Gouldstone, *Northeastern University, Boston, MA, United States*

12-8 Time-Dependent Materials and Their Composites: Experimental, Theoretical, and Numerical Studies

12-8-2 Time-Dependent Materials and Their Composites

514A **3:00pm–4:45pm**

Session Organizer: Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: Ioannis Chasiotis, *University of Illinois, Urbana, IL, United States*, Martin Leveque, *École Polytechnique Montreal, Montreal, QC, Canada*, Daniel Tscharnuter, *Polymer Competence Center Leoben GmbH, Leoben, Austria*

Session Chair: Pedro Ponte-Castaneda, *University of Pennsylvania, Philadelphia, PA, United States*

Session Co-Chair: Ireneusz Lapczyk, *Dassault Systemes Simulia Corporation, Providence, RI, United States*

3:00pm – Extracting Rate-Dependent Traction-Separation Relations

Technical Presentation. IMECE2014-40551

Sundeep Palvadi, Nanshu Lu, Kenneth Liechti, *University of Texas at Austin, Austin, TX, United States*

3:21pm – Unique Wrinkling Behavior of Stiff Thin Films on Shape Memory Polymers

Technical Presentation. IMECE2014-40242

Yu Wang, Kai Yu, Jianliang Xiao, *University of Colorado at Boulder, Boulder, CO, United States*, **H. Jerry Qi**, *Georgia Institute of Technology, Atlanta, GA, United States*

3:42pm – Mechanical Properties of PEG-Based Hydrogels Measured by Colloidal Probe Microscopy

Technical Presentation. IMECE2014-37066

Brian Bush, Robert Cook, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, **Jenna M. Shapiro, Michelle L. Oyen**, *University of Cambridge, Cambridge, United Kingdom*, **Frank DelRio**, *National Institute of Standards and Technology, Boulder, CO, United States*

4:03pm – Electro-Chemo-Mechanical Modeling of the Artery Myogenic Transient and Steady-State Response

Technical Paper Publication. IMECE2014-39237

Yali Li, Nakhiah Goulbourne, *University of Michigan, Ann Arbor, MI, United States*

4:24pm – Extension of Nonassociated Hill48 Model for Characterizing Dynamic Mechanical Behavior of a Typical High-Strength Steel Sheet

Technical Paper Publication. IMECE2014-36985

Juner Zhu, Yong Xia, Gongyao Gu, Qing Zhou, *Tsinghua University, Beijing, China*

12-10 Mechanics and Design of Cellular Materials

12-10-3 Mechanics and Design of Cellular Materials III

512A

3:00pm–4:45pm

Session Organizer: Jaehyung Ju, *University of North Texas, Denton, TX, United States*

3:00pm – Fatigue Properties of Cellulosic-Fiber Mat Reinforced Thermosetting Plastic Composites

Technical Paper Publication. IMECE2014-37802

Bing Xiao, Yuqiu Yang, *Donghua University, Shanghai, China*, Toshihiko Hojo, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*

3:21pm – Finite Element Analysis of Crack Propagation in the Strombus Gigas Conch Shell

Technical Presentation. IMECE2014-40094

Scott Dipette, Ani Ural, Sridhar Santhanam, *Villanova University, Villanova, PA, United States*

3:42pm – Experimental and Numerical Analysis on the Buckling Behavior of Functionally Graded Cellular Media With Extension-Capable C1 Higher Order Plate Theory

Technical Paper Publication. IMECE2014-39090

Farooq Al Jahwari, Hani E. Naguib, *University of Toronto, Toronto, ON, Canada*

4:03pm – Auxetic Structures Using Selective Electron Beam Melting (SEBM)

Technical Presentation. IMECE2014-39824

Franziska Warmuth, Yvonne Liebold Ribeiro, Carolin Koerner, *Chair of Metals Science and Technology, Erlangen, Germany*

4:24pm – Design and Manufacturing of a 3D Printed Lattice Based on Negative Stiffness With High-Energy Dissipation

Technical Presentation. IMECE2014-40685

Anna Guell Izard, Alex Mercado, Lorenzo Valdevit, *University of California, Irvine, Irvine, CA, United States*, Ricardo Fabian Alfonso, *University of California, Irvine, Barcelona, Barcelona, Spain*

12-15 Polymer Nanocomposites and Nanostructured Materials: Simulations and Experiments

12-15-1 Polymer Nanocomposites and Nanostructured Materials: Simulations and Experiments

512E

3:00pm–4:45pm

Session Organizer: Hassan Mahfuz, *Florida Atlantic University, Boca Raton, FL, United States*

Session Chair: Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*

3:00pm – Structural Performance of a Glass/Polyester Composite Wind Turbine Blade With Flatback and Thick Airfoils

Technical Paper Publication. IMECE2014-39507

Xiao Chen, Zhiwen Qin, Xiao Lu Zhao, Jian Zhong Xu, *Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing, China*

3:17pm – Self-Sustaining Irrigation System for High-Rise Building

Technical Presentation. IMECE2014-40446

Terence Goh, Ron Tay Wee Jeng, William Phay, *SIM University, Singapore, Singapore*, Ernest Chua, *National University of Singapore, Singapore, Singapore*

3:34pm – Optimization of AC Electrokinetic Mixing by Nanocomposite Monolayer

Extended Abstract Publication. IMECE2014-40216

Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*

3:51pm – Finite Element Prediction of Effective Elastic Properties of Micro-/Nanoarchitected Interpenetrating Phase Composites

Technical Presentation. IMECE2014-37427

Ahmed S. Dalaq, Diab W. Abueidda, Rashid K. Abu Al-Rub, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

4:08pm – Analytical Solution of the Dilute Strain Concentration Tensor for Coated Cylindrical Inclusions and Applications for Polymer Nanocomposites

Technical Paper Publication. IMECE2014-37517
Zhen Wang, Frank Fisher, *Stevens Institute of Technology, Hoboken, NJ, United States*

4:25pm – In Situ Nanomechanical Characterization of Carbon Nanotube-Polymer Interfacial Strength

Technical Presentation. IMECE2014-38861
Xiaoming Chen, Meng Zheng, Changhong Ke, *State University of New York at Binghamton, Binghamton, NY, United States*,
Cheol Park, *NASA Langley Research Center, Hampton, VA, United States*

12-17 Polymer Nanocomposites: Simulations and Experiments

12-17-1 Polymer Nanocomposites: Simulations and Experiments

514B **3:00pm–4:45pm**

Session Organizer: Hassan Mahfuz, *Florida Atlantic University, Boca Raton, FL, United States*
Session Chair: Zheng H. Zhu, *York University, Toronto, ON, Canada*

3:00pm – Coarse-Grained Molecular Dynamics Study of Epoxy Molding Compound and Fracture of Epoxy/Cu Bimaterial

Technical Presentation. IMECE2014-37749
Shaorui Yang, Jianmin Qu, *Northwestern University, Evanston, IL, United States*

3:21pm – Characterization of Electrical Conductivity of Carbon Nanotube Composites

Technical Paper Publication. IMECE2014-38596
Zheng H. Zhu, Shen Gong, Jun Li, *York University, Toronto, ON, Canada*

3:42pm – Effects of Moisture Absorption on the Dielectric Properties of Nanoclay-Reinforced Epoxy for Radome Applications

Technical Paper Publication. IMECE2014-38815
Carla Garcia, Christine Chesley, Joshua L. Cohn, *University of Miami, Coral Gables, FL, United States*, **Landon Grace**, *University of Miami, Miami, FL, United States*

4:03pm – Simulation of Composites Incorporating Structured Nanoreinforcements

Technical Presentation. IMECE2014-39420
Ling Liu, Lin Zhang, *Utah State University, Logan, UT, United States*

4:24pm – Strain and Damage Sensing of CNT-Epoxy Composite via Electrical Conductivity

Technical Paper Publication. IMECE2014-39972
Mahmoud Ardebili, *City University of New York/Borough of Manhattan Community College, New York, NY, United States*,
Kerim T. Ikikardaslar, Feridun Delale, *City College of New York, New York, NY, United States*

12-35 Mechanics and Materials in the Oilfield

12-35-3 Elastomeric Materials

512C **3:00pm–4:45pm**

Session Organizer: Yucun Lou, *Schlumberger, Cambridge, MA, United States*
Session Co-Organizer: Nathan Wicks, *Schlumberger, Cambridge, MA, United States*

3:00pm – Mechanics of Swellable Packers

Technical Presentation. IMECE2014-37607
Zhigang Suo, *Harvard University, Cambridge, MA, United States*

3:17pm – Novel Reactive Elastomer Composites for Swellable Seals

Technical Presentation. IMECE2014-38436
Agathe Robisson, *Schlumberger, Cambridge, MA, United States*,
Meng Qu, *Schlumberger–Doll Research, Cambridge, MA, United States*,
Travis Hohenberger, Xiaohong Ren, Frederick Lemme, Henghua Jin, *Schlumberger Reservoir Completions, Rosharon, TX, United States*

3:34pm – Kinetics of Diffusion and Swelling in Swell Packer Systems

Technical Presentation. IMECE2014-38899
Benjamin Druecke, A.E. Hosoi, *Massachusetts Institute of Technology, Cambridge, MA, United States*

3:51pm – Hyperelastic Modeling of an Elastomeric O-Ring for a Hydraulic Actuator

Technical Presentation. IMECE2014-39007
Arun Reddy Bommeneni, Jaehyung Ju, *University of North Texas, Denton, TX, United States*

4:08pm – Three-Dimensional Modeling on Kinetics of Swellable Packers

Technical Presentation. IMECE2014-40450
Yucun Lou, Schlumberger, Cambridge, MA, United States

4:25pm – Simulating Rubber in the Oilfield Though an Expanded Eyring Relationship

Technical Presentation. IMECE2014-40463
Alex Arzoumanidis, Charles M. Spellman, Psylotech, Inc., Evanston, IL, United States

Wednesday, November 10

12-41 Experiments and Simulations II (Technical Session)

12-41-2 Experiments and Simulations II (Technical Session)
Room 513D **3:00pm–4:45pm**

3:00pm – Modeling of Metal Cutting as Purposeful Fracture of Work Materials

Technical Presentation. IMECE2014-40326
Yalla Abushawashi, Engineering Technology Associates Inc, Xinran Xiao, Michigan State University, **Viktor Astakhov**, Production Service Management Inc.

3:26pm – Modeling and Simulation of Ductile Crack Branching in Welded Thin-Walled Metallic Structures

Technical Presentation. IMECE2014-40341
Tingting Zhang, Phillip Liu, Eugene Fang, Xiaohu Liu, Jim Lua, Global Engineering and Materials, Inc.

3:52pm – Stress Analysis in 3D Joints With a Small Crack at a Vertex in an Interface

Technical Presentation. IMECE2014-37212
Hideo Koguchi, Naoki Kimura, Nagaoka University of Technology

4:18pm – Effect of Geometric Projections on Plate Subjected to Impact

Technical Presentation. IMECE2014-38008
Harshal Zalke, Hemant Jawale, Nilesh Bhajan, Abhilash Bire, Visvesvaraya National Institute of Technology

12-44 Mechanics in Biology and Medicine

12-44-3 Mechanics of Single Cell/Cluster II
514C **3:00pm–4:45pm**

Session Organizer: Ashutosh Agrawal, University of Houston, Houston, TX, United States

Session Co-Chair: Daminano Pasini, McGill University, Montreal, QC, Canada

Session Co-Organizer: Kai-tak Wan, Northeastern University, Boston, MA, United States

3:00pm – Adhesion-Detachment Mechanics of a Spherical/Cylindrical Bacterium in the Presence of an Electrostatic Double Layer

Technical Presentation. IMECE2014-40513
Jianfeng Sun, Katherine Bausemer, Sinan Muftu, Kai-tak Wan, Northeastern University, Boston, MA, United States

3:17pm – Mechanics of Bacterial Adhesion in Microfluidics Channel and Its Correlation With Macroscopic Water Filtration Column Test

Technical Presentation. IMECE2014-40516
Jianfeng Sun, Edgar Goluch, April Z. Gu, Sinan Muftu, Kai-tak Wan, Northeastern University, Boston, MA, United States

3:34pm – Nanomechanics Based Investigation Into Interface Thermomechanics of Collagen and Chitin Based Biomaterials

Technical Presentation. IMECE2014-40525
Tao Qu, Vikas Tomar, Purdue University, West Lafayette, IN, United States

3:51pm – Mechanics of Water Actuation in Resurrection Plant Selaginella lepidophylla

Technical Presentation. IMECE2014-40539
Ahmad Rafsanjani, Véronique Brulé, Tamara L. Western, Damiano Pasini, McGill University, Montreal, QC, Canada

4:08pm – SK2 Channel Expression and Nanoclustering Is Under the Control of Tonic Protein Kinase A

Technical Presentation. IMECE2014-40543
Krithika Abiraman, Anastasios Tzingounis, George Lykotrafitis, University of Connecticut, Storrs, CT, United States

4:25pm – Simulation of Protein Diffusion in the Defective Erythrocyte Membrane

Technical Presentation. IMECE2014-40544
He Li, George Lykotrafitis, University of Connecticut, Storrs, CT, United States

TRACK 13: MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING

13-1 General

13-1-1: Dynamic and Thermal Behavior of Micro- and Nanosystems

13-2 Computational Studies on MEMS and Nanostructures

- 13-2-1: Computational Studies on MEMS and Nanostructures I
- 13-2-2: Computational Studies on MEMS and Nanostructures II
- 13-2-3: Computational Studies on MEMS and Nanostructures III

13-3 Design and Fabrication Analysis, Processes, and Technology for Micro and Nano Devices and Systems

- 13-3-1: Analysis, Processes, and Technology 1
- 13-3-2: Analysis, Processes, and Technology 2
- 13-3-3: Analysis, Processes, and Technology 3

13-4 Carbon-Based Nanomaterials and Applications

- 13-4-1: Physics and Chemistry of Carbon Nanomaterials and Devices

13-5 Power-Harvesting MEMS and NEMS

- 13-5-1: Microscale Power Harvesting Devices

13-6 Applications of Micro- and Nanosystems in Medicine and Biology

- 13-6-1: Sensing and Manipulation of Cells
- 13-6-2: Tools for Studying Properties of Tissues, Cells, or Molecules

13-7 Micro- and Nanodevices

- 13-7-1: Sensors and Actuators
- 13-7-2: Fabrication and Structure

13-8 Applied Mechanics and Materials

- 13-8-2: Nanomaterials and Nanostructures
- 13-8-3: Manufacturing and Devices
- 13-8-4: Composites

13-10 NEES Panel on Nanomanufacturing: Successful, Scalable, and Sustainable at the Nanometer Scale

- 13-10-1: NEES Panel on Nanomanufacturing: Successful, Scalable, and Sustainable at the Nanometer Scale

13-11 Micro-/Nanoscale Phononic Crystals: Fundamentals, Devices, and Applications

- 13-11-1: Micro-/Nanoscale Phononic Crystals: Fundamentals, Devices, and Applications

13-12 Fluid Engineering in Micro-and Nanosystems

- 13-12-2: Flows in Microfluidic Systems
- 13-12-3: Novel Applications of Micro-/Nanofluidics—II
- 13-12-4: Droplet/Particle/Bubble Dynamics and Capillary Flow II

13-13 Plenary Presentations in MEMS/NEMS Engineering and Packaging

- 13-13-1: Plenary Presentations in MEMS and Microfluidics

13-14 Quality and Reliability in Electronics and Photonic Packaging

- 13-14-1: Quality and Reliability in Electronic and Photonic Packaging

13-15 Modeling and Simulation in Electronics and Photonics Packaging

- 13-15-1: Modeling in Integrated Structures and Materials
- 13-15-2: Modeling and Simulation in Electronic and Photonic Packaging

13-16 Manufacturing, Materials and Processes in Electronics and Photonics Packaging

- 13-16-1: Manufacturing, Materials, and Processes for Microelectronics and Photonics

13-17 Power Electronics, High Temperature, and Advanced Packaging

- 13-17-1: Power Electronics, High Temperature, and Advanced Packaging

13-18 Emerging Technologies

- 13-18-1: Emerging Technologies

13-19 Thermal Management in Electronics

- 13-19-1: Thermal Management in Electronics I
- 13-19-2: Thermal Management in Electronics II

13-20 Research, Skills and Careers: A Workshop for Students and Early-Career Professionals

- 13-20-1: Preparing for Success—Careers in Industry, Academia, and Government
- 13-20-2: Opportunities and Challenges in Semiconductors, Packaging, and Micro- and Nanosystems Engineering
- 13-20-3: Resume-Critique & Networking

ACKNOWLEDGMENT

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 Ronggui Yang, *University of Colorado, USA*
 Junghoon Yeom, *Michigan State University, USA*
 Byoung Hee You, *Texas State University, USA*

TRACK 13 MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING

Monday, November 17

13-2 Computational Studies on MEMS and Nanostructures

13-2-1 Computational Studies on MEMS and Nanostructures I

520A

9:45am–11:30am

Session Organizer: Ion Stiharu, *Concordia University, Montreal, QC, Canada*

Session Co-Organizers: Matthew R. Maschmann, *University of Missouri, Columbia, MO, United States*, Rasim Guldiken, *University of South Florida, Tampa, FL, United States*

9:45am – Time-Resolved Modeling of Growing CNT Forests

Technical Paper Publication. IMECE2014-38469

Damola Ajiboye, P. Frank Pai, Matthew R. Maschmann, *University of Missouri, Columbia, MO, United States*

10:06am – Complete Parametric Study of Pull-In Voltage By Nonlinear Differential Equation

Technical Paper Publication. IMECE2014-37744

M. Amin Changizi, *Intelliquip, Bethlehem, PA, United States*, **Ion Stiharu,** *Concordia University, Montreal, QC, Canada*

10:27am – Model Reduction for the Electrostatically Actuated Silicon Diaphragm Based on Modal-Type Dynamic Condensation

Technical Paper Publication. IMECE2014-37800

Xiezhao Lin, Zhenming Hu, Jianmeng Huang, *Fuzhou University, Fujian, China*

10:48am – Numerical Modeling Graphene NEMS Resonator Boundary Conditions for Strain Engineering to Improve Quality Factor

Technical Presentation. IMECE2014-39977

Grzegorz Hader, *U.S. Army ARDEC, Picatinny Arsenal, NJ, United States*, **Eui-Hyeok Yang,** *Stevens Institute of Technology, Hoboken, NJ, United States*

11:09am – Characterization and Modeling of Multiscale Regular-Fractal Topography on RF-Switch MEMS

Technical Paper Publication. IMECE2014-40214

Jinya Liu, Vijaya Chalivendra, *University of Massachusetts Dartmouth, North Dartmouth, MA, United States*, **Charles L. Goldsmith,** *MEMTronics Inc., Richardson, TX, United States*, **Wenzhen Huang,** *University of Massachusetts Dartmouth, Lakeville, MA, United States*

13-3 Design and Fabrication Analysis, Processes, and Technology for Micro- and Nanodevices and Systems

13-3-1 Analysis, Processes, and Technology 1

520B

9:45am–11:30am

Session Organizer: Aaron Mazzeo, *Rutgers University, Piscataway, NJ, United States*

Session Co-Organizer: Abdoul Maiga, *University of Arkansas, Fayetteville, AR, United States*

9:45am – Electrical Parameter Measurement Techniques for PZT Nanowire Devices

Technical Presentation. IMECE2014-36180

Richard Galos, Yong Shi, Guitao Zhang, Liang Zhou, *Stevens Institute of Technology, Hoboken, NJ, United States*

10:02am – Nanoengineered Tunable Carbon Surfaces

Technical Presentation. IMECE2014-36436

Eui-Hyeok Yang, *Stevens Institute of Technology, Hoboken, NJ, United States*

10:19am – Self-Assembly of Ordered SiO₂@Au Core-Shell Nanoparticle Arrays

Technical Paper Publication. IMECE2014-36539

Huan Yang, Jinyou Shao, *Xi'an Jiaotong University, Xi'an, China*, **Ben.Q Li,** *University of Michigan Dearborn, Dearborn, MI, United States*

10:36am – Growth of WS₂ Monolayers: Nanoislands to Microislands

Technical Presentation. IMECE2014-37323

KyungNam Kang, Kyle Godin, Eui-Hyeok Yang, *Stevens Institute of Technology, Hoboken, NJ, United States*

10:53am – Processing and Electrochemical Properties of PEDOT:Tosylate for Applications in Organic Bioelectronics Extended Abstract Presentation. IMECE2014-38938
Prajwal Kumar, Zhihui Yi, Shiming Zhang, Hao Tang, Fabio Cicoira, École Polytechnique de Montreal, Montreal, QC, Canada

11:10am – Creating Biotemplated Nanostructured Filtration Membranes Using the Tobacco Mosaic Virus Technical Presentation. IMECE2014-39371
Donald Fehlinger, Md. Mahamudur Rahman, Emre Olceroglu, Matthew McCarthy, Drexel University, Philadelphia, PA, United States

13-7 Micro- and Nanodevices

13-7-1 Sensors and Actuators

520D 9:45am–11:30am

Session Organizer: Byungki Kim, *Korea University of Technology and Education, Chungnam, Korea (Republic)*
Session Co-Organizer: Seok Kim, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*
 TJunghoon Yeom, *Michigan State University, East Lansing, MI, United States*

9:45am – Design of Biaxial Navigation-Grade MEMS Accelerometers

Technical Paper Publication. IMECE2014-37280
Xiaowei Shan, Ting Zou, Jorge Angeles, McGill University, Montreal, QC, Canada, James R. Forbes, University of Michigan, Michigan, MI, United States

9:58am – Parameter Study of Micromachined Seesaw-Type Microphone

Extended Abstract Publication. IMECE2014-37458
Sangil Han, Byungki Kim, Korea University of Technology and Education, Chungnam, Korea (Republic)

10:11am – Translation Micromirror for MEMS FTIRs Alcohol Interlock

Technical Paper Publication. IMECE2014-37651
Yuan Xue, Siyuan He, Farzana Husain, Ryerson University, Toronto, ON, Canada

10:37am – Design and Analysis of Actuated Microneedles for Robotic Manipulation

Technical Paper Publication. IMECE2014-39308
Steven Banerjee, Stefanie Gutschmidt, University of Canterbury, Christchurch, Canterbury, New Zealand, Wenhui Wang, Tsinghua University, Beijing, China

10:50am – Simulation and Experiment of a MEMS Omnidirectional Inertial Switch

Technical Paper Publication. IMECE2014-39737
Y. Cao, J. Wang, Z.W. Xi, W.R. Nie, X.J. Wang, Q. Ouyang, Nanjing University of Science and Technology, Nanjing, Jiangsu Province, China

11:03am – Detection of Anomalous Sodium Chloride Concentrations in Perspiration Using Microsensors

Technical Paper Publication. IMECE2014-39526
Mehdi Goulamaly, Mark Piontkowski, David Gaibor, Mansour Zenouzi, Gergely Sirokman, Ali Khabari, Wentworth Institute of Technology, Boston, MA, United States, Nilu Jariwala, Wentworth Institute of Technology, South Weymouth, MA, United States

11:16am – Portable Sensing System for Gold-Nanoparticle-Based Colorimetric Detection of Metal Ions in Water

Technical Paper Publication. IMECE2014-38994
Chen Zhao, Guowei Zhong, Da-eun Kim, Jinxia Liu, Xinyu Liu, McGill University, Montreal, QC, Canada

13-12 Fluid Engineering In Micro- and Nanosystems

13-12-4 Droplet/Particle/Bubble Dynamics and Capillary Flow II

519B 9:45am–11:30am

Session Organizer: Mina Hoorfar, *University of British Columbia, Kelowna, BC, Canada*

9:45am – Magic Droplets From Capillary Microfluidic System

Technical Presentation. IMECE2014-36043
Xiaowei Tian, Liqiu Wang, University of Hong Kong, Hong Kong, Hong Kong

10:11am – Manipulation of Microdroplets at Ultralow Voltages on Conjugated Polymer

Technical Presentation. IMECE2014-36934
Wei Xu, Stevens Institute of Technology, Harrison, NJ, United States, Jian Xu, Xin Li, Anthony Palumbo, Ellexis Cook, Chang-Hwan Choi, Hyeok Yang, Stevens Institute of Technology, Hoboken, NJ, United States

10:37am – Computational Determination of the Modified Vortex Shedding Frequency for a Rigid, Truncated, Wall-Mounted Cylinder in Cross Flow

Technical Paper Publication. IMECE2014-39064
Aimie Faucett, Todd Harman, Tim Ameel, University of Utah, Salt Lake City, UT, United States

11:03am – Study of Microdroplet Deformation on Doped Polypyrrole Surfaces

Technical Presentation. IMECE2014-40008

Jian Xu, Eui-Hyeok Yang, *Stevens Institute of Technology, Hoboken, NJ, United States*, Wei Xu, *Stevens Institute of Technology, Harrison, NJ, United States*

13-14 Quality and Reliability in Electronics and Photonic Packaging

13-14-1 Quality and Reliability in Electronic and Photonic Packaging

520C

9:45am–11:30am

Session Organizer: Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizers: Tung Nguyen, *Microsoft Corporation, Mountain View, CA, United States*, Satish Parupalli, *Intel Corporation, Hillsboro, OR, United States*

9:45am – Improvement of the Long-Term Reliability of TSV Interconnections Used in Three-Dimensionally Stacked Modules

Technical Paper Publication. IMECE2014-36973

Hideo Miura, Ken Suzuki, *Tohoku University, Sendai, Miyagi, Japan*

10:11am – Modeling Study of the Effect of Underfill Materials on Solder Joint Thermal Fatigue of Ball Grid Array Package

Technical Paper Publication. IMECE2014-38889

Wei Wang, Tung Nguyen, *Microsoft Corporation, Mountain View, CA, United States*

10:37am – Cohesive Zone Models to Predict Multiple White Bumps in Flip-Chip Assemblies

Technical Paper Publication. IMECE2014-40199

Sathyanarayanan Raghavan, *Georgia Institute of Technology, Clifton Park, NY, United States*, Ilko Schmadlak, *Freescale Halbleiter Deutschland GmbH, München, Munich, Germany*, George Leal, *Freescale Semiconductor, Austin, TX, United States*, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

11:03am – Fault-Mode Classification of Solid State Luminaires Using Bayesian Probabilistic Models

Technical Paper Publication. IMECE2014-39523

Pradeep Lall, Peter Sakalaukus, Junchao Wei, *Auburn University, Auburn, AL, United States*

13-17 Power Electronics, High Temperature, and Advanced Packaging

13-17-1 Power Electronics, High Temperature, and Advanced Packaging

520F

9:45am–11:30am

9:45am – High-Temperature Storage and HAST Reliability of Copper-Aluminum Wirebond Interconnects

Invited Paper Publication. IMECE2014-39524

Pradeep Lall, Shantanu Deshpande, *Auburn University, Auburn, AL, United States*, Luu Nguyen, *Texas Instruments, Inc., Santa Clara, CA, United States*

10:15am – Micron-Thickness Flexible Graphite for Device-Scale Applications

Technical Presentation. IMECE2014-38907

Saad Hasan, Richard Beyerle, *GrafTech International, Parma, OH, United States*

10:30am – Overplated Electroplated Nanowires as Electrical Interconnections

Technical Presentation. IMECE2014-40021

Justin Chow, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

13-20 Research, Skills, and Careers: A Workshop for Students and Early-Career Professionals

13-20-1 Preparing for Success—Careers in Industry, Academia, and Government

520E

9:45am–11:30am

Session Organizer: Kaushik Mysore, *AMD, Austin, TX, United States*

Session Co-Organizer: Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

9:45am – Research Careers in Industry and Academia: Transitions From One to the Other

Invited Presentation. IMECE2014-40898

Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

10:20am – Leveraging Industry-Academia Relationship

Invited Presentation. IMECE2014-40899

Satish Chaparala, *Corning Inc., Corning, NY, United States*

10:55am – Perfect Postdoc Appointment and the Argument for National Labs

Invited Presentation. IMECE2014-40900

Marriner H. Merrill, *U.S. Naval Research Laboratory, Washington, MD, United States*

13-2 Computational Studies on MEMS and Nanostructures

13-2-2 Computational Studies on MEMS and Nanostructures II

520A

1:00pm–2:45pm

Session Organizer: Shahzad Towfighian, *Binghamton University, Vestal, NY, United States*

Session Co-Organizers: Ali Kosar, *Sabanci University, Istanbul, Turkey*, Rasim Guldiken, *University of South Florida, Tampa, FL, United States*

1:00pm – Factors Affecting Spherical Nanoindentation of Thin Film/Substrate Systems

Technical Paper Publication. IMECE2014-36064

Awlad Hossain, *Eastern Washington University, Cheney, WA, United States*, **Ahsan Mian**, *Wright State University, Dayton, OH, United States*

1:21pm – Hydrogen Diffusion in Ceramic/Metal Multilayer Nanocomposites

Technical Presentation. IMECE2014-36799

Iman Salehinia, *Hussein Zbib*, *Washington State University, Pullman, WA, United States*, **Ioannis Mastorakos**, *Clarkson University, Potsdam, NY, United States*

1:42pm – Numerical Investigation of Slip Flow Across Micro/Nano Pin Fins

Technical Paper Publication. IMECE2014-37287

Abdolali Khalili Sadaghiani, **Ali Kosar**, *Sabanci University, Istanbul, Turkey*

2:03pm – Static Analysis of a Microscale Cricket Filiform Hair Socket

Technical Paper Publication. IMECE2014-36065

Awlad Hossain, *Eastern Washington University, Cheney, WA, United States*, **Ahsan Mian**, *Wright State University, Dayton, OH, United States*

2:24pm – Vibration Analysis of Defective Double-Walled Carbon Nanotube-Based Nanoresonators

Technical Paper Publication. IMECE2014-36454

Anand Joshi, *G.H.Patel College of Engineering & Technology, Anand, Gujarat, India*, **Ajay Patel**, *G.H.Patel College of Engineering & Technology, Vallabh Vidyanagar, Gujarat, India*

13-3 Design and Fabrication Analysis, Processes, and Technology for Micro- and Nanodevices and Systems

13-3-2 Analysis, Processes, and Technology 2

520B

1:00pm–2:45pm

Session Organizer: Abdoul Maiga, *University of Arkansas, Fayetteville, AR, United States*

Session Co-Chair: Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States*

1:00pm – Fabrication and Investigation of a Micro-Progressive Die Set for Microforming of Sheet Metals

Technical Paper Publication. IMECE2014-36933

Christopher Nehme, **Amrit Sagar**, **William Messner**, *Tufts University, Medford, MA, United States*, **Thomas James**, *Tufts University, Boxford, MA, United States*

1:26pm – On the Formation of Photopolymerized Voxel With Varying Focal Length During Bulk Lithography

Technical Paper Publication. IMECE2014-38401

Kiran Bhole, **Prasanna Gandhi**, **T. Kundu**, *Indian Institute of Technology Bombay, Mumbai, Maharashtra, India*

1:52pm – Study on Stress and Thermal Contraction During Cooling and Demolding in Hot Embossing

Technical Paper Publication. IMECE2014-39203

Juan A. Gomez, **Devanda Lek**, **In-Hyounk Song**, **Byoung Hee You**, *Texas State University, San Marcos, TX, United States*, **Du-Hwan Chun**, *Yeungnam University, Gyeongsan, Korea (Republic)*

2:18pm – Fabrication of Second-Level TriDelta Interconnects Using Negative Dry-Film Photoresist

Technical Paper Publication. IMECE2014-40154

Wei Chen, **Yaqin Song**, **Jiaxing Liang**, **Suresh Sitaraman**, *Georgia Institute of Technology, Atlanta, GA, United States*

13-4 Carbon-Based Nanomaterials and Applications

13-4-1 Physics and Chemistry of Carbon Nanomaterials and Devices

520C

1:00pm–2:45pm

Session Organizer: Jong Hyun Choi, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizer: Xin Li, *Stevens Institute of Technology, Hoboken, NJ, United States*

1:00pm – Fabrication of Large Area Graphene Nanomesh Using Interference Lithography

Technical Presentation. IMECE2014-36466

Junjun Ding, Ke Du, Chang-Hwan Choi, Eui-Hyeok Yang, *Stevens Institute of Technology, Hoboken, NJ, United States*, **Ishan Wathuthanthri,** *Stevens Institute of Technology, Kew Gardens, NY, United States*, **Frank Fisher,** *Stevens Institute of Technology, Union City, NJ, United States*

1:15pm – Understanding Photophysical Interactions of Semiconducting Carbon Nanotubes With Porphyrin Chromophores

Technical Presentation. IMECE2014-36713

Hanyu Zhang, Matthew Bork, Molly Riccitelli, Kelley Riedy, David McMillin, Jong Hyun Choi, *Purdue University, West Lafayette, IN, United States*

1:30pm – Highly Sensitive Two-Dimensional Tactile Sensor Using Multiwalled Carbon Nanotube

Technical Paper Publication. IMECE2014-36868

Takuya Nozaki, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

1:45pm – Numerical Study of Contact Resistance of Double Graphene/Graphene-Like Materials

Technical Paper Publication. IMECE2014-39008

Mehrdad Irannejad, Apratim Chakraborty, Nirushan Udayakumar, Bo Cui, Andrew Brzezinski, Eihab Abdel-Rahman, Mustafa Yavuz, *University of Waterloo, Waterloo, ON, Canada*

2:00pm – Change in Spatial Distribution of State Densities of Carbon Nanotubes Under Anisotropic Strain Field

Technical Paper Publication. IMECE2014-39470

Masato Ohnishi, Yang Meng, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

2:15pm – Effect of Strain on the Electronic Properties of Graphene Nanoribbons

Technical Paper Publication. IMECE2014-39635

Meng Yang, Masato Ohnishi, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

2:30pm – Ab Initio Investigation of Defect Structure Evolution in Stacked Graphene/h-BN Heterostructures

Technical Presentation. IMECE2014-39997

Bin Ouyang, Jun Song, *McGill University, Montréal, QC, Canada*

13-5 Power-Harvesting MEMS and NEMS

13-5-1 Microscale Power-Harvesting Devices

520D

1:00pm–2:45pm

Session Organizer: Diana-Andra Borca-Tasciuc, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Session Co-Organizer: Ioana Voiculescu, *City College of New York, New York, NY, United States*

1:00pm – Methodology for Concurrent Design of Micro-Power Generators

Technical Paper Publication. IMECE2014-37354

Edwin H. Solano Araque, Jaime Parra-Raad, Sebastian Roa-Prada, *Universidad Autónoma de Bucaramanga, Bucaramanga, Santander, Colombia*

1:21pm – Anomalous Photovoltaic Effects in Large Area MoS₂

Technical Presentation. IMECE2014-38305

Baoming Wang, *Pennsylvania State University, State College, PA, United States*, **Christopher Muratore,** *University of Dayton, Dayton, OH, United States*, **Andrey Voevodin,** *AFRL, WPAFB, OH, United States*, **Md Haque,** *Pennsylvania State University, University Park, PA, United States*

1:42pm – Modeling of Near-Field Concentrated Solar Thermophotovoltaic Microsystem

Technical Paper Publication. IMECE2014-38396

Mahmoud Elzouka, Mukesh Kulsreshath, Sidy Ndao, *University of Nebraska–Lincoln, Lincoln, NE, United States*

2:03pm – Investigation of Gap-Closing MEMS Device for Vibration Energy Harvesting

Technical Presentation. IMECE2014-39277

John Oxaal, Diana-Andra Borca-Tasciuc, Mona Hella, *Rensselaer Polytechnic Institute, Troy, NY, United States*

2:24pm – Microboiler: Waste Heat to Power Scavenging System**Technical Paper Publication. IMECE2014-38478****Leland Weiss, Suvhashis Thapa, Eric Borquist, Ji Fang, Debbie Wood, Ashok Baniya, Louisiana Tech University, Ruston, LA, United States****13-12 Fluid Engineering in Micro- and Nanosystems****13-12-2 Flows in Microfluidic Systems****519B****1:00pm–2:45pm****Session Organizer: Scott Thompson, Mississippi State University, Mississippi State, MS, United States****1:00pm – Predictive Model for the Cell Passing Pressure in Deformation-Based CTC Chips****Technical Paper Publication. IMECE2014-37172****Zhifeng Zhang, Jie Xu, Xiaolin Chen, Washinton State University Vancouver, Vancouver, WA, United States****1:21pm – Molecular Dynamics Simulation of Nanoscale Fluid Infiltration****Technical Presentation. IMECE2014-37764****Jingwen Mo, Zhigang Li, Hong Kong University of Science and Technology, Kowloon, Hong Kong****1:42pm – Impedance Effects During High-Frequency Dielectrophoresis****Technical Paper Publication. IMECE2014-38435****Hanieh Hadady, University of Nevada, Reno, Reno, NV, United States, Kelsey A. Michael, Hamilton Company, Reno, NV, United States, Emil Geiger, University of Nevada, Reno, Reno, NV, United States****2:03pm – Biofilm Streamer Formation in a Microfluidic Porous Media Mimic****Technical Paper Publication. IMECE2014-38956****Mahtab Hassanpourfard, Amin Valiei, Thomas Thundat, Yang Liu, Alope Kumar, University of Alberta, Edmonton, AB, Canada****2:24pm – Microfluidic Device for Caenorhabditis Elegans Based Chemical Testing****Technical Paper Publication. IMECE2014-39126****Pengfei Song, Weize Zhang, Alexandre Sobolevski, Kristine Bernard, Siegfried Hekimi, Xinyu Liu, McGill University, Montreal, QC, Canada****13-18 Emerging Technologies****13-18-1 Emerging Technologies****520F****1:00pm–2:45pm****1:00pm – Emerging Interconnect Technologies for Next-Generation Microsystems****Invited Presentation. IMECE2014-40674****Suresh Sitaraman, Georgia Institute of Technology, Atlanta, GA, United States****1:30pm – Munition Electronics Tin-Whisker Growth Control Technical Presentation. IMECE2014-36511****Nien-hua Chao, Frank A. Gagliardi, Mario E. DeAngelis, Nelson Pineda, U.S. Army ARDEC, Picatinny Arsenal, NJ, United States, Lauren Shea Rohwer, Sandia National Labs, Albuquerque, NM, United States, Carl Foehner, Carl Foehner Associates, Newfoundland, NJ, United States****1:45pm – Strain Monitoring Near Through Silicon Vias Using Metal Piezoresistive Sensors****Technical Paper Publication. IMECE2014-40041****Christine Taylor, Xi Liu, Suresh Sitaraman, Georgia Institute of Technology, Atlanta, GA, United States****13-20 Research, Skills, and Careers: A Workshop for Students and Early-Career Professionals****13-20-2 Opportunities and Challenges in Semiconductors, Packaging, and Micro- and Nanosystems Engineering****520E****1:00pm–2:45pm****Session Organizer: Kaushik Mysore, AMD, Austin, TX, United States****Session Co-Organizers: Fatemeh Hassanipour, UTDallas, Plano, TX, United States, Niru Kumari, Hewlett-Packard, Palo Alto, CA, United States**

13-1 General

13-1-1 Dynamic and Thermal Behavior of Micro- and Nanosystems

520F

3:00pm–4:45pm

Session Organizer: Zhili Hao, *Old Dominion University, Virginia Beach, VA, United States*

Session Co-Organizer: Ahsan Mian, *Wright State University, Dayton, OH, United States*

3:00pm – Effect of Imperfections on Fused Silica Shell Resonators

Technical Paper Publication. IMECE2014-39303

Ali Darvishian, Behrouz Shiari, Jae Y. Cho, Khalil Najafi, *University of Michigan, Ann Arbor, MI, United States*

3:26pm – Numerical Investigation of Atomic Scale Kinetic Friction in Ambient Condition With a Novel Extended Prandtl-Tomlinson Model

Technical Paper Publication. IMECE2014-39725

Birahima Gueye, Chenfei Sun, Yan Zhang, Yujuan Wang, Yunfei Chen, *Southeast University, Nanjing, China*

3:52pm – Parametric Study of the Response of a Beam-Rigid Body Microgyroscope

Technical Paper Publication. IMECE2014-40012

S. Amir Mousavi Lajimi, Glenn Heppler, Eihab Abdel-Rahman, *University of Waterloo, Waterloo, ON, Canada*

4:18pm – Intentional Integration of Geometric Nonlinearity for a Broadband Micromechanical Resonator

Technical Presentation. IMECE2014-40270

Keivan Asadi, Hanna Cho, *Texas Tech University, Lubbock, TX, United States*, Snehan Peshin, Junghoon Yeom, *Michigan State University, East Lansing, MI, United States*

13-2 Computational Studies on MEMS and Nanostructures

13-2-3 Computational Studies on MEMS and Nanostructures III

520A

3:00pm–4:45pm

Session Organizer: Wenzhen Huang, *University of Massachusetts Dartmouth, Lakeville, MA, United States*

Session Co-Organizers: Yen-Lin Han, *Seattle University, Seattle, WA, United States*, Rasim Guldiken, *University of South Florida, Tampa, FL, United States*

3:00pm – Nanoparticle-Enhanced Plasmonic Light Absorption in Thin-Film Silicon Solar Cells

Technical Paper Publication. IMECE2014-36182

Zhenhui Jia, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*, Changhong Liu, *Shanghai Jiao tong University, Shanghai, Shanghai, China*, Ben Q. Li, *University of Michigan Dearborn, Dearborn, MI, United States*

3:21pm – Compact Model for the Static and Dynamic Behavior of a Piezoelectric Bimorph Actuator for Microfluidic MEMS

Technical Paper Publication. IMECE2014-36654

Dominik Rumschoettel, Markus Kagerer, Franz Irlinger, Tim C. Lueth, *Technical University Munich, Garching, Germany*

3:42pm – Computational Study on a Novel Micropump Driven by a Built-in Thermal Bimorph Microvalve

Technical Paper Publication. IMECE2014-38708

Yen-Lin Han, *Seattle University, Seattle, WA, United States*

4:03pm – Static Modeling of a Bi-Axial Micro-Mirror With Sidewall Electrodes

Technical Paper Publication. IMECE2014-38834

Shahzad Towfighian, Mehmet Ozdogan, *Binghamton University, Vestal, NY, United States*

4:24pm – Discrete Model for an Electrostatically Driven Micro-Hydraulic Actuator

Technical Paper Publication. IMECE2014-39019

Behrouz Shiari, Mahdi Sadeghi, Ali Darvishian, Khalil Najafi, *University of Michigan, Ann Arbor, MI, United States*

13-3 Design and Fabrication Analysis, Processes, and Technology for Micro and Nano Devices and Systems

13-3-3 Analysis, Processes, and Technology 3

520B

3:00pm–4:45pm

Session Organizer: Byoung Hee You, *Texas State University, San Marcos, TX, United States*

Session Co-Chair: Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States*

3:00pm – Microfluidic MEMs Device in the Cultivation of Microalgae With Positive Dielectrophoretic Cell Trapping for Media Exchange

Technical Paper Publication. IMECE2014-38448

Johnson J. Wong, Emil Geiger, *University of Nevada, Reno, Reno, NV, United States*

3:21pm – Lightweight Optimization Design for a Connection Frame Considering Thermal-Structural Coupling Deformation

Technical Paper Publication. IMECE2014-39661

Lufan Zhang, Jiwen Fang, *Xi'an Jiaotong University, Shaanxi, China*, **Zhili Long,** *Harbin Institute of Technology Shenzhen Graduate School, Shenzhen, China*, **Jiandong Cai,** *Chinese University of Hong Kong, Hong Kong, China*

3:42pm – Solvent-Based Polymer Swelling Characterization for the Development of the Nano-/Microparticle Polymer Composite MEMS Corrosion Sensor

Technical Paper Publication. IMECE2014-40145

Feng Pan, Abdoul Maiga, Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States*

4:03pm – Design and Implementation of a MEMS-Based Ambient Pressure Micropropulsion System

Extended Abstract Presentation. IMECE2014-40147

Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States*

4:24pm – Removal of Multiwalled Carbon Nanotubes From Contaminated Surfaces With Microscale Topological Features

Extended Abstract Publication. IMECE2014-39752

Zahra Karimi, Babak Haghpanah, *Northeastern University, Boston, MA, United States*, **Paul Su, William Doerr, Louis Gritzko,** *FM Global, Norwood, MA, United States*, **Syed Ali Hassan,** *University of Massachusetts, Lowell, Lowell, MA, United States*, **Ashkan Vaziri,** *Northeastern University, Cambridge, MA, United States*

13-7 Micro and Nano Devices

13-7-2 Fabrication and Structure

520D

3:00pm–4:45pm

Session Organizer: Seok Kim, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

Session Co-Organizer: Xinyu Liu, *McGill University, Montreal, QC, Canada*

Session Chair: Wenhui Wang, *Tsinghua University, Beijing, China*

3:00pm – Preliminary Study of a Polymer-Based Microfluidic Device for Detecting Distributed Shear Loads

Technical Paper Publication. IMECE2014-36670

Yichao Yang, Jiayue Shen, *Old Dominion University, Norfolk, VA, United States*, **Mark Levenstein,** *Old Dominion University, Chesapeake, VA, United States*, **Zhili Hao,** *Old Dominion University, Virginia Beach, VA, United States*

3:21pm – Biomimetic, Namib Beetle Inspired, Hydrophobic Paper-Based Devices

Technical Presentation. IMECE2014-40487

Martin Thuo, *Iowa State University, Ames, IA, United States*, **Stephanie Oyola-Reynoso, Ian Tevis, Julian Halberstma-Black, Zhi Li,** *University of Massachusetts, Boston, MA, United States*

3:42pm – Chemical Sensors Based on Vertically Aligned Silicon Nanowire Arrays With a Porous Electrode

Technical Presentation. IMECE2014-40158

Snehan Peshin, Jared Gaumer, Jongwon Kim, Junghoon Yeom, *Michigan State University, East Lansing, MI, United States*

4:03pm – Self-Assembly of Drug-Loaded MC-1 Magnetotactic Bacteria Acting as Self-Propelled Therapeutic Micro-agents

Technical Presentation. IMECE2014-40078

Sylvain Martel, *Polytechnique Montreal, Montreal, QC, Canada*

4:24pm – Investigation of Thermoelastic Loss Mechanism In Shell Resonators

Technical Paper Publication. IMECE2014-39331

Ali Darvishian, Behrouz Shiari, Jae Y. Cho, Tal Nagourney, Khalil Najafi, *University of Michigan, Ann Arbor, MI, United States*

13-12 Fluid Engineering In Micro- and Nanosystems

13-12-3 Novel Applications of Micro-/Nanofluidics—II

519B

3:00pm–4:45pm

Session Organizer: Rohit Karnik, *Massachusetts Institute of Technology, Cambridge, MA, United States*

3:00pm – Experimental investigation of Poiseuille Flows in Nanochannels

Technical Presentation. IMECE2014-37680

Long Li, Zhigang Li, *Hong Kong University of Science and Technology, Hong Kong, Hong Kong, Hong Kong*

3:26pm – Microparticle Trapping in Streaming Flows in Open Rectangular Chambers Undergoing Low-Frequency Vertical Vibrations

Technical Paper Publication. IMECE2014-38101

Prashant Agrawal, *Indian Institute of Technology, Bombay, Monash Research Academy, Mumbai, Maharashtra, India,*

Prasanna Gandhi, *Indian Institute of Technology, Bombay, Mumbar, Maharashtra, India,* **Adrian Neild,** *Monash University, Melbourne, Victoria, Australia*

3:52pm – Development of All-Plastic Microvalve Array for Multiplexed Immunoassay

Technical Paper Publication. IMECE2014-38154

Shancy Augustine, Pan Gu, Xiangjun Zheng, Toshikazu Nishida, Hugh Fan, *University of Florida, Gainesville, FL, United States*

4:18pm – Fabrication of Three-Dimensional Microfluidic Channels in a Single Layer of Cellulose Paper

Technical Presentation. IMECE2014-39054

Xiao Li, Xinyu Liu, *McGill University, Montreal, QC, Canada*

13-20 Research, Skills, and Careers: A Workshop for Students and Early-Career Professionals

13-20-3 Resume-Critique and Networking

520E

3:00pm–4:45pm

Session Organizer: Kaushik Mysore, *AMD, Austin, TX, United States*

Session Co-Organizers: Satish Chaparala, *Corning Inc., Corning, NY, United States,* Kaustubh Nagarkar, *GE Global Research Center, Niskayuna, NY, United States,* Marriner H. Merrill, *U.S. Naval Research Laboratory, Washington, MD, United States*

Tuesday, November 18

13-8 Applied Mechanics and Materials

13-8-2 Nanomaterials and Nanostructures

520C

9:45am–11:30am

Session Organizer: Uttam Chakravarty, *University of New Orleans, New Orleans, LA, United States*

Session Co-Organizer: Awlad Hossain, *Eastern Washington University, Cheney, WA, United States*

9:45am – Size-Dependent Fracture Strength of Single-Crystal Si Theta-like Specimens

Technical Presentation. IMECE2014-37095

Mark McLean, William Osborn, Richard Gates, Robert Cook, *National Institute of Standards and Technology, Gaithersburg, MD, United States,* **Frank DeRiio,** *National Institute of Standards and Technology, Boulder, CO, United States*

10:06am – Characterization of the Electromechanical Response of a Dielectric Elastomer Membrane

Technical Paper Publication. IMECE2014-38797

Jose Rubio, Pratik Sarker, Uttam Chakravarty, *University of New Orleans, New Orleans, LA, United States*

10:27am – Mechanics of Instability in Nanostructure Fabrication

Technical Presentation. IMECE2014-38901

Xiao Hu Liu, *IBM TJ Watson Research Center, Yorktown Heights, NY, United States*

10:48am – Pull-in Behavior of Graphene Nanoribbon Electrostatic Actuators

Technical Presentation. IMECE2014-40219

Hossein Rokni, Wei Lu, *University of Michigan, Ann Arbor, MI, United States*

11:09am – Mechanics of Carbon Nanotube Forest Patterns

Technical Presentation. IMECE2014-40317

Peng Wang, Junjun Ding, Eui-Hyeok Yang, *Stevens Institute of Technology, Hoboken, NJ, United States*, **Parisa Pour Shahid Saeed Abadi**, *Stevens Institute of Technology, New York, NY, United States*

13-13 Plenary Presentations in MEMS/NEMS Engineering and Packaging

13-13-1 Plenary Presentations in MEMS and Microfluidics

520D

9:45am–

11:30am

Session Organizer: Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States*

Session Co-Organizer: Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*

9:45am – NIAC: The Most Visionary and Far-Reaching Program in NASA

Plenary Presentation. IMECE2014-40611

Jay Falker, *NASA NIAC & CIF, Washington, DC, United States*

10:37am – Capillary Microfluidics and Microfluidic Probes: Concepts and Applications

Plenary Presentation. IMECE2014-40612

David Junker, *McGill University, Montreal, QC, Canada*

13-19 Thermal Management in Electronics

13-19-1 Thermal Management in Electronics I

520E

9:45am–

11:30am

Session Organizer: Mark Kimber, *University of Pittsburgh, Pittsburgh, PA, United States*

Session Co-Organizer: Vadim Gektin, *Futurewei Technologies, Santa Clara, CA, United States*

9:45am – Experimentally Verified Transient Models of Data Center Cross-Flow Heat Exchangers

Technical Paper Publication. IMECE2014-36022

Tianyi Gao, Bahgat Sammakia, James F Geer, *SUNY Binghamton University, Binghamton, NY, United States*, **Milnes David, Roger Schmidt**, *IBM Corp, Poughkeepsie, NY, United States*

10:06am – Experimental and Computational Analysis of a Dual Cooling Jet Device in a Low-Form Factor Platform

Panel Presentation. IMECE2014-37130

Andrew McNamara, Ali Merrikh, Kaushik Mysore, Chris Jagers, *Advanced Micro Devices, Austin, TX, United States*, **Gamal Refai-Ahmed**, *GE Global Research, Niskayuna, NY, United States*

10:27am – Understanding the Impact of Flow Bypass on the Heat Transfer Performance of Air-Cooled Heat Sinks

Technical Paper Publication. IMECE2014-37521

Krishna Kota, *New Mexico State University, Las Cruces, NM, United States*, **M.M. Awad**, *Mansoura University, Mansoura, Egypt*

10:48am – Thermal Resistance and PIV Characterization of a Line-Replaceable Compact Liquid-Cooled Server Module for High-Performance Computing Platforms

Technical Paper Publication. IMECE2014-38866

Joshua Gess, Sushil H. Bhavnani, *Auburn University, Auburn, AL, United States*, **R. Wayne Johnson**, *Tennessee Tech University, Cookeville, TN, United States*

11:09am – Hot Spot Cooling and Harvesting CPU Waste Heat Using Thermoelectric Modules

Technical Paper Publication. IMECE2014-36629

Soochan Lee, Patrick Phelan, Carole-Jean Wu, *Arizona State University, Tempe, AZ, United States*

13-6 Applications of Micro- and Nanosystems in Medicine and Biology

13-6-1 Sensing and Manipulation of Cells

520A

1:00pm–2:45pm

Session Organizer: Fang Li, *New York Institute of Technology, New York, NY, United States*

Session Co-Organizer: Moses Noh, *Drexel University, Philadelphia, PA, United States*

1:00pm – Continuous Separation of Cancer Cells From Blood in a Microfluidic Channel Using Dielectrophoresis

Technical Paper Publication. IMECE2014-37438

Anas Alazzam, *Khalifa University, Abu Dhabi, United Arab Emir.*,
Ion Stiharu, *Concordia University, Montreal, QC, Canada*, **Saud Khashan**, *Uaeu University, Al-ain, United Arab Emir.*

1:21pm – Stretchable Impedance Spectroscopy Sensor for Mammalian Cells Impedance Measurements

Technical Paper Publication. IMECE2014-37737

Ioana Voiculescu, **Xudong Zhang**, *City College of New York, New York, NY, United States*, **Fang Li**, *New York Institute of Technology, New York, NY, United States*, **Remi Petrissans**, *Institute Catholique–Arts et Metiers, Toulouse, France*

1:42pm – Effect of Media Conductivity on High-Frequency Dielectrophoresis Response

Technical Paper Publication. IMECE2014-38423

Hanieh Hadady, **Johnson J. Wong**, **Sage R. Hiibel**, **Emil Geiger**, *University of Nevada, Reno, Reno, NV, United States*

2:03pm – Theoretical and Experimental Studies of Love Mode Surface Acoustic Wave Sensors for Cellular Sensing

Technical Paper Publication. IMECE2014-39279

Fang Li, *New York Institute of Technology, New York, NY, United States*, **Lifeng Qin**, *Xiamen University, Xiamen, Fujian, China*,
Qing-Ming Wang, *University of Pittsburgh, Pittsburgh, PA, United States*

2:24pm – Simulation of Impaction Between Liquid Droplet and Solid Particles Based on SPH Method

Technical Paper Publication. IMECE2014-37189

Shuai Meng, **Qian Wang**, **Rui Yang**, *Tsinghua University, Beijing, China*

13-8 Applied Mechanics and Materials

13-8-3 Manufacturing and Devices

520C

1:00pm–2:45pm

Session Organizer: Awlad Hossain, *Eastern Washington University, Cheney, WA, United States*

Session Co-Organizer: Uttam Chakravarty, *University of New Orleans, New Orleans, LA, United States*

1:00pm – Residual Stresses in Laser Microjoints of Dissimilar Materials

Technical Paper Publication. IMECE2014-36121

Mohammed Mayeed, *Southern Polytechnic State University, Marietta, GA, United States*, **Golam Newaz**, *Wayne State University, Detroit, MI, United States*

1:21pm – Synchronized Heterogeneous Dynamic Behavior of Soft Materials Upon Macroscopic Loading: A Preliminary Study

Technical Paper Publication. IMECE2014-37201

Wenting Gu, **Jiayue Shen**, **Xavier-Lewis Palmer**, *Old Dominion University, Norfolk, VA, United States*, **Zhili Hao**, *Old Dominion University, Virginia Beach, VA, United States*

1:42pm – Finite Element Analysis of a Hobie 16 Mast and Possible Alternatives for Improvement

Technical Paper Publication. IMECE2014-37228

Mosfequr Rahman, **Eric Sullivan**, **Matthew Darley**, **Anthony Hanson**, **Collin Hare**, *Georgia Southern University, Statesboro, GA, United States*, **Bryan Calloway**, *Georgia Southern University, Savannah, GA, United States*, **Ahsan Mian**, *Wright State University, Dayton, OH, United States*

2:03pm – System Identification Using Neural Nets for Dynamic Modeling of a Surface Marine Vehicle

Technical Paper Publication. IMECE2014-38322

Nikolas Xiros, *University of New Orleans, New Orleans, LA, United States*, **Eleftherios Loghis**, *National Technical University of Athens, Athens, Greece*

2:24pm – Influence of Process Parameters on the Mechanical Response of Various Layers Processed Using Direct Metal Laser Sintering (DMLS)

Extended Abstract Publication. IMECE2014-39911

Sazzad Ahmed, **Ahsan Mian**, **Raghavan Srinivasan**, *Wright State University, Dayton, OH, United States*, **Heather Doak**, *Mound Laser and Photonics Center, Kettering, OH, United States*

13-10 NEES Panel on Nanomanufacturing: Successful, Scalable, and Sustainable at the Nanometer Scale

13-10-1 NEES Panel on Nanomanufacturing: Successful, Scalable, and Sustainable at the Nanometer Scale

520B

1:00pm–2:45pm

Session Organizer: Ronggui Yang, *University of Colorado, Boulder, CO, United States*

Session Co-Organizers: Samit Roy, *University of Alabama, Tuscaloosa, AL, United States*, Ajit Roy, *Air Force Reserach Lab, Dayton, OH, United States*

Moderator: Marriner H. Merrill, *U.S. Naval Research Laboratory, Washington, MD, United States*

13-15 Modeling and Simulation in Electronics and Photonics Packaging

13-15-1 Modeling in Integrated Structures and Materials

520D

1:00pm–2:45pm

Session Organizer: Kaushik Mysore, *AMD, Austin, TX, United States*

Session Co-Organizer: Satish Chaparala, *Corning Inc., Corning, NY, United States*

1:00pm – Computing Low-Cycle Fatigue in BGA Solder Joints by Finite Element Simulations

Technical Presentation. IMECE2014-38557

Gabriel Potirniche, Jose Ramirez, Shams Arifeen, Fred Barlow, Aicha Elshabini, University of Idaho, Moscow, ID, United States

1:26pm – Finite Element Analysis and Fatigue Life Prediction of an Aluminum Alloy Braze for High-Temperature Thermoelectric Generator Package Assembly

Technical Paper Publication. IMECE2014-38829

Shams Arifeen, Victor Wolemiwa, Dominic Nwoke, Lyudmyla Barannyk, Gabriel Potirniche, Aicha Elshabini, Fred Barlow, University of Idaho, Moscow, ID, United States

1:52pm – High Strain-Rate Constitutive Behavior of SAC305 Solder During Operation at High Temperature

Technical Paper Publication. IMECE2014-39518

Pradeep Lall, Di Zhang, Vikas Yadav, Auburn University, Auburn, AL, United States

2:18pm – Large-Scale Model of Flip-Chip Joining Defects Technical Paper Publication. IMECE2014-36744

Julien Sylvestre, Université de Sherbrooke, Sherbrooke, QC, Canada, Maud Samson, Éric Duchesne, IBM, Bromont, QC, Canada, Dominique Langlois-Demers, C2MI, Bromont, QC, Canada

13-6 Applications of Micro- and NanoSystems in Medicine and Biology

13-6-2 Tools for Studying Properties of Tissues, Cells, or Molecules

520A

3:00pm–4:45pm

Session Organizer: Deyu Li, *Vanderbilt University, Nashville, TN, United States*

Session Co-Organizer: Zhili Hao, *Old Dominion University, Virginia Beach, VA, United States*

3:00pm – Biomimetic Microfluidic Device for the Study of the Response of Endothelial Cells Under Mechanical Forces

Technical Paper Publication. IMECE2014-36430

Lei Li, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, China, Xuetao Shi, WPI Advanced Institute for Materials Research, Tohoku Univeristy, Sendai, Japan, Xiaoqing Lv, Tianjin Medical University, Tianjin, China, Jing Liu, Chinese Academy of Sciences, Beijing, China

3:21pm – Synchronized Heterogeneous Indentation and Stress Relaxation Behavior of Articular Cartilage Upon Macroscopic Compression: A Preliminary Study

Technical Paper Publication. IMECE2014-37060

Jiayue Shen, Wenting Gu, Xavier-lewis Palmer, Siqi Guo, Old Dominion University, Norfolk, VA, United States, Zhili Hao, Old Dominion University, Virginia Beach, VA, United States

3:42pm – Effects of Mechanical Stress in Normal Tissue Fibroblast Activation and Cancer Associated Fibroblast Genesis

Technical Presentation. IMECE2014-38577

Lijie Yang, Bryson Brewer, Deyu Li, Mingfang Ao, Donna Webb, Vanderbilt University, Nashville, TN, United States

4:03pm – Retina-on-a-Chip: A Microfluidic Platform Designed for Point Access Signaling on Whole Organ Tissue

Technical Presentation. IMECE2014-38531

Kirsten Heikkinen, Deyu Li, Franklin Echevarria, Rebecca Sappington, Vanderbilt University, Nashville, TN, United States, Jon Edd, Harvard Medical School, Boston, MA, United States

4:24pm – Xylem on a Chip for In Vitro Simulation of Long Distance Signaling in Plants

Technical Presentation. IMECE2014-38749

Aviral Joshi, Moses Noh, Drexel University, Philadelphia, PA, United States, Abraham Koo, University of Missouri, Columbia, MO, United States

13-8 Applied Mechanics and Materials

13-8-4 Composites

520C

3:00pm–4:45pm

Session Organizer: Uttam Chakravarty, University of New Orleans, New Orleans, LA, United States

Session Co-Organizer: Awlad Hossain, Eastern Washington University, Cheney, WA, United States

3:00pm – SIF Prediction of Nanocomposite With Interfacial Debonding

Technical Paper Publication. IMECE2014-36399

Waleed Ahmed, United Arab Emirates University, Al Ain, United Arab Emir.

3:21pm – Effect of Ply Stacking Sequence on Structural Response of Symmetric Composite Laminates

Technical Paper Publication. IMECE2014-37217

Mosfequr Rahman, Saheem Absar, F.N.U. Aktaruzzaman, Abdur Rahman, Georgia Southern University, Statesboro, GA, United States, Awlad Hossain, Eastern Washington University, Cheney, WA, United States

3:42pm – Finite Element Analysis of Prosthetic Running Blades Using Different Composite Materials to Optimize Performance

Technical Paper Publication. IMECE2014-37293

Mosfequr Rahman, Tyler Bennett, Darrell Beckley, David Glisson, Georgia Southern University, Statesboro, GA, United States, Jobaidur Khan, University at Buffalo, Buffalo, NY, United States

4:03pm – Finite Element Analysis of Polyurethane Based Composite Shafts Under Different Boundary Conditions

Technical Paper Publication. IMECE2014-37753

Mosfequr Rahman, F.N.U. Aktaruzzaman, Saheem Absar, Aniruddha Mitra, Georgia Southern University, Statesboro, GA, United States, Awlad Hossain, Eastern Washington University, Cheney, WA, United States

4:24pm – Measurements of the Through-Thickness Young's Moduli of Composite Laminates Using Nanoindentation

Technical Presentation. IMECE2014-39779

Luoyu Roy Xu, New Mexico State University, El Paso, TX, United States

13-11 Micro-/NanoScale Phononic Crystals: Fundamentals, Devices, and Applications

13-11-1 Micro-/Nanoscale Phononic Crystals: Fundamentals, Devices, and Applications

520B

3:00pm–4:45pm

Session Organizer: Patrick Hopkins, University of Virginia, Charlottesville, VA, United States

Session Co-Organizer: Charles Reinke, Sandia National Laboratories, Albuquerque, NM, United States

3:00pm – Multiphonon Scattering Processes in a One-Dimensional Nonlinear Phononic Crystal

Technical Presentation. IMECE2014-37526

Jérôme Vasseur, Pierre-Yves Guerder, Olivier BouMatar, International Associated Laboratory LEMAC: IEMN, Villeneuve d'Ascq, France, Alix Deymier-Black, Washington University in St. Louis, St Louis, MO, United States, Nicklas Swintec, Khrishna Muralidharan, Pierre Deymier, University of Arizona, Tucson, AZ, United States

3:26pm – Simulation of Optomechanical Effects in Phoxonic Crystal Cavities

Technical Presentation. IMECE2014-38130

Said El-jallal, IEMN/University of Lille 1, Villeneuve d'ascq, France, Mourad Oudich, Institut Jean Lamour, University of Lorraine, Vandoeuvre-lès-Nancy, France, Yan Pennec, Institut d'Electronique, De Microélectronique, Lille, France, Abdelkader Makhoute, Université Meknes, Meknes, Morocco, Bahram Djafari Rouhani, IEMN UMR CNRS 8520, Villeneuve d'Ascq, France

3:52pm – Metallic Inclusions in Phononic Crystals for Thermoelectric Applications

Technical Presentation. IMECE2014-38745

Charles Reinke, Ihab El-Kady, Sandia National Laboratories, Albuquerque, NM, United States, Seyedhamidrez Alaie, Mehmet Su, Zayd C. Leseman, University of New Mexico, Albuquerque, NM, United States

4:18pm – TiO₂ Nanotube Arrays With Periodically Modulated Diameters for Photonic and Energy Harvesting Applications

Technical Presentation. IMECE2014-39225

Samira Farsinezhad, Himani Sharma, *University of Alberta, Edmonton, AB, Canada*, **Karthik Shankar**, *University of Alberta & National Research Council, Edmonton, AB, Canada*

13-15 Modeling and Simulation in Electronics and Photonics Packaging

13-15-2 Modeling and Simulation in Electronic and Photonic Packaging

520D

3:00pm–4:45pm

Session Organizer: Satish Chaparala, *Corning Inc., Corning, NY, United States*

Session Co-Organizer: Kaushik Mysore, *AMD, Austin, TX, United States*

3:00pm – Modeling Crystal Plasticity in Solder Joints and Intermetallic Layers With a Few Grains

Technical Presentation. IMECE2014-39958

Soud F. Choudhury, Leila Ladani, *University of Connecticut, Storrs, CT, United States*

3:26pm – Comparative Study of Analytical Models to Predict Warpage in Microelectronics Packages

Technical Paper Publication. IMECE2014-38594

Charandeep Singh, Yeonsung Kim, *Binghamton University, Binghamton, NY, United States*, **Seungbae Park**, *State University of New York at Binghamton, Binghamton, NY, United States*

3:52pm – Molecular Simulation of Interface Behavior of Copper and Single-Walled Carbon Nanotubes

Technical Paper Publication. IMECE2014-39089

Ibrahim Awad, Leila Ladani, *University of Connecticut, Storrs, CT, United States*

4:18pm – Investigation of Vapor Chamber Based Thermal Management of Microserver Chips

Technical Paper Publication. IMECE2014-39928

Mohammad Parhizi, *University of Texas at Arlington, Arlington, TX, United States*, **Ali Merrikh**, *Advanced Micro Devices, Austin, TX, United States*, **Ankur Jain**, *University of Texas at Arlington, Arlington, TX, United States*

13-16 Manufacturing, Materials, and Processes in Electronics and Photonics Packaging

13-16-1 Manufacturing, Materials, and Processes for Microelectronics and Photonics

523B

3:00pm–4:45pm

Session Organizer: Abhijit Dasgupta, *University of Maryland, College Park, College Park, MD, United States*

Session Co-Chairs: Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*, Seungbae Park, *State University of New York at Binghamton, Binghamton, NY, United States*

3:00pm – Scalable Nanomanufacturing of Metasurfaces

Technical Paper Publication. IMECE2014-38969

Jacob Wilson, Wipula Liyanage, Michelle Gegel, Manashi Nath, Edward Kinzel, *Missouri University of Science and Technology, Rolla, MO, United States*

3:26pm – Anisotropic Behavior of Single Grain Cu₆Sn₅ Intermetallic

Technical Paper Publication. IMECE2014-40196

Soud F. Choudhury, Leila Ladani, *University of Connecticut, Storrs, CT, United States*

3:52pm – Improvement of Thermal Conductivity of Electroplated Copper Thin-Film Interconnections by Controlling Their Microtexture

Technical Paper Publication. IMECE2014-36863

Pornvitoo Rittinon, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

4:18pm – Validation of Material Constants for Low-Cycle Fatigue Modeling

Technical Paper Publication. IMECE2014-39267

Quang Nguyen, *Auburn University, Auburn, AL, United States*, **Seungbae Park**, *State University of New York at Binghamton, Binghamton, NY, United States*, **Tung Nguyen**, *Microsoft Corporation, Mountain View, CA, United States*

13-19 Thermal Management in Electronics

13-19-2 Thermal Management in Electronics II

520E

3:00pm–4:45pm

Session Organizer: Subramanyaravi Annapragada, *United Technologies Research, East Hartford, CT, United States*

Session Co-Organizer: Justin A. Weibel, *Purdue University, West Lafayette, IN, United States*

3:00pm – Application of Hybrid Fillers for Improving the Through-Plane Heat Transport in Graphite Nanoplatelet-Based Thermal Interface Layers

Technical Presentation. IMECE2014-37169

Xiaojuan Tian, Mikhail E. Itkis, Elena B. Bekyarova, Robert C. Haddon, *University of California, Riverside, Riverside, CA, United States*

3:26pm – Liquid Metal Flows in Manifold Microchannel Heat Sinks

Technical Paper Publication. IMECE2014-39283

Haibao Hu, Feng Ren, *Northwestern Polytechnical University, Xian, China,* **Sarada Kuravi, Pei-Feng Hsu,** *Florida Institute of Technology, Melbourne, FL, United States*

3:52pm – Experimental, Numerical, and Analytical Investigation of Thermal Resistance in High Brightness LED Arrays

Technical Paper Publication. IMECE2014-39286

Mahmood R. S. Shirazy, Andréane D’Arcy-Lepage, Luc Frechette, *Sherbrooke University, Sherbrooke, QC, Canada,* **Michel Gilbert, Samuel Richard,** *LEDTECH, Sherbrooke, QC, Canada*

4:18pm – Impact of Processor and System Geometry on Skin Temperature of Fanless Tablets

Technical Presentation. IMECE2014-38452

Kaushik Mysore, Ali Merrikh, Andrew McNamara, *Advanced Micro Devices, Austin, TX, United States*

TRACK 14: SYSTEMS, DESIGN, AND COMPLEXITY

14-1 General

- 14-1-1: General Topics in Systems, Design, and Complexity I
- 14-1-2: General Topics in Systems, Design, and Complexity II
- 14-1-3: Plenary Session

14-2 Design Innovations, Methodologies, and Philosophies

- 14-2-1: Design Innovations, Methodologies, and Philosophies I
- 14-2-2: Design Innovations, Methodologies, and Philosophies II
- 14-2-3: Design Innovations, Methodologies, and Philosophies III

14-3 Product and Process Design

- 14-3-1: Product and Process Design I
- 14-3-3: Product and Process Design II

14-4 CAD, CAM, and CAE

- 14-4-1: CAD, CAM, and CAE

14-5 Optimization

- 14-5-1: Optimization I
- 14-5-2: Optimization II

14-6 Systems and Complexity

- 14-6-1: Systems, Design, and Complexity

ACKNOWLEDGMENT

TRACK ORGANIZERS

Shuichi Fukuda, *Keio University, Japan*
Franz-Josef Kahlen, *University of Cape Town, South Africa*

TOPIC ORGANIZERS

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Monica Bordegoni, *Politecnico di Milano, Italy*
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Cameron Turner, *Colorado School of Mines, USA*
Paul Witherell, *NIST, USA*

SESSION ORGANIZERS

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Anabela Alves, *University of Minho, Portugal*
Manuel Contero, *Universitat Politècnica de València, Spain*
Yan Fu, *Ford Motor Company, USA*
Shuichi Fukuda, *Keio University, Japan*
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Chuck Pezeshki, *Washington State University, USA*
Douglas L. Van Bossuyt, *Colorado School of Mines, USA*

TRACK 14 SYSTEMS, DESIGN, AND COMPLEXITY

Thursday, November 20

14-1 General

14-1-1 General Topics in Systems, Design, and Complexity I

512A 7:45am–9:15am

Session Organizer: Shuichi Fukuda, *Keio University, Tokyo, Tokyo, Japan*

7:45am – The methodology of Predictive Design Analysis

Technical Paper Publication. IMECE2014-37141

Martin Eriksson, Lund University, Lund, Sweden

8:00am – Physical Hand Tremor Simulator for Use With Inclusive Design Research

Technical Paper Publication. IMECE2014-38246

Sebastian Immel, Robin Kiff, Jessica Armstrong, Robert Stone, Oregon State University, Corvallis, OR, United States

8:15am – Structural Integrity and Mechanical Design of a Probe of High Pressure and High Temperature for Oil Wells Applying Finite Elements Tools

Technical Paper Publication. IMECE2014-39930

Erik Rosado-Tamariz, Rito Mijarez Castro, Agustin Javier Antunez Estrada, Alfonso Campos-Amezcuca, David Pascacio Maldonado, Alfonso Aragón Aguilar, Instituto de Investigaciones Electricas, Cuernavaca, Mexico

8:30am – Innovative Solutions for Complex Problems

Technical Presentation. IMECE2014-36087

Don Winfree, Lockheed Martin, Cresson, TX, United States

8:45am – Impeller Placement Optimization: Mixing Versus Mechanical Shaft Fatigue

Technical Paper Publication. IMECE2014-36886

Sang Jin Lee, Robert W. Higbee, Binxin Wu, Philadelphia Mixing Solutions, Ltd, Palmyra, PA, United States

9:00am – Diver's Full Face Mask Head-Up Display Using Waveguide Optical Display Technology

Technical Paper Publication. IMECE2014-37124

Dennis Gallagher, Richard Manley, U.S. Navy (NSWC PCD), Panama City, FL, United States

14-5 Optimization

14-5-1 Optimization I

512C 7:45am–9:15am

Session Organizer: Joshua Hamel, *California State University, Long Beach, Long Beach, CA, United States*

7:45am – Dynamic Programming Based Algorithm for Compressor Station Optimization

Technical Paper Publication. IMECE2014-36289

Xiaorui Zhang, Changchun Wu, Lili Zuo, China University of Petroleum, Beijing, Beijing, China, Xiangyan Meng, PetroChina Beijing Gas Pipeline Co., Ltd., Beijing, China

8:03am – Mixed Model Assembly Line Sequencing by Minimizing Utility Work and Using Genetic Algorithm

Technical Paper Publication. IMECE2014-38000

Uzair Khaleeq uz Zaman, Aamer Ahmed Baqai, National University of Sciences and Technology, Islamabad, Pakistan

8:21am – Model Development for the Design Optimization of a Novel Reciprocating Engine Technology

Technical Paper Publication. IMECE2014-38696

Joshua Hamel, Devin Allphin, Joshua Elroy, California State University, Long Beach, Long Beach, CA, United States

8:39am – Robust Topology Optimization Under Random Load Locations

Technical Paper Publication. IMECE2014-36824

Trung Pham, Christopher Hoyle, Brian Bay, Oregon State University, Corvallis, OR, United States

8:57am – Experimental Verification and Finite Element Analysis of Automotive Door Hinge

Technical Paper Publication. IMECE2014-39295

Serdar Dogan, Caner Güven, Rollmech Company, Bursa, Turkey, Tufan G. Yilmaz, Fatih Karpat, Oguz Dogan, Uludag University, Bursa, Turkey

14-6 Systems and Complexity

14-6-1 Systems, Design and Complexity

512B

7:45am–9:15am

Session Organizer: Shuichi Fukuda, *Keio University, Tokyo, Tokyo, Japan*

Session Chair: Anabela Alves, *University of Minho, Guimaraes, Portugal*

7:45am – Dynamic Behavior Models and Their Modeling Depth in the Design Process of Mechatronic Systems

Technical Paper Publication. IMECE2014-37040

Matthias Lochbichler, Felix Oestersötebier, Ansgar Trächtler, *University of Paderborn, Paderborn, North Rhine-Westphalia, Germany*

7:57am – Pattern Driven Decision Making Approach to Engineering Systems Design

Technical Paper Publication. IMECE2014-37989

Shuichi Fukuda, *Keio University, Tokyo, Tokyo, Japan*

8:09am – Decision-Making Competencies in Engineering and Medicine

Technical Paper Publication. IMECE2014-39891

Franz-Josef Kahlen, George Swingler, *University of Cape Town, Cape Town, South Africa, Anabela Alves,* *University of Minho, Guimaraes, Portugal, Shannon Flumerfelt,* *Oakland University, Destin, FL, United States*

8:21am – Systems Competency for Engineering Practice

Technical Paper Publication. IMECE2014-40142

Shannon Flumerfelt, *Oakland University, Destin, FL, United States, Franz-Josef Kahlen,* *University of Cape Town, Cape Town, South Africa, Anabela Alves,* *University of Minho, Guimaraes, Portugal, Javier Calvo-Amodio, Christopher Hoyle,* *Oregon State University, Corvallis, OR, United States*

8:33am – Fuzzy Decision Making for Conceptual Design of a Visual Servoing Using Mechatronic Multicriteria Profile (MMP)

Technical Paper Publication. IMECE2014-40442

Abolfazl Mohebbi, Sofiane Achiche, Luc Baron, *Polytechnique Montréal, Montréal, QC, Canada, Lionel Birglen,* *École Polytech De Montreal, Montreal, QC, Canada*

8:45am – Modeling Probability Density Functions With Metamodels for More Efficient Monte Carlo Analysis

Extended Abstract Presentation. IMECE2014-38367

Cameron Turner, *Colorado School of Mines, Golden, CO, United States*

8:57am – Visual Product Evaluation: Using the Semantic Differential to Investigate the Influence of Basic Vase Geometry on Users' Perception

Technical Paper Publication. IMECE2014-40443

Sofiane Achiche, *Polytechnique Montréal, Montréal, QC, Canada, Anja Maier, Krasimira Milanova,* *Technical University of Denmark, Lyngby, Denmark, Aurelian Vadean,* *École Polytechnique de Montréal, Montréal, QC, Canada*

14-1 General

14-1-2 General Topics in Systems, Design, and Complexity II

512A

9:30am–11:15am

Session Organizer: Daniel Kruse, *Fraunhofer Institute of Production Technology, Paderborn, Germany*

9:30am – Analysis of Tool Changing Mechanism of ATC Used in VMC by Implementing Finite Element Method

Technical Paper Publication. IMECE2014-36032

M.B. Vaghela, S.B. Jadeja, *B H Gardi College of Engineering & Technology, Rajkot, Gujarat, India, India, Vimal Savsani,* *Pandit Deendayal Petroleum University, Gandhinagar, India*

9:51am – Effect of Applying Advanced Optimization Techniques for the One-Dimensional Cutting Stock Problem

Technical Paper Publication. IMECE2014-36095

Prashant Arya, Vimal Savsani, Poonam Savsani, *Pandit Deendayal Petroleum University, Gandhinagar, India*

10:12am – Methodology for a Partly Automated Parameter Identification for the Validation of Multidomain Models

Technical Paper Publication. IMECE2014-37041

Daniel Kruse, Christoph Schweers, *Fraunhofer Institute of Production Technology, Paderborn, Germany, Ansgar Trächtler,* *University of Paderborn, Paderborn, Germany*

10:33am – Multilevel Meta-Model for Simulation of Traffic Evacuation With Multi-Variability

Technical Paper Publication. IMECE2014-37437

Shengcheng Yuan, Yi Liu, Gangqiao Wang, Yefeng Ma, Hui Zhang, *Tsinghua University, Beijing, Beijing, China*

10:54am – Wind Turbine Blade Structure Parameterization Using T4T

Technical Paper Publication. IMECE2014-39674

Giorgos A. Strofylas, Georgios I. Mazanakis, Ioannis K. Nikolos, *Technical University of Crete, Chania, Greece*

14-1-3 Plenary Session**512E** **9:30am–11:15am**

9:30am – Noninvasive Measurement Technique of Brain Activity and Its Application to Human-Machine Interfaces**Plenary Presentation. IMECE2014-40914****Keiichi Watanuki**, *Saitama University, Saitama, Japan*

14-2 Design Innovations, Methodologies, and Philosophies

14-2-1 Design Innovations, Methodologies, and Philosophies I**512B** **9:30am–11:15am**

Session Organizer: **Chuck Pezeshki**, *Washington State University, Pullman, WA, United States***9:30am – Root Cause and Corrective Action Process: 10 Steps to Every Solution****Technical Presentation. IMECE2014-36234****Don Winfree**, *Lockheed Martin, Cresson, TX, United States***9:47am – Design of a Transfer Chute for Multiple Operating Conditions****Technical Paper Publication. IMECE2014-36414****Alejandro Gutierrez, Gonzalo Garate**, *Universidad de Santiago de Chile, Santiago, Metropolitana, Chile***10:04am – Piezoelectric Ultrasonic Atomization System for Passive Humidification Device Intensive Care Patient Applications****Technical Paper Publication. IMECE2014-36506****Mahmoud Shafik**, *University of Derby, Derby, United Kingdom*,
Anne Lechevretel, *UK Materials Technology Research Institute, Melton Mowbray, United Kingdom***10:21am – Understanding Engineering Relational and Knowledge Structures for Facilitation of Collaboration and Global Development****Technical Paper Publication. IMECE2014-38640****Chuck Pezeshki**, *Washington State University, Pullman, WA, United States***10:38am – Examining Design for Development Online: A Qualitative Analysis of OpenIDEO Using HCD/UCD Metrics****Technical Paper Publication. IMECE2014-38751****Pierce Gordon**, *University of California, Berkeley, Oakland, CA, United States*, **Mark Fuge, Alice Agogino**, *University of California, Berkeley, Berkeley, CA, United States***10:55am – Cassowary Casques for Shock Absorption****Technical Presentation. IMECE2014-39342****Scott Widholm**, *General Atomics Aeronautical Systems, La Crescenta, CA, United States*, **Mariappan Jawaharlal**, *Cal Poly Pomona, Pomona, CA, United States*, **Kiranbala Thokchom**, *Manipur University, Imphal, Manipur, India*

14-5 Optimization

14-5-2 Optimization II**512C** **9:30am–11:15am**

9:30am – Modular Optimization Method Based on a Multi-DOE Approach Proposed for a Centrifugal Impeller**Technical Paper Publication. IMECE2014-38056****Paolo Cicconi, Michele Germani, Daniele Landi**, *Università Politecnica delle Marche, Ancona, Italy***9:56am – Design Optimization of Ultrasonic Transducer Element by Evolutionary Algorithm****Technical Paper Publication. IMECE2014-39111****Tariq Arif**, *New Jersey Institute of Technology, Harrison, NJ, United States*, **Zhiming Ji**, *New Jersey Institute of Technology, Newark, NJ, United States***10:22am – Design of a Cam-Actuated Robotic Leg****Technical Paper Publication. IMECE2014-39803****Diane Peters, Steven Chen**, *Kettering University, Flint, MI, United States***10:48am – Forward Kinematics Analysis of Parallel Manipulator Using Dynamic Bacterial Foraging Optimization Algorithm Based on Clonal Selection****Technical Paper Publication. IMECE2014-39829****Shenli Wu, Sun'an Wang, Xiaohu Li**, *Xi'an Jiaotong University, Xi'an, China*

14-2 Design Innovations, Methodologies, and Philosophies

14-2-2 Design Innovations, Methodologies, and Philosophies II

512B 1:00pm–2:45pm

Session Organizer: Douglas L. Van Bossuyt, *Colorado School of Mines, Golden, CO, United States*

1:00pm – Toward an Automated Model-Based Geometric Method of Representing Function Failure Propagation Across Uncoupled Systems

Technical Paper Publication. IMECE2014-36514

Isaac Ramp, Douglas L. Van Bossuyt, *Colorado School of Mines, Golden, CO, United States*

1:21pm – Synthesis of N-Lobed Involute Modified Noncircular Bevel Gears

Technical Paper Publication. IMECE2014-36695

Kan Shi, Jiqiang Xia, Chunjie Wang, Chunming Geng, Rui Wang, *Beihang University, Beijing, China*

1:42pm – Structural Design Optimization With Economic Uncertainty: An Application to Interactions Between Designers, Airlines, and Regulators

Technical Paper Publication. IMECE2014-36779

Garrett Waycaster, Raphael Haftka, Nam Ho Kim, *University of Florida, Gainesville, FL, United States*, **Christian Bes, Christian Gogu,** *University of Toulouse III, Toulouse, France*, **Volodymyr Bilotkach,** *Newcastle University, Newcastle upon Tyne, United Kingdom*

2:03pm – Positional Accuracy Analysis in Serial Chain and Four-Bar Closed Chain Manipulator

Technical Paper Publication. IMECE2014-37375

Hemant Jawale, H. Thorat, *Vivesvaraya National Institute of Technology, Nagpur, Maharashtra, India*

2:24pm – Sustainability Assessment of Products: A Comparative Study of Sustainability Assessment Tools

Technical Paper Publication. IMECE2014-39449

Javier Avila, *Universidad Nacional Autonoma de Mexico, Xaltocan, Xochimilco, Mexico*, **Vicente Borja, Adrian Espinosa,** *Nacional Autonomous University of Mexico, Mexico, Mexico*, **Alejandro Ramirez-Reivich,** *Universidad Nacional Autonoma de Mexico, Del. Coyoacan, D.F., Mexico*, **Marcelo Lopez-Parra,** *Universidad Nacional Autonoma de Mexico, Queretaro, Queretaro, Mexico*

14-3 Product and Process Design

14-3-1 Product and Process Design I

512A 1:00pm–2:45pm

Session Organizer: Yan Fu, *Ford Motor Company, Dearborn, MI, United States*

Session Co-Organizer: Sanjeev Khanna, *University of Missouri–Columbia, Columbia, MO, United States*

1:00pm – Novel Finish Hobbing Methodology for Longitudinal Crowning of a Helical Gear With Twist-Free Tooth Flanks by Using Dual-Lead Hob Cutter

Technical Paper Publication. IMECE2014-36149

Van-The Tran, Ruei-Hung Hsu, *Feng Chia University, Taichung, Taiwan*, **Chung-biau Tsay,** *National Chiao Tung University, Hsinchu, Taiwan*

1:15pm – New Method for Hierarchical Clustering Analysis of Large-Scale Machine Tools

Technical Paper Publication. IMECE2014-37451

Xian ming Gao, Jun Hong, Shuai Zheng, Yichao Zhen, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

1:30pm – Methodological Approach for Supporting the Thermal Design of Li-Ion Battery for Customized Electric Vehicles

Technical Paper Publication. IMECE2014-37931

Daniele Landi, Paolo Cicconi, Michele Germani, *Università Politecnica delle Marche, Ancona, Italia, Italy*

1:45pm – Multidisciplinary Decision Making Methods in an Information-Driven Product Development Framework

Technical Paper Publication. IMECE2014-40175

Angran Xiao, *New York City College of Technology, Brooklyn, NY, United States*

2:00pm – Remote Sealing of Canisters for Hot Isostatic Pressing

Technical Paper Publication. IMECE2014-36919

Dennis Wahlquist, Kenneth Bateman, *Idaho National Laboratory, Idaho Falls, ID, United States*, **Timothy Malewitz,** *Portage Inc., Idaho Falls, ID, United States*

2:15pm – Evaluation of Football Helmets in Preventing Concussions to Football Players

Technical Paper Publication. IMECE2014-36290

David Kalapa, *San Jose State University, San Jose, CA, United States*

**2:30pm – Analysis on the Three-Dimensional Wire Orientation
Technical Paper Publication. IMECE2014-37889**

Wang Zelong, *Kyoto Institute of Technology, Kyoto, Japan*,
Ken-ichi Tsuji, *Toru Tsuji, Kanaami Tsuji, Kyoto, Japan*, **Akihiko
Goto**, *Osaka Sangyo University, Osaka, Japan*, **Yuka Takai**,
Osaka Sangyo University, Daito-shi, Japan, **Yuqiu Yang**, *Donghua
University, Shanghai, China*, **Hiroyuki Hamada**, *Kyoto Institute of
Technology, Kyoto, Japan*

14-4 CAD, CAM, and CAE

14-4-1 CAD, CAM, and CAE

512C

1:00pm–2:45pm

Session Organizer: Manuel Contero, *Universitat Politècnica de
València, Valencia, Spain*

**1:00pm – Evaluation of Formal Strategies to Create Stable and
Reusable Parametric Feature-Based 3D Models**

Technical Paper Publication. IMECE2014-37859
Jorge D. Camba, *Texas A&M University, College Station,
TX, United States*, **Ana Cosin**, **Manuel Contero**, *Universitat
Politécnica de València, Valencia, Spain*

**1:21pm – Optimum 3D Rapping of CAD Models Using Single
NURBS**

Technical Paper Publication. IMECE2014-36736
Mohamed El-Komy, **Sayed M. Metwalli**, *Cairo University, Cairo,
Cairo, Egypt*

**1:42pm – Fast and Robust Method for Boolean Operations on
Triangulated Solids Based on Signed Octree**

Technical Paper Publication. IMECE2014-37694
Shuai Zheng, **Jun Hong**, **Wei Wang**, **Baotong Li**, **Xian Ming
Gao**, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

**2:03pm – Effect of Rim Thickness on Tooth Root Stress and
Mesh Stiffness of Internal Spur Gears**

Technical Paper Publication. IMECE2014-39181
Fatih Karpat, **Baris Engin**, **Oguz Dogan**, **Celalettin Yuce**,
Tufan G. Yilmaz, *Uludag University, Bursa, Turkey*

**2:24pm – Top-Down, Knowledge-Based Approach for Rapid
Design of the Turbopump Overall Structure**

Technical Paper Publication. IMECE2014-40274
Yong Liao, **Xiaoyan Tong**, **Bo Dong**, *Beijing University of
Aeronautics and Astronautics, Beijing, China*

**14-2 Design Innovations, Methodologies,
and Philosophies**

**14-2-3 Design Innovations, Methodologies, and
Philosophies III**

512B

3:00pm–4:45pm

Session Organizer: Shuichi Fukuda, *Keio University, Tokyo,
Tokyo, Japan*

3:00pm – Using Functional Analysis Diagrams as a Design Tool

Technical Paper Publication. IMECE2014-37557
Ioannis Michalakoudis, **Peter Childs**, **Marco Aurisicchio**,
Imperial College London, London, United Kingdom, **Nathan
Pollpeter**, **Neil Sambell**, *Industrial Gas Springs Ltd., London,
United Kingdom*

**3:17pm – Performance Decomposition and Integration
of a Five-Degrees-of-Freedom Compliant Hybrid Parallel
Micromanipulator**

Technical Paper Publication. IMECE2014-37692
Zhen Gao, **Dan Zhang**, *University of Ontario Institute of
Technology, Oshawa, ON, Canada*

3:34pm – Framing Engineering Problems: Basic Concept

Technical Paper Publication. IMECE2014-37954
Shuichi Fukuda, *Keio University, Tokyo, Tokyo, Japan*

**3:51pm – Multiobjective Optimization and Knowledge-Based
Engineering to Improve Refrigerated Display Unit Design**

Technical Paper Publication. IMECE2014-37963
Francesco Furini, **Giorgio Colombo**, *Politecnico di Milano,
Milano, Italy*, **Maurizio Orlandi**, *Epta S.p.A., Milano, Italy*

**4:08pm – Aerodynamic Optimization in Lightweight Electric
Vehicle Design**

Technical Paper Publication. IMECE2014-38053
J.P. De Kock, **Nickey Janse van Rensburg**, **Sunita Kruger**,
R.F. Laubscher, *University of Johannesburg, Johannesburg,
Gauteng, South Africa*

4:25pm – Heuristics-Based Prototyping Strategy Formation: Development and Testing of a New Prototyping Planning Tool
Technical Paper Publication. IMECE2014-39959

Brock Dunlap, Christopher L. Hamon, Richard Crawford, *University of Texas at Austin, Austin, TX, United States*, **Bradley Camburn, Kevin Otto, Kristin Wood,** *Singapore University of Technology and Design, Singapore, Singapore*, **Daniel Jensen,** *U.S. Air Force Academy, USAF Academy, CO, United States*, **Matthew Green,** *Le Tourneau University, Longview, TX, United States*

14-3 Product and Process Design

14-3-3 Product and Process Design II

512A

3:00pm–4:45pm

Session Organizer: Basel Alsayyed, *United Arab Emirates University, Al Ain, United Arab Emir.*

Session Co-Organizer: S.B. Jadeja, *B H Gardi College of Engineering & Technology, Rajkot, Gujarat, India*

3:00pm – Modern Software Infrastructure for Industrial Selection Tools

Technical Paper Publication. IMECE2014-36585

Carlo Cortese, Marco A. Calamari, Paolo Spagli, *GE Oil & Gas, Florence, Italy*

3:17pm – Product Architecture and Modularization Process for Brownfield Development

Technical Paper Publication. IMECE2014-37862

Benjamin R. Thumm, Dietmar Göhlich, *Technische Universität Berlin, Berlin, Germany*, **Caroline Orth, Nazmir Presser,** *Siemens Energy–Power Transmission Division–High Voltage Products, Berlin, Berlin, Germany*, **Sascha Grammel,** *Siemens Energy–Power Transmission Division–High Voltage Products, Erlangen, Germany*

3:34pm – Quantifying Uncertainty in Sketches
Technical Paper Publication. IMECE2014-39383

Ricardo Cruz-Lozano, Fisseha Alemayehu, Stephen Ekwaro-Osire, *Texas Tech University, Lubbock, TX, United States*

3:51pm – Investigations on Deformation in Spur Gear for Transmission Efficiency

Technical Paper Publication. IMECE2014-39463

Hemant Jawale, H. Thorat, Harshal Zalke, Vivesvaraya *National Institute of Technology, Nagpur, Maharashtra, India*

4:08pm – Lean Design for the Developing World: Making Design Decisions Through the Use of Validated Learning Techniques in the Developing World

Technical Paper Publication. IMECE2014-36612

Jordan Pease, Jered H. Dean, Douglas L. Van Bossuyt, *Colorado School of Mines, Golden, CO, United States*

4:25pm – Mining Big Data in Sustainable Manufacturing: Requirement Analysis, Tools, and Techniques

Technical Paper Publication. IMECE2014-38822

Utpal Roy, Bicheng Zhu, Yunpeng Li, Heng Zhang, Omer Yaman, *Syracuse University, Syracuse, NY, United States*

TRACK 15: TRANSPORTATION SYSTEMS

15-1 Crashworthiness, Occupant Protection, and Biomechanics in Transportation Systems

15-1-2: Occupant Protection and Biomechanics I

15-1-3: Occupant Protection and Biomechanics II

15-2 Railroad and Off-Road Vehicles

15-2-1: Railroad and Off-Road Systems Dynamics

15-3 Advanced Automotive Technologies

15-3-2: Advances in Control Systems and Methodologies

15-3-4: Automotive Systems Modeling and Analysis

15-3-5: Design Optimization of Advanced Automotive Systems

15-3-6: Advanced Automotive Systems and Methodologies

15-3-7: Advances in Hybrid Systems and Engine technology

15-4 Plenary

15-4-1: Plenary Session

ACKNOWLEDGMENT

TRACK ORGANIZERS

Marcus Cappelli, *Sikorsky Aircraft, USA*
 Mohamed El-sayed, *Kettering University, USA*

TOPIC ORGANIZERS

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 Saeed Barbat, *Ford Motor Company, USA*
 Marcus Cappelli, *Sikorsky Aircraft, USA*
 Mohamed El-sayed, *Kettering University, USA*

SESSION ORGANIZERS

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 Saeed Barbat, *Ford Motor Company, USA*
 Marcus Cappelli, *Sikorsky Aircraft, USA*
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 Reza Zarringhalam, *University of Waterloo, Canada*
 Shenjin Zhu, *University of Ontario Institute of Technology, Canada*

TRACK 15 TRANSPORTATION SYSTEMS

Monday, November 17

15-1 Crashworthiness, Occupant Protection, and Biomechanics in Transportation Systems

15-1-2 Occupant Protection and Biomechanics I

521A 9:45am–11:30am

Session Organizer: Saeed Barbat, *Ford Motor Company, Dearborn, MI, United States*

Session Co-Organizer: Lingyu Sun, *Beihang University, Beijing, China*

9:45am – Rear Impact Vehicle Seat Structure (RIVSS) Design

Technical Paper Publication. IMECE2014-36326

James Salmon, *Caulfield Engineering, Terrace Park, OH, United States*, **Roger Burnett**, *Ford Motor Company, Dearborn, MI, United States*, **Ed Caulfield**, *Caulfield Engineering, Naperville, IL, United States*

10:11am – Response Surface Methodology in Predicting Injuries to Out-of-Position Occupants From Frontal Airbags

Technical Paper Publication. IMECE2014-36782

Yi Yang Tay, *Hamid Lankarani, Wichita State University, Wichita, KS, United States*, **Rasoul Moradi**, *Key Safety System, Sterling Heights, MI, United States*

10:37am – Analyzing Roadside Safety Implications of Future Vehicle Designs

Technical Paper Publication. IMECE2014-38167

Tejas Ruparel, *Karma Yonten, Azim Eskandarian, George Washington University, Ashburn, VA, United States*

11:03am – Improving Child Safety Seat Performance Through Finite Element Simulations

Technical Paper Publication. IMECE2014-38471

Jingwen Hu, *Raj Jayakar, University of Michigan, Ann Arbor, MI, United States*

15-3 Advanced Automotive Technologies

15-3-2 Advances in Control Systems and Methodologies

521B 9:45am–11:30am

Session Organizer: Jorge de Jesus Lozoya-Santos, *Universidad de Monterrey, San Pedro Garza García, Nuevo León, Mexico*

Session Co-Organizers: Reza Zarringhalam, *University of Waterloo, Waterloo, ON, Canada*, **Shenjin Zhu**, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

9:45am – Design of SUV Differential Braking Controller Considering the Interactions of Driver and Control System

Technical Paper Publication. IMECE2014-36439

Shenjin Zhu, *Yuping He, University of Ontario Institute of Technology, Oshawa, ON, Canada*

10:06am – Wireless Networked Control for Active Trailer Steering Systems of Articulated Heavy Vehicles

Technical Paper Publication. IMECE2014-36440

Tina Mirfakhraie, *Yuping He, Ramiro Liscano, University of Ontario Institute of Technology, Oshawa, ON, Canada*

10:27am – Control of Electric Vehicles Using a Model Predictive Controller With a Closed-Form Solution

Technical Paper Publication. IMECE2014-38316

Milad Jalaliyazdi, *Amir Khajepour, Alireza Kasaiezadeh, University of Waterloo, Waterloo, ON, Canada*, **Shih-Ken Chen**, *Bakhtiar Litkouhi, General Motors, Warren, MI, United States*

10:48am – Nonlinear Robust Control of Vehicle Lateral Dynamics Considering the Human Driver Effects

Technical Paper Publication. IMECE2014-39311

Saeid Khosravani, *Amir Khajepour, Baris Fidan, University of Waterloo, Waterloo, ON, Canada*, **Iman Fadakar**, *University of Waterloo, Kitchener, ON, Canada*, **Shih-Ken Chen**, *Bakhtiar Litkouhi, General Motors, Warren, MI, United States*

11:09am – Towards a Supermileage Autonomous Vehicle

Technical Paper Publication. IMECE2014-40187

Jorge de Jesus Lozoya-Santos, *Pedro G. Aguiar, Paulina Ferretiz, Cesar A. Hernandez, Universidad de Monterrey, San Pedro Garza García, Nuevo León, Mexico*, **Sébastien Varrier**, *Grenoble INP, Grenoble, France*

15-1 Crashworthiness, Occupant Protection, and Biomechanics in Transportation Systems

15-1-3 Occupant Protection and Biomechanics II

521A

1:00pm–2:45pm

Session Organizer: Ridha Baccouche, *Ford, Ann Arbor, MI, United States*

1:00pm – Energy Absorption Characteristics of a Thin-Walled Tube Filled With Carbon Nano Polyurethane Foam and Application in Car Bumper

Technical Paper Publication. IMECE2014-37318
Damodar Tankara, Yi Yang Tay, *Wichita State University, Wichita, KS, United States,* **Rasoul Moradi,** *Key Safety System, Sterling Heights, MI, United States,* **Hamid Lankarani,** *Wichita State University, Wichita, KS, United States*

1:26pm – Failure Mechanisms of Weld Bonded Lap Joints Between Composite/Metal Adherends

Technical Paper Publication. IMECE2014-37333
Lijun Li, Lingyu Sun, *Beihang University, Beijing, China*

1:52pm – Crash Probabilities With the Consideration of the Host Vehicle Speed

Technical Presentation. IMECE2014-37929
Choongryeong Lee, Hyun-Yong Jeong, *Sogang University, Seoul, Korea (Republic)*

2:18pm – Enhancement of Occupant Safety During Frontal Collisions Using New Vehicle/Occupant Interaction Modeling With VDC Systems and Smart Structures

Technical Paper Publication. IMECE2014-37007
Ahmed Elmarakbi, *University of Sunderland, Sunderland, United Kingdom,* **Mustafa Elkady,** *Lebanese International University, Beirut, Lebanon*

15-2 Railroad and Off-Road Vehicles

15-2-1 Railroad and Off-Road Systems Dynamics

521C

1:00pm–2:45pm

Session Organizer: Mostafa Salama, *University of Alabama at Birmingham, South Birmingham, AL, United States*

Session Co-Organizer: Iman Hazrati Ashtiani, *Concordia University, Montreal, QC, Canada*

1:00pm – Parallel Control of Four Independently Driven Wheels to Maintain UGV Inverse Dynamics

Technical Paper Publication. IMECE2014-36441
Mostafa Salama, *University of Alabama at Birmingham, South Birmingham, AL, United States,* **Vladimir Vantsevich,** *University of Alabama at Birmingham, Hoover, AL, United States*

1:17pm – Vehicle Handling Dynamics Optimization Based in Passive Suspension Settings in Target Cascading Framework

Technical Paper Publication. IMECE2014-36760
Juan Camilo Blanco, Luis Munoz, *Universidad de los Andes, Bogota, Colombia*

1:34pm – Hunting Characteristics of a Freight Car in Presence of Secondary Suspension Nonsmooth Contact Dynamics

Technical Paper Publication. IMECE2014-38960
Iman Hazrati Ashtiani, Abul Karam Waizuddin Ahemd, Subhash Rakheja, *Concordia University, Montreal, QC, Canada,* **Jimin Zhang,** *Tongji University, Shanghai, China*

1:51pm – Structural Integrity of Conventional and Modified Railroad Bearing Adapters for Onboard Monitoring Applications

Technical Paper Publication. IMECE2014-37492
Joseph Montalvo, Alexis Trevino, Arturo Fuentes, Constantine Tarawneh, *University of Texas–Pan American, Edinburg, TX, United States*

2:08pm – Aerodynamic Simulation of Evacuated Tube Transport (ETT) Trains With Suction at Tail

Technical Paper Publication. IMECE2014-37904
Brijesh Pandey, *Bengal Engineering and Science University, Shibpur, Kolkata, West Bengal, India,* **Sujay Kumar Mukherjea,** *Bengal Engineering and Science University, Howrah, West Bengal, India*

2:25pm – Prediction of Contact Area and Frictional Behavior of Rubber on Rigid Rough Surfaces

Technical Paper Publication. IMECE2014-37998
Hagen Lind, Matthias Wangenheim, *Leibniz Universität Hannover, Hannover, Germany*

15-3 Advanced Automotive Technologies

15-3-4 Automotive Systems Modeling and Analysis

521B

1:00pm–2:45pm

Session Organizer: Mohamed El-sayed, *Kettering University, Flint, MI, United States*

Session Co-Organizer: Ehsan Hashemi, *University of Waterloo, Waterloo, ON, Canada*

1:00pm – Employing Adaptive Mesh Refinement for Simulating the Exhaust Gas Recirculation Mixing Process of a Compression Ignition Engine

Technical Paper Publication. IMECE2014-36464

Richard Bramlette, Chenaniah Langness, Michael Mangus, Christopher Depcik, *University of Kansas, Lawrence, KS, United States*

1:17pm – Tire Force Estimation With Strain Gauge Measurement

Technical Paper Publication. IMECE2014-36762

Valery Pylypchuk, *UTECH LLC, West Bloomfield, MI, United States*, **Shih-Ken Chen,** *General Motors, Warren, MI, United States*, **Nikolai Moshchuk,** *General Motors, Grosse Pointe Farms, MI, United States*

1:34pm – Modeling of the Internal Combustion Engine by Means of Willians Line Approach for the Study of Hybrid Electric Powertrain

Technical Paper Publication. IMECE2014-36867

Davide Tarsitano, Laura Mazzola, Federico Cheli, Ferdinando Mapelli, *Politecnico di Milano, Milano, Italy*

1:51pm – Finite Element Modeling of Tire With Validation Using Tensile and Frequency Response Testing

Technical Paper Publication. IMECE2014-38286

Jennifer M. Bastiaan, Amir Khajepour, *University of Waterloo, Waterloo, ON, Canada*

2:08pm – Robust Estimation and Experimental Evaluation of Longitudinal Friction Forces in Ground Vehicles

Technical Paper Publication. IMECE2014-39390

Ehsan Hashemi, Alireza Kasaiezadeh, Amir Khajepour, *University of Waterloo, Waterloo, ON, Canada*, **Shih-Ken Chen,** *General Motors, Warren, MI, United States*, **Nikolai Moshchuk,** *General Motors, Grosse Pointe Farms, MI, United States*

2:25pm – Impact Analysis of Microelectromechanical Systems (MEMS) in Automotive Usage and Maintenance

Technical Paper Publication. IMECE2014-40071

Oluwafunbi Simolowo, Peter Olaoye, *University of Ibadan, Ibadan, Oyo, Nigeria*

15-3 Advanced Automotive Technologies

15-3-5 Design Optimization of Advanced Automotive Systems

521A

3:00pm–4:45pm

Session Organizer: Yuping He, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

Session Co-Organizer: Shubhashisa Sahoo, *Centre for Artificial Intelligence and Robotics, DRDO, Bangalore, Karnataka, India*

3:00pm – Design of Kinetic Energy Recovery System for Efficiency

Technical Paper Publication. IMECE2014-37860

Sidhu Suresh, Balagovind N.K. Kartha, Vinod Kumar Gopal, Sujith T. Pillai, Govind Udayabhanu, Akilesh Narayanan, Nikhil Unnikrishnan, Vinayak Jayaprakash, Amrita Vishwa Vidyapeetham, *Amritapuri Campus, Kollam, Kerala, India*

3:21pm – Design Optimization of Car-Trailer Combinations With Electronic Stability Control Systems

Technical Paper Publication. IMECE2014-36477

Tao Sun, Yuping He, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

3:42pm – Vehicle Mass Optimization for Frontal Structure Using I-Sight and Study of Weld Parameterization for Mass Improvement

Technical Paper Publication. IMECE2014-37311

Sachin Patil, Hamid Lankarani, *Wichita State University, Wichita, KS, United States*, **Rasoul Moradi,** *Key Safety System, Sterling Heights, MI, United States*

4:03pm – Robust Handling Performance Against Weight Variation for Lightweight Vehicle

Technical Paper Publication. IMECE2014-39200

Kyosuke Takekoshi, Yusuke Udagawa, *Meiji University, Kanagawa, Japan*, **Taichi Shiiba,** *Meiji University, Kawasaki, Japan*

4:24pm – Sensitivity Analysis of Vehicle Parameters for Heading Angle Control of an Unmanned Ground Vehicle

Technical Paper Publication. IMECE2014-39685

Shubhashisa Sahoo, *Centre for Artificial Intelligence and Robotics, DRDO, Bangalore, Karnataka, India*, **Shankar C. Subramanian**, *Indian Institute of Technology Madras, Chennai, Tamilnadu, India*, **Suresh Srivastava**, *Office of the Director General (Aeronautics), Bengaluru, Karnataka, India*

15-3-6 Advanced Automotive Systems and Methodologies

521B

3:00pm–4:45pm

Session Organizer: Ioannis K. Nikolos, *Technical University of Crete, Chania, Greece*

Session Co-Organizer: Mina Attari, *McMaster University, Hamilton, ON, Canada*

3:00pm – Automotive Tracking Techniques Using a New IMM-Based PDA-SVSF

Technical Paper Publication. IMECE2014-36412

Mina Attari, Saeid Habibi, *McMaster University, Hamilton, ON, Canada*

3:21pm – Study and Development of Vehicle Collision Detection System

Technical Paper Publication. IMECE2014-37227

Alemayehu Wakjira Huluka, *Adama Science and Technology University, Adama, Oromia, Ethiopia*, **Hirpa G. Lemu**, *University of Stavanger, Stavanger, Rogaland, Norway*

3:42pm – Surge Limit Prediction of Centrifugal Compressor Using Semi-Classical Signal Analysis

Technical Paper Publication. IMECE2014-37546

Michaël Deligant, *Dynfluid, Arts et Métiers ParisTech, Paris, Ile de France, France*, **Sofiane Khelladi, Farid Bakir**, *Arts et Métiers ParisTech, Paris, Ile de France, France*, **Pierre Podevin**, *Conservatoire National des Arts et Métiers, Paris, Ile de France, France*

4:03pm – New Identification Approach of Road Bank Angle and Road Grade

Technical Paper Publication. IMECE2014-39349

Ayyoub Rezaeian, Amir Khajepour, William Melek, *University of Waterloo, Waterloo, ON, Canada*, **Nikolai Moshchuk**, *General Motors, Grosse Pointe Farms, MI, United States*, **Shih-Ken Chen**, *General Motors, Warren, MI, United States*

4:24pm – Assessing the Impact of a Cooperative Merging System on Highway Traffic Using a Microscopic Flow Simulator

Technical Paper Publication. IMECE2014-39850

Ioannis A. Ntousakis, Kallirroï Porfyri, Ioannis K. Nikolos, Markos Papageorgiou, *Technical University of Crete, Chania, Greece*

15-3-7 Advances in Hybrid Systems and Engine Technology

521C

3:00pm–4:45pm

Session Organizer: Mohamed El-sayed, *Kettering University, Flint, MI, United States*

Session Co-Organizers: Christopher Depcik, *University of Kansas, Lawrence, KS, United States*, **K.D. Sapate**, *Trinity College of Engineering and Research, Pune, Pune, India*

3:00pm – Mobility and Energy Efficiency of Military Tactical Vehicle With Hybrid-Electric Driveline System

Technical Paper Publication. IMECE2014-36448

Vladimir Vantsevich, Jesse Paldan, *University of Alabama at Birmingham, Birmingham, AL, United States*, **Jeremy P. Gray**, *U.S. Army TARDEC, Warren, MI, United States*

3:17pm – Review of Hybrid Electric Vehicles (HEV)

Technical Paper Publication. IMECE2014-37846

Balagovind N.K. Kartha, Vinod Kumar Gopal, Akilesh Narayanan, Sidhu Suresh, Vinayak Jayaprakash, Amrita Vishwa Vidyapeetham, *Amritapuri Campus, Kollam, Kerala, India*

3:34pm – Experimental Investigation of Two Stroke Direct Injection Spark Ignition Engine

Technical Paper Publication. IMECE2014-37879

K.D. Sapate, *Trinity College of Engineering and Research, Pune, Pune, India*, **A.N. Tikekar**, *Walchand College of Engineering, Sangali, Sangali, India*

3:51pm – Experimental Study for Propane Injection in Gasoline Engines

Technical Paper Publication. IMECE2014-39819
Mohamed El-sayed, Don Byrley, Wes Urbanik, Aaron Selis, Jared Kreft, Tianao Li, Kah Aik Ng, Kettering University, Flint, MI, United States

4:08pm – Performance Investigation of an Eight-Cylinder Gasoline Engine

Technical Paper Publication. IMECE2014-40417
Ali Kilicarslan, Hitit University, Corum, Turkey, Mohamad S. Qatu, Central Michigan University, Mount Pleasant, MI, United States

4:25pm – Swappable Battery Pack for Short-Range Electric Vehicles

Technical Paper Publication. IMECE2014-37080
Matthew Choate, Jake Meeth, Caleb Christianson, Patrick Collins, Christopher Depcik, University of Kansas, Lawrence, KS, United States

Tuesday, November 18

15-4 Plenary

15-4-1 Plenary Session

522A

9:45am–11:30am

Session Organizer: Marcus Cappelli, Sikorsky Aircraft, Stratford, CT, United States

9:45am – Engineering Management of Product Development Process

Plenary Presentation. IMECE2014-40913

Mohamed El-sayed, Kettering University, Flint, MI, United States

TRACK 16: VIBRATION, ACOUSTICS & WAVE PROPAGATION

16-4 General Noise and Vibration Control

16-4-1: Noise and Vibration Control

16-5 Phononic Crystals and Metamaterials

16-5-1: Special Properties

16-5-2: Nonlinear Waves

16-5-3: Effective Properties and Cloaking

16-5-4: 2D Structures and Bravais Lattices

16-5-5: Wave Manipulation

16-5-6: Nano and Bio Systems

16-5-7: Tunability and Optimization

16-5-8: Computation and Fabrication

16-6 Numerical Methods in Vibrations and Acoustics

16-6-1: Numerical Methods in Vibrations and Acoustics

16-7 Vibrations and Acoustic/Elastic Waves

16-7-1: Vibration and Acoustic/Elastic Waves

16-10 Flow-Induced Noise and Vibration

16-10-1: Flow-Induced Noise and Vibration

16-12 Vibration and Acoustic Measurement Techniques and Facilities

16-12-1: Vibration and Acoustic Measurement Techniques and Facilities

16-12-2: Vibration and Acoustic Measurement Techniques and Facilities

16-15 Noise Control and Acoustics Tutorial

16-15-1: Noise Control and Acoustics Tutorial

16-16 NCAD Rayleigh Lecture

16-16-1: Rayleigh Lecture

ACKNOWLEDGMENT

TRACK ORGANIZERS

Liang-Wu Cai, *Kansas State University, USA*
 Kristin Cody, *BMPC Bettis Lab, USA*
 Noah H. Schiller, *NASA Langley Research Center, USA*
 Zhongquan Zheng, *University of Kansas, USA*

TOPIC ORGANIZERS

Albert R. Allen, *NASA Langley Research Center, USA*
 Badreddine Assouar, *University of Lorraine-CNRS, France*
 Rui Botelho, *General Dynamics Electric Boat, USA*
 Liang-Wu Cai, *Kansas State University, USA*
 Robert Campbell, *Penn State University Applied Research Laboratory, USA*
 Kristin Cody, *BMPC Bettis Lab, USA*
 Nicholas Fang, *Massachusetts Institute of Technology, USA*
 Mahmoud Hussein, *University of Colorado Boulder, USA*
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 Henry Scarton, *Rensselaer Polytechnic Institute, USA*
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 Usama Tohid, *PULSCO, USA*
 Robert Tomko, *Bechtel Marine Propulsion Corporation, USA*
 Jeffrey Vipperman, *University of Pittsburgh, USA*
 Jinkyu Yang, *University of Washington, USA*

SESSION ORGANIZERS

Albert R. Allen, *NASA Langley Research Center, USA*
 Badreddine Assouar, *University of Lorraine-CNRS, France*
 Bernard Bonello, *CNRS and University Paris 6, France*
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 Jeffrey Vipperman, *University of Pittsburgh, USA*
 Xu Wang, *RMIT University, Australia*
 Jinkyu Yang, *University of Washington, USA*

TRACK 16 VIBRATION, ACOUSTICS, AND WAVE PROPAGATION

Tuesday, November 18

16-6 Numerical Methods in Vibrations and Acoustics

16-6-1 Numerical Methods in Vibrations and Acoustics

523A 9:45am–11:30am

Session Organizer: Rui Botelho, *General Dynamics Electric Boat, Groton, CT, United States*

Session Co-Organizers: Albert R. Allen, *NASA Langley Research Center, Hampton, VA, United States*, Usama Tohid, *PULSCO, Irvine, CA, United States*

9:45am – Finite Element Analysis Conversion Factors for Natural Vibrations of Beams

Technical Paper Publication. IMECE2014-37261

Austin Cosby, *United Technologies–Pratt & Whitney, East Hartford, CT, United States*, **Ernesto Gutierrez-Miravete**, *Rensselaer at Hartford, Hartford, CT, United States*

10:00am – Fast Phononic Eigenvalue Calculations Through a GPU Accelerated Variational Method

Extended Abstract Publication. IMECE2014-36597

Ankit Srivastava, *Illinois Institute of Technology, Chicago, IL, United States*

10:15am – Design for a Hybrid Absorbing Element in the Time Domain Using PML and Infinite Element Concepts

Technical Paper Publication. IMECE2014-37159

Jeffrey Cipolla, *Weidlinger Associates, Inc., New York, NY, United States*

10:35am – Combined Perfectly Matching Layer and Infinite Element Formulation for Unbounded Wave Problems in the Frequency Domain.

Technical Paper Publication. IMECE2014-37985

Joseph S. Pettigrew, **Anthony J. Mulholland**, *University of Strathclyde, Glasgow, United Kingdom*, **Jeffrey L. Cipolla**, *Weidlinger Associates, Inc., Washington, DC, United States*, **John Mould**, **Robert Banks**, *Weidlinger Associates, Inc., Mountain View, CA, United States*

10:50am – Applying Incompatible Meshes for Modeling Structural-Acoustic Domains in Energy Finite Element Analysis

Technical Paper Publication. IMECE2014-39085

Sergey Medyanik, *MES, Ann Arbor, MI, United States*, **Nick Vlahopoulos**, *University of Michigan, Ann Arbor, MI, United States*

11:10am – Impacts of Bias Flow and Geometric Variables on Acoustic Damping Attributes of Perforated Liners

Technical Paper Publication. IMECE2014-36375

Alireza Mazdeh, *Honeywell, Urbana, OH, United States*, **Ahmad Kashani**, *University of Dayton, Dayton, OH, United States*

16-12 Vibration and Acoustic Measurement Techniques and Facilities

16-12-1 Vibration and Acoustic Measurement Techniques and Facilities

523B

9:45am–11:30am

Session Organizer: Robert Tomko, *Bechtel Marine Propulsion Corporation, South Park, PA, United States*

Session Co-Organizer: Kristin Cody, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

9:45am – Development of 45° Incident Angle Sound Absorption Coefficient Test Device for Design of Vehicle Interior Trim Sound Package

Technical Paper Publication. IMECE2014-36103

Yuli Zhao, **Weishan Chen**, *RMIT University, East Malvern, Victoria, Australia*, **Laith Egab**, *RMIT University, Bundoora East, VIC, Australia*, **Haiqiao Wei**, *Tianjin University, Tianjin, Tianjin, China*, **Xu Wang**, *RMIT University, East Malvern, VIC, Australia*

10:06am – Finite Element Simulations and Tests for a Module of a Microspeaker

Technical Presentation. IMECE2014-37932

Hyeongjoo Moon, **Hyun-Yong Jeong**, *Sogang University, Seoul, Korea (Republic)*

10:27am – Analytical Evaluation of Spectral Moments and Dirlik's Damage Model to Allow Comparison of Life Testing With Dissimilar PSD Vibration Curves

Technical Paper Publication. IMECE2014-36391

Jon Pointer, *Woodward, Inc., Loveland, CO, United States*

10:48am – Advanced Real-Time and Long-Term Monitoring of Transportation Pipelines

Technical Paper Publication. IMECE2014-36872

Giancarlo Bernasconi, Silvio Del Giudice, *Politecnico di Milano, Milano, Italy*, **Giuseppe Giunta**, *ENI Spa, San Donato Milanese, Italy*

11:09am – Phased Array Ultrasonic Technique Parametric Evaluation for Composite Materials

Technical Paper Publication. IMECE2014-36945

Hossein Taheri, Katrina Ladd, Fereidoon Delfanian, Jikai Du, *South Dakota State University, Brookings, SD, United States*

16-10 Flow-Induced Noise and Vibration

16-10-1 Flow Induced Noise and Vibration

523A

1:00pm–2:45pm

Session Organizer: Robert Tomko, *Bechtel Marine Propulsion Corporation, South Park, PA, United States*

Session Co-Organizers: Robert Campbell, *Applied Research Laboratory/Pennsylvania State University, State College, PA, United States*, Kristin Cody, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

1:00pm – Vibration Vulnerability of Rod-Baffle Type Heat Exchangers—Case Study Badak LNG Multicomponent Refrigerants Aftercoolers

Technical Paper Publication. IMECE2014-39673

Frilo Fitrasali Hutagalung, *Badak LNG, Bontang, East Kalimantan, Indonesia*

1:17pm – Coupled FSI Simulations of the Interaction of a Flexible Hydrofoil With Large-Scale Unsteady Flows

Technical Paper Publication. IMECE2014-40368

Abe Lee, Robert Campbell, Brent Craven, Stephen Hambric, *Applied Research Laboratory/Pennsylvania State University, State College, PA, United States*

1:34pm – Assessment of Surface-Based Aeroacoustic Noise From Blades of a Vertical-Axis Wind Turbine

Technical Paper Publication. IMECE2014-38199

Robert Williams, Joana Rocha, Edgar Matida, Fred Nitzsche, *Carleton University, Ottawa, ON, Canada*

1:51pm – Aeroacoustics of a Low-Speed Free Tip Fan With a Complex Clearance Geometry

Technical Paper Publication. IMECE2014-39160

Dominic Lallier-Daniels, Stéphane Moreau, Marlene Sanjose, *Université de Sherbrooke, Sherbrooke, QC, Canada*

2:08pm – Parametric Study of a PULSCO Vent Silencer

Technical Paper Publication. IMECE2014-36420

Usama Tohid, Chris Genger, John Kaiser, Ilaria Accorsi, *PULSCO, Irvine, CA, United States*, **Arturo Pacheco-Vega**, *California State University, Los Angeles, Los Angeles, CA, United States*

2:25pm – Unsteady Force Measurement for a Beam Using Small Piezoelectric End Sensors

Technical Paper Publication. IMECE2014-36590

Margalit Goldschmidt, Michael Jonson, George Lesieutre, *Pennsylvania State University, State College, PA, United States*

16-12 Vibration and Acoustic Measurement Techniques and Facilities

16-12-2 Vibration and Acoustic Measurement Techniques and Facilities

523B

1:00pm–2:45pm

Session Organizer: Kristin Cody, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

Session Co-Organizer: Xu Wang, *RMIT University, East Malvern, VIC, Australia*

1:00pm – Rolling Element Bearing Fault Diagnostics Using Acoustic Emission Technique and Advanced Signal Processing

Technical Paper Publication. IMECE2014-36618

Farzad Hemmati, Mohamed Gadala, *University of British Columbia, Vancouver, BC, Canada*, **Mohammed Alqaradawi**, *Qatar University, Doha, Qatar*

1:21pm – Morphological Decomposition Method for Multimode Ultrasonic Guided Waves

Technical Paper Publication. IMECE2014-39738

Xiang Li, Bo Huang, Xunbo Li, *University of Electronic Science and Technology of China, Chengdu, Sichuan, China*

1:42pm – Power Transformer Fault Diagnosis Based on Vibration Correlation Analysis

Technical Paper Publication. IMECE2014-37214

Kaixing Hong, Hai Huang, *Zhejiang University, Hangzhou, Zhejiang, China*

2:03pm – Tooth Contact Analysis of Planetary Gear Trains and Its Transmission Error Experiments and Frequency Spectrum Analysis

Technical Paper Publication. IMECE2014-37418

Kai Xu, Aijun Xu, Jianjun Yang, Ming Qiu, Jianxin Su, Henan University of Science & Technology, LuoYang, Henan, China

2:24pm – Verification of the Vibration Characteristics of a Reciprocating Compressor in Operation and the Proposal of the Model Parameters Estimation Method

Technical Paper Publication. IMECE2014-36812

Yoshifumi Mori, Tokuyama Corporation, Shunan City Yamaguchi, Japan, Takashi Saito, Yamaguchi University, Ube, Yamaguchi, Japan, Katsuhide Fujita, Ube National College of Technology, Ube, Japan

16-16 NCAD Rayleigh Lecture

16-16-1 Rayleigh Lecture

523A

3:00pm–4:45pm

Session Organizer: Kristin Cody, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

3:00pm – Going Underwater With Acoustic Resonators and Waveguides

Plenary Presentation. IMECE2014-40655

Mardi Hastings, Georgia Institute of Technology, Atlanta, GA, United States

Wednesday, November 19

16-15 Noise Control and Acoustics Tutorial

16-15-1 Noise Control and Acoustics Tutorial

519A

9:45am–11:30am

Session Organizer: Kristin Cody, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

9:45am – Control of Sound With Periodic Structures

Plenary Presentation. IMECE2014-40654

Andrew Norris, Rutgers University, Piscataway, NJ, United States

16-4 General Noise and Vibration Control

16-4-1 Noise and Vibration Control

519B

1:00pm–2:45pm

Session Organizer: Noah H. Schiller, *NASA Langley Research Center, Hampton, VA, United States*

Session Co-Organizer: Jeffrey Vipperman, *University of Pittsburgh, Pittsburgh, PA, United States*

1:00pm – Sound Transmission Loss Through a Corrugated-Core Sandwich Panel With Integrated Acoustic Resonators

Technical Paper Publication. IMECE2014-39612

Noah H. Schiller, Albert R. Allen, NASA Langley Research Center, Hampton, VA, United States, Bart F. Zalewski, Zin Technologies, Inc., Cleveland, OH, United States, Benjamin S. Beck, National Institute of Aerospace, Hampton, VA, United States

1:20pm – Optimization on Microlattice Materials for Noise Control

Technical Presentation. IMECE2014-38558

Jun Yang, Xiaobing Cai, Qiuquan Guo, University of Western Ontario, London, ON, Canada

1:40pm – Modified Optimal Design of a Vibration Absorber for Ground Motion Isolation

Technical Paper Publication. IMECE2014-36500

Jimmy Issa, Lebanese American University, Byblos, Lebanon

2:00pm – Characterization of the Damping Behavior of Thin Films With Dynamic Mechanic Analysis in Bending Mode
Technical Paper Publication. IMECE2014-38279

Gilbert Knapp, Martin Leyrer, Gernot Oreski, *Polymer Competence Center Leoben GmbH, Leoben, Austria*, **Gerald Pinter**, *University of Leoben, Leoben, Austria*

2:20pm – Adaptive ITERATIVE Learning Control for Unbalance Compensation in a Power Magnetically Levitated Spindle
Technical Paper Publication. IMECE2014-37025

Lixin Zhan, Kai Zhou, *Tsinghua University, Beijing, Beijing, China*

16-5 Phononic Crystals and Metamaterials

16-5-1 Special Properties

519A

1:00pm–2:45pm

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

1:00pm – Negative Reflection With Positive Phase-velocity and Positive Reflection With Negative Phase-Velocity in Periodic Composites

Technical Presentation. IMECE2014-37069

Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

1:17pm – Dirac-Like Cones at Low-Symmetry Points in Phononic Crystals

Technical Paper Publication. IMECE2014-37422

Huixian Cao, Jun Mei, *South China University of Technology, Guangzhou, Guangdong, China*

1:34pm – Topologically Protected Edge State in Phononic Crystals

Technical Presentation. IMECE2014-38421

Pai Wang, Katia Bertoldi, *Harvard University, Cambridge, MA, United States*

1:51pm – Mutual Interaction Effect of Internal Resonators in Acoustic Metamaterials

Technical Presentation. IMECE2014-37669

Kwek Tze Tan, Chin-Teh Sun, *Purdue University, West Lafayette, IN, United States*

2:08pm – Dispersion and Elastic Properties of Locally Resonant Acoustic Metamaterials With Incompressible Components

Technical Presentation. IMECE2014-36879

Anastasiia Krushynska, Varvara Kouznetsova, Marc Geers, *Eindhoven University of Technology, Eindhoven, Netherlands*, **Kim Pham**, *École Nationale Supérieure de Techniques Avancées, Palaiseau Cedex, France*

2:25pm – Metadamping in Viscoelastic Metamaterials

Technical Presentation. IMECE2014-39063

Clemence Bacquet, Todd Murray, Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

16-5 Phononic Crystals and Metamaterials

16-5-2 Nonlinear Waves

519A

3:00pm–4:45pm

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: Liang-Wu Cai, *Kansas State University, Manhattan, KS, United States*

3:00pm – Theory of Nonlinear Wave Dispersion in Rods

Extended Abstract Presentation. IMECE2014-39050

Romik Khajehtourian, Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

3:17pm – Wave Manipulation in Microbead Chains Including Interparticle Attraction

Extended Abstract Presentation. IMECE2014-39091

Jonathan Bunyan, Sameh Tawfick, Alexander Vakakis, *University of Illinois at Urbana–Champaign, Champaign, IL, United States*

3:34pm – Large-Amplitude Stress Waves in Nonlinear Periodic Structures

Technical Presentation. IMECE2014-38493

Filippo Casadei, Pai Wang, Katia Bertoldi, *Harvard University, Cambridge, MA, United States*

3:51pm – Experimental and Numerical Verifications of Traveling Breathers in Granular Crystal Pillars

Technical Presentation. IMECE2014-38458

Feng Li, Eunho Kim, Jinkyu Yang, *University of Washington, Seattle, WA, United States*

4:08pm – Nonlinear Dynamics of Microscale Granular Metamaterials

Technical Presentation. IMECE2014-38675

Nicholas Boechler, *University of Washington, Seattle, WA, United States*

4:25pm – Tunable Phononic Crystals via Instability-Induced Interfacial Wrinkling in Deformable Layered Composites

Technical Presentation. IMECE2014-39319

Stephan Rudykh, Nicholas Fang, *Massachusetts Institute of Technology, Cambridge, MA, United States*, **Mary Boyce**, *Columbia University, New York, NY, United States*

16-7 Vibrations and Acoustic/Elastic Waves

16-7-1 Vibration and Acoustic/Elastic Waves

519B

3:00pm–4:45pm

Session Organizer: Henry Scarton, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Session Co-Organizer: Kristin Cody, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

3:00pm – Nonlinear Guided Waves for Continuous Material Microstructure State Awareness

Technical Paper Publication. IMECE2014-39699

Cliff Lissenden, Yang Liu, Vamshi Chillara, Gloria Choi, Xiaochu Yao, *Pennsylvania State University, University Park, PA, United States*

3:25pm – Shear and Longitudinal Acoustic Communication and Power Transfer Through Plates Using Acoustic Wedges

Technical Paper Publication. IMECE2014-38716

Ben Litman, Kyle Wilt, Henry Scarton, Gary Saulnier, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:50pm – Localization Approach of Damage in Welded Joint Based on Acoustic Emission Beamforming

Technical Paper Publication. IMECE2014-37658

Denghong Xiao, Tian He, Xiandong Liu, Yingchun Shan, *Beihang University, Beijing, Beijing, China*

4:15pm – Theoretical and Experimental Research on Design of Nonresonant Gear Transformer

Technical Paper Publication. IMECE2014-39714

Wang Shiyang, Lv Ming, Ya Gang, Liang Guoxing, *Taiyuan University of Technology, Taiyuan City, Shanxi Province, China*, **Liu Jiancheng**, *University of the Pacific, Stockton, CA, United States*

Thursday, November 20

16-5 Phononic Crystals and Metamaterials

16-5-3 Effective Properties and Cloaking

520C

7:45am–9:15am

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: Nicholas Fang, *Massachusetts Institute of Technology, Cambridge, MA, United States*

7:45am – Applicability of Dynamic Homogenization for Acoustic Metamaterials

Extended Abstract Publication. IMECE2014-36601

Ankit Srivastava, *Illinois Institute of Technology, Chicago, IL, United States*, **Siavouche Nemat-Nasser**, *University of California, San Diego, La Jolla, CA, United States*

8:00am – Dynamical Effective Parameters of Electrically Tunable Piezoelectric 1D Phononic Crystals

Technical Presentation. IMECE2014-38863

Olivier Poncelet, Anton Kutsenko, Alexander L. Shuvalov, *University of Bordeaux–CNRS, Talence, France*, **Alexander N. Darinskii**, *Institute of Crystallography RAS, Moscow, Russia*

8:15am – Effective Properties of Plate-Type Acoustic Metamaterials

Technical Presentation. IMECE2014-38179

Mourad Oudich, *Institut Jean Lamour, University of Lorraine, Vandoeuvre-lès-Nancy, France*, **Yan Pennec**, *Institut D'Electronique, De Microélectronique, Lille, France*, **Bahram Djafari Rouhani**, *IEMN UMR CNRS 8520, Villeneuve D'Ascq, France*, **Badreddine Assouar**, *University of Lorraine–CNRS, Vandoeuvre les Nancy, France*, **Bernard Bonello**, *CNRS and University Paris 6, Paris, France*

8:30am – Semi-Dirac Points in Phononic Crystals

Technical Paper Publication. IMECE2014-37421

Xiujuan Zhang, Ying Wu, *King Abdullah University of Science and Technology, Thuwal, Saudi Arabia*

8:45am – 2D Acoustic Cloaks of Arbitrary Shape With Layered Structure Based on Transformation Acoustics

Extended Abstract Presentation. IMECE2014-39644

Qi Li, Jeffrey Viperman, *University of Pittsburgh, Pittsburgh, PA, United States*

9:00am – Constrained Optimization for Design of Acoustic Cloaks Comprising Mixture of Fluid and Solid Materials

Technical Presentation. IMECE2014-40229

Chunyan Bao, Liang-Wu Cai, *Kansas State University, Manhattan, KS, United States*

16-5 Phononic Crystals and Metamaterials

16-5-4 2D Structures and Bravais Lattices

520C

9:30am–11:15am

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: Badreddine Assouar, *University of Lorraine–CNRS, Vandoeuvre les Nancy, France*

9:30am – Attenuation of Lamb Waves Through a Periodic Array of Rectangular Holes

Technical Presentation. IMECE2014-38171

Rayisa Moiseyenko, *IEMN University Lille 1, Villeneuve d'Ascq, France*, **Yan Pennec**, *Institut D'Electronique, De Microélectronique, Lille, France*, **Rémi Marchal**, *INSP, University Pierre et Marie Curie, Paris, Cedex 05, France*, **Bernard Bonello**, *CNRS and University Paris 6, Paris, France*, **Bahram Djafari Rouhani**, *IEMN UMR CNRS 8520, Villeneuve D'Ascq, France*

9:51am – Silicon Pillars as Resonators in an Acoustical Metamaterial

Extended Abstract Publication. IMECE2014-37914

Bernard Bonello, *CNRS and University Paris 6, Paris, France*, **Rémi Marchal**, *INSP, University Pierre et Marie Curie, Paris, France*, **Rayisa Moiseyenko**, *IEMN University Lille 1, Villeneuve d'Ascq, France*, **Yan Pennec**, *Institut D'Electronique, De Microélectronique, Lille, France*, **Bahram Djafari Rouhani**, *IEMN UMR CNRS 8520, Villeneuve D'Ascq, France*, **Jinfeng Zhao**, *University Paris 6, Paris, France*

10:12am – True and Pseudo Rayleigh Surface Waves Propagation in One-Dimensional Surface Phononic Crystal
Technical Presentation. IMECE2014-37586

Bartłomiej Graczykowski, **Jordi Gomis-Bresco**, **Francesc Alzina**, **Marianna Sledzinska**, **Clivia M. Sotomayor Torres**, *ICN2–Catalan Institute of Nanoscience and Nanotechnology, Bellaterra, Barcelona, Spain*

10:33am – Gradient Micro-Architected Materials for Nonreflective Layered Media

Technical Presentation. IMECE2014-38449

Alireza Amirkhizi, *University of Massachusetts, Lowell, Lowell, MA, United States*

10:54am – Band Gaps in Bravais Lattices Inspired Periodic Cellular Materials and the Effect of Relative Density and Strain Fields

Technical Paper Publication. IMECE2014-40189

Sumantu Iyer, Maen Alkhader, T.A. Venkatesh, *Stony Brook University, Stony Brook, NY, United States*

16-5-7 Tunability and Optimization

520D

9:30am–11:15am

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: Jinkyu Yang, *University of Washington, Seattle, WA, United States*

9:30am – Low-Frequency Wave Steering in Lattices With Adaptively Relaxed Cell Symmetry

Technical Presentation. IMECE2014-39811

Paolo Celli, Stefano Gonella, *University of Minnesota, Minneapolis, MN, United States*

9:47am – Load Tunable Dispersion in Plates

Technical Presentation. IMECE2014-40113

Giuseppe Trainiti, Massimo Ruzzene, Julian J. Rimoli, *Georgia Institute of Technology, Atlanta, GA, United States*

10:04am – Wave Propagation in Geometrically Reconfigurable Magnetoelastic Meta-Structures

Technical Presentation. IMECE2014-38503

Marshall Schaeffer, Massimo Ruzzene, *Georgia Institute of Technology, Atlanta, GA, United States*

10:21am – Tunable Acoustic Transmission of Elastic Media by Microfluidics System

Technical Presentation. IMECE2014-40022

Abel Thangawng, David Calvo, Christopher Layman, *Naval Research Laboratory, Washington, DC, United States*

10:38am – Elastic Wave Mode Converters by Using Elastic Metamaterials Exhibiting Anomalous Polarizations

Technical Presentation. IMECE2014-37687

Hyung Jin Lee, Yoon Young Kim, *Seoul National University, Seoul, Korea (Republic)*

10:55am – Three-Dimensional Phononic Composites Optimized for Wide Multimodal, Omnidirectional Stopbands

Extended Abstract Publication. IMECE2014-36800

Ankit Srivastava, *Illinois Institute of Technology, Chicago, IL, United States*, **James Guest**, *Johns Hopkins University, Baltimore, MD, United States*

16-5 Phononic Crystals and Metamaterials

16-5-5 Wave Manipulation

520C

1:00pm–2:45pm

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

1:00pm – Metal Based Acoustic Metamaterials for Underwater Sound Control

Invited Presentation. IMECE2014-37622

Andrew Norris, *Rutgers University, Piscataway, NJ, United States*

1:21pm – Self-Collimation of an Ultrasonic Cylindrical Wave Source Inserted in a Solid Two-Dimensional Phononic Crystal: Toward the Design of Directional Sources for Underwater Acoustics

Technical Presentation. IMECE2014-37530

Jérôme Vasseur, *IEMN, Villeneuve d'Ascq Cedex, France*, **Bruno Morvan**, **Alain Tinel**, **Reveka Sainidou**, **Pascal Rembert**, *Université du Havre, Le Havre, France*, **Nicklas Swintek**, **Pierre Deymier**, *University of Arizona, Tucson, AZ, United States*

1:42pm – Acoustic Hyperfocusing in Solid Metamaterials for Subwavelength Imaging

Technical Presentation. IMECE2014-36851

Badreddine Assouar, **Xiaoming Zhou**, **Mourad Oudich**, *University of Lorraine, Vandoeuvre-lès-Nancy, France*

2:03pm – Mechanics of a Truly Hyperbolic Elastic Metamaterial Lens and Design Optimization

Technical Presentation. IMECE2014-37425

Joo Hwan Oh, **Hong Min Seung**, **Young Kwan Ahn**, **Yoon Young Kim**, *Seoul National University, Seoul, Korea (Republic)*

2:24pm – New Route Toward the Making of (Negative-Index) Acoustic Metamaterials

Technical Presentation. IMECE2014-38660

Thomas Brunet, **Benoit Mascaro**, **Olivier Poncelet**, **Christophe Aristegui**, *University of Bordeaux-CNRS, Talence, France*, **Aurore Merlin**, **Simon Raffy**, **Jacques Leng**, **Olivier Mondain-Monval**, *University of Bordeaux-CNRS, Pessac, France*

16-5-8 Computation and Fabrication

520D

1:00pm–2:45pm

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: Andrew Norris, *Rutgers University, Piscataway, NJ, United States*

1:00pm – Semi-Analytical Approach for Sound Transmission Loss Analysis Through a Metamaterial Plate

Technical Presentation. IMECE2014-36878

Mourad Oudich, **Xiaoming Zhou**, **Badreddine Assouar**, *University of Lorraine, Vandoeuvre-lès-Nancy, France*

1:21pm – Variational Methods for Phononic Band-Structure Evaluation

Extended Abstract Publication. IMECE2014-36594

Ankit Srivastava, *Illinois Institute of Technology, Chicago, IL, United States*

1:42pm – Investigation on Different Types of Band Gap Interactions in Acoustic Metamaterials

Technical Presentation. IMECE2014-39281

Seong Yoel Choi, **Il Kyu Lee**, **Yoon Young Kim**, *Seoul National University, Seoul, Korea (Republic)*

2:03pm – Elastic Chiral Metamaterials Based on Rotational Resonance

Extended Abstract Presentation. IMECE2014-37644

Gengkai Hu, **Xiaoning Liu**, *Beijing Institute of Technology, Beijing, China*, **Guoliang Huang**, *University of Arkansas at Little Rock, Little Rock, AR, United States*

2:24pm – Investigation of 3-D Printed Variable Solids as Mechanical Metamaterials

Extended Abstract Presentation. IMECE2014-37937

Emilio Calius, *Callaghan Innovation, Auckland, New Zealand*, **Charlotte Laus**, **Genevieve Lyon**, *University of Auckland, Auckland, New Zealand*, **Tim Miller**, **Jack Huston**, *Victoria University of Wellington, Wellington, New Zealand*

16-5 Phononic Crystals and Metamaterials

16-5-6 Nano and Bio Systems

520C

3:00pm–4:45pm

Session Organizer: Mahmoud Hussein, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: Bernard Bonello, *CNRS and University Paris 6, Paris, France*

3:00pm – Engineering Thermal Conductance Using a Two-Dimensional Phononic Crystal

Technical Presentation. IMECE2014-37936

Nobuyuki Zen, *AIST, Tsukuba, Japan*, **Tuomas Puurtinen**, **Tero Isotalo**, **Saamyadip Chaudhuri**, **Ilari Maasilta**, *University of Jyväskylä, Jyväskylä, Finland*

3:17pm – Nanophononic Metamaterial: Slowing Down Thermal Transport by Mechanical Vibrations

Technical Presentation. IMECE2014-39038

Mahmoud Hussein, **Hossein Honarvar**, **Dimitri Krattiger**, **Osama Bilal**, *University of Colorado Boulder, Boulder, CO, United States*

3:34pm – Hypersonic Phononic Composite Materials

Extended Abstract Presentation. IMECE2014-36987

George Fytas, *University of Crete and IESL-FORTH, Heraklion, Greece*

3:51pm – Interaction of Acoustic Solitons With Biological Tissues

Technical Presentation. IMECE2014-39478

Ehsan Nasr Esfahani, **Tae-Yeon Kim**, **Jinkyu Yang**, *University of Washington, Seattle, WA, United States*

4:08pm – Cavity Resonance Biomedical Sensor

Technical Paper Publication. IMECE2014-38222

Simon Villa Arango, **Ralf Lucklum**, **Mikhail Zubtsov**, *Otto-von-Guericke-University, Magdeburg, Germany*

4:25pm – Facile and Effective Phononic Structures for Ultrasound Focusing Application

Extended Abstract Publication. IMECE2014-39381

Qiuquan Guo, *Western University, London, ON, Canada*, **Xiaobing Cai**, **Jun Yang**, *University of Western Ontario, London, ON, Canada*

TRACK 17: VIRTUAL PODIUM (POSTERS)

**17-1 Advances in Aerospace
Technology**

**17-2 Biomedical and Biotechnology
Engineering**

**17-3 Dynamics, Vibration, and
Control**

17-6 Energy

**17-7 Fluids Engineering Systems &
Technologies**

**17-8 Heat Transfer and Thermal
Engineering**

**17-9 Mechanics of Solids, Structures,
and Fluids**

17-12 Systems and Design

17-13 Transportation Systems

**17-14 Vibration, Acoustics, & Wave
Propagation**

**17-15 Society-Wide Micro- and
Nanotechnology Forum**

**17-16 Engineering Management,
Safety, Ethics, Society, and
Education**

17-17 Advanced Manufacturing

**17-18 Materials: Genetics to
Structures**

ACKNOWLEDGMENT

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Anastasia Muliana, *Texas A&M University, USA*

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Xiaoning Jiang, *North Carolina State University, USA*

TRACK 17 VIRTUAL PODIUM (POSTERS)

Tuesday, November 18

17-15 Society-Wide Micro- and Nanotechnology Forum

17-15-1

210

12:30pm–3:30pm

Frost Nucleation and Growth on Hydrophilic, Hydrophobic, and Biphilic Surfaces

Poster Presentation. IMECE2014-36230

Alexander Van Dyke, Amy Betz, Kansas State University, Manhattan, KS, United States

Improvement of Thermal Conductivity of Electroplated Copper Thin-Film Interconnections by Controlling Their Micro Texture

Poster Presentation. IMECE2014-36869

Pornvitoo Rittinon, Ken Suzuki, Hideo Miura, Tohoku University, Sendai, Miyagi, Japan

Adventures in Pool Boiling

Poster Presentation. IMECE2014-38240

Nanxi Li, Ashton Archer, Kansas State University, Manhattan, KS, United States

Harvesting Waste Heat Recovery by Electrochemical Systems

Poster Presentation. IMECE2014-40585

Yuan Yang, Gang Chen, Massachusetts Institute of Technology, Cambridge, MA, United States, Seok Woo Lee, Yi Cui, Stanford University, Stanford, CA, United States

Influence of Na Diffusion on VO₂ Films and Prevention Through Mixed-Alkali Effect

Poster Presentation. IMECE2014-40599

Mark J. Miller, Junlan Wang, University of Washington, Seattle, WA, United States

Effect of Meniscus Curvature on Apparent Thermal Slip

Poster Presentation. IMECE2014-40629

Lisa Lam, Tufts University, Stow, MA, United States, Marc Hodes, Tufts University, Medford, MA, United States, Scott Maclachlan, Memorial University, St. John's, NL, Canada

Flow and Slip Transition of Water in Nanochannels

Poster Presentation. IMECE2014-40642

Long Li, Zhigang Li, Jingwen Mo, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

The Graduate Student Poster Competition in Heat Transfer and Fluid Sciences

Technical Presentation. IMECE2014-40650

Mahmood R.S. Shirazy, Andréane D'Arcy-Lepage, Sherbrooke University, Sherbrooke, QC, Canada, Michel Gilbert, Samuel Richard, LEDTECH, Sherbrooke, QC, Canada, Luc Frechette, University de Sherbrooke, Sherbrooke, QC, Canada

Probing and Controlling Photothematic Heat Generation in Plasmonic Nanostructures

Poster Presentation. IMECE2014-40660

Wei Li, Zachary Coppens, Greg Walker, Jason G. Valentine, Vanderbilt University, Nashville, TN, United States

Fabrication of Large Area Graphene Nanomesh Using Interference Lithography

Technical Presentation. IMECE2014-40665

Junjun Ding, Ke Du, Chang-hwan Choi, Eui-Hyeok Yang, Stevens Institute of Technology, Hoboken, NJ, United States, Ishan Wathuthanthri, Stevens Institute of Technology, Kew Gardens, NY, United States, Frank Fisher, Stevens Institute of Technology, Union City, NJ, United States

Molecular Dynamics Simulation of Nanoscale Fluid Infiltration

Poster Presentation. IMECE2014-40673

Jingwen Mo, Long Li, Zhigang Li, Hong Kong University of Science and Technology, Hong Kong, Hong Kong

Sodium Chloride Doped With Nanoparticulate Metal Oxides: Thermal Energy Storage With Enhanced Radiative Heat Transfer

Poster Presentation. IMECE2014-40687

Philip D. Myers, Jr., Abhinav Bhardwaj, D. Yogi Goswami, Elias Stefankos, University of South Florida, Tampa, FL, United States

Dual-Beam Gyroscope Sensor

Poster Presentation. IMECE2014-40689

S. Amir Mousavi Lajimi, University of Waterloo, Waterloo, ON, Canada, A. Marzouk, A. Sarrafan, O. Pooyanfar, B. Bahreyni, M. Golnaraghi, Simon Fraser University, Surrey, BC, Canada

Magnetically Assembling Nanoscale Metal Network Into Phase Change Material

Poster Presentation. IMECE2014-40695

Junwei Su, Hongwei Sun, Iman Mirzaee, Fan Gao, Xiao Liu, Majid Charmchi, Zhiyong Gu, University of Massachusetts Lowell, Lowell, MA, United States

Development of Graphene-Based Flexible Strain Sensors

Poster Presentation. IMECE2014-40697

Meng Yang, Masato Ohnishi, Ken Suzuki, Hideo Miura,
Tohoku University, Sendai, Miyagi, Japan

Electronic Conductivity of Carbon Nanotubes Under Anisotropic Strain Field

Poster Presentation. IMECE2014-40699

Masato Ohnishi, Yang Meng, Ken Suzuki, Hideo Miura,
Tohoku University, Sendai, Japan

Surface Subcooling Induced Wetting Transition and Invalid Superhydrophobicity During Pure Steam Condensation

Poster Presentation. IMECE2014-40700

Wen Rongfu, Xuehu Ma, Zhong Lan, Benli Peng, Xu Wei,
Dalian University of Technology, Dalian, Liaoning, China

Experimental Investigation of the Effect of Superhydrophilic Surface on the Liquid Film Deposition Length in the Oscillatory Flow

Poster Presentation. IMECE2014-40707

Tingting Hao, Xuehu Ma, Zhong Lan, *Dalian University of Technology, Dalian, Liaoning, China*

Condensate Droplet Size and Its Distribution Adjustment With Hydrophobic-Hydrophilic Hybrid Surface

Poster Presentation. IMECE2014-40708

Peng Benli, Xuehu Ma, Zhong Lan, Xu Wei, Wen Rongfu, Bai Tao, *Dalian University of Technology, Dalian, Liaoning, China*

Jumping Coalesced Droplets on Superhydrophobic Surfaces

Poster Presentation. IMECE2014-40719

Iman Mirzaee, Junwei Su, Majid Charmchi, Patrick Drane, *University of Massachusetts Lowell, Lowell, MA, United States*,
Hongwei Sun, *University of Massachusetts Lowell, Lexington, MA, United States*

Highly Sensitive Two-Dimensional Tactile Sensor Using Multiwalled Carbon Nanotube

Poster Presentation. IMECE2014-40729

Takuya Nozaki, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

Investigation of Novel Coatings for Nano-BT Particles for Composite Dielectric Materials

Poster Presentation. IMECE2014-40730

Keisha Mullings, Udhay Sundar, Kimberly Cook-Chennault, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Fabrication of Second-Level TriDelta Interconnects Using Negative Dry-Film Photoresist

Technical Presentation. IMECE2014-40741

Wei Chen, Yaqin Song, Jiaxing Liang, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

Micro Tensile Test for Measuring the Strength of Grain Boundaries

Poster Presentation. IMECE2014-40743

Takahiro Nakanishi, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

High-Cycle Fatigue Strength of Modified 9CR-1MO Steel at Elevated Temperatures

Poster Presentation. IMECE2014-40745

Motoyuki Ochi, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Miyagi, Japan*

Electrowetting on Dielectric Suppression of Coffee Ring Stains

Poster Presentation. IMECE2014-40747

Peter D. Dunning, Michael Schertzer, *Rochester Institute of Technology, Rochester, NY, United States*

Scalable Nanomanufacturing of Metasurfaces

Poster Presentation. IMECE2014-40750

Jacob Wilson, Wipula Liyanage, Michelle Gegel, Manashi Nath, Edward Kinzel, *Missouri University of Science and Technology, Rolla, MO, United States*

Detection of Selected Pharmaceutical Contaminants and Removal Efficiency of Emerging Contaminants by Application of Membrane Filtration Technology

Poster Presentation. IMECE2014-40751

Yanghe Liu, *Purdue Water Institute, Hammond, IN, United States*,
Chenguang Sheng, George Agbai Nnanna, *Purdue University Calumet, Hammond, IN, United States*

Effect of Copper Concentrations on Morphology of Cu₂Zn_{0.8}Cd_{0.2}SnS₄ Pentray Alloy Nanostructures

Poster Presentation. IMECE2014-40755

Authman Ibraheam, *University Malaysia Perlis, Kangar, Perlis, Malaysia*,
Yarub Al-Douri, *University Malaysia Perlis, Perlis, Malaysia*,
Waleed Ahmed, *United Arab Emirates University, Al Ain, United Arab Emir.*

Cohesive Zone Models to Predict Multiple White Bumps in Flip-Chip Assemblies

Poster Presentation. IMECE2014-40756

Sathanarayanan Raghavan, *Georgia Institute of Technology, Clifton Park, NY, United States*, **Ilko Schmadlak**, *Freescale Halbleiter Deutschland GmbH, München, Munich, Germany*, **George Leal**, *Freescale Semiconductor, Austin, TX, United States*, **Suresh Sitaraman**, *Georgia Institute of Technology, Atlanta, GA, United States*

Molecular Bridge Enables Anomalous Enhancement in Thermal Transport Across Hard-Soft Material Interfaces

Poster Presentation. IMECE2014-40758

Teng Zhang, *University of Notre Dame, South Bend, IN, United States*, **Tengfei Luo**, *University of Notre Dame, Notre Dame, IN, United States*

Investigation of Carbon Nanotubes Mixing Methods and Functionalizations for Electrically Conductive Polymer Composites

Technical Presentation. IMECE2014-40759

Brijpal Singh Talwar, **Kambiz Chizari**, **Shuangzhuang Guo**, **Daniel Therriault**, *École Polytechnique de Montreal, Montreal, QC, Canada*

Aligned-Multiwalled Carbon Nanotube Membranes for Oil-Water Mixture and Gas Mixture Separation

Poster Presentation. IMECE2014-40767

Dokyung Yoon, **Bong jun Cha**, *Woongjin Chemical Company, Ltd., Suwon, Korea (Republic)*, **Cheesung Lee**, **Jongju Yun**, **Wonjae Jeon**, **Seunghyun Baik**, *Sungkyunkwan University, Suwon, Korea (Republic)*

Bulk Lithography: Characterization, and Development of Process Plan for the Fabrication of 3D Microstructures

Poster Presentation. IMECE2014-40768

Kiran Bhole, **Prasanna Gandhi**, *Indian Institute of Technology Bombay, Mumbai, Maharashtra, India*

Self-Assembly of Ordered SiO₂@Au Core-Shell Nanoparticle Arrays

Technical Presentation. IMECE2014-40769

Huan Yang, **Jinyou Shao**, *Xi'an Jiaotong University, Xi'an, China*, **Ben Q. Li**, *University of Michigan Dearborn, Dearborn, MI, United States*

Nanoparticle-enhanced Plasmonic Light Absorption in Thin-film Silicon Solar Cells

Technical Presentation. IMECE2014-40770

Zhenhui Jia, **Changhong Liu**, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*, **Ben Q. Li**, *University of Michigan Dearborn, Dearborn, MI, United States*

Manipulation of Microdroplets at Ultralow Voltages on Conjugated Polymer

Poster Presentation. IMECE2014-40772

Wei Xu, **Jian Xu**, **Xin Li**, **Anthony Palumbo**, **Ellexis Cook**, **Chang-Hwan Choi**, **Eui-Hyeok Yang**, *Stevens Institute of Technology, Hoboken, NJ, United States*

Behavior of Two-Way Microreinforced Concrete Under Impact Loads

Poster Presentation. IMECE2014-40774

Wail Al-Rifaie, *Philadelphia University, Amman, Jordan*, **Waleed Ahmed**, *United Arab Emirates University, Al Ain, United Arab Emir.*

Toward a Near-Field Concentrated Solar Thermophotovoltaic Microsystem

Poster Presentation. IMECE2014-40775

Mahmoud Elzouka, **Mukesh Kulsreshath**, **Sidy Ndao**, *University of Nebraska–Lincoln, Lincoln, NE, United States*

Understanding Photophysical Interactions of Semiconducting Carbon Nanotubes With Porphyrin Chromophores

Poster Presentation. IMECE2014-40778

Hanyu Zhang, **Jong Hyun Choi**, *Purdue University, West Lafayette, IN, United States*

Dynamic Regeneration of Light Harvesting Complexes

Poster Presentation. IMECE2014-40779

Hanyu Zhang, **Jong Hyun Choi**, *Purdue University, West Lafayette, IN, United States*

Flexibility and Folding/Unfolding Kinetics of DNA Origami Tiles

Poster Presentation. IMECE2014-40780

Haorong Chen, **Jong Hyun Choi**, *Purdue University, West Lafayette, IN, United States*

Micrometer-Long DNA Origami Nanostructures With Thousands of Individually Programmable Binding Sites

Poster Presentation. IMECE2014-40781

Haorong Chen, **Hanyu Zhang**, **Jing Pan**, **Jong Hyun Choi**, *Purdue University, West Lafayette, IN, United States*

Biofilm Streamer Formation in a Microfluidic Porous Media Mimic

Poster Presentation. IMECE2014-40782

Mahtab Hassanpourfard, **Amin Valiei**, **Thomas Thundat**, **Yang Liu**, **Aloke Kumar**, *University of Alberta, Edmonton, AB, Canada*

Mechanical and Thermal Characterization of Nanoscale Thin Films

Poster Presentation. IMECE2014-40783

Raghu Pulavarthy, Baoming Wang, Tarek Alam, *Pennsylvania State University, State College, PA, United States*, **Md Haque**, *Pennsylvania State University, University Park, PA, United States*

Preliminary Study of a Polymer-Based Microfluidic Device for Detecting Distributed Shear Loads

Poster Presentation. IMECE2014-40787

Yichao Yang, Jiayue Shen, *Old Dominion University, Norfolk, VA, United States*, **Mark Levenstein**, *Old Dominion University, Chesapeake, VA, United States*, **Zhili Hao**, *Old Dominion University, Virginia Beach, VA, United States*

Oscillating Bubbles for Microfluidic Manipulation—A Theoretical Approach

Poster Presentation. IMECE2014-40791

Yun Chen, Dillon Strack, Sungyon Lee, *Texas A&M University, College Station, TX, United States*, **Zecong Fang, Brett Merritt, Darius Saadat-Moghaddam, Jie Xu**, *Washington State University Vancouver, Vancouver, WA, United States*

Synchronized Heterogeneous Indentation and Stress Relaxation Behavior of Articular Cartilage Upon Macroscopic Compression: A Preliminary Study

Poster Presentation. IMECE2014-40793

Jiayue Shen, Wenting Gu, Xavier-Lewis Palmer, Siqi Guo, *Old Dominion University, Norfolk, VA, United States*, **Zhili Hao**, *Old Dominion University, Virginia Beach, VA, United States*

Synchronized Heterogeneous Viscous Behavior of Soft Materials Upon Macroscopic Loading: A Preliminary Study

Poster Presentation. IMECE2014-40794

Wenting Gu, Jiayue Shen, Xavier-Lewis Palmer, *Old Dominion University, Norfolk, VA, United States*, **Zhili Hao**, *Old Dominion University, Virginia Beach, VA, United States*

Spatial Control of Condensate Droplets Using Nanostructured Surfaces With Mixed-Wettability

Poster Presentation. IMECE2014-40797

Emre Olceroglu, Matthew McCarthy, *Drexel University, Philadelphia, PA, United States*

Nanoporous Membranes Based on Biological Templates

Poster Presentation. IMECE2014-40799

Donald Fehlinger, Matthew McCarthy, *Drexel University, Philadelphia, PA, United States*

Numerical Modeling Graphene NEMS Resonator Boundary Conditions for Strain Engineering to Improve Quality Factor

Poster Presentation. IMECE2014-40800

Grzegorz Hader, *U.S. Army ARDEC, Picatinny Arsenal, NJ, United States*, **Eui-Hyeok Yang**, *Stevens Institute of Technology, Hoboken, NJ, United States*

Dynamic Response of a Dielectric Elastomer Membrane

Poster Presentation. IMECE2014-40801

Pratik Sarker, Jose Rubio, Uttam Chakravarty, *University of New Orleans, New Orleans, LA, United States*

CFD Design of Deformation Based Cancer Cell Microfiltration

Poster Presentation. IMECE2014-40802

Zhifeng Zhang, Jie Xu, Xiaolin Chen, *Washington State University Vancouver, Vancouver, WA, United States*

Microparticle Trapping in Streaming Flows Through Capillary Waves (Low Frequency)

Poster Presentation. IMECE2014-40805

Prashant Agrawal, *Indian Institute of Technology, Bombay, Monash Research Academy, Mumbai, Maharashtra, India*, **Prasanna Gandhi**, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*, **Adrian Neild**, *Monash University, Melbourne, Victoria, Australia*

Mechanical Property of Rodlike Superlattice Assembled From Tobacco Mosaic Viruses

Poster Presentation. IMECE2014-40807

Xinnan Wang, *North Dakota State University, Fargo, ND, United States*

The mTm: A "Microfluidic T-Maze" for the Study of Chemotactic Decision Making in Microorganisms

Poster Presentation. IMECE2014-40808

Mohammad Mehdi Salek, Roman Stocker, *Massachusetts Institute of Technology, Cambridge, MA, United States*, **Jeffrey Guasto**, *Tufts University, Medford, MA, United States*

Cryopreservation of Small Amounts of Cells by Using PDMS-Glass Microfluidic Chips

Poster Presentation. IMECE2014-40810

Lei Li, *Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, China*, **Jing Liu**, *Chinese Academy of Sciences, Beijing, China*

Forming-Free Resistive Switching in Plasma Electrolytically Oxidized Mesoporous Pt/TiO₂ Structures

Poster Presentation. IMECE2014-40130

Spencer Fullam, Eduard Karpov, *University of Illinois—Chicago, Chicago, IL, United States*

Effect of Vertical Mini-Fins on External Condensation Heat Transfer**Poster Presentation. IMECE2014-36513****Andres Martinez, Amy Betz**, *Kansas State University, Manhattan, KS, United States*, **Caleb Chiroy**, *Kansas State University, Emporia, KS, United States***Excimer Laser-Machined SU-8 Microstructures for Polydimethylsiloxane (PDMS) Replica Molding****Poster Paper Publication. IMECE2014-39177****Kewei Liu**, *Resonetics, LLC., Nashua, NH, United States*, **Yoontae Kim, Moses Noh**, *Drexel University, Philadelphia, PA, United States***Computational and Experimental Study of Microfluidic Flow-Focusing Devices for Synthesizing Hydrogel Microtissues****Poster Presentation. IMECE2014-39434****Roya Samanipour, Keekyoung Kim**, *University of British Columbia Okanagan Campus, Kelowna, BC, Canada***Dirac-Like Surface Acoustic Wave in Honeycomb Lattices of Nickel Pillars on a Lithium Niobate Crystal****Poster Presentation. IMECE2014-37844****Siyuan Yu, Minghui Lu, Ze-Guo Chen, Xu Ni, Xiao-Cheng Sun, Ye-Long Xu, Xiao-Ping Liu, Yanfeng Chen**, *Nanjing University, Nanjing, China***Reduce Thermal Conductivity by Forming a Nanophononic Crystal on a Si Slab****Poster Presentation. IMECE2014-37847****Xuejun Yan, Minghui Lu, Xu Ni, Ze-Guo Chen, Xiaoping Liu, Yanfeng Chen**, *Nanjing University, Nanjing, Jiangsu, China***Characterizations of Creep Behavior of Actual Lead-Free Solder Joint for Modeling****Poster Paper Publication. IMECE2014-38661****Hohyung Lee**, *Binghamton University, Binghamton, NY, United States*, **Ruiyang Liu**, *SUNY Binghamton, Vestal, NY, United States*, **Seungbae Park**, *State University of New York at Binghamton, Binghamton, NY, United States*, **Jae Kwak**, *Samsung Electronics Co.,Ltd., Suwon-si, Korea (Republic)***Wednesday, November 19****17-1 Advances in Aerospace Technology****17-1-1****210****11:30am–2:30pm****Taylor's Model-Based Analysis of Turning Inserts Tool-Life in the Dry Turning of UNS R56400 Alloy****Poster Paper Publication. IMECE2014-38710****Moises Batista Ponce**, *University of Cadiz, Cadiz, Spain*, **Paulo Davim**, *University of Aveiro, Aveiro, Portugal*, **Jorge Salguero, Alvaro Gomez-Parra, Mariano Marcos**, *Universidad de Cádiz, Cádiz, Cadiz, Spain***17-2 Biomedical and Biotechnology Engineering****17-2-1****210****11:30am–2:30pm****Aquaponics: A Sustainable Food Production System****Poster Paper Publication. IMECE2014-39441****Maryam Shafahi, Daniel Woolston**, *California State Polytechnic University, Pomona, Pomona, CA, United States***Cervical Musculature Injury Prediction Using a New Approach of 3D Muscle Modeling****Poster Presentation. IMECE2014-40119****Fatemeh Moghaddam, Marwan El-Rich**, *University of Alberta, Edmonton, AB, Canada***Effect of Inter-Lesion Distance on the Functional Impact of Coronary Bifurcation Lesions****Poster Presentation. IMECE2014-38093****Catherine Pagiatakis, Rosaire Mongrain**, *McGill University, Montreal, QC, Canada***Mechatronic Lung Simulator to Reproduce Respiratory Mechanics in Total Liquid Ventilation****Poster Presentation. IMECE2014-40093****Julien Mousseau, Philippe Micheau, Raymond Robert, Mathieu Nadeau, Jonathan Vandamme, Jean-Paul Praud, Hervé Walti**, *Université de Sherbrooke, Sherbrooke, QC, Canada*

Theraml Effects on the Skin by Mobile Telephone

Poster Presentation. IMECE2014-38285

Zhizhu He, *Technical Institute of Physics and Chemistry, Beijing, China*, Jing Liu, *Chinese Academy of Sciences, Beijing, China*

17-2-2 SPC Poster Presentations

210

11:30am–2:30pm

Session Organizer: Xiaoning Jiang, *NC State University, Raleigh, NC, United States*

Mechanics of Hip Dysplasia Reduction in Infants With the Pavlik Harness Using Patient-Specific Geometry

Poster Presentation. IMECE2014-40920

Victor Huayamave, *University of Central Florida, Orlando, FL, United States*

11:55am – High-Intensity Targeted Cavitation as a More Efficient and Safer Approach to Treat Kidney Stones

Poster Presentation. IMECE2014-40921

Steven Dion, *Université de Sherbrooke, Sherbrooke, QC, Canada*

Development of a Self-Oscillating Mechanical Model to Investigate the Biological Response of Human Vocal Fold Fibroblasts to Phono-Mimetic Stimulation

Poster Presentation. IMECE2014-40922

Neda Latifi, *McGill University, Montreal, QC, Canada*

Characterization of Calcified Plaques Retrieved From Occluded Arteries and Comparison With Potential Artificial Analogues

Poster Presentation. IMECE2014-40923

Louis-Philippe Riel, *Universite de Sherbrooke, Sherbrooke, QC, Canada*

Minimal Kinematic Model for Inverse Dynamic Analysis of Gait

Poster Presentation. IMECE2014-40924

D.S. Mohan Varma, *Indian Institute of Technology, Madras, Chennai, Tamil Nadu, India*

Investigation of Lumbosacral Spine Anatomical Variation Effect on Load-Partitioning Under Follower Load Using Geometrically Personalized Finite Element Model

Poster Presentation. IMECE2014-40925

Sadegh Naserkhaki, *University of Alberta, Edmonton, AB, Canada*

In Silico Evaluation of Effects of Swirl Direction and Intensity on Aortic Flow Patterns Induced by an Aortic Pump Using Computational Fluid Dynamics

Poster Presentation. IMECE2014-40926

Prahlad G. Menon, *Sun Yat-sen University–Carnegie Mellon University Joint Institute of Engineering, Pittsburgh, PA, United States*

Understanding Biofilm Growth Dynamics Within a Stagnant Culture of *Sporosarcina Pasteurii*

Poster Presentation. IMECE2014-40777

Swayamdipta Bhaduri, Sushanta Mitra, Aloke Kumar, *University of Alberta*

17-3 Dynamics, Vibration, and Control

17-3-1

210

11:30am–2:30pm

Design, Analysis, and Experimental Studies of a Novel PVDF-Based Piezoelectric Energy Harvester With Beating Mechanisms

Poster Paper Publication. IMECE2014-36968

Kuo-Shen Chen, *National Cheng-Kung University, Tainan, Taiwan, Taiwan*

Development of Double-Frequency Vibration Energy Harvester Using Multi-Morph Piezoelectric Cantilever

Poster Presentation. IMECE2014-37845

Yuji Goto, Yuske Morita, Eiji Nakamachi, *Doshisha University, Kyotanabe, Kyoto, Japan*

17-6 Energy

17-6-1

210

11:30am–2:30pm

Development and Field Testing of Micro Unidirectional Co-Axial Series Rotor Wind Turbine Consists of Three Rotors

Technical Presentation. IMECE2014-40717

Sandip Kale, *Trinity College of Engineering and Research, Pune, Pune, India*, S.N. Sapali, *College of Engineering, Pune, Pune, India*

Experimental Studies of Rotation Efficiency of Packing on Characteristics of Counterflow Wet Cooling Tower

Poster Paper Publication. IMECE2014-37108

Khashayar Teimoori, Ali Sadegh, *City University of New York, New York, NY, United States*

17-7 Fluids Engineering Systems and Technologies

17-7-1

210

11:30am–2:30pm

Simulation of Pressure Wave Propagation in the Two-Phase Flow

Poster Presentation. IMECE2014-36134

Moon-sun Chung, *Korea Institute of Energy Research, Daejeon, Korea (Republic)*, **Youn-Gyu Jung, Sung Jae Yi**, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*

Fiber Supplemented Droplet Diving Into Two Liquid Layers

Poster Paper Publication. IMECE2014-37277

Alyssa Harris, Tsung-chow Su, *Florida Atlantic University, Boca Raton, FL, United States*

LBM Simulation of Electro-Osmotic Flow (EOF) in Nano-/Microscales Porous Media With an Inclusive Parameters Study

Poster Paper Publication. IMECE2014-37831

Ramin Zakeri, Eon Soo Lee, *New Jersey Institute of Technology, Newark, NJ, United States*, **Mohammad Reza Salimi**, *Sharif University of Technology, Tehran, Iran*

Similar Regions in Electroosmotic Flow Rate for Newtonian and non-Newtonian Fluids Using Dissipative Particle Dynamics (DPD)

Poster Paper Publication. IMECE2014-37836

Ramin Zakeri, Eon Soo Lee, *New Jersey Institute of Technology, Newark, NJ, United States*

Simulation of Polymer Chain Sensor in Electroosmotic Flow Using Dissipative Particle Dynamics (DPD) Method

Poster Paper Publication. IMECE2014-37840

Ramin Zakeri, Eon Soo Lee, *New Jersey Institute of Technology, Newark, NJ, United States*

Testing The Method ASMTurb on the Example of the Pulsation Structure of Turbulent Flows

Poster Paper Publication. IMECE2014-38022

Yuriy Nuzhnov, *Al-Farabi Kazakh National University, Almaty, Kazakhstan*

Aerodynamic Analysis of Tilted Rotor Wind Turbine

Technical Presentation. IMECE2014-40716

Sandip Kale, *Trinity College of Engineering and Research, Pune, Pune, India*, **S.N. Sapali**, *College of Engineering, Pune, Pune, India*

17-8 Heat Transfer and Thermal Engineering

17-8-1

210

11:30am–2:30pm

Design of a Device for Experimental Validation of Dynamic System Behavior in Natural Convection

Poster Presentation. IMECE2014-40666

Justin Roberts, Kyle Zada, *University of Portland, Portland, OR, United States*, **Heather Dillon**, *University of Portland, Kelso, WA, United States*

Experimental, Numerical, and Analytical Investigation of Thermal Resistance in High Brightness LED Arrays

Technical Presentation. IMECE2014-40649

Mahmood R.S. Shirazy, Andréane D'Arcy-Lepage, *Sherbrooke University, Sherbrooke, QC, Canada*, **Michel Gilbert**, *LEDTECH Canada, Sherbrooke, QC, Canada*, **Samuel Richard**, *LEDTECH, Sherbrooke, QC, Canada*, **Luc Frechette**, *University de Sherbrooke, Sherbrooke, QC, Canada*

Thermal Transport in Two-Dimensional Boron Nitride-Graphene Superlattices

Poster Presentation. IMECE2014-40676

Carlos da Silva, Julia Sborz, David A. Romero, Cristina Amon, *University of Toronto, Toronto, ON, Canada*

Thermal Study and Redesign of Storage Integratrated Solar Modules

Poster Presentation. IMECE2014-40669

Balagovind N.K. Kartha, Sidhu Suresh, Akilesh Narayanan, Vinayak Jayaprakash, Vinod Kumar Gopal, Amrita Vishwa Vidyapeetham, *Amritapuri Campus, Kollam, Kerala, India*

Experimental Investigation of Viscosity and Thermal Conductivity of PDMS Based Nanofluid

Poster Presentation. IMECE2014-40711

Oswaldo Sanchez, Rahul Singh, Ganesh Balasubramanian, *Iowa State University, Ames, IA, United States*

Thermal Transport in Two-Dimensional Boron Nitride-Graphene Superlattices

Poster Presentation. IMECE2014-40675

Carlos da Silva, Julia Sborz, David A. Romero, Cristina Amon, *University of Toronto, Toronto, ON, Canada*

SENSE: Getting a Week's Worth of Lighting System Data

Poster Presentation. IMECE2014-40725

Zak Pearson, Tanya Crenshaw, *University of Portland, Portland, OR, United States*, Heather Dillon, *University of Portland, Kelso, WA, United States*

Modified Overall Thermal Transfer Value (OTTV) Calculation Method for Cool Roof/Walls

Poster Presentation. IMECE2014-40683

Kishor Zingre Tarachand, Xingguo Yang, Man Pun Wan, *Nanyang Technological University, Singapore, Singapore*

Schlieren Imaging Visualizations for Heat Transfer

Poster Presentation. IMECE2014-40727

Patrick Doherty, Jacob C. Kaessinger, Kramer C. Kors, Jordan S. Lum, *University of Portland, Portland, OR, United States*, Heather Dillon, *University of Portland, Kelso, WA, United States*

Electro-Wetting of a Heated Surface in the Presence and Absence of Gravity to Enhance Liquid Film Boiling

Poster Presentation. IMECE2014-40712

Viral Patel, Jamal Yagoobi, *Worcester Polytechnic Institute, Worcester, MA, United States*, Franklin Robinson, Jeffrey Didion, *National Aeronautics and Space Administration–GSFC, Greenbelt, MD, United States*

Experimental and Computational Study on Efficiency of LED Chips and Their Ideal Operating Conditions

Poster Presentation. IMECE2014-40826

Umut Yuruker, Enes Tamdogan, Mehmet Arik, *Ozyegin University, Istanbul, Turkey*

Mist-Based Steam Condensation for Efficiency Enhancement in Thermoelectric Power Plants

Poster Presentation. IMECE2014-40724

Vaibhav Bahadur, Enes Gokkus, *University of Texas at Austin, Austin, TX, United States*

Generating Electricity From Waste Heat Recovery With Solid State Thermoelectric Devices—A Computational and Experimental Study

Poster Presentation. IMECE2014-40833

Berk Karayalim, Mehmet Arik, Enes Tamdogan, *Ozyegin University, Istanbul, Turkey*

Mode-Decay Molecular Dynamics for Frequency-Dependent Phonon Scattering Rates

Poster Presentation. IMECE2014-40728

Matthew D. Gerboth, Greg Walker, *Vanderbilt University, Nashville, TN, United States*

Fluorescent Oil Flow Visualization of Pin Fins: Understanding Heat Transfer in Gas Turbine Airfoils

Poster Presentation. IMECE2014-40861

Yuvraj Rathore, *Pennsylvania State University, Easton, PA, United States*, Stephen Lynch, *Pennsylvania State University, University Park, PA, United States*

Thermal Transport in Chemically Ordered Ferromagnetic Metallic Alloys

Poster Presentation. IMECE2014-37636

Leighann Larkin, MacKenzie R. Redding, Justin L. Smoyer, Pamela Norris, *University of Virginia, Charlottesville, VA, United States*

Thermal Resistance and PIV Characterization of a Line-Replaceable Compact Liquid-Cooled Server Module for High-Performance Computing Platforms

Poster Presentation. IMECE2014-40736

Joshua Gess, Sushil H. Bhavnani, *Auburn University, Auburn, AL, United States*, R. Wayne Johnson, *Tennessee Tech University, Cookeville, TN, United States*

Surface Phonon-Polariton-Assisted Thermal Transport in a One-Dimensional Nanoparticle Chain

Poster Presentation. IMECE2014-38110

Olalekan Adewuyi, James Hammonds, Jr., *Howard University, Washington, DC, United States*

Effect of Meniscus Curvature on Apparent Thermal Slip

Poster Presentation. IMECE2014-40815

Lisa Lam, *Tufts University, Stow, MA, United States*, Marc Hodes, *Tufts University, Medford, MA, United States*, Scott MacLachlan, *Memorial University, St. John's, NL, Canada*

Frequency Resolved Thermal Diffusivity in Amorphous Silicon

Poster Presentation. IMECE2014-38563

Christopher Baker, Pamela Norris, *University of Virginia, Charlottesville, VA, United States*

Effect of Electron-Phonon Coupling on Thermal Transport Across Metal-Nonmetal Interface—A Second Look

Poster Presentation. IMECE2014-40816

Xufei Wu, *University of Notre Dame, South Bend, IN, United States*, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*

Lateral Thermal Conductivities of Metal Thin Films Measured With Transient Thermal Grating Technique

Poster Presentation. IMECE2014-40480

Feng He, Wenzhi Wu, Yaguo Wang, *University of Texas at Austin, Austin, TX, United States*

Airflow Distribution in the Longitudinal Plan of a Boeing 767 Mockup Cabin

Poster Presentation. IMECE2014-40825

Maher Shehadi, Mohammad Hosni, Byron Jones, *Kansas State University, Manhattan, KS, United States*

Simulation of Heat Flux Between Two Parallel Metal Plates With Thermic Fluid as a Media Using Solar Thermal Energy

Poster Presentation. IMECE2014-40670

K.D. Sapate, Ganesh P. Bharambe, Sandip Kale, *Trinity College of Engineering and Research, Pune, Pune, India*, **Avinash Patil**, *PVP Institute of Technology, Budhgaon, Sangli, Sangli, India*

Optimum Air-Gap Height for Double-Skin Roofs

Poster Presentation. IMECE2014-40837

Kishor Zingre Tarachand, Xingguo Yang, Man Pun Wan, *Nanyang Technological University, Singapore, Singapore*

Evaluation of a Refrigerant R161 as a Replacement to R22

Poster Presentation. IMECE2014-40679

Chandrakishor Choudhari, *AISSMS COE Pune/PuneUniversity, Pune, India*, **S.N. Sapali**, *College of Engineering, Pune, Pune, India*, **K.D. Sapate**, *Trinity College of Engineering and Research, Pune, Pune, India*

Thermal Conductivity of Compound Semiconductors: Interplay of Density and Acoustic-Optical Phonon Dispersion Gap

Poster Presentation. IMECE2014-40843

Ankit Jain, Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

Influence of Air and Water Parameters on Exergy of a Cross-Flow Cooling Tower

Poster Presentation. IMECE2014-40701

S.N. Sapali, Nandkumar A. Rawabawale, *College of Engineering, Pune, Pune, India*, **K.D. Sapate**, *Trinity College of Engineering and Research, Pune, Pune, India*

Steady and Unsteady Simulations for Annular Internal Condensing Flows in a Channel

Poster Presentation. IMECE2014-40848

Ranjeeth Naik, Amitabh Narain, Soumya Mitra, *Michigan Technological University, Houghton, MI, United States*

Bi-Conductive Surfaces for the Enhancement of Pool Boiling Heat Transfer

Poster Presentation. IMECE2014-40798

Md Mahamudur Rahman, Jordan Pollack, Matthew McCarthy, *Drexel University, Philadelphia, PA, United States*

Toward Simulation of Wind Turbine Flow Using the Actuator Line Method in NEK5000

Poster Presentation. IMECE2014-40852

Murphy O'Dea, Laila Guessous, *Oakland University, Rochester, MI, United States*

Investigating the Relationships Between Mechanical and Thermal Properties of Hydrogel Nanocomposites

Poster Presentation. IMECE2014-37219

Josergio Zaragoza, Matthew Blanco, Kalpith Ramamoorthi, Aitor Zabalegui, Hohyun Lee, Prashanth Asuri, *Santa Clara University, Santa Clara, CA, United States*

Phonon Mean Free Path–Dependence of Thermal Interface Conductance Accumulation

Poster Presentation. IMECE2014-40855

Shubhaditya Majumdar, Ankit Jain, Simon Lu, Jonathan A. Malen, Alan J.H. McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

Experimental Study of a Pulsating Heat Pipe Using Nanofluid as a Working Fluid

Poster Presentation. IMECE2014-40280

Miguel Gonzalez, Brian Kelly, Yoon Jo Kim, *Washington State University Vancouver, Vancouver, WA, United States*

Dynamic Response of a Solid Oxide Fuel Cell Stack to Changes in a University Building's Load

Poster Presentation. IMECE2014-40857

Michael M. Whiston, William O. Collinge, Melissa M. Bilec, Laura A. Schaefer, *University of Pittsburgh, Pittsburgh, PA, United States*

Sensitivity and Error Analysis of Thermal Models Used in Time Domain Thermoreflectance

Poster Presentation. IMECE2014-38507

MacKenzie Redding, Leighann Larkin, Justin Smoyer, Pamela Norris, *University of Virginia, Charlottesville, VA, United States*

Multiscale Modeling of the Electrocaloric Effect in a P(VDF-TrFE-CFE) Terpolymer

Poster Presentation. IMECE2014-40858

YingJu Yu, Dongzhi Guo, JinSheng Gao, Suresh Santhanam, Shi-Chune Yao, Gary K. Fedder, Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

Robust Data Processing for High Precision Measurements of Thin Film Thermophysical Properties via Ultrafast Optical Pump-Probe Spectroscopy

Poster Presentation. IMECE2014-40370

Justin Smoyer, MacKenzie Redding, Leighann Larkin, Pamela Norris, *University of Virginia, Charlottesville, VA, United States*

Thermal Conductivity and Interfacial Thermal Resistance Measurement at Micro-/Nanoscale

Poster Presentation. IMECE2014-40872

Raghu Pulavarthy, Tarek Alam, *Pennsylvania State University, State College, PA, United States*, Md. Haque, *Pennsylvania State University, University Park, PA, United States*

3-D Numerical Heat Transfer for Confined Turbulent Twin Circular-Jets Impingement on an Inclined Moving Plate

Poster Paper Publication. IMECE2014-36054

Jiin-yuh Jang, Jyun-Cin Huang, *National Cheng-Kung University, Tainan, Taiwan*

Equivalent R-Value Increment Due to Cool Roof Coatings

Poster Presentation. IMECE2014-40873

Kishor Zingre Tarachand, Xingguo Yang, Man Pun Wan, *Nanyang Technological University, Singapore, Singapore, Singapore*

Transient Thermal Coefficient of Ceramic Coated Fabrics

Poster Paper Publication. IMECE2014-38882

Khashayar Teimoori, Ali Sadegh, *City University of New York, New York, NY, United States*

Effect of Viscous Dissipation on Heat Transfer of Ostwald-de Waele Fluid Over an Unsteady Stretching Sheet

Poster Presentation. IMECE2014-40877

Nariman Ashrafi, Mohamadreza Sayar, Meysam Mohamadali, *Islamic Azad University, Tehran, Tehran, Iran*

Comparison of One- and Three-Dimensional Impeller Design of Centrifugal Compressor for a Micro Gas Turbine

Technical Presentation. IMECE2014-40884

Mohammad Toudefallah, Abolghasem Mesgarpour Tousi, Masoud Boroomand, *Amirkabir University of Technology, Tehran, Iran*

17-8-2

210

11:30am–2:30pm

17-9 Mechanics of Solids, Structures, and Fluids

17-9-1

210

11:30am–2:30pm

Comparison Between Analytical and Finite Element Calculation for Pressurized Container

Poster Paper Publication. IMECE2014-36106

Frank Otremba, Christian Sklorz, *Federal Institute of Material Research and Testing, Berlin, Germany*, Otto Iancu, *University of Applied Sciences Karlsruhe, Karlsruhe, Germany*

Model for the Mechanical Characterization of Boron Nitride Nanotubes

Poster Presentation. IMECE2014-39065

Katherine Bausemer, Sinan Muftu, Kai-tak Wan, *Northeastern University, Boston, MA, United States*

Investigating Hygroactuation Using Selaginella Lepidophylla as a Model System

Poster Presentation. IMECE2014-40506

Véronique Brulé, Ahmad Rafsanjani, Damiano Pasini, Tamara L. Western, *McGill University, Montreal, QC, Canada*

Effect of the Friction Model on Results of Mathematical and Computer Simulation of the Linear Friction Welding Process

Poster Presentation. IMECE2014-40570

Alexander T. Bikmeyer, Alfiya M. Yamileva, Rafail K. Gazizov, *Ufa State Aviation Technical University, Ufa, Bashkortostan, Russia*, Achilles Vairis, *Technological Education Institute of Crete, Heraklion, Greece*

Evaluation of Out-of-Plane Fatigue Properties of Unidirectional and Quasi-Isotropic Thick CFRP Laminates With Interlaminar Toughened Layers

Poster Presentation. IMECE2014-40661

Atsushi Hosoi, Shigeyoshi Sakuma, Ko Shigemori, Hiroyuki Kawada, *Waseda University, Tokyo, Japan*, Yuzo Fujita, Ichiro Taketa, *Toray Industries, Inc., Ehime, Japan*

Torsional Properties of CFRP Pipes by Stacking Sequence Optimization

Poster Presentation. IMECE2014-40677

Hiroyuki Kawada, *Waseda University, Tokyo, Japan*

Reconfigurable Surface Patterns Enabled by Covalent Adaptive Polymer Networks

Poster Presentation. IMECE2014-38348

Lewis Cox, Nancy Sowan, Chris Bowman, Yifu Ding, University of Colorado Boulder, Boulder, CO, United States

Computational Modeling of the Effects of Transient Blood Flow Characteristics and Wall Thickness on the Rupture of Abdominal Aortic Aneurysm

Poster Paper Publication. IMECE2014-36150

Pinaki Pal, University of Michigan, Ann Arbor, MI, United States

Limit Load Analysis of Pressurized Containers

Poster Paper Publication. IMECE2014-36334

Frank Otremba, Christian Sklorz, Federal Institute of Material Research and Testing, Berlin, Germany, Franziska Reich, BAM Berlin, Berlin,, Germany

Bistability Evolution, Autowaves, and Dissipative Structures in Dynamic Behavior of Elastic Metamaterials

Poster Presentation. IMECE2014-40126

Michelle Chen, Eduard Karpov, Univeristy of Illinois–Chicago, Chicago, IL, United States

Modelling of Surface Nanostructures in Natural Plywoods

Poster Presentation. IMECE2014-40504

Pardis Rofouieeraghi, Alejandro Rey, Damiano Pasini, McGill University, Montreal, QC, Canada

Modeling and Experimental Studies of Spalling Process in Silicon Wafers

Poster Paper Publication. IMECE2014-37549

Ibrahim A. Alhomoudi, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia

17-12 Systems and Design

17-12-1

210

11:30am–2:30pm

Design, Construction, and Implementation of an Electrostatic Levitation Facility for Neutron Scattering Studies on Liquids

Poster Presentation. IMECE2014-40726

Kevin Derendorf, Washington University in St. Louis, Gainesville, FL, United States, Kenneth Kelton, Washington University in St. Louis, St Louis, MO, United States

Experimental Study on Hydraulic Rotation Device for Neutron Transmutation Doping

Poster Presentation. IMECE2014-38010

Ki-Jung Park, Han-Ok Kang, Seong Hoon Kim, Juhyeon Yoon, Sangik Wu, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

Development of NTD Hydraulic Rotation System for Research Reactor

Poster Presentation. IMECE2014-37868

Han-Ok Kang, Ki-Jung Park, Seong Hoon Kim, Juhyeon Yoon, Sangik Woo, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)

17-13 Transportation Systems

17-13-1

210

11:30am–2:30pm

Comprehensive Review of Whiplash Test Requirements Across the Globe

Technical Presentation. IMECE2014-40714

K.D. Sapate, Trinity College of Engineering and Research, Pune, Pune, India, Dhananjay Bhalerao, Pune, Pune, India, Sandip Kale, Trinity College of Engineering and Research, Pune, Pune, India

Simulation and Visualization Model of the Vehicle–Pavement Interaction

Poster Presentation. IMECE2014-40804

Gerardo Hurtado, Queretaro Autonomous University, San Juan del Rio, Querétaro, Mexico, Jose Antonio Romero Navarrete, Queretaro Autonomous University, Queretaro, Queretaro, Mexico

17-14 Vibration, Acoustics, and Wave Propagation

17-14-1

210

11:30am–2:30pm

Active Vibration Control Using Self-Sensing Actuators: An Experimental Comparison of Piezoelectric and Electromagnetic Technologies

Poster Paper Publication. IMECE2014-40082

Romain Boulandet, Philippe Micheau, Alain Berry, Université de Sherbrooke, Sherbrooke, QC, Canada, Anik Pelletier, Université de Sherbrooke, Ile-Bizard, QC, Canada

17-16 Engineering Management, Safety, Ethics, Society, and Education

17-16-1

210

11:30am–2:30pm

Uncertainty Evaluation of Renewable System Performance Models Calculations

Poster Presentation. IMECE2014-38064

Parsa Satari, Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, Iran*

Cellular Automaton Model and Its Application on Emotional Infections

Poster Paper Publication. IMECE2014-36136

Zhao Liu, Taide Tan, Huan Zhang, Changxiong Qin, Jing Fan, *Hunan University, Changsha, Hunan, China*

17-17 Advanced Manufacturing

17-17-1

210

11:30am–2:30pm

Intelligent Resin Delivery System Development Large Composite Structure Manufacturing

Poster Paper Publication. IMECE2014-36442

Tolga Yuksel, Dan Stockton, Paul Marshall, Dave (Dae-wook) Kim, Hakan Gurocak, *Washington State University Vancouver, Vancouver, WA, United States*

Additive Manufacturing of Glass

Poster Paper Publication. IMECE2014-39227

Junjie Luo, Heng Pan, Edward Kinzel, *Missouri S&T, Rolla, MO, United States*

Prediction of Hardness Profile of 4340 Steel Plate Heat Treated by Laser Using 3D Model and Experimental Validation

Poster Paper Publication. IMECE2014-37678

Guillaume Billaud, Nouredine Barka, Abderrazak El Ouafi, Jean Brousseau, Ahmed Chebak, *University of Quebec at Rimouski, Rimouski, QC, Canada*

Flexible and Stretchable Transparent Conductive Electrodes Based on Silver Nanowire/Polymer Composites

Poster Paper Publication. IMECE2014-40908

Tricia Carmichael, *University of Windsor, Windsor, ON, Canada*

3D Printing of Soft, Dielectric Transducers

Poster Presentation. IMECE2014-38247

Sanlin Robinson, Robert F. Shepherd, *Cornell University, Ithaca, NY, United States*

Designing of Flexible, Sandwich-Structure OECT-Based Biosensors for Wearable Bioelectronics

Poster Paper Publication. IMECE2014-40910

Shiming Zhang, *Polytechnique Montreal, Montreal, QC, Canada*

Processing of Conducting Polymer Films for High-Performance Organic Transistors

Poster Paper Publication. IMECE2014-40911

Shiming Zhang, *Polytechnique Montreal, Montreal, QC, Canada*

Porous Lamellar Microstructure by Plasma Spray Co-deposition

Poster Presentation. IMECE2014-37110

Yugeswaran Subramaniam, Saeid Salavati, Larry Pershin, Thomas W. Coyle, Javad Mostaghimi, *University of Toronto, Toronto, ON, Canada*

Cutting Speed and Feedrate Based Analysis of Cutting Forces in the One Shot Drilling (OSD) of CFRC/AI Hybrid Stacks

Poster Paper Publication. IMECE2014-38027

Mariano Marcos, Jorge Salguero, Moises Batista Ponce, Pedro Mayuet, Edwing I. Rosales, Severo R. Fernandez-Vidal, *University of Cadiz, Cádiz, Cadiz, Spain*

Multiscale Measures on Hole Quality in the Drilled CFRP Holes

Poster Presentation. IMECE2014-40277

Sina Alizadeh, Dave (Dae-wook) Kim, Dan Stockton, *Washington State University Vancouver, Vancouver, WA, United States*

Designing of Flexible, Sandwich-Structure OECT-Based Biosensors for Wearable Bioelectronics

Poster Presentation. IMECE2014-38939

Hao Tang, Shiming Zhang, Prajwal Kumar, Zhihui Yi, Fabio Cicoira, *École Polytechnique de Montreal, Montreal, QC, Canada*

17-18 Materials: Genetics to Structures

17-18-1

210

11:30am–2:30pm

Conductive Filaments From CNTs/PLA Composites

Poster Presentation. IMECE2014-38397

Kambiz Chizari, Daniel Therriault, *École Polytechnique Montreal, Montreal, QC, Canada*

TRACK 18: ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY)

**18-1 Undergraduate Research
Projects**

18-2 Undergraduate Design Projects

ACKNOWLEDGMENT

TRACK ORGANIZERS

Matteo Aureli, *University of Nevada,
Reno, USA*
Catherine Phan, *Georgia Institute of
Technology, USA*

TOPIC ORGANIZERS

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Catherine Phan, *Georgia Institute of
Technology, USA*

**TRACK 18
ASME INTERNATIONAL UNDERGRADUATE
RESEARCH AND DESIGN EXPO (POSTERS
ONLY)**

Sunday, November 16

18-1 Undergraduate Research Projects

18-1-1 Undergraduate Research Projects

210

6:00pm–7:30pm

On the Effect of Heart Isolation on the Embryonic Chick Undergraduate Expo Presentation. IMECE2014-36609
Xavier Capaldi, Ashok Ramasubramanian, Union College, Schenectady, NY, United States

Numerical Investigation of Mini Wind Energy Generation System Near Highways Undergraduate Expo Presentation. IMECE2014-36949
Caelan Lapointe, Harish Gopalan, Union College, Schenectady, NY, United States

Scaled T-Junction Cylindrical Model Validation Using Surface Evolver Undergraduate Expo Presentation. IMECE2014-37912
Kris Wiedenheft, Harry Bryant, Jade Mantell, John Kizito, North Carolina A&T State University, Greensboro, NC, United States

Analytical and Experimental Investigation of the Meniscus Recession in the Presence of Phase Change in a Capillary Tube Undergraduate Expo Presentation. IMECE2014-39614
Andréane D’Arcy-Lepage, Mahmood R.S. Shirazy, Luc Frechette, University de Sherbrooke, Sherbrooke, QC, Canada

Design, Development, and Initial Results From an Experiment to Measure Apparent Fluid Velocity Slip Over Superhydrophobic Aerogel Surfaces Undergraduate Expo Presentation. IMECE2014-40149
Jonathan Martin, Bradford Bruno, Ann M. Anderson, Mary K. Carroll, Union College, Schenectady, NY, United States

Design and Construction of a Three-Stage Rocket Directed to Achieve Stratospheric Altitude.

Undergraduate Expo Presentation. IMECE2014-40598
Gari Ciodaro, Fabio Rojas, Universidad de los Andes, Bogota, Bogota, Colombia

Relating Energy Efficiency to CPU Usage in 1U Servers Undergraduate Expo Presentation. IMECE2014-40688
Kagan Richardson, Aaron Wemhoff, Villanova University, Villanova, PA, United States

Load Capacity and Thermal Efficiency Optimization of a Research Data Center Using Computational Modeling Undergraduate Expo Presentation. IMECE2014-40680
Joseph Schaadt, Kamran Fouladi, Aaron Wemhoff, Villanova University, Villanova, PA, United States, Tom Wu, Future Facilities Inc., San Jose, CA, United States

Stiffness Components of Wings in Three Species of Lycaenid Butterflies. Undergraduate Expo Presentation. IMECE2014-40694
Nehal Ninad, University of Southern Indiana, Newburgh, IN, United States, Eric McCloud, Julian L. Davis, Brandon Field, University of Southern Indiana, Evansville, IN, United States

Investigating Pt-Based Microcombustor Performance for Portable Power Device Undergraduate Expo Presentation. IMECE2014-40713
Eric Westphal, Smitesh Bakrania, Rowan University, Glassboro, NJ, United States

Path Control of a Differential Robot Using Artificial Vision Undergraduate Expo Presentation. IMECE2014-40737
Jairo A. Rodriguez-Barrera, Edwin H. Solano Araque, Hernan Gonzalez-Acuna, Hernando Gonzalez-Acevedo, Sebastian Roa-Prada, Universidad Autónoma de Bucaramanga, Bucaramanga, Santander, Colombia

Effect of Curvature on the Stress Concentration Factor of a Biaxial Plate—A Numerical Study Undergraduate Expo Presentation. IMECE2014-40746
Zechariah Gajadhar, Vaughn College of Aeronautics and Technology, Flushing, NY, United States, Yougashwar Budhoo, Vaughn College of Aeronautics and Technology, Jamaica, NY, United States

Using the Pareto Chart and Ishikawa Diagram to Increased Availability and Reliability of a System of Mobile Equipment Crushing Iron Ore

Undergraduate Expo Presentation. IMECE2014-40749
Adriano Soares, *Universidade Federal de São João Del Rei, Sete Lagoas, Brazil*, **Douglas Jose**, *Companhia Siderúrgica Nacional, Congonhas, Brazil*, **Jorge Nei Brito**, *Federal University of São João del Rei, São João del Rei, Minas Gerais, Brazil*

Effect of Vertical Mini-Fins on External Condensation Heat Transfer

Undergraduate Expo Presentation. IMECE2014-40757
Andres Martinez, **Amy Betz**, *Kansas State University, Manhattan, KS, United States*

18-2 Undergraduate Design Projects

18-2-1 Undergraduate Design Projects

210 **6:00pm–7:30pm**

Development of a Unique Robotic Manipulator and Its Dynamic and Kinematic Analysis

Undergraduate Expo Presentation. IMECE2014-40435
Devyesh Tandon, **Rakesh Kumar**, **Sanidhya Gupta**, **Anshuman Kumar**, **Tushar Sharma**, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*

Design and Development of Twisted Fin Torpedo and Its Actuation

Undergraduate Expo Presentation. IMECE2014-40436
Rakesh Kumar, **Devyesh Tandon**, **Anshuman Kumar**, **Tushar Sharma**, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*

Impact of Thruster Positioning and Profiling on Controls of Autonomous Underwater Vehicles (AUVs)

Undergraduate Expo Presentation. IMECE2014-40437
Tushar Sharma, **Devyesh Tandon**, **Dinesh Kumar**, **Anshuman Kumar**, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*

Design Evaluation of Pressure Chamber for Underwater Vehicles

Undergraduate Expo Presentation. IMECE2014-40438
Akash Verma, **Anshuman Kumar**, **Devyesh Tandon**, *Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*

Swappable Battery Pack for Short-Range Electric Vehicles

Undergraduate Expo Presentation. IMECE2014-40460
Matthew Choate, **David J. Meeth**, **Caleb Christianson**, **Christopher Depcik**, *University of Kansas, Lawrence, KS, United States*

Flying Without Depending on Surrounding Medium

Undergraduate Expo Presentation. IMECE2014-40540
Mohamed Elhalawany, *Suez University, Cairo, Egypt*

Implementation of Various Sensors to a Recreation Radio Controlled Aerial Vehicle

Undergraduate Expo Presentation. IMECE2014-40742
Cuitlahuac Calderon-Lopez, **Jose Contreras Navarrete**, **Daniel Cahue**, **Carlos Alberto Guizar Gomez**, *Instituto Tecnológico de Morelia, Morelia, Michoacan, Mexico*

Active Ankle Foot Orthotic

Undergraduate Expo Presentation. IMECE2014-39288
Charles Williams, **Bradley Brossard**, **Robert Rizza**, *Milwaukee School of Engineering, Milwaukee, WI, United States*

TRACK 19: NSF STUDENT COMPETITION

19-1 General

ACKNOWLEDGMENT

TRACK ORGANIZERS

Julie Chen, *University of Mass Lowell,*
USA

TRACK 20: GENERAL TOPICS

20-1 General Topics

TRACK 20 GENERAL TOPICS

Monday, November 17

20-1 General Topics (Technical Session)

20-1 General Topics (Technical Session)

Room 525A

9:45am–11:30am

9:45am – Magnetoelastic Analysis of Sandwich Cellular Cylinders

Technical Paper Publication. IMECE2014-39060

Hamid Akbarzadeh, Damiano Pasini, *McGill University, Montreal, QC, Canada*, **Jiawei Fu, Zengtao Chen**, *University of New Brunswick, Fredericton, NB, Canada*, **Nanjing University of Science and Technology, Nanjing, Jiangsu Province, China**

10:02am – Structural Analysis of Variable Stiffness Laminated Plates Using First-Order Shear Deformation Theory

Technical Paper Publication. IMECE2014-39092

Hamid Akbarzadeh, Mahdi Arian Nik, Damiano Pasini, *McGill University, Montreal, QC, Canada*

10:19am – Translation Micromirror for MEMS FTIRs Alcohol Interlock

Technical Paper Publication. IMECE2014-37651

Yuan Xue, Siyuan He, Farzana Husain, *Ryerson University, Toronto, ON, Canada*

10:36am – Optical Trapping in Living Cells to Investigate Motor Protein Dynamics and Cell Mechanics

Technical Presentation. IMECE2014-39535

Adam Hendricks, *McGill University, Montreal, QC, Canada*, **Erika L.F. Holzbour, Yale E. Goldman**, *University of Pennsylvania, Philadelphia, PA, United States*

10:53am – Balanced-Force Algorithm for Two-Phase Flows

Technical Presentation. IMECE2014-39137

Hanif Montazeri, *NuPhysics, Toronto, ON, Canada*

11:10am – Adaptive Fuzzy Computed Torque Controller for Bipedal Robot

Technical Paper Publication. IMECE2014-39773

Hamzeh Ansari, Ahmad Ghanbari, *University of Tabriz, Tabriz, Iran*, **Mohammad Pourgol-Mohammad**, *Sahand University of Technology*

20-1 General Topics — II (Technical Session)

20-1-2 General Topics - II (Technical Session)

525A

1:00pm–2:45pm

1:00pm – Forced and Mixing Convection Analysis of Discrete Heated Porous Convergent Channel

Technical Paper Publication. IMECE2014-39266

Mohamed G. Ghorab, *Alexandria University*

1:21pm – Dynamical Stability Analysis of a Hose to the Sky

Technical Presentation. IMECE2014-39678

Frederick Gosselin, *École Polytechnique de Montreal, Montreal, QC, Canada*, **Michael Paidoussis**, *McGill University, Montreal, QC, Canada*

1:42pm – Characterization of Calcified Plaques Retrieved From Occluded Arteries and Comparison With Potential Artificial Analogues

Technical Paper Publication. IMECE2014-38152

Louis-Philippe Riel, Steven Dion, Martin Brouillette, *Université de Sherbrooke*, **Simon Bérubé, Marc-Antoine Despatis**, *Centre Hospitalier Universitaire de Sherbrooke*, **Étienne Bousser**, *École Polytechnique*

2:03pm – Drug Accumulation Into Single Drug-Sensitive and Drug-Resistant Prostate Cancer Cells Measured on the Single Cell Bioanalyzer

Technical Paper Publication. IMECE2014-36166

Avid Khamenehfar, Paul C.H. Li, *Simon Fraser University*, **Ji Liu, Patrick Ling, Pamela Russell**, *Australian Prostate Cancer Research Centre*, **Jia Cai, Michael Wong**, *ZellChip Technologies Inc., Burnaby, BC, Canada*

2:24pm – Improved Air Cooling Methods for Transformer

Technical Presentation. IMECE2014-38883

Adam Fain, Pradip Majumdar, *Northern Illinois University*, **Scott Downing, Hamilton Sundstrand**, *United Technologies*

20-1-3 General Topics – II (Technical Session)

525A

3:00pm–4:45pm

3:00pm – Multiscale Modeling of Nanocomposites

Invited Presentation. IMECE2014-39623

Shaker Meguid, *University of Toronto, Toronto, ON, Canada*

3:21pm – Multiscale Modeling of Multifunctional Nanocomposites

Invited Presentation. IMECE2014-39584

Shaker Meguid, *University of Toronto, Toronto, ON, Canada*

3:42pm – Quantification of Scratch and Mar Damage on Polymeric Thin Films

Technical Presentation. IMECE2014-40384

Hung-Jue Sue, Marouen Hamdi, *Texas A&M University, College Station, TX, United States*

4:03pm – Process Development for Hot Isostatic Pressing Treatability Study

Technical Paper Publication. IMECE2014-36935

Kenneth Bateman, Dennis Wahlquist, *Idaho National Laboratory, Idaho Falls, ID, United States*, **Timothy Malewitz**, *Portage Inc., Idaho Falls, ID, United States*.

4:24pm – Two-Way Fluid–Structure Coupling in Vibration and Damping Analysis of an Oscillating Hydrofoil

Technical Paper Publication. IMECE2014-38441

Tahereh Liaghat, Francois Guibault, *École Polytechnique de Montreal, Montreal, QC, Canada*, **Bernd Nennemann**, *Andritz, Point Claire, QC, Canada*, **Lukas Allenbach**, *EPFL, Lausanne, Switzerland*

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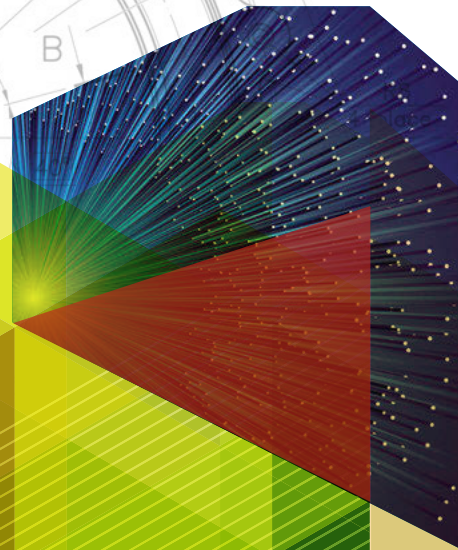
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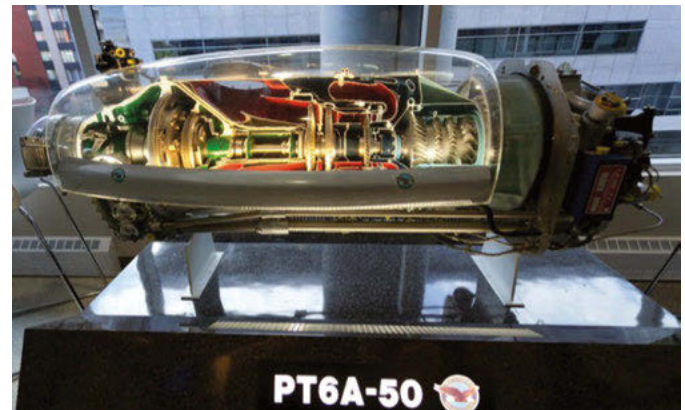


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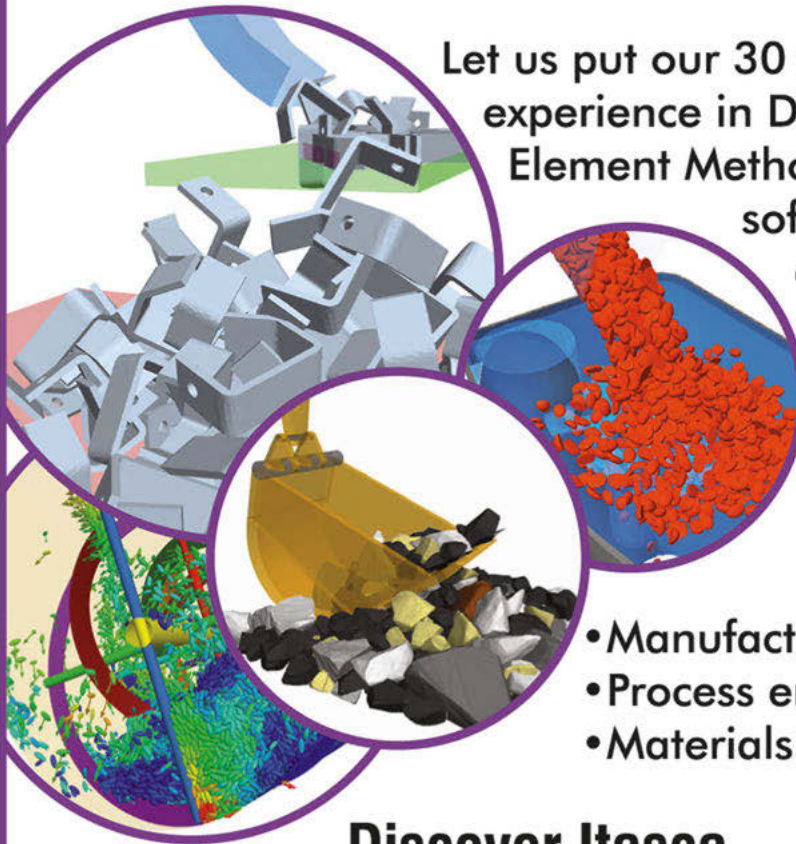
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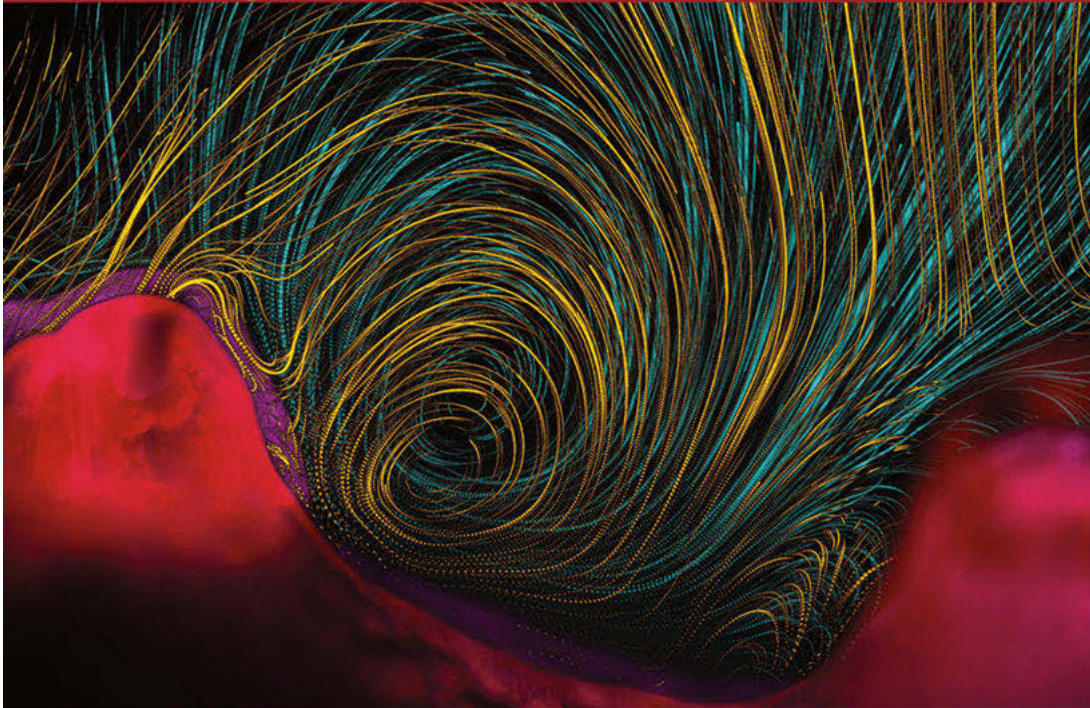
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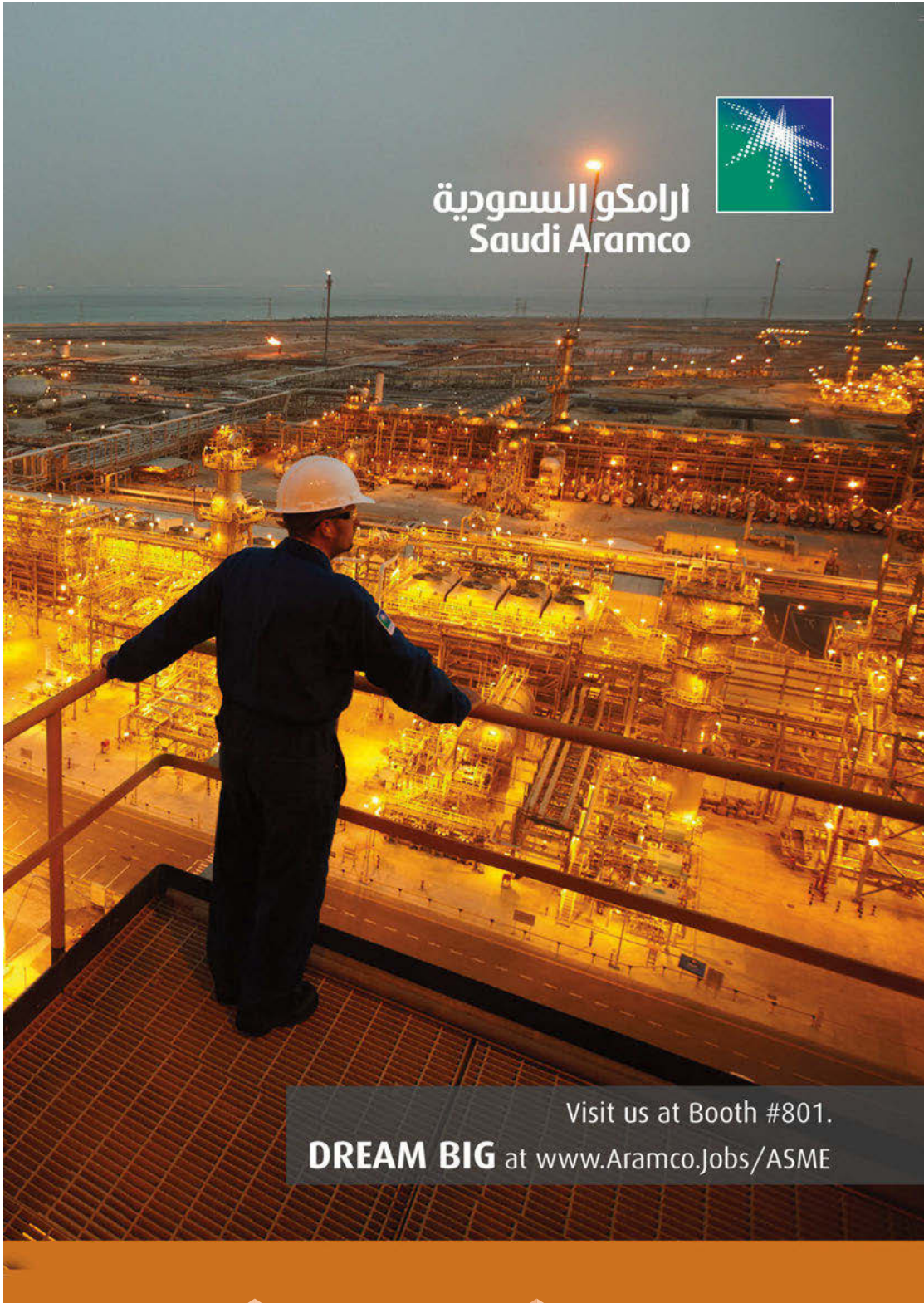
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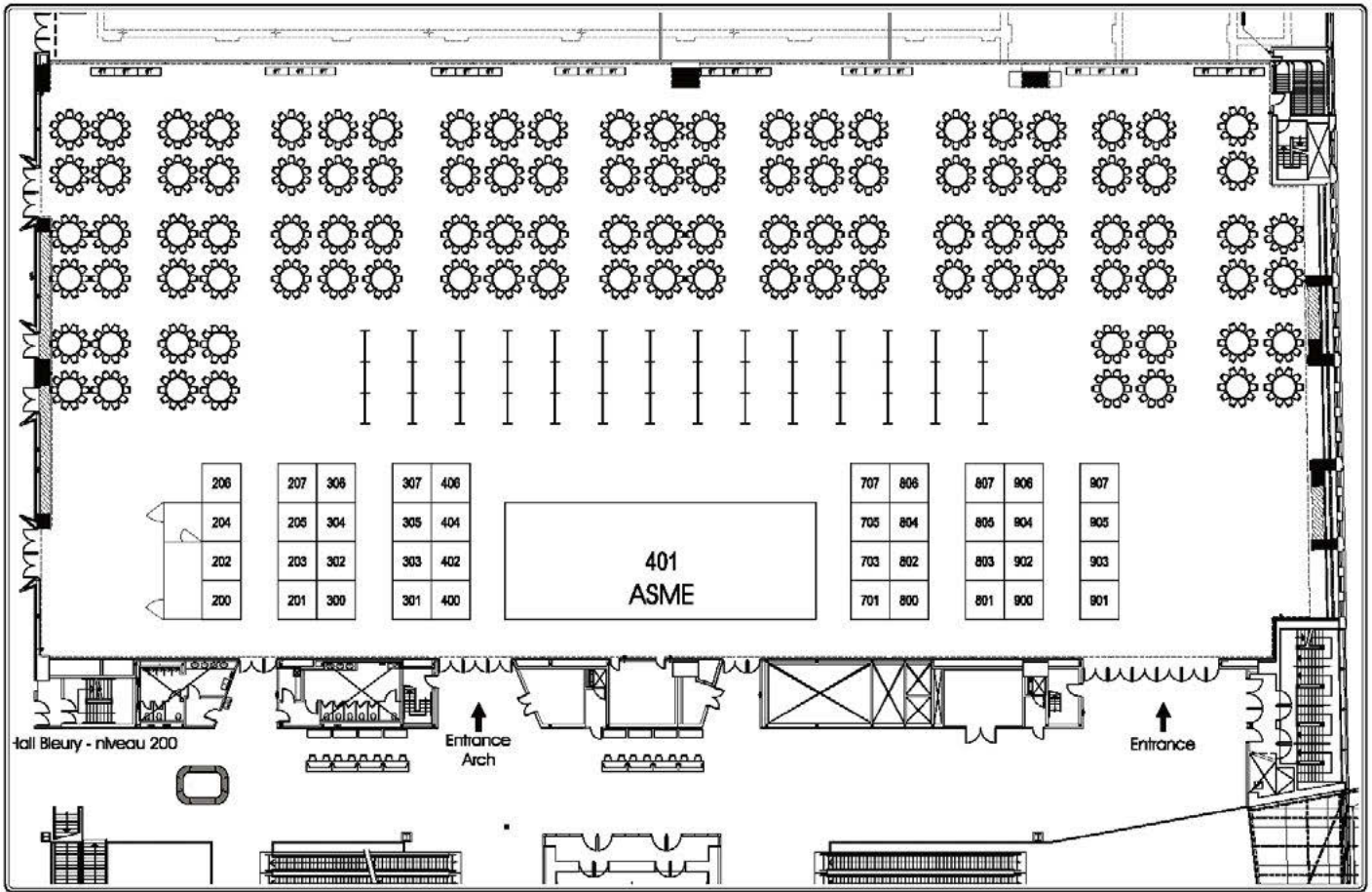
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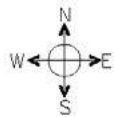
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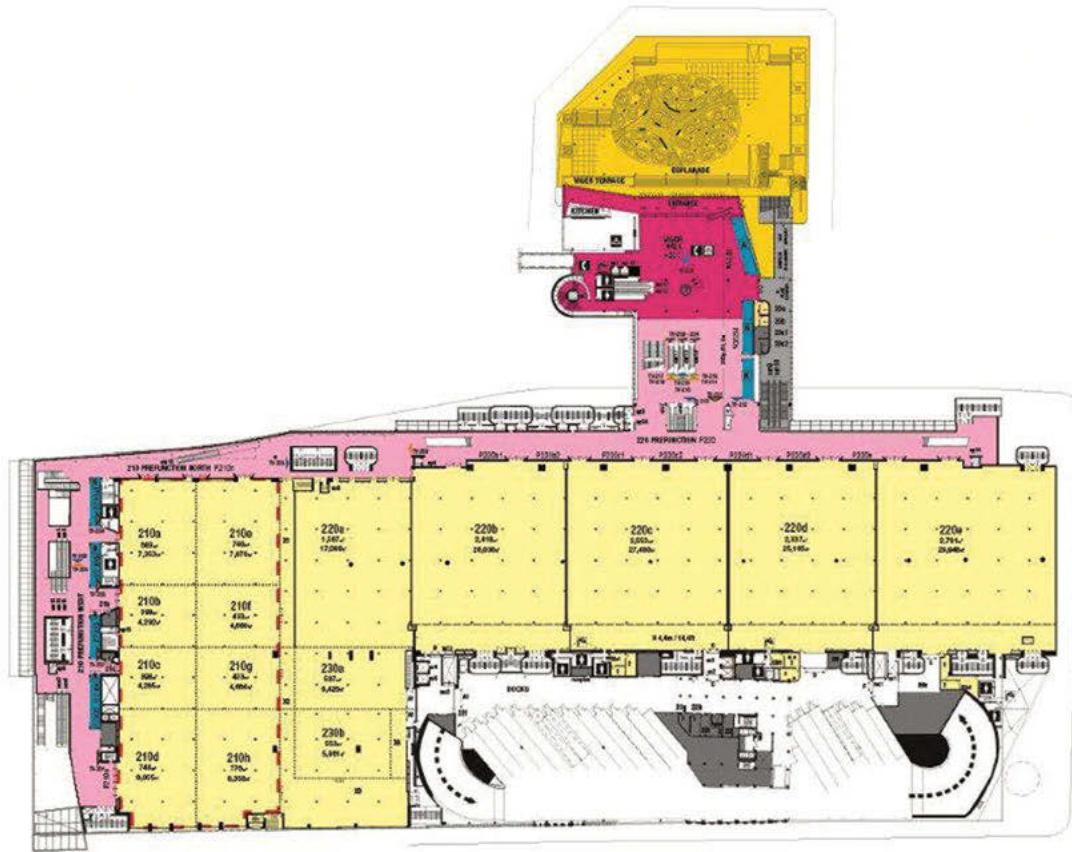


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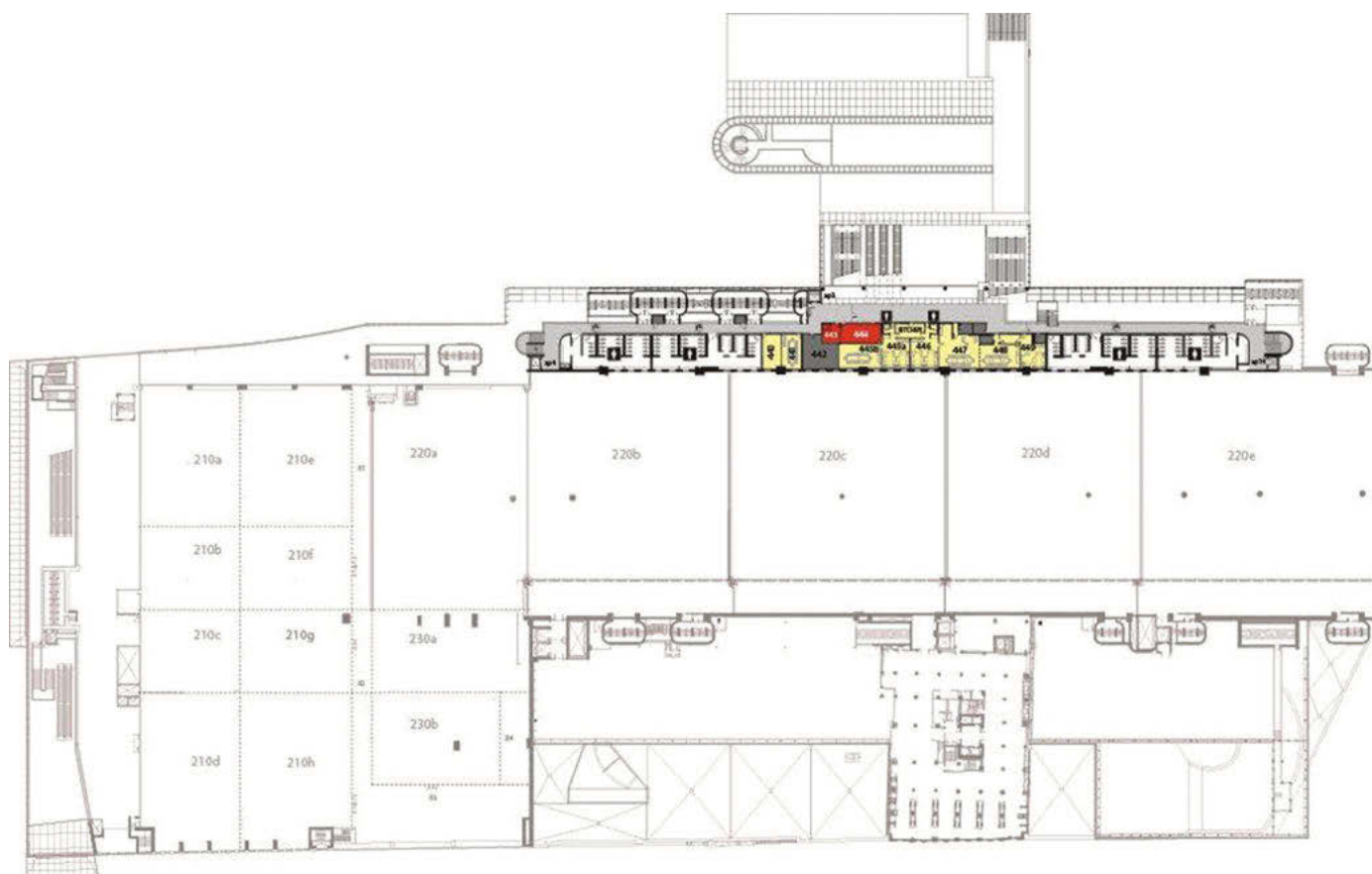
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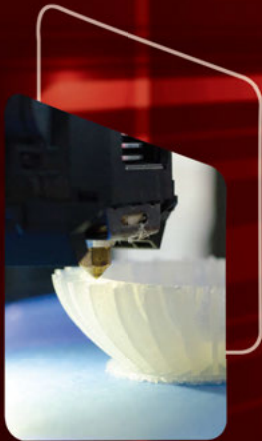
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JULY 19 – 23, 2015
BOSTON, MA



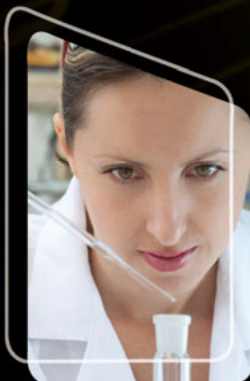
POWER & ENERGY
Power Conference
Energy Sustainability Conference
Fuel Cell Conference
Nuclear Forum
JUNE 28 – JULY 2, 2015
SAN DIEGO, CA

TURBO EXPO
JUNE 15 – 19, 2015
MONTREAL, CANADA



ADDITIVE MANUFACTURING + 3D PRINTING
INTERNATIONAL DESIGN AND ENGINEERING TECHNICAL CONFERENCES & COMPUTERS AND INFORMATION IN ENGINEERING CONFERENCE
AUGUST 2 – 5, 2015
BOSTON, MA

INTERNATIONAL MECHANICAL ENGINEERING CONGRESS & EXPOSITION
NOVEMBER 13 – 19, 2015
HOUSTON, TX



NANOENGINEERING FOR MEDICINE AND BIOLOGY CONGRESS
APRIL 19 – 22, 2015
MINNEAPOLIS, MN

PLAN TO ATTEND

ASME 2015 INTERNATIONAL MECHANICAL ENGINEERING CONGRESS & EXPOSITION

November 13–19, 2015 • Houston, Texas

Areas of Interest

- Advances in Aerospace Technology
- Advanced Manufacturing
- Biomedical & Biotechnology Engineering
- Dynamics, Vibration, and Control
- Education and Globalization
- Emerging Technologies
- Energy
- Engineering Management, Safety, Ethics, Society, and Education
- Fluids Engineering Systems & Technologies
- Heat Transfer and Thermal Engineering
- Materials: Genetics to Structures
- Mechanics of Solids, Structures and Fluids
- Micro- and Nano-Systems Engineering and Packaging
- Systems, Design, and Complexity
- Transportation Systems
- Vibration, Acoustics & Wave Propagation
- Virtual Podium (Posters)
- ASME International Undergraduate Research and Design Expo (Posters Only)

