

ARC Centre of Excellence for
**Electromaterials
Science**

NEW DIMENSIONS IN MATERIALS SCIENCE



ANNUAL REPORT 2014

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FOREWORD

I am delighted to support the ARC Centre of Excellence for Electromaterials Science as you launch into a further seven years of exploring electromaterials and how they can improve our lives and wellbeing.

This is a field with huge potential and we are lucky to have some of the world's leading researchers and professionals to undertake the work.

With extensive international collaboration underway on cross-disciplinary projects, the centre is not only pushing back the frontiers of knowledge, but is also an inspiration to young people who may be considering a career in science.

A robust and thriving research sector drives the future development of our industries and the value of this is well-recognised within the Coalition Government.

We have committed to building a world-class education and research sector as one of the five pillars of a stronger, more productive and prosperous Australia.

Within my portfolio of Education alone, this year we announced \$11 billion for future research, as a major investment in the long-term sustainability of Australia's science and research capacity.

This includes nearly \$140 million to renew the ARC Future Fellowships scheme. The Coalition Government has committed to 100 outstanding mid-career research fellowships each year, with each researcher receiving funding for four years to undertake vital research.

This support for research builds on a proud legacy of many great Australians whose work has substantially improved our wellbeing.

It is vital for our future that we continue to support research excellence. The ARC Centre of Excellence for Electromaterials Science has produced outstanding research outcomes in the past and I know it will continue to do so with this renewed funding. I look forward to your continued success and wish all involved in the centre well for the future.

**The Hon Christopher Pyne
MP, Minister for Education**

The Australian Research Council (ARC) Centre of Excellence for Electromaterials Science (ACES) plays an important role in the research landscape both nationally and internationally.

Since its establishment in 2005, under the guidance and leadership of Professor Gordon Wallace, the Centre has produced outstanding outcomes, including: the development of nanotube yarn to power implantable biomedical devices; the manipulation of fishing line to produce artificial muscles with super human strength; and the acceleration of 3D printing to deliver solutions to a number of medical challenges.

I am pleased the Centre submitted such a strong bid in the most recent ARC Centres of Excellence round and will move forward for a further seven years.

ACES has built an internationally recognised research program in materials science, and looking forward it will translate this knowledge into devices that will have an impact on the Australian community. Benefits for the community include the development of new industries and manufacturing opportunities around the next generation of batteries, solar cells and medical implants.

The ARC Centres of Excellence scheme, which supports ACES, is an important research investment model. This scheme allows research groups to tackle large-scale challenges and it provides them with funding surety to undertake that work.

The ARC is extremely proud of this scheme and its ability to foster and build highly innovative and potentially transformational research, as well as training our future generation of researchers in this environment. One of the most rewarding aspects of the scheme is its capacity to bring different discipline perspectives together to solve big problems.

What is equally important is the right people to forge ahead. ACES has a strong leader in Professor Wallace and he has built a dedicated team that is committed to accelerating research discoveries for the benefit of the nation.

I wish Professor Wallace and the entire ACES team all the very best in their endeavours in the next seven years.



Professor Aidan Byrne
Chief Executive Officer
Australian Research Council

Research is the key to unlocking New South Wales' intellectual capital, as well as bolstering its competitiveness, productivity and innovative capacity.

Since its establishment in 2005, the ARC Centre of Excellence for Electromaterials Science (ACES), headquartered at the University of Wollongong, has built on its internationally-recognised research program in materials science.

The researchers at ACES, led by Professor Gordon Wallace, have received a significant boost this year. The Centre has been refunded for a further seven years from 2014 – including a \$500,000 investment from the NSW Government's Research Attraction and Acceleration Program (RAAP).

ACES is a great example of the Centre of Excellence concept – a prestigious hub of expertise through which high-quality researchers maintain and develop Australia's international standing in areas of research strength.

Professor Wallace and his team continue their efforts to translate their knowledge into devices that will have an impact on the Australian community, including the development of new industries and manufacturing opportunities around the



next generation of batteries, solar cells and medical implants. Implantable biomedical devices powered by glucose in our blood rather than a battery could soon become a reality after a recent breakthrough by an international team comprising ACES researchers.

I congratulate ACES on its achievements to date and wish the Centre, including its university partners across Australia, in Asia, Europe and the UK, continued success into the future.

**Professor Mary O'Kane
NSW Chief Scientist &
Engineer**

WELCOME TO ACES

The ARC Centre of Excellence for Electromaterials Science (ACES) is a global leader in advanced materials and integrated device development. Encompassing researchers, clinicians and industry partners worldwide, ACES is uniquely positioned to translate materials research into next-generation solutions for clean energy and medical bionics.

The ACES Vision

To be the pre-eminent world centre for electromaterials science and integrated device assembly.

- To use our research into advanced materials to deliver innovative device solutions for clean energy and medical bionics.
- To deliver research programs that produce world class graduates with not only exceptional technical skills, but skills in science communication, research management or commercialisation, and an awareness of the impact of their research.
- To realise commercial opportunities for our research.
- To educate and inspire stakeholders and the broader community, by effectively communicating our research messages.

The Partners

We have established a global network of partners that will be integral to our success in research, training, commercialisation and engagement.

The Adminstrating Institution is the University of Wollongong. The lead node, the Intelligent Polymer Research Institute (IPRI), is located within the Australian Institute for Innovative Materials (AIIM), a state-of-the-art purpose built facility at the University of Wollongong's Innovation Campus. This precinct is also home to the Materials node of the Australian National Fabrication Facility (ANFF).

Collaborating Institutions are Monash University, Deakin University, University of Tasmania, The Australian National University and The University of Melbourne.

International partner institutions are Dublin City University, Ireland; University of Warwick, UK; Friedrich Alexander University of Erlangen, Nuremburg, Germany; Hanyang University, Korea and Yokohama National University, Japan.

Each of the nodes possesses key research strengths, which, when combined, places ACES in a powerful position to design, discover and develop new electromaterials.

Track Record

We have a strong track record of securing the support of the Australian Research Council (ARC).

The ARC invested in ACES to:

- Bring together eminent scientists to develop the nanoscience and nanotechnology related to the movement of electric charge within and between materials (2005-10). The approach provided an alternative to varying the composition of a material to alter physical and biological properties – ACES alters dimensions and shape in the nanodomain.
- Continue our groundbreaking electromaterials research (2010-13). The integrated research projects within each program provided the capability to design, synthesise and characterise new electromaterials.
- Translate our research into the next generation of health and energy devices (2014-20).

As we work towards this goal, we are also responsible for training the next generation of research leaders, and providing new manufacturing and industry opportunities for Australia.

ACES NEW DIMENSIONS LAUNCHED JULY 2014



Pictured from left: Prof Byrne, Prof Raper, Senator the Hon Concetta Fierravanti-Wells, Vice-Chancellor Prof Wellings, Prof Wallace.

Senator the Hon Concetta Fierravanti-Wells joined us in July to help celebrate the Australian Government's \$25 million investment in ACES through the Australian Research Council to expand our research program over the next seven years. The NSW Government has also invested \$500,000 through its Research Attraction and Acceleration Program (RAAP) to help us fast-track the commercialisation of our research. With the contribution of our partners, ACES has more than \$36.8m to deploy to 2020.

This significant and sustained funding provides us with the support we need to keep us at the cutting edge of electromaterials science and will enable us to translate our accrued knowledge of materials into the next generation of 'smart devices' for the benefit of the community. We think of a smart device as one that uses the advanced materials we make in our laboratories to create new health and energy solutions that improve people's lives.

DIRECTOR'S REPORT

In the quest to consolidate existing collaborations, and to initiate new ventures in research, training, commercialisation and communications, the ACES team has transversed the globe more than once during 2014.

We can report that ACES is held in high regard internationally and, in particular, our holistic approach across the ideas-to-industry pipeline has attracted much attention.

In addition to building relationships worldwide, this was an opportunity to learn and to unearth future possibilities. We must continue to work to ensure the most efficient generation of new knowledge through our collaborative research programs, and the most effective use of that knowledge through the development of new global business opportunities and translation of findings into clinical environments.

On the research front, we have established a strong international network. Through visits and active exchange of researchers, we will consolidate this. Our international events including conferences, workshops and embassy showcases have also enabled new collaborations on specific projects to be developed.

The launch of the new global Master of Philosophy in BioFabrication course is a taste of things to come in research training. By partnering with Queensland University of Technology, Utrecht University (the Netherlands) and University of Wurzburg (Germany), ACES is able to offer this unique, global training experience.

Watch out for the new Master's Degree in Electromaterials Science to be launched in 2016. Lecturers will be drawn from the incredible pool of talent available to ACES throughout Australia and beyond.

It is vital that ACES provides new knowledge to enable the further development of existing commercial enterprises. Where this seed is planted for the growth of new ventures, exciting opportunities will present themselves for

highly skilled graduates and early career researchers.

Shortly, we will complete the pilot program of the Graduate Certificate in Entrepreneurship, a course developed in partnership with the University of Wollongong's Sydney Business School. All indications are that this program will be rolled out across other ACES nodes.

At ACES, we are acutely aware of the immense opportunities afforded to us through our status as an ARC Centre of Excellence, and we focus on returning real benefits to our communities, from research outcomes, to training opportunities and commercialisation initiatives. This is further facilitated by our Ethics, Policy and Public Engagement program, along with a commitment to develop the most effective communication methods possible to disseminate information to stakeholders.

I look forward to the journey ahead and appreciate your ongoing support, which is critical to our success.

Best wishes



Prof Gordon Wallace
Executive Director Australian
Research Council (ARC)
Centre of Excellence for
Electromaterials Science
(ACES).

2014 GLOBAL ENGAGEMENT

Adelaide, Australia
Bath, United Kingdom
Beijing, China
Canberra, Australia
Christchurch, New Zealand
Coventry, United Kingdom
Belfast, Northern Ireland
Daejeon, South Korea
Dallas, USA
Dublin, Ireland
Erlangen, Germany
Geelong, Australia
Geneva, Switzerland
Gold Coast, Australia
Hobart, Australia
Melbourne, Australia
Nagano, Japan
Newcastle, Australia
Ningde, China
Palmerston North, New Zealand
Philadelphia, USA
San Francisco, USA
San Sebastián, Spain
Seoul, Korea
Shanghai, China
Sydney, Australia
Tampere, Finland
The Hague, Amsterdam
Tokyo, Japan
Turku, Finland
Ueda, Japan
Utrecht, Netherlands
Washington, USA
Wellington, New Zealand
Wuhan, China
Wurzburg, Germany
Yokohama, Japan

IAC REPORT

Quality Research, High Achievement, Accountability and Impact!

The ACES team has provided important and fundamental insights needed to advance the field of materials science.

The researchers are connected globally, within the nominated research themes. This connectivity not only accelerates progress on the fundamental research front but also facilitates translation into practical devices.

Research partnerships remain crucial to the ACES success and we acknowledge the expansion of ACES to include not only its six Australian nodes but also five international partner organisations known for their expertise in materials and devices.

Commercial partnerships are also critical to success and ACES continues to consolidate links with existing industry. The team is aware that partnerships that bring business development expertise will greatly enhance the likelihood of new commercial ventures.

These developments will diversify the research funding base for ACES. They will also provide an opportunity to develop a critical area currently under-resourced - business development activities. These new resources are critical as commercialisation activities must not detract from its primary goal of excellence and quality in research and research training.

ACES has implemented a dynamic program of events for industry engagement. ACES has an open door-policy and individuals are welcome to tour the facilities, meet the researchers and see research in action. Some 20 companies visited in 2014.

The innovative research training programs within ACES are ensuring graduates are well equipped with the tools and



skills required to communicate across all levels of society – a life skill. The IAC praised ACES communication activities. “Exemplary!” and “shows how simple real life applications can trigger new connections” were a few of the comments received.

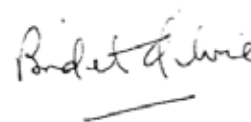
Attracting high achieving undergraduates to pursue postgraduate research careers remains a high priority. The ACES summer research program for undergraduates has proven highly successful. The IAC noted that ACES is striving to expand the expertise of future leaders by providing access to either formal training in entrepreneurship, science communication or research management – at the same time recognising that this additional training is not every graduate’s journey.

The IAC was pleased to hear from Steve Kloos, Partner at True North Venture Partners and Director of AquaHydrex – a company established from ACES developing technology. Mr Kloos commented that the “talented researchers and scientists are a real comody for ACES” and to have such quality in researchers and in scientific endeavour is a rare thing that makes ACES a world class centre.

The IAC noted the development of the ACES strategic plan to be available mid 2015.

Dr (Dame) Bridget Ogilvie (AC, DBE, FAA, FRS, FMedSci). Chair International Advisory Board for ACES.

“ACES is poised to take all areas of activity to a new and exciting level. The ability to maximise impact through translational activities while further enhancing the fundamental research and research training programs will be challenging. This exceptional team of researchers might just be up for that challenge.”

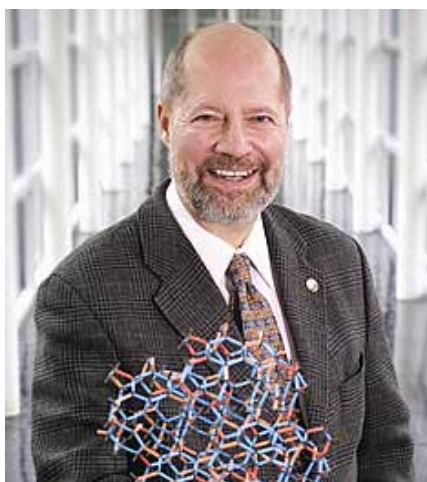


IAC MEMBER BACKGROUND

**Dr (Dame) Bridget Ogilvie
(AC, DBE, FAA, FRS, FMedSci).
Chair International Advisory
Board for ACES.**

Dr (Dame) Bridget Ogilvie worked as a research scientist with the UK Medical Research Council for 17 years before moving to the Wellcome Trust, which funds medical research. This Trust became very large during her 19 years on its staff, ultimately as its Director (= CEO). Here she was responsible for developing the Trust's funding policies. She is best known for the career development and university infrastructure awards made by the Trust during her time on its staff, and for establishing the Sanger Institute, which is a key body for genome sequencing and analysis.

Dr Ogilvie was a main board Director of the pharmaceutical company AstraZeneca and of Lloyds TSB Bank. She has been a Trustee of Cancer Research UK and was the founding Chair of the Medicines for Malaria Venture. Both these bodies have successfully developed new medicines for cancer and malaria respectively, working in partnership with the pharmaceutical industry.



**Prof Ray Baughman- Director
of the MacDiarmid Centre for
Nanotechnology, USA.**

Ray Baughman became the Robert A. Welch Professor of Chemistry and Director of the NanoTech Institute at the University of Texas in Dallas in August 2001, after 31 years in industry. He is a Member of The National Academy of Engineering and The Academy of Medicine, Engineering and Science of Texas; a Fellow of the American Physical Society and the Royal Society of Chemistry; an Academician of The Russian Academy of Natural Sciences; and an honorary professor of five universities in China. The Ray H. Baughman Laboratory has been created in his honour in Changzhou, China. He has 71 issued US patents and over 368 refereed publications, with over 26,000 citations.



**Dr Ian Dagley - CEO CRC for
Polymers, Australia.**

Dr Ian Dagley is the Chief Executive Officer of the CRC for Polymers, a position held since December 1995. Dr Dagley has a PhD in organic chemistry from the University of Melbourne and an MBA from RMIT. His research career has also included periods at Oxford University, time with Pacific Dunlop, and 10 years in research positions with the Defence Science and Technology Organisation. He is a Fellow of the Academy of Technological Science and Engineering and a Fellow of the Royal Australian Chemical Institute.



**Prof Hans-Joachim Freund
-Director Fritz-Haber-Institut
der Max-Planck-Gesellschaft,
Germany.**

Prof Hans-Joachim Freund has been the Director of the Fritz-Haber-Institut since 1996. He has been the recipient of over 40 awards; published more than 700 refereed publications and delivered over 690 invited talks to international conferences. He serves as Adjunct Professor at five universities in Germany and UK and is a regular member of the Chemical Sciences Section of the Academia Europea, the Berlin-Brandenburgische Akademie der Wissenschaften, the Academia Brasileira de Ciencias, the German National Academy of Sciences Leopoldina, and the Chemical section of the Hungarian Academy of Sciences. Hajo Freund holds an honorary Doctorate from University Aix Marseille, France, is Fellow of the American Physical Society and of several scientific societies, and is a member of several advisory boards of scientific journals. Hajo Freund is a founding member of the Scientific Council of the European Research Council. He has educated more than 120 PhD students and collaborated with more than 70 postdoctoral associates.



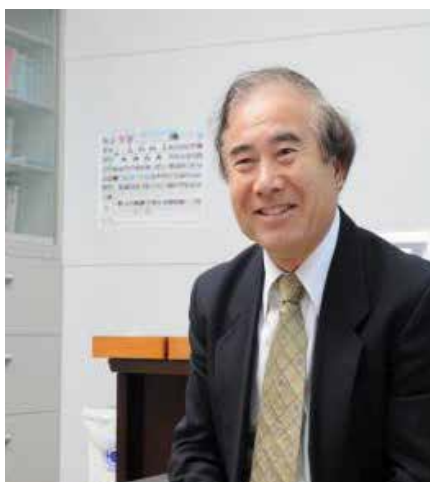
**Dr Anita Hill -Division Chief
CSIRO Process Science and
Engineering, Australia.**

Dr Anita Hill is a member of the CSIRO Executive Team and is CSIRO's Executive Director – Manufacturing, Digital Productivity and CSIRO Services Sector, with responsibilities for oversight of the organisation's manufacturing and digital research and CSIRO's services line of business. She holds or has held Board positions for: the Membrane Society of Australasia; the Institute for Technology Research and Innovation (Deakin University); The Wark (University of South Australia); the National Centre of Excellence in Desalination (NCEDA); the Victorian Centre for Sustainable Chemical Manufacturing (VCSCM); International Scientific Advisory Committee membership for the Australian Institute for Bioengineering and Nanotechnology (University of Queensland) and is on the Editorial Board of the Journal of Polymer Science. Dr Hill's work in nanotechnology and electromaterials was recognised by CSIRO Medals for Research Achievement in 2002 and 2004.



**Dr Russell Jones -Bio-
MPD Leader, Cell and Gene
Therapy Platform, Biopharm
R&D, GlaxoSmithKline.**

Russell Jones has worked at GlaxoSmithKline for 23 years in product development and late stage project delivery. He has recently joined the Advanced Therapy Delivery team as a Biopharmaceutical Project Leader (CMC and Supply Chain) and his work involves autologous ex-vivo gene therapy treatment for two rare disease conditions. Russell has been based in London since 2000. He is an Australian citizen and completed a PhD from Deakin University in electro-analytical chemistry, BSc Hons (first class) from Melbourne University and a Graduate Diploma in Management from RMIT. He is a Fellow of the Royal Australian Chemical Institute.



Prof Yoshihito Osada-Former Deputy Director of the RIKEN Advanced Science Institute, Japan.

Prof Osada was the Deputy Director of the Advanced Science Institute at RIKEN in Japan (2007-2012); Director of Corporate and International Relation Division RIKEN and Unit leader of the Molecular and Informative Life Science Unit RIKEN as well as Professor Emeritus of Hokkaido University, Japan. Prof OSADA is the pioneer of polymer gels and therefore, often called "a father of polymer gels". He is an associated member of Japan Academy of Sciences, and the Fellow of The Chemical Society of Japan, Honorary Doctor of Polytechnic University of Caltagna, Spain and Visiting Professor of various universities. He is the winner of several awards from The Chemical Society of Japan, The Society of Polymer Science, Japan and others. He played important roles for the science community as a vice-president of The Society of Polymer Science in Japan and as a committee member on the government programs, WPI and PREST.



Prof Lee Won-Mook - President Hanbat University, Korea.

Prof Won-Mook is Prof/ Honorary President, Dept of Chemical & Bio-engineering, Hanbat National University, Korea. He is also the Chairman for the Committee for Advanced College Education of Korea (Ministry of Education); Chairman, Daeduk Forum for Industrialisation of new technology established by Ministry of Science, Information and Communication Technology; Chairman, University President Association of Daejeon- Chung Nam Area (30 Universities) and the Director, Korea University Education Association. More recently Prof Won-Mook has been involved in 3D printing technology.



Dr Jan Weber - Boston Scientific, Netherlands.

Dr Weber is a Senior Research Fellow for Boston Scientific, a world-wide leading medical company for whom he has worked in a variety of senior technical and management positions over the last 17 years, living in Ireland, USA and the Netherlands. Prior he worked for J&J and was responsible for the advanced R&D group. He studied physics at the Free University of Amsterdam. Dr Weber has been involved over the past 28 years with the development, application and implementation of basically all processes and materials as used nowadays in the medical device industry with internal and external partners. He was given the highest BSC annual award in 2012 for continuous outstanding technical work during his career at BSC. His work is reflected in 175 issued patents and 150 additional pending applications in the fields of materials, processes and products, covering all areas of medical devices.



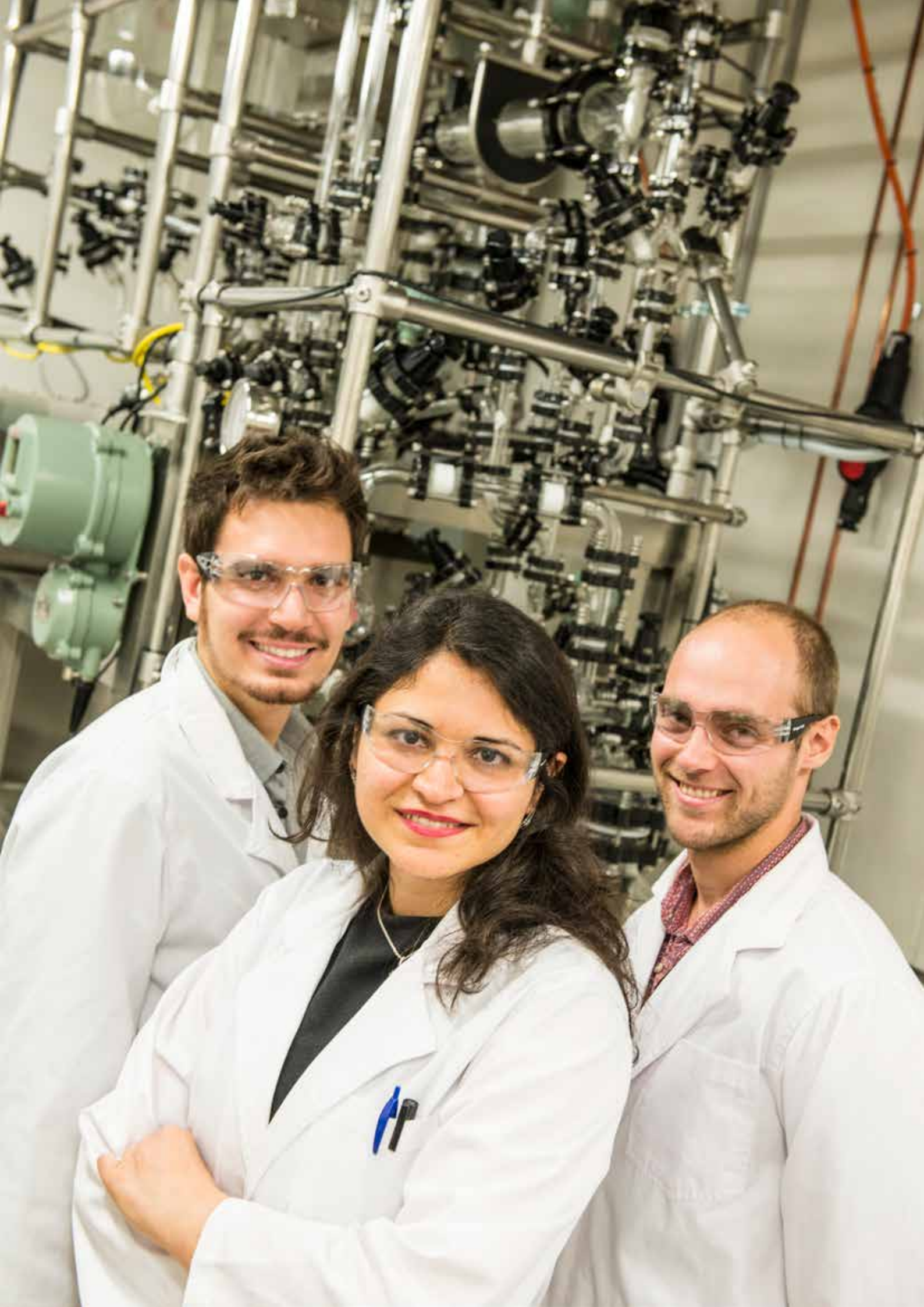
**Prof Chung-Yu (Peter) Wu-
Chair Professor at National
Chiao Tung University,
Director Nanotechnology
Program, Taiwan.**

Since 1980, Prof Wu has served as a consultant to high-tech industry and research organisations and has built up strong research collaborations with high-tech industries. Since 1987, he has been a Professor at National Chiao Tung University. From 1991 to 1995 he was rotated to serve as the Director of the Division of Engineering and Applied Science on the National Science Council, Taiwan. From 1996-1998 he was honored as the Centennial Honorary Chair Professor at National Chiao Tung University. He is the Chair Professor at National Chiao Tung University. He has 38 patents including 19 US patents. His research interests are biomedical electronics, nanoelectronics and VLSI including circuits and systems in low-power/low-voltage mixed-signal design, neural vision sensors, neuromorphic network, and RF circuits.



**Prof Daoben Zhu-Former
Director of the Institute of
Chemistry, Chinese Academy
of Science, China.**

Daoben Zhu is a professor and Director of the Organic Solids Laboratory of the Institute of Chemistry, Chinese Academy of Sciences. He was selected as an academician of Chinese Academy of Sciences in 1997. His research interests include molecular materials and devices. Prof Zhu has contributed a lot to the development and promotion of research institutions, academic societies and research foundations in China. He was the vice-president of National Natural Science Foundation of China (NSFC) from 2000-2007. He served as the vice-director of the Institute of Chemistry, CAS from 1988 to 1992, and director from 1992 to 2000. He is a member and vice-president of Chinese Chemical Society, member and vice-president of Chinese Materials Society. He became a member of Asia-Pacific Academy of Materials (APAM) on June 2, 2003. He is a member of the editorial board of Chemistry-Asian Journal, and Applied Physics A. He is also the member of International Advisory Board of Macromolecular Rapid Communications, Polymer Reviews and Molecular Physics Reports.



RESEARCH THEMES & MILESTONES



3D Electromaterials

Developing high performance electromaterials fabrication protocols to enable integration into devices wherein the extraordinary properties discovered in the nano-domain are retained within macroscopic structures for applications in energy, robotics, bionics and diagnostics.

THEME LEADER - PROF D. OFFICER

End Year 2

Supplied 1st Generation structural, reaction centre and electromaterials for the application themes projects.

Developed a fully integrated multi-axial material delivery system for fabrication of core-shell structures.

Developed the 1st example of a contactless characterisation probe.

End Year 3

Developed initial model to understand spatial distribution of composition.

Developed the 2nd example of a contactless characterisation probe.

Supplied 2nd Generation structural, reaction centre and electromaterials for the application themes projects.

End Year 4

Provided optimised materials to application themes projects.



Electrofluidics and Diagnostics

Developing next-generation integrated diagnostic platforms for applications in biomedical, industrial and environmental monitoring, through the control of fluids within 3D structures containing electromaterials.

THEME LEADER - PROF B. PAULL

End Year 1.5

Determined the effect of distributed composition and structure on fluid flow throughout 3D structures.

End Year 3

Determined the effect of distributed electro-materials on electrofluidic behaviours in 3D structures.

End Year 5

Developed a multicomponent 3D system for monitoring nutrients (phosphates, nitrates).

End Year 7

Developed a 3D fluidic diagnostic system for Parkinson's disease.



Synthetic Energy Systems

Using new materials to create devices in three key energy-related areas: solar fuels, energy storage and thermal energy conversion. Developing low-cost energy devices using waste heat, and solar-driven carbon dioxide reduction processes to produce high value fuels.

THEME LEADER - PROF D. MACFARLANE

End Year 1.5

Determined the impact of 3D architecture on catalytic activity, ionic conductivity and charge storage.

End Year 3

Characterised and optimised reactive site connectivity.

End Year 5

Developed and characterised each device prototype.

End Year 7

Demonstrated optimised device prototypes.



Synthetic BioSystems

Developing implantable, self-powered structures that support the development of tissue structure to monitor, maintain and restore function in neural tissues for applications in epilepsy and schizophrenia sufferers and the ageing human brain.

THEME LEADER - PROF M. COOK

End Year 1

Elucidated the effect of distributed 3D mechanical properties on cell behaviour.

End Year 2

Determined the impact of electromaterial distribution on cell behaviour.

End Year 3

Determined impact of reactive centre and living cell distribution on neural tissue formation and function.

End Year 5

Developed electromaterial-based Microtissue constructs (MTCs) for in-vitro cell development and synthetic tissue studies.

End Year 7

Applied integrated MTC systems for in-vitro disease modelling studies.

Soft Robotics

Developing a multi-digit, fluid and highly dexterous 3D robotic hand with a control system, programmable mechanical compliance, integrated sensors and a neural interface system, delivering new benchmarks in performance for applications in industrial, personal and prosthetic robotic systems.

THEME LEADER - PROF G. ALICI

End Year 1.5

Determined the impact of composition and porosity distribution on mechanical properties.

End Year 3

Determined the impact of electromaterials distribution on mechanical and electromechanical properties.

End Year 5

Built a multidigit 3D robotic prosthetic hand with control system enabling tunable grip compliance.

End Year 6

Integrated pressure sensors into the multidigit 3D robotic prosthetic hand.

End Year 7

Built a neural interface system (in-vitro) for the multidigit 3D robotic prosthetic hand.

Ethics, Policy and Public Engagement

Anticipating, understanding, evaluating and responding to ethical, policy and community concerns arising from emerging technologies, to guide ongoing ACES research.

THEME LEADER - PROF S. DODDS

End Year 3

Identified the potential ethical responsibilities of manufacturers to end users for prosthetic organs.

End Year 4

Identified the ethical implications of assumptions about "dual use", therapy and enhancement.

Developed an approach to engagement of key stakeholders in new energy technologies.

End Year 6

Identified the limits of randomised clinical trials for medical device and personalised medicine regulation.

End Year 7

Identified the policy implications of local energy systems in Australia and on a global and transnational scale.

Identified implications of new medical diagnostic systems for access to health care and international aid policy.

ACES GOVERNANCE

ACES Governance Structure

The Centre's governance structure aims to ensure the efficient operation of the Centre across multiple locations and is focused on achievement of Centre objectives through specialist committees and advisory groups informing the Centre Executive. The Governance arrangements provide the appropriate mix of strategic planning and day to day management and ensure proper engagement with key stakeholders and end-users.

Centre Executive Committee

The Centre Executive Committee oversees the Centre's operations and reviews performance against defined indicators. It is responsible for reporting outcomes to the ARC and other stakeholders and for setting strategic directions and broad budget allocations. The committee is advised by the International Advisory Committee.

The executive committee met twice since the Centre was launched on 30 June 2014.

The committee reviewed and endorsed the activities of its sub-committees (i.e. Research Strategy Group, Commercialisation Development Group, Global Engagement Group, Research Training Group and Communications Group).

The committee endorsed the Multi Institutional Agreement (MIA) that defines the financial and intellectual property interactions between the ACES institutional collaborators and partners. The ACES multi-institutional agreements were issued and signed by each organisation prior to 30 June 2014.

International Advisory Committee

The role of the International Advisory Committee (IAC) is to provide ongoing input into the Centre's research programs with critical input into the positioning of the Centre's activities to secure and retain a position of global leadership in electromaterials science.

The first meeting of the International Advisory committee (IAC) was held on 12 February 2015.

Research Strategy Group

One of the key goals of the Research Strategy Group (RSG) is to generate the most cohesive and constructive collaborative effort within the research teams. The group will drive ACES interconnecting theme projects, as well as coordinate the theme activities to maximise the synergies that will arise from the diverse skill-sets of the researchers.

The RSG has met twice since the Centre was launched on 30 June 2014.

The RSG reviewed the progress in recruitment of new members into the Centre as well as the strategic direction of each of the theme research areas.

The group noted that monthly ACES research theme meetings, open to all members and collaborators of ACES, had commenced in September 2014. Monthly reports from each ACES researcher are reviewed by the theme leaders prior to each monthly theme meeting.

Internodal visits around emerging areas of research have commenced, with 24 ACES members travelling between the various nodes of ACES over 40 occasions to hold planning meetings and workshops during 2014.

The first of the themed workshops, aimed to drive ACES's interconnecting theme projects, took place on 10 November 2014 in Melbourne (ACES Synthetic Biosystems workshop) with more planned in conjunction with the annual international ACES workshop early February 2015.

Operations Group

Meetings will address cross-institutional matters. The purpose of the group is to:

- Ensure proper alignment of the Centre's activities with the strategic directions of the participating Universities.
- Address any impediments to progress and to explore the most effective ways to provide support.

The first meeting of the Operations Group was held on 18 February 2015.

Commercialisation Development Group

The Commercialisation Development Group (CDG) is chaired by Prof John Glynn (MA, MPhil, PhD, FCPA, FCCA, MIACD), Executive Dean (Faculty of Business), University of Wollongong.



Prof Glynn is responsible for the strategic direction of the Faculty of Business, including the Sydney Business School at the University of Wollongong. He has wide international experience in management development programs and executive education. He is an advisor to a number of companies and government agencies, including the National Audit Office (UK), the Australian Audit Office, the NSW Parliament's Public Accounts Committee and the OECD. Prof Glynn has particular research interests and expertise in the areas of corporate governance and business ethics, strategy formulation, the management of change, financial management and performance appraisal across all levels of the public and private sectors.

The CDG has met twice since the Centre was launched. In its role to assist the Centre to identify, review and advise on commercial opportunities, the group concurred that ACES undertake an audit of ACES research and associated technologies/ capabilities and how they match the needs of the market. Committee members agreed to endorse the final scoping brief given by CTechBA; who will commence the audit early in 2015.

Research Training Group

The Research Training Group (RTG) is responsible for designing, establishing and implementing an innovative research training and career development program, including various industry and web-based programs.

The RTG group met three times in 2014 and had two meetings of the working group for development of an ACES Master's course.

A key goal for ACES is to develop the flagship course - Masters of Electromaterials Science. The route for this has been identified as a joint MPhil Electromaterials between Deakin and UOW, to be expanded to other nodes in subsequent years. This will be a Research Masters, with cross-node co-supervision of research projects and a shared taught course component.

Communications Group

The Communications Group works with all Chief Investigators to ensure effective and efficient communication of research progress to all stakeholders including media, industry, government departments and the public. The Communications Group met twice in 2014.

In its role to assist the Centre develop communication strategies, in order to generate and disseminate knowledge in electromaterials science for the benefit of the broader community, the group debated various communication strategies for stakeholders and as a result, a draft Communication Strategy was put forward to the Centre Executive in December 2014.

Global Engagement Group

The Global Engagement Group (GEG) is chaired by Prof Joe Chicharo, Deputy Vice-Chancellor (Global Strategy), University of Wollongong.

Informed by extensive experience in the steel industry, Prof Chicharo joined the University of Wollongong in 1985. Having held many senior academic roles leading research at UOW, Prof Chicharo was appointed Dean of Informatics in 2003, before being appointed as a member of the Senior Executive in 2008.

He served as the Research Director of the CRC for Smart Internet Technology and has published more than 200 journal papers. His leadership roles have included: Chair of a panel for the national Excellence in Research for Australia 2010 assessment exercise (Cluster 5: Mathematics, Information and Computer Sciences panel); Chair of the Australian Research Council, College of Experts 2006-2008 (Mathematics, Information and Communications panel) and Managing Director of the Telecommunications and Information technology Research Institute at UOW. He has been a longstanding strong advocate for Higher Education at all levels; was Chair of the NSW's P/ DVC(I)'s group (2013-2014) and serves as a member of the NSW Police Commissioner's Multicultural Advisory Committee.

The GEG has met twice since the Centre was launched.

The group is focussing on ways to assist build ACES' global reputation in electromaterials science. Assistance could be by the way of identification and establishment of new interactive partners, developing collaborative arrangements with international research agencies, promoting ACES research, supporting and marketing international research training opportunities as well as activities and events and/or implementing programs.



ACES – NEW DIMENSIONS TEAM

With three Australian Laureate Fellows at the helm, ACES attracts highly talented people from all over the world to study, work and conduct research. We are building a new balanced team of youth and experience, with diverse skills, and a commitment to success. We aim to bring together a critical mass of the best minds across all disciplines to develop innovative solutions based on advanced next-generation electromaterials.

The strength of the Centre - past, present and future - is its vibrant, clever and collaborative researchers and the unique research training experience that it provides. Our research team includes fundamental chemists, materials scientists, biologists, engineers and clinicians. We also have a strong team in ethics and public engagement working alongside our scientists and engineers, as well as helping to convey the link between our research and its impact on the community.

We have established a global network of partners that will be integral to our success in research, training, commercialisation and engagement.

With a commitment from all the ACES team to explore new dimensions in all aspects of our work, we are confident of building a new Centre of Excellence with an extraordinary future.

"I'm excited to be joining ACES!

We have recently made some exciting discoveries at ANU about the effects of electric fields on chemical reactions, and ACES has the world-class experts and resources we need to test some of these findings and use them in practical applications. My dream is to catalyse reactions by applying fields, maybe even triggering reversible debonding in self-healing polymers, which could have applications in 3D printing, recyclable materials and even artificial muscles. Being part of ACES will give us the best shot at achieving this." - CI Professor Michelle Coote (ARC Future Fellow) from Australian National University (ANU).

ACES Chief Investigators (CI)

ACES brings together a strong team of investigators drawn from six domestic and five international research organisations.

The ACES Chief Investigator team has the diversity of skills needed to tackle the research, as evidenced by the quality and breadth of citations for published work and wide range of primary skills brought by them in areas such as Materials Chemistry (Officer, McFarlane, Spiccia), Materials Physics (Mozer, Coote, Panhuis), Engineering (Spinks, Alici, Wang), Biology (Cook, Crook, Kapsa, Higgins) and Social Sciences (Dodds, Sparrow, Hancock).

This team introduces new chief and partner investigators which broaden the skill base of the existing strong, well-credentialed core team that were part of ACES 2005-2013. Included are CIs Wang (Deakin), Higgins (UOW) and Mozer (UOW), plus PIs Unwin (Warwick) and Guldi (Erlangen), who will assist CI Officer coordinate a wider range of 3D fabrication technologies. Wang in fibre science and technology for producing such; Higgins in the application of scanning probe microscopy techniques to study biological-material systems and Mozer, who aims to develop contactless, in-line characterisation tools to aid rapid prototyping and additive manufacturing.

Unwin's world leading expertise and the unique instrumental capability of his group will significantly enhance ACES's ability to probe and understand electrochemical interfaces. Guldi internationally recognised for his outstanding contributions to designing, synthesising, and testing novel nanometre-scale structures as integrative components for solar energy conversion will bring a wealth of experience not only to the ACES materials focussed projects but as importantly to the characterisation projects.

CI Coote (ANU), an outstanding chemical systems modeller, will work with CI Forsyth (Deakin) to develop models for 3D electromaterials.

PI Watanabe (Yokohama) joins the synthetic energy team, led by CI MacFarlane, and his experience in the development of a range of electrolyte types and their application in various electrochemical devices will contribute strongly to the demanding goals of the projects in this theme.

Similarly, CI Paull (UTas) brings expertise in the applied microfluidic work along with PI Diamond (DCU). A major driver of Prof Paull's research is to expand the boundaries of analytical science, developing new technologies and analytical approaches to enable greater qualitative and quantitative exploration of our chemical and biological environment.

Diamond has almost 30 years of research experience in the areas of sensors, diagnostics, materials chemistry and microfluidics. The ACES Electrofluidic and Diagnostic Theme, will bring together the analytical and materials sciences to generate new diagnostic platforms.

The Soft Robotics team, led by CI Alici, has been joined by PI Kim (Hanyang). His experience in developing novel materials for artificial muscles and energy systems (eg. capacitors and fuel cells) will be invaluable.

CI Crook (UOW) will provide critical knowledge and skills within the Synthetic Biosystems theme, led by CI Cook (UOM). Crook brings extensive experience (industry and academic) in developing and applying stem cell technologies for basic and applied research. This includes the derivation of the world's first GMP-grade and clinically-compliant pluripotent stem cell lines [Cell Stem Cell (2007) 1(5):490-495], and the development of the first human stem cell models for psychiatric disorders [Molec Psychiatry (2010) 15(7):672-675].

ACES considers ethical, legal and social implication programs essential and recognises that public engagement strategies are vital. CIs Sparrow (Monash) and Hancock (Deakin) have joined the team led by CI Dodds (UTas) to enhance the Ethics, Policy and Public Engagement contribution. Prof Hancock is a specialist in social and environmental sustainability, with a Personal Chair in Public Policy at Deakin University and Sparrow's research interests are bioethics, political philosophy and applied ethics. This group is focused on exploration of the social and ethical significance of the development of electromaterials, including careful analysis of engagement across industry, community groups, regulators and policy makers who anticipate likely energy and medical applications.

ACES Partner Investigators (PI)

PI Diamond has almost 30 years of research experience in the areas of sensors, diagnostics, materials chemistry and microfluidics that will feed into ACES projects. The National Centre for Sensor Research (NCSR) at DCU, at which Diamond is Director, is a world renowned, large-scale, multidisciplinary research facility comprising custom-designed laboratories, a range of specialist support units and equipment, and dedicated technical and administrative staff. NCSR hosts over 200 researchers.

PI Guldi is internationally recognised for his outstanding contributions to designing, synthesising, and testing novel nanometre-scale structures as integrative components for solar energy conversion. He brings a wealth of experience not only to the materials focussed projects, but as importantly to the characterisation projects. FAU has established its reputation as a top-ranking institution in cutting-edge research; encouraging interdisciplinary research.

PI Kim's experience in developing novel materials for artificial muscles and energy systems (eg. capacitors and fuel cells) is invaluable to ACES. His laboratories at Hanyang University are home to the Creative Research Institute for Bioartificial Muscles in the Department of Biomedical Engineering within the Faculty of Engineering.

PI Unwin is a leading academic in the field of electrochemistry and brings to this centre his unique nanoscale capability to understand and create novel nanostructured Materials. The University of Warwick is one of the leading UK universities, commonly ranked in the top 10 of UK's 100 Universities for quality of research; with state-of-the-art facilities in electrochemical imaging and nanomanipulation.

PI Watanabe's experience in the development of a range of electrolyte types and their application in various electrochemical devices will contribute strongly to the demanding goals of these ACES projects. Apart from his research leadership activities in the international arena, Prof Watanabe is Vice Dean of Graduate School of Engineering at Yokohama National University and has graduated more than 70 PhD and Masters students in his career.

ACES CHIEF INVESTIGATORS



Centre Executive Research Director
Prof Gordon Wallace
Australian Laureate Fellow
University of Wollongong



Centre Deputy Director
Prof Maria Forsyth
Australian Laureate Fellow
Deakin University



Synthetic Energy Systems-
Theme Leader
Prof Douglas MacFarlane
Australian Laureate Fellow,
Monash University



Electromaterials –
Theme Leader
Prof David Officer
University of Wollongong



Ethics, Policy and Public
Engagement- Theme Leader
Prof Susan Dodds
University of Tasmania



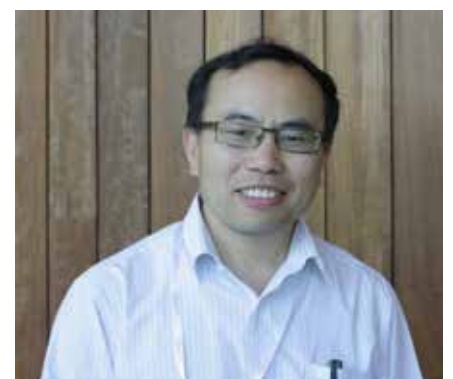
Synthetic BioSystems-
Theme Leader
Prof Mark Cook
University of Melbourne



Electrofluidics and Diagnostics-
Theme Leader
Prof Brett Paull
University of Tasmania



Soft Robotics –
Theme Leader
Prof Gursel Alici
University of Wollongong



Electromaterials –
Additive Fabrication Coordinator
Prof Xungai Wang
Deakin University



Electromaterials –
Modelling Coordinator
Prof Michelle Coote
Australian National University
ARC Future Fellow



Electromaterials –
Characterisation Coordinator
A/Prof Atilla Mozer
University of Wollongong
ARC ARF



Research Training Coordinator
A/Prof Jennifer Pringle
Monash University



Prof Geoffrey Spinks
University of Wollongong
ARC APF



Prof Leone Spiccia
Monash University
ARC DORNA



Prof Robert Kapsa
University of Wollongong
St Vincent's Hospital, Melbourne



Prof Marc in het Panhuis
University of Wollongong



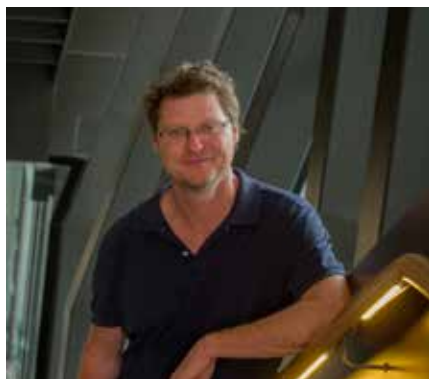
A/Prof Peter Innis
University of Wollongong



Prof Simon Moulton
Swinburne University



A/Prof Robert Sparrow
Monash University
ARC Future Fellow



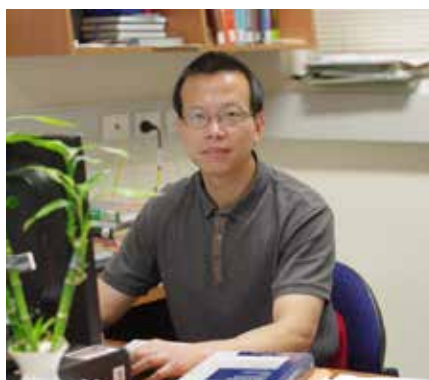
Dr Patrick Howlett
Deakin University



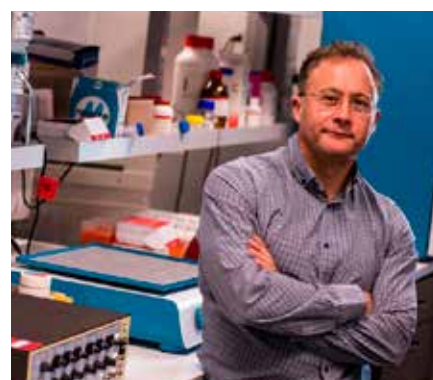
A/Prof Michael Higgins
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ARC ARF



Prof Linda Hancock
Deakin University



Dr Jie Zhang
Monash University
ARC Future Fellow



A/Prof Jeremy Crook
University of Wollongong

ACES PARTNER INVESTIGATORS



Prof Dermot Diamond
Dublin City University (DCU),
Ireland



Prof Dirk Guldi
Friedrich Alexander University (FAU)
of Erlangen, Nuremberg



Prof Seon Jeong Kim
Hanyang University, Korea



Prof Patrick Unwin
University of Warwick, United
Kingdom



Prof Masayoshi Watanabe
Yokohama University, Japan



RESEARCH TRAINING AND PROFESSIONAL EDUCATION

Key Performance Indicators	2014
Number of professional training courses for staff and postgraduate students attended KPI target 2014: 3	5
Number of Centre attendees at all professional training/development courses offered by the Centre KPI target 2014: 25	20
Number of new postgraduate students working on core Centre research and supervised by Centre staff KPI target 2014: 9	14 <i>(See Appendix 2)</i>
Number of new postdoctoral researchers recruited to the Centre working on core Centre research KPI target 2014: 9 FTE	19.2 FTE <i>(See Appendix 1)</i>
Number of Early Career Researchers working on core Centre research KPI target 2014: 12	12
Number of students mentored KPI Target 2014: 9	14
Number of mentoring programs offered by the Centre. KPI Target 2014: 0	0
Effectiveness of the Centre in bringing researchers together to form an interactive and effective research team KPI Target 2014: 40% of researchers to have cross-nodal supervision	62%

Postgraduate Education

ACES provides a combination of full scholarships and scholarship top-ups for high achieving graduates to undertake postgraduate (mainly PhD) degrees at its participant universities. The research undertaken is multidisciplinary, in leading edge fields of materials science and their application area as well as in ethics and policy.

A major portion of the requested ARC budget will be expended on the support of research staff (levels A, B & C) to work on the research programs with the PhD students. The more experienced research staff will be involved in more than one theme. At the end of 2014 ACES had recruited 2.5 FTE senior research fellows, 18 research fellows/engineers (of whom 12 were early career researchers ECRs) and 14 PhD students. The number of PhD students recruited will increase throughout 2015. An ACES membership list is shown in Appendix 1 and 2.

To assist with collaborative networking and to ensure interaction across the ACES research project themes the Centre has opted for as much multinodal supervision of research fellows and PhD students as practical. In addition, 24 ACES members travelled between the various nodes of ACES over 40 occasions to hold planning meetings and workshops during 2014.

International Conference/Symposia Program

The advancement of the scientific knowledge that ACES generates is an important component of this Centre's activities. ACES runs at least two or more international conferences/workshops each year – for more details see engagement chapter later in this report. The ACES students and ECRs are given the opportunity to communicate their research in an ACES showcase afternoon as well as at the poster sessions run frequently throughout the events. Networking by ECRs and students with our international guests is encouraged!

Over the years, ACES has developed a reputation for not only excellence in the educational quality of its conferences, but also the collegiate atmosphere.

ACES Workshop Program

The ACES workshop program targets the professional development of research staff and postgraduate students as well as key areas of continuing technical and scientific education. These workshops are undertaken in the form of one full centre meeting each year as well as weekly theme meetings between all nodes within the centre via video link.

The weekly theme meetings began in September and ran through to mid December 2014.

ACES students and staff are supported to travel between nodes to undertake multidisciplinary research tasks.

ACES staff and students also attended many seminars/lectures from numerous visitors and collaborators to the nodes throughout the year.

COMMUNICATIONS WORKSHOP Ian Potter Technology Learning Centre Canberra 16-17 December 2014



A handful of ACES ECRCs and PhD students at the Science Communication workshop held at Ian Potter Learning Centre, Canberra 16-17 December 2014.

What do you get when you put 30 talented young scientists in a room together with a handful of the country's best science communicators?

Potato cannons, a lot of laughs, and a whole bunch of skills-sharing.

PhD students and early career researchers from three ARC Centres of Excellence across nine universities came together in Canberra for a science communication workshop in December.

Organised by ACES, the workshop hosted a total of 30 members, including from two new Centres, the ARC Centre of Excellence in Convergent Bio-Nano Science and Technology, and the ARC Centre of Excellence for Nanoscale BioPhotonics.

Over two days, participants learned practical communication skills from professional science communicators at Questacon - The National Science and Technology Centre.

Keeping the audience in mind was a key take-home message from the workshop. Fletcher Thompson from the University of Wollongong said he learned that science communication is a two-way dialogue.

"It's important to know who your audience is and how you plan to talk to them," Fletcher said. "Not too many five-year-olds are going to take a deep interest in radiophysics or immunology, after all."

PhD student Ciaran McDonnell-Worth from Monash University said the workshop inspired him to consider how to engage an audience in his research.

"The workshop challenged me to think about new ways to interest the general public in scientific research, and how I might explain different concepts to them effectively," Ciaran said.

A keynote presentation was given at the workshop dinner by well-known science communicator and ABC broadcaster, Lish Fejer, who provided the participants with tips for communicating their work through the media.

Lish's enthusiasm and energy set a great example for the attendees, who then were asked on day two of the workshop, to fully commit to communicating their messages including through hopping, skipping and jumping around the space (with much laughter, of course).

Wei Deng from Macquarie University was impressed with the communicators' enthusiasm.

"The educators were so active and energetic. I was totally inspired by their enthusiasm," Wei said.

Walter Muskovic from the University of New South Wales said the workshop provided a great opportunity to practise communicating his research to a non-technical audience.

"The skills I learnt from the workshop will be useful in my current and future research career, to help engage the community about my research," Walter said.

ACES Full Centre Workshop
Innovation Campus, University of
Wollongong
31 July 2014

The full Centre workshop was held at University of Wollongong with Centre staff/ students (22) who had been recruited at this early stage of the Centre, in attendance. The ACES Theme leaders and chairs of the ACES governance groups outlined their vision for the research and research targets in the coming years of the Centre. Research Fellows and PhD students then introduced themselves and their research activities in the form of five-minute short talks.

Monash University Postgraduate
Electrochemical Conference and Workshop
Ian Wark Theatre, Monash University
Clayton Campus
25 March 2014

This conference featured talks from established and well known electrochemists, including Prof Rick McCreery from the University of Alberta, and Prof Keith Oldham from Trent University, as well as PhD students.

The talks given by students Cameron Bentley, Yuping Liu (ACES), Shannon Bonke (ACES) and Matthew Gustafson (ACES) gave a great insight into the lively research being done by students at Monash University and CSIRO Clayton.

Graduate Certificate in Entrepreneurship-run in partnership with University of Wollongong's Sydney Business School. An ACES pilot program - the Graduate Certificate in Entrepreneurship-run in partnership with University of Wollongong's Sydney Business School was offered to a small number of ACES students at UOW. The aim of the certificate is to build up PhD / ECR acumen in the business arena. Two units have been completed in 2014, with the remainder to be completed in 2015.

Masters of Philosophy in BioFabrication degree

The University of Wollongong, through ACES, joined forces with three leading research universities (Queensland University of Technology in Australia, the University Medical Center Utrecht in the Netherlands and the University of Würzburg in Germany) to offer the world's first Masters degree in BioFabrication.

During 2014 the course content available at all four partner institutions was discussed and determined. The degree entry for Master of Philosophy in Biofabrication at UOW is given at the link: <http://www.uow.edu.au/handbook/yr2015/pg/H15000151.html>

A number of targeted research project areas have also been identified. These include:

- Formulations for printing based on biopolymers
- New hardware developments (including coaxial printing)
- Controlled delivery of bioactives from 3D printed structures
- Cartilage regeneration using 3D printed scaffolds

Professional Training

Gilbert, F. (ECR), Future Research Leaders Program, University of Tasmania, Completion 28 November 2014.

Pringle, J. (CI), The Advanced Leadership Program by Woman & Leadership Australia, Sept 2014 - June 2015.

WiCell, Madison, WI, USA
2-11 November 2014

Dr Eva Tomaskovic-Crook received hands-on training in advanced methods of human induced pluripotent stem cell (hiPSC) and human embryonic stem cell (hESC) maintenance and culture – towards culture of stem cells and neural cell derivatives for biomaterials interfacing. Many of the techniques will be translated into the ACES labs.

Training Course/Lectures

Four ACES CI's (Higgins, Innis, Mozer, Moulton) from UOW each spent a week at Hanbat University in Korea giving up to 10 lectures on electrochemistry and electromaterials science during April and May.

The ACES members at St Vincent's Hospital Bionics laboratory conducted a training course for 17 Indonesian Medical Students as part of their Advanced Medical Science (AMS) year in September and October. The "Laboratory Techniques" course was designed to introduce students to the theory and practice of medical research. All students learned the theory behind the methodologies, as well as how to conduct scientific research.

SUMMER STUDENTS LAP UP THE BIG BREAK WORKING AT ACES



Summer scholarship holders ACES at University of Wollongong forwent lazy days at the beach to pursue higher learning as part of a 10-week ACES scholarship.

Most university students have packed their bags for the summer break, but Richard Spinks is spending his entire vacation packing a "science suitcase". The mechanical engineering undergraduate from University of Wollongong will forgo lazy days at the beach to pursue higher learning alongside five other students as part of a 10-week ACES scholarship at ACES/UOW. The students are:

- Kiera Grierson working on electrical stimulation of neural stem cells
- Gwilym Price on 3D printing nickel
- Brendan Howe on 3D interdigitated electrodes
- Richard Spinks on Science in a Suitcase- controlled delivery systems
- Grant Barnsley on 3D printing copper
- Grace Waring on printing bionic electrodes

"You feel like you're part of a giant family, the supervisors have been very helpful, treating me almost like a peer," Richard said.

Two weeks into the program, Brendan said his summer scholarship was enlightening. "I've learnt so much already, it's actually quite amazing," he said. "I'm working on 3D printed interdigitated electrodes; we're basically working on capacitors for research, so you miniaturise them and pack a lot more power into a smaller area to create miniaturised batteries."

At Deakin University, three students worked on summer scholarships. Ana Erceg, a final year student undertaking a Bachelor of Engineering/ Bachelor of Science double degree, majoring in Electrical/Electronic Engineering and Chemistry, worked on the project entitled "Towards Reversible Metal-air batteries" for a period of 10 weeks from 17 November 2014.

Another Deakin University student, Callan Young worked on electrochemical harvesters. These summer research projects align with the ACES research theme Synthetic Energy Systems.

Molly Patten, a 3rd year Arts/Science double degree student at Deakin participated in the "Science in a Suitcase" summer project aimed at designing a travelling demonstration kit to explain the research surrounding Shrilk and how it can act as a potential biomimetic material for articular cartilage. After electrospinning nanofibres of chitosan for treatment with a silk solution, and investigating ways to increase the intrinsic strength of the chitosan and Shrilk materials, she spent a week at the UOW/ACES node, working with the 3D printing team. Together they designed and printed 3D models to explain the structure and function of cartilage, how Shrilk can mimic these, and the methods that Molly uses to synthesise Shrilk coated cellulose paper.

ENGAGEMENT

Key Performance Indicators	2014
Number of international visitors and visiting fellows Target 2014: 20	29 international 24 national
Number of national and international workshops held/organised by the Centre KPI target 2014: 1	6
Number of government, industry and business community briefings KPI target 2014: 8	36 <i>(See Appendix 3)</i>
10% of public conferences, government and industry briefings, and communiques will address the National Research Priority of Frontier Technologies for Building & Transforming Australian Industries in the goal areas of Advanced Materials, Frontier Technologies and Breakthrough Sciences.	60% 12 events of the 20 listed in this chapter address the goal areas of Advanced Materials, Frontier Technologies or Breakthrough Sciences. <i>This is in addition to the industry briefings listed in Appendix 3.</i>

ACES Events

ACES New Dimensions Networking Event
Lagoon Restaurant, North Wollongong
12 February 2014

Following the announcement that ACES was to be awarded \$25 million Government funding for a new Centre of Excellence, an evening event was held to inform potential collaborators, industry participants and peers of the new ACES vision. Held at Lagoon Restaurant in North Wollongong, 85 guests from research and industry heard presentations from centre Director Prof Gordon Wallace, collaborator Dr Jan Weber from Boston Scientific and Paul Barrett, CEO of spin-off company AquaHydrex.

Webinar 3D BioPrinting and Your Career
17 September 2014

Since the launch a webinar information session has been held and publicity material for the course has been produced. The webinar given by Prof Gordon Wallace on 3D BioPrinting and Your Career was then held on 17 September 2014 to attract applicants and provide information on this area of ACES research. 35 participants were online for this webinar. (<https://connect.uow.edu.au>)

Launch of Masters of Philosophy in BioFabrication degree
Queensland University of Technology
Australian Embassy in the Netherlands 9 May 2014

The University of Wollongong, through the ARC Centre of Excellence for Electromaterials Science (ACES), joined forces with three leading research universities (Queensland University of Technology in Australia, the University Medical Center Utrecht in the Netherlands and the University of Würzburg in Germany) to offer the world's first Masters degree in BioFabrication, to award graduates qualifications in Australia and Europe.

A launch was held at the Queensland University of Technology, at which Dr Stephen Beirne was present on behalf of Prof Gordon Wallace, to answer questions from the media.

Prof Wallace spoke at a similar launch event at the Australian Embassy in The Hague, the Netherlands, hosted by Mr Neil Mules, Australian Ambassador to the Netherlands. Also speaking at this event were Prof Jos Malda, Utrecht University and Prof Paul Dalton, University of Würzburg.

Collaborative Meeting between ACES and Advanced Materials and BioEngineering Research (AMBER) Science Foundation of Ireland.

Trinity College Dublin
12 May 2014

Five ACES members attended a collaborative meeting between ACES and Advanced Materials and BioEngineering Research (AMBER) Science Foundation of Ireland, where all contributed to a collaboration scoping meeting with the Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Dublin graphene group of Prof Jonathon Coleman and the Trinity Centre for Bioengineering (TCBE) orthopaedics engineering group of Prof Daniel Kelly.

UOW members gave the following talks at this meeting:

- Prof Gordon Wallace: Introduction to Bio-Printing and 3D Printing
- Fletcher Thompson: Printing Approaches for Polymers and Metals
- Rhys Cornock: Customised Hardware for printing
- A/Prof Rob Kapsa: Printing cells and other bioactive molecules

ACES NEW DIMENSIONS LAUNCH

Hanyang University & 3D printing symposium

23 October 2014

The ACES new dimensions launch at Hanyang University, with partner investigator Prof Kim, was celebrated with a half day symposium "From functional materials to 3D printing" in front of 50 delegates.

Talks engaging the audience with ACES research and capabilities were given by Prof Joe Chicaro (UOW & chair of ACES global engagement group), Prof G Wallace, Fletcher Thompson (ACES) and Dr Stephen Beirne (ANFF).



AUSTRALIAN EMBASSY IN KOREA

23 October 2014

An ACES Showcase was held at the Australian Embassy in Korea. At this event, the long and fruitful collaboration between Australian and Korean researchers was celebrated and new partnerships in academia and industry were encouraged.

Speakers included UOW Deputy Vice Chancellor – Prof Joe Chicaro, UOW Director Corporate Relations – Craig Peden, and ACES Director Prof Gordon Wallace.



3D BioPrinting Symposium Dublin City University, Ireland 14-15 May 2014

ACES joined forces with Dublin City University (DCU) to hold a 3D BioPrinting Symposium in Ireland, attracting 150 delegates, which included clinicians, researchers and materials experts from around the world, including Australia, Germany and the US.

3D Bioprinting is providing the technology capabilities to construct customised medical devices for movement or monitoring systems in wearable and implantable devices. It is also being used to develop prosthetic devices implanted in the body for muscle or bone repair and in devices such as the bionic ear.

The 3D Bioprinting for Wearables and Implantables symposium held at Dublin City University 14-15 May 2014 was opened by Minister Sherlock.

The event featured:

- Presentations from fabrication engineers and materials fabrication scientists to set the current scene
- Presentations from clinicians to highlight current challenges
- Presentations from other world leaders highlighting emerging research trends
- Poster presentations
- A public engagement session highlighting the future impact of 3D Bioprinting

Presentations given by UOW members were:

- Rhys Cornock: 'Taking Printing to the Clinic' at 3D Bioprinting for Wearables and Implantables symposium.
- A/Prof Robert Kapsa: 'Can we print regenerative Bionics Platforms?'
- Mr Fletcher Thompson: 'Printing Devices to Facilitate Research'.
- Prof Gordon Wallace 'Printing Bioprinting Next Generation Medical Devices'.

Also on display at the symposium were the following posters showcasing ACES/ UOW research:

- A Cell-Based Hydrogel "Ink" for Extrusion Printing of Cells - Johnson Chung, Simon Moulton, Robert Kapsa, and Gordon Wallace
- Printing Devices for Biomedical Applications - F.W. Thompson, S. Beirne, D. Myers, B. Thompson, E. Stewart, A. Jeiranikhameneh, and G.G. Wallace
- Advanced Materials in a Clinical Setting: ACES/St. Vincent's Hospital Biofabrication - Rhys Cornock, Ken Ye, Raed Felimban, Magdalena Kita, Zhilian Yue, Johnson Chung, Stephen Beirne, Anita Quigley, Javad Foroughi, Simon Moulton, Damian E Myers, Robert M. I. Kapsa, Peter FM Choong, and Gordon G. Wallace



ACES New Dimensions Launch & Showcase

Australian Embassy, Dublin, Ireland
15 May 2014

An ACES Showcase was held at the Australian Embassy in Ireland, hosted by the Australian Ambassador to Ireland, Dr Ruth Adler. At this event, the 20year collaborative relationship between ACES and DCU was further strengthened with the announcement that DCU was to sign-on as a Partner Organisation of ACES. The Australian ambassador Ruth Adler spoke about how valuable the DCU-UOW collaboration is for Australian and Irish national interests, while Profs Gordon Wallace and Dermot Diamond, the Directors of the two research groups, introduced their groups research interests. Fletcher Thompson (UOW) showcased a live 3D printing exhibition.

ACES: The New Dimensions Launch Erlangen and the Erlangen – UOW symposium 6-8 July 2014

The 2nd UOW/Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg workshop was held in Erlangen, Germany 6-8 July, 2014. The workshop was attended by three ACES UOW staff, Prof David Officer, and Drs Attila Mozer and Pawel Wagner, five UoW Chemistry staff and one student, as well as 20 FAU staff and PhD students.

Prof Dirk Guldi (Erlangen) presented an introduction to materials and energy research at FAU. An introduction to ACES by Prof David Officer followed and over the next two days, 22 research lectures were presented by FAU and UOW staff along with posters highlighting PhD student research work.

During the course of the two days, the FAU President, Prof Karl-Dieter Gröske, and the Vice President for Research and future President of FAU, Prof Joachim Hornegger, visited the workshop and expressed their strong support for the ongoing interactions between FAU, UoW and ACES researchers.

ACES: The New Dimensions Launch Innovation Campus, North Wollongong 30 July 2014

Senator the Hon Concetta Fierravanti-Wells launched the new ACES with \$25 million in Federal Government funding.

In addition to the Senator's presentation, the audience of 80 VIPs from ACES partners and collaborators heard from the Australian Research Council CEO – Professor Aidan Byrne, UOW Deputy Vice Chancellor (Research) - Professor Judy Raper, and Centre Director – Professor Gordon Wallace.

The Senator and other speakers also toured the facility and spoke with ACES researchers.

International Symposium on Polymer Electrolytes

Deakin University, Geelong
24-29 August 2014

More than 140 of the world's leading scientists, engineers and polymer experts attended this symposium, chaired by ACES Associate Director – Professor Maria Forsyth. Topics discussed over the five day event included microscale batteries for implantation into the body, growing new nerves in the spinal cord and the bionic bra.

ACES - New Dimensions Launch Yokohama University, Japan

27 October 2014

The official ceremonial launch of ACES at Yokohama University (YNU) was hosted by the president of YNU Prof Kunio Suzuki.

Memorial lectures followed the launch, including two by ACES chief investigators Doug MacFarlane and Gordon Wallace. While at YNU the two CIs also met with ACES partner investigator Prof Masa Watanabe and his colleagues for discussions.

Swinburne University of Technology – ACES workshop, Wollongong

11 November 2014

Ten visitors from Chemistry, Dept of Telecommunication, Dept of Mechanical Engineering and Product Design, National Institute for Design Research, Department of Civil and Construction Engineering, PVC Future Manufacturing and Centre for Micro-Photonics at Swinburne visited the lead node of ACES in Wollongong for a workshop. There were several short talks followed by discussions and lab tours.

Stem Cells for Bionics Workshop UOW Innovation Campus, North Wollongong

25 November 2014

Chaired by A/Prof Jeremy Crook and Prof Gordon Wallace, this workshop, with 32 attendees, featured 11 presentations on topics ranging from ethics to stem cell applications. Presenters came from University of Sydney, University of Western Sydney, University of Queensland, St Vincent's Hospital Melbourne, STC Australia, University of Tasmania, University of Adelaide, as well as University of Wollongong.

Events specific to End-Users

Creating New Opportunities for Australian Manufacturing: Technology challenges and applications of low-cost printable solar. Melbourne Town Hall 16 June 2014 and NSW Trade & investment Centre, Sydney 17 June 2014

The two breakfast seminars were held relating to polymer solar cells organised by the CRC for Polymers and co-sponsored by ACES. Recent developments in low cost printable solar cell technology were highlighted and insights from experts in manufacture and commercialisation of this and similar technologies were presented. There were 70 registrants in Melbourne and 60 in Sydney.

Australian 3D Manufacturing Australia (A3DMA) workshop (CIT) and Parliament House Members display 24-25 June 2014

ACES/ANFF capabilities were showcased at Canberra's CIT where 3D printing was demonstrated to over 150 attendees followed by a public lecture presented by Gordon Wallace, the ACES/ANFF Node Director. On the following day the ACES/ANFF Materials Node demonstrated 3D printing and scanning to members of the Australian Parliament upper and lower houses where a members and staff only event presented active displays of 3D printing capabilities.

Celebrating Carbon Networking Breakfast Wollongong Northbeach 30 July 2014

A networking breakfast for 35 was held to inform potential collaborators of the ACES facilities and expertise in the area of graphene synthesis.

Speakers included Prof. David Officer (ACES) and Prof. Gordon Wallace (ACES) and Chris Gilbey (NanoCarbon).

NCRIS showcase at Parliament House 30 September 2014

ACES CI A/Prof Peter Innis represented ACES and the Australian National Fabrication Facility (ANFF) stand at the NCRIS showcase at Parliament House. ACES UOW is the host of the ANFF Materials Node. The showcase exhibited the 27 funded NCRIS projects in the Great Hall. The event had two components:

Afternoon session was open to parliamentarians and general public. The evening session was an invitation only event for parliamentarians and industry users of the facilities.

Parliamentary Seminar Parliament House, Canberra 1 October 2014

Representatives from ACES including Prof Gordon Wallace, Prof Sue Dodds, A/Prof Peter Innis, Dr Stephen Beirne, Natalie Foxon and Fletcher Thompson attended a Parliamentary Seminar for 30 invitees run by 3DMA in order to advise politicians and their advisors of developments in 3D printing. The ACES/ANFF additive fabrication capabilities were presented via active displays of 3D printing capabilities followed by a lecture from Prof Wallace.

Printed 3D busts were produced for the coalition members in attendance:

- Hon Ian Macfarlane, M.P., Minister for Industry.
- Hon Bob Baldwin, M.P., Parliamentary Secretary to the Minister for Industry.
- Hon Luke Howarth, M.P., Member for Petrie.
- Hon Don Radall, M.P., Member for Canning.
- Hon Mal Brough, M.P. Member for Fisher
- Sen Dr Christopher Back, Chair, Senate Foreign Affairs, Defence & Trade Legislation Committee.
- Mr Greg Gilbert, Advisor – Science and Research to Minister for Industry
- Ms Stephanie McKew, Assistant Policy Advisor to Minister for Industry.

Celebrating Carbon Networking Breakfast Intercontinental Adelaide 13 November 2014

A networking breakfast was held to inform 24 potential collaborators of the ACES facilities and expertise in the area of graphene synthesis.

Hosted by Prof Peter Murphy from the Mawson Institute at the University of South Australia, speakers included Prof Dusan Losic (University of Adelaide), Christopher Darby (Valence Industries), Prof David Officer (ACES) and Prof Gordon Wallace (ACES).

ENCOURAGING RESEARCH COLLABORATION

Key Performance Indicators	2014
Invited talks/papers/ keynote lectures given at major international meetings. Target 2014: 10 per annum	ACES – The New Dimensions (May - December 2014) 25 invited talks 8 keynote/plenary addresses
Number of visits to overseas laboratories and facilities KPI target 2014: 10	30

Invited Conference Talks June – December 2014

- Wallace, G.G. (2014) A Collision of Knowledge Cauldrons to Progress Advanced Biomaterials from Seaweed Phycopolymers, 5th International Congress of the International Society for Applied Phycology (ISAP) 2014, Sydney, Australia, 22-27 June.
- Officer, D. L. (2014) Developing an Artificial Photosynthetic Reaction Centre at the 8th International Conference on Porphyrins and Phthalocyanines, Istanbul, Turkey, 22-27 June.
- Wallace, G. (2014), Organic Bionics at the International Conference of Science and Technology of Synthetic Metals (ICSM2014), Turku, Finland, 30 June- 5 July.
- Cook, M. (2014) Brain Stimulation-State of the Art in 2014 at 10th Asian & Oceanian Epilepsy Congress, Singapore, 8 August.
- Coote, M.L. (2014) Lewis acid-mediated radical polymerisation-catalysis versus stereocontrol tutorial at 7th symposium on "Controlled/Living Radical Polymerization" (CRP), 248th National Meeting of the American Chemical Society in San Francisco, CA, 10-14 August.
- Pringle J. (2014) Ionic Liquid Electrolytes for Thermal Energy Harvesting at Gordon Research Conference on Ionic Liquids, Newry, ME, USA, 17-22 August.
- In het Panhuis, M. (2014) Electrical conductivity and impedance behaviour of hydrogel materials, SPIE Optics and Photonics, San Diego, USA, 17-20 August.
- MacFarlane, D (2014), Ionic Liquids in Pharmaceuticals and Biopreservation Applications, at Gordon Research Conference on Ionic Liquids, August 18, Newry, Maine, USA.
- Sparrow, R (2014) Grappling with the universal protoplasm, Ethics for the Future of iPS/Stem Cells: The 2014 Uehiro-Carnegie-Oxford Ethics Conference, University of Kyoto, Japan, 28 August.
- Spinks, G. (2014) Pumping Ions – artificial muscles from electroactive polymers and hydrogels, XIV International Symposium on Polymer Electrolytes, Geelong, 24-29 August.
- Crook, J. (2014) Smart Surfaces for Stem Cell Expansion and Engineering Biosynthetic Excitable Tissues at New South Wales Stem Cell Network Bioengineering and Stem Cells Workshop, 23 September.
- Pringle J. (2014) Ionic liquid based thermos-electrochemical cells for harvesting waste heat at 4th Asia-Pacific Conference on Ionic Liquids and Green Processes / 6th Australasian Symposium on Ionic Liquids, Coogee, NSW, 28 September-1 October.
- Howlett, P. (2014) Ionic Liquids in Batteries- Tailoring Composition and Performance, at 4th Asia-Pacific Conference on Ionic Liquids and Green Processes / 6th Australasian Symposium on Ionic Liquids, Coogee, NSW, 28 September-1 October.
- Wallace, G. (2014), Three-dimensional Printing: Creating Complex Designs by Adding Layers, at the Australian College of Optometry (ACO) National Conference, Melbourne, Australia, 18-19 October.
- Mozer, A (2014) Charge recombination in conjugated polymer donor: fullerene acceptor blends studied by transient optical and electrical probes at the IUMRS-ICYRAM 2014 conference: 2nd International conference of Young Researchers on Advanced Materials, Haikou, China, 23-29 October.
- Cook, M. (2014) Deep Brain Stimulation: mechanism of action, evidence from animal models at Epilepsy Society of Australia, 28th Annual Scientific Meeting, Melbourne, 7 November.
- Sparrow, R. (2014) at workshop on "The ethical aspects of autonomous vehicles?" 2014 Australasian Road Safety Research Policing and Education Conference, Melbourne, 12 November.

18. Officer, D. L. (2014) Developing Nanostructured Electromaterials for Solar Cells and Solar Fuels at the 3rd Biennial Conference of the Combined Australian Materials Societies, University of Sydney, Sydney, Australia, 26-28 November.
19. Officer, D. L. (2014) Graphene—Materials Processing, Fabrication and Devices; invited tutorial at the 2014 Materials Research Society Fall Meeting, Boston, USA, 30 November - 5 December.
20. Officer, D. L. (2014) 3D Fabrication: New Dimensions to Enable Organic Bionics at the 2014 Materials Research Society Fall Meeting, Boston, USA, 30 November - 5 December.
21. MacFarlane, D (2014), Clean Energy Applications of Ionic Liquids: From Solar Cells and Water Splitting to Thermocells at Australia-China Energy Conference, Monash University, Australia, 5 December.
22. Cook, M (2014) Current State of the Art: Prediction and Devices; American Epilepsy Society at the Presidential Symposium, Seattle, Washington, USA, 6 December.
23. Gilbert, F. (2014) Deep Brain Stimulation and Postoperative Feelings of Self-Estrangement, Neuroethics Down-Under 2014: Neuroscience and Society in the 21st Century, Monash University, Melbourne, Australia, 10-11 December.
24. Zhang, J (2014) Electrochemistry and Electrocatalysis of Polyoxometalates at the International Symposium on Green Science, Kochi University, Japan, 13 December.
25. Forsyth, M. (2014) Decoupling Ion Dynamics in Ionomer systems by a mixed cation approach at the 13th Eurasia Conference on Chemical Sciences, Bangalore, India, 14-18 December.

Plenary/ Keynote addresses June – December 2014

1. Forsyth, M. (2014) at the Ionic Liquids for Electrochemical Devices (ILED 2014) conference, Rome, Italy, 28-30 May.
2. Alici, G (2014) at 4th International Conference on Electromechanically Active Polymer Transducers & Artificial Muscles (EuroEAP 2014), Sweden 10 June.
3. Coote, M.L. (2014) Electrostatic effects on hydrogen atom transfer reactions: Towards non-directional polar effects?, at International Conference on Hydrogen Atom Transfer (iCHAT2014), Rome, Italy, 22-26 June.
4. Coote, M.L. (2014) Lewis acid-mediated radical polymerization – catalysis versus stereocontrol", EUCHEM Conference on Organic Free Radicals, Prague, Czech Republic, 29 June-4 July.
5. Wallace, G. (2014) Flexible Electromaterials – Stretching the Limits of Human Performance at the International Symposium on Polymer Electrolytes (ISPE-14), Geelong, Australia, 24-29 August.
6. Wallace, G.(2014) Surfaces, Interfaces and Organic Bionics at the 17th International Conference on Solid Films and Surfaces (ICSFS17), Rio de Janeiro, Brazil, 8-11 September.
7. Wallace, G. (2014) Functional Fibres to Fabricated Devices (Knitting Function into Fashion) at the 89th Textile Institute World Conference (TIWC 2014), Wuhan, China, 2-6 November.
8. Wallace, G. (2014) Monitoring and Enhancing Human Performance using 3D Printing at the 9th Australasian Biomechanics Conference (ABC9), Wollongong, Australia, 30 November - 2 December 2014.

In the quest to consolidate existing collaborations and to initiate new ventures in research, ACES members were actively out and about speaking of ACES New Dimensions to existing and potential collaborators; 61 of those occasions are listed below.

Please note attendance and presentations at ACES events reported in the previous chapters are not included on this list.

Presentations/ Visits to research organisations/ Industry by ACES personnel:

1. Innis, P (2014) gave a presentation to CUDOS, Sydney University about the ACES-ANFF facility at UOW on 6 February.
2. Crook J & Wallace G (2014) Visit to School of Mechanical and Aerospace engineering at Nanyang Technological University in Singapore with view to establish collaboration, 21 February.
3. Higgins, M. & Mozer, A (2014) Delivered 10 lectures each in electrochemistry at Hanbat University, 6-12 April.
4. Crook, J (2014) Presented at 12th Annual Meeting of the international Society of Stem Cell Research (ISSCR) as well as attend the international Stem Cell Consortium meeting which includes 80 leading scientists engaged in large collaborative projects discussing potential new collaborative opportunities, 18-22 April.
5. Officer, D. L. (2014) Porphyrins – Light Harvesting and Catalysis at the 2014 Johnson Foundation Britton Chance Research Discussions Joint University of Pennsylvania (USA), University of Wollongong (AU) and University of Otago (NZ) Workshop, Perelman School of Medicine, University of Pennsylvania, Philadelphia, USA, 22 April.
6. Forsyth, M and Pringle J (2014) held 2 days of talks with Tecnalia in Spain to establish joint projects.
7. Wallace, G. (2014) Printed Organic Bionics at the University of Würzburg, Germany, 5 May.
8. Innis, P (2014) ANFF-ACES facility representation at National Manufacturing week 2014, 14 May.
9. Innis, P. & Moulton S. (2014) delivered a series of lectures in electromaterials science at Hanbat University, 18-24 May.
10. Forsyth, M. (2014) Polymer Electrolytes: Enabling Future Energy Technologies" at the VIC RACI polymer workshop, 26 June 2014, Parkville.
11. Sparrow, R (2014) Invited speaker, debate on the topic "Should we fear robots in care" as part of the session on the role of assistive technology in dementia care, at the Risky business 2: This time it's personal conference, organised by Hammond care, Sydney, 27 June.
12. Gilbert, F (2014) Collaborative research visit to the Brocher Foundation, Switzerland in July.
13. Zhang, J (2014) International laboratory visits to Warwick University (Prof Pat Unwin); Oxford University (Prof Richard Compton); Bath University (Prof Frank Marken and Dr Ulrich Hintermair) and Cambridge University (Drs Adrian Fisher and Erwin Reisner) in July.
14. Officer, D.L. (2014) Developing Multifunctional Electromaterials for Energy-related Applications at the 2nd Joint University Of Wollongong/Friedrich-Alexander University Erlangen Workshop, Erlangen, Germany, 7-9 July.
15. Mozer, A. (2014) Organic Solar Cells at 2nd Joint University Of Wollongong/Friedrich-Alexander University Erlangen Workshop, Erlangen, Germany, 7 July.
16. Mozer, A. (2014) Visited Prof C Brabec, Erlangen to discuss collaborative opportunities, 8 July.
17. Alici, G (2014) Attended, presented papers, and chaired sessions at 2014 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, France, 9 July.
18. Higgins, M (2014) Bio-AFM research at AFM Users forum, University of Melbourne, 13-15 July.
19. Alici, G (2014) Visited Karadeniz Technical University, Turkey, and delivered a seminar, and updated on the collaborative project on the force control of polymer actuators, 17 July.
20. Alici, G (2014) Visiting Professor at the School of Mechanical and Biomedical engineering at City University of Hong Kong, 15 July 14-15 January 2015.
21. Gilbert, F (2014) worked with collaborator Prof Samia Hurst at the Institute of Biomedical Ethics, University of Geneva, Switzerland 1-8 August 2014.
22. Mozer, A. (2014) Charge Generation, transport and recombination in di-chromophoric porphyrin-sensitised solar cells at UTS seminar, Sydney, 8 August.
23. Moulton, S.E. (2014) at O'Brien Institute Symposium, 21 August.
24. Wang, C (2014) visited A/Prof Tong Lin lab at Deakin University for talks 29 August.
25. Sparrow, R (2014), 'The case against genetic selection for human enhancement' at the Practical ethics workshop, University of Kyoto, Japan, 2 September.
26. Wallace, G. (2014) Printing Parts for Bodies at the Nephrology Update Course Dinner, European, Melbourne, Australia, 23 August.
27. Sparrow, R. (2014) visited University of Tokyo Centre for Biomedical Ethics and Law, University of Tokyo, 25-26 August.
28. Sparrow, R. (2014) visited the Centre for IPS Cell Research and Application, University of Kyoto, Japan, 27-30 August.
29. Sparrow, R. (2014) visited the department of Ethics, University of Kyoto, Japan, 31 August-10 September.

30. Higgins, M (2014) Attended ISCSFS17 Conference, Rio de Janeiro and held collaborative talks at San Paulo, 2-14 September.
31. In het Panhuis, M. (2014) Printing of conducting and tough hydrogel materials, UMD workshop on distributed sensing, actuation and control for bio-inspired soft robotics, University of Maryland, Washington, USA, 11-12 September.
32. MacFarlane, D (2014) Ionic Liquids - New Solvents and Media for the Chemical-, Electro- and Bio-Sciences at Victoria University Wellington, NZ, 19 September.
33. Kapsa, R (2014) Two talks presented: 'Bionic Materials for Neuromuscular Restoration and Maintenance' and 'Nanostructured electrically active scaffolds for neural and muscle regeneration' plus chaired the young research forum session at the 3rd International Conference on Tissue Science and Regenerative Medicine, Valencia, Spain, 24-26 September.
34. Mozer, A (2014) Attended ANSTO workshop, Sydney, 25 September.
35. MacFarlane, D (2014) Ionic Liquids - New Solvents and Media for the Chemical-, Electro- and Bio-Sciences at Massey University, NZ, 26 September.
36. Unwin, P (2014) Nanoscale Views of Electrocatalysis at ECAT14, Whistler, Canada in October.
37. Mozer, A (2014) gave an invited seminar University of Technology Sydney 8 October.
38. Wallace, G. (2014) 3D Bioprinting-The Third Dimension at the Griffith Health Institute Seminar Series, Gold Coast, Australia, 10 October.
39. Mozer, A. (2014) visited University of Newcastle for scientific collaboration talks 20 October.
40. Hancock, L. (2014) Visiting Professor at Centre for Risk and Regulation: Meetings at London School of Economics with Prof Martin Lodge and Dr Kira Matus on energy applications in disasters, 16 October to 16 December.
41. Wallace, G. (2014) 3D Bioprinting – The Third Dimension at the Victor Chang Cardiac Research Institute, Sydney, Australia, 17 October.
42. Wang, X (2014) Elected president of the Fiber Society for 2015 at the Fiber Society conference and governing council meeting held October 22-24 in Philadelphia, Pennsylvania.
43. Wallace, G. (2014), 3D Bio Printing at the Australia-Korea Joint 3D Printing Symposium, Seoul, Korea, 23 October.
44. Wallace, G. (2014) Electromaterials: The New Dimensions at the Korean Embassy Event, Seoul, Korea, 23 October.
45. Wallace, G. (2014) ACES: Electromaterials: The New Dimensions at the ACES Launch Workshop in YNU, Yokohama, Japan, 27 October.
46. MacFarlane, D (2014), Energy Applications of Ionic Liquids at the ACES Launch Workshop in YNU, Yokohama, Japan, 27 October.
47. MacFarlane, D (2014), CO₂-dangerous but precious at Tokyo University of Agriculture and Technology, Japan, 27-31 October.
48. Wallace, G.G. (2014) ACES: Electromaterials: The New Dimensions at Shinshu University, Japan, 29 October.
49. MacFarlane, D (2014), Clean Energy Applications of Ionic Liquids: From Solar Cells and Water Splitting to Thermocells at Sophia Symposium on Ionic Liquids, Sophia University, Japan, 1 November.
50. Wang, X (2014) Chaired the 89th Textile Institute World Conference, 2-6 November 2014, Wuhan, China.
51. Mozer, A. (2014) gave a half day seminar in photophysics and organic solar cell technology at the MESA Bootcamp, MacDiarmid Institute, New Zealand, 7-11 November.
52. Wang, X (2014) Visited the Energy Materials Institute at Southwest University, China on 10 November.
53. Hancock, L. (2014) Visit to University of Bath for corporate political activity analysis, 13 November.
54. Howlett, P. (2014) Ionic Liquid and Organic Ionic Plastic Crystal Electrolytes for energy Storage Devices, Amperex Technology Limited (Chinese Battery Manufacturer), Ningde, China, 16 November.
55. Spinks, G. (2014) Dept Electrical Engineering and Computer Science, QUT, Brisbane, 28 November.
56. Spinks, G. (2014) at CSIRO Manufacturing Flagship; QCAT, Brisbane, 28 November.
57. Gilbert, F (2014) presented 'Deep Brain Stimulation and Postoperative Feelings of Self-Estrangement', Neuroethics Down-Under 2014: Neuroscience and Society in the 21st Century, Monash University, Melbourne, Australia, 10-11 December.
58. MacFarlane, D (2014) Ionic Liquids - New Solvents and Media for the Chemical-, Electro- and Bio-Sciences at University of Canterbury, NZ, 11 December.
59. Hancock, L (2014) Paper presented on Risk and Regulation to LSE colloquium Regulation in Crisis? London School of Economics, December 12.
60. Zhang, J (2014) International laboratory visits to Kochi University (Dr Tadaharu Ueda); Konan University (Profs Masahiro Yamamoto and Takashi Kakiuchi); Kobe University (Toshiyuki Osakai); Osaka University (Prof Susumu Kuwabata); Kyoto Institute of Technology (Prof Kohji Maeda and Dr Yumi Yoshida) and Kyoto University (Drs Munitaka Oyama and Nishi Naoya) in December.
61. Li, H (2014) Dr Li spent 1 month at Soochow University, China, for the purpose of synthesising various novel quantum dots and photocatalytic materials. Working in the Jiangsu Key Laboratory for Carbon-based Functional Materials and Devices, Dr Li had access to high quality TEM and XPS facilities, and benefited from the world class expertise of the researchers in the group. The trip yielded many different materials, most of which were brought back to Monash University for further analysis and testing.

Following is a list of international and national visitors and their affiliations who have been hosted at ACES (hosted at ACES/UOW unless otherwise stated). This list does not include visitors who visited our facilities as part of ACES hosting international conferences.

International Academic Visitors

1. Alina Brzeczek, PhD student Silesian University of Technology, hosted at ACES UOW from April to December 2014.
2. Prof Louis A Madsen, Virginia Tech, USA - at ACES/Deakin from 18 August 2013 to 30 July 2014.
3. Prof Michel Armand, France - 6 month stay from 20 September 2014 to 20 April 2015 at ACES/Deakin.
4. Anais Pradignac, University Montpellier 2, France at ACES/Deakin from 20 February – 30 July 2014.
5. Celia Garnier, University Montpellier 2, France at ACES/Deakin from 20 February – 30 July 2014.
6. Pierre Martin, University of Orleans, France at ACES/Deakin from 1 April -31 August 2014.
7. Sylvain Beaurepaire, ECPM, France at ACES/Deakin from 5 May -22 August 2014.
8. Prof Tom Welton, Head of Chemistry at Imperial College in London, 2 May 2014 at ACES/Deakin.
9. Claire Williams, communications/ marketing officer at Dublin City University, Ireland spent 2 months from 2 June at ACES/UOW.
10. Mathilde Lamaze, Ecole des Mines de Saint Etienne site Geroges Charpak, Gardanne, France spent 4 months working at ACES/UOW from 2 June.
11. Dr Usman Ali Rana, Sustainable Energy Technologies (SET) centre, College of Engineering, King Saud University, Kingdom of Saudi Arabia at ACES/Deakin 25 June.
12. Jennifer Deignan, PhD Student, Dublin City University, Ireland spent 3 months at ACES/UOW from 2 July.
13. Wayne Francis, PhD Student, Dublin City University, Ireland spent 3 months at ACES/UOW from 2 July.
14. Prof David Alfredo Pacheco Tanaka, Membrane Technology Group, Materials for Energy and Environment Area Tecnalia, Spain, at ACES/Deakin 10 July 2014.
15. Prof Stefan Bon from Warwick University visited Prof Brett Paull at UTas 7 August for a discussion of potential collaboration on nanodiamond colloids.
16. Sabeel Mohammed Basheer, an Endeavour fellowship awardee from National Institute of Technology, Trichy, India worked at ACES/IPRI from 8 August- 19 December as part of his fellowship with ANU.
17. Prof Patrik Johansson, Applied Physics, Chalmers University of Technology, Sweden at ACES/Deakin on 21 August 2014.
18. Prof Sang-Mo (Simon) Shin, Director Center for Applied Life Science, Hanbat University, Korea for 2 days 25-26 August.
19. Prof David Furukawa & Hazel Turner, National Centre of Excellence in Desalination Australia, Murdoch University, Dixon Road, Rockingham at ACES/Deakin on 2 September 2014.
20. Prof Ralph Colby, the Pennsylvania State University, USA at ACES/Deakin on 3 September 2014.
21. Prof. Masahiro Yoshizawa-Fujita, Department of Materials & Life Sciences, Sophia University, Japan at ACES/Deakin on 4 September 2014.
22. Dr Rebeca Marcilla, Imdea Energy Institute, Spain at ACES/Deakin from 24 August-9 September 2014.
23. Nerea Casado, Polymat Fundazioa, Spain at ACES/Deakin for six months from 24 September 2014.
24. Dr Anne Willert, Technical University of Clausthal, Institute of Electrochemistry, Germany at ACES/Deakin 7-8 October 2014.
25. Prof Karl-Dieter Gruske & Prof Dirk Guldi, Friedrich-Alexander-Universitat Erlangen-Nurnberg, 8-9 October.
26. Dr Simone Dimartino, Lecturer - University of Canterbury, New Zealand, 20 October.
27. China Iron & Steel Research Institute Group (CISRI), The Australian China Energy Nanomaterials Research Centre – Beijing Key Laboratory in Energy Materials, Beijing ,China visited ACES Deakin node 18 November.
28. Prof Andrew Bocarsly, Princeton University, USA hosted at ACES/Monash.
29. Prof Huber Girault, International academic from EPFL, Switzerland hosted at ACES/Monash.



Visitors are also welcomed to the ACES nodes to see our research and to discuss possible collaborations to enable us to develop together new sources of innovation and growth across the global network. Building collaborations puts ACES in the best position to benefit from the intellectual and financial leverage that comes with international partnerships. It also allows ACES to keep our national science relevant and of high quality. With the knowledge plus with communication channels in place this allows for better dissemination of the research, hence it can have more impact.



National Academic Visitors

1. Dr Denny Oetomo, University of Melbourne, 19 June.
2. Bob Cowan, CEO of the Hearing CRC 19 June.
3. A/Prof Damian Myers, University of Melbourne, ACES/UOW for 3 days from 28 July.
4. Dr Bill Zhang, Orthopedic Research Fellow (SVHM), 2 days at ACES/UOW from 30 July.
5. Prof Jurg Keller, Director of Advanced Water Management Centre, University of Queensland, 14 August.
6. A/Prof Marie Ranson, IHMRI UOW, 15 August.
7. Prof Francois Ladouceur, UNSW, 19 August.
8. Dr Gianni Renda & Bridgette Engeler-Newbury, Course Coordinator & Lecturer Industrial Design –Swinburne, 29 August.
9. Graphic design/brand strategist researcher - Swinburne"
10. Dr Hua Li, Newcastle University at ACES/Deakin 7-21 September 2014
11. A/Prof Rob Atkin, Newcastle University at ACES/Deakin 11 September 2014.
12. Prof Leslie Yeo, Co-Director Micro/ Nanophysics Research Laboratory, RMIT University, 23 September.
13. Prof Bijan Samali & Dr Pezhman Sharafi, Infrastructure Systems, University of Western Sydney, 1 October.
14. Prof Alan Bond, Monash University, 2 October.
15. Prof Melissa Knothe Tate, UNSW, 2 October.
16. Prof Stephen O'Leary, University of Melbourne, 2 October.
17. Dr Claudia Di Bella, Orthopaedic Surgeon (SVHM) & Senior Lecturer/Research Fellow (University of Melbourne) at ACES/ UOW for 2 days 8-9 October.
18. A/Prof Damian Myers, University of Melbourne, visited Prof Brett Paull at UTas 10 October, to present seminar and discussed collaboration on fluidics and 3D printed micropumps.
19. Vipul Gupta (PhD-UTAS) had a research placement in ACES labs at Wollongong, 13-24 October.
20. Dr Darling Rojas-Canales & Ms Daniella Penko, Senior Scientists - Royal Adelaide Hospital for 2 days 16-17 October.
21. A/Prof Damian Myers, Head of Biomedical Sciences (SVHM) at ACES/ UOW for 3 days 22-25 October.
22. 6 personnel from Air Force Office of Scientific Research, 25 November.
23. Dr Oli Jones from RMIT visited Prof Brett Paull at UTas 26-27 November to present a seminar and discuss collaboration on metabolomics.
24. Prof Peter Murphy, University of South Australia, 22 December.

COMMUNICATIONS

Key Performance Indicators	2014
ARC KPI Number of website hits Target 2014: 1000 visits/month	Oct-Dec: Average 2543 visits/month
ACES Facebook	47% increase in activity
ACES Twitter	104% increase in followers
Web stories 2014 Target: 50	Jan-June : 168 July-Dec: 83 <i>(full list in Appendix 4 Table 1)</i>
In print stories 2014 Target: 10	Jan-June : 19 July-Dec: 23 <i>(full list in Appendix 4 Table 2)</i>
Radio 2014 Target: 10	Jan-June : 10 July-Dec: 6 <i>(full list in Appendix 4 Table 3)</i>
TV 2014 Target: 2	Jan-June : 2 July-Dec: 4 <i>(full list in Appendix 4 Table 4)</i>

International Headlines

All the outputs for communications are based upon either the efforts of the high calibre of team members or on the fantastic developments by the Centre that are the basis for international headlines.

Led by ACES' Chief Investigator Geoffrey Spinks, the soft robotics team's 'fishing line muscles' garnered huge media interest globally. All media platforms reported on the breakthrough, notably global digital news publication International Business Times, which has an audience of 30 million people per month. Other sources included websites Digital Journal, Slashdot, and the New York-based website ScienceWorldReport. Professor Spinks appeared on ABC Radio's PM, while magazines Cosmos and Science Magazine also covered the technology. In Robots Podcast episode 168 interviewer Ron Vanderkley spoke with Prof Geoffrey Spinks (<http://robots.net/article/3649.html>) about the artificial muscles, made from simple materials like fishing line.

The work started with the discovery by PhD student (and now ARC Discovery Early Career Researcher Award Fellow) Javad Foroughi of a "torsional" type of actuation movement in electrochemically charged carbon nanotube yarns.

Subsequently, our collaborators at the University of Texas at Dallas (UTD) – who make the yarns – also found that similar torsional actuation response could be produced by filling the yarn pore volume with candle wax to make hybrid yarn muscles. Then the collaboration revealed more on the coupling between the torsion and the coil contraction by applying mechanics theory that had been developed for more than a century and applied to helically-coiled springs. Finally, the collaborative group also discovered that similar effects occur in highly oriented polymer fibres when they are twisted into coils. All this work has been published in Science.

A development from the synthetic biosystems program that uses seaweed and 3D printers to help regenerate human bone and tissue was covered by multiple media, including ABC, PrimeTV and SBS news on television, websites Bionews, Stories by Williams, Gizmodo, Business Insider Australia, 3D printing from Scratch, The New Daily and the UK based BioNews. Magazines Asian Scientist and Medical Design Technology also reported on the advance.

ACES' graphene research gained more attention in 2014, with a feature article appearing in The Sydney Morning Herald's

Good Weekend Magazine. TV coverage included an interview with Prof Gordon Wallace on the material's future and applications. Profs Gordon Wallace and David Officer contributed an opinion piece to news website The Conversation and Prof Wallace also presented on the topic at business sustainability program Green Capital. News on \$25m in funding for graphene development by ACES was reported on by a host of media, including the Illawarra Mercury, SP2Tech, Australian Mining magazine and the website ferret.com.au.

Work on a next generation gel-based condom using ACES materials, with \$100,000 in funding from the Bill and Melinda Gates Foundation, was perhaps the biggest news story of the year for ACES. Coverage was worldwide and to list all media entities who documented the research is beyond the scope of this report. Dr Robert Gorkin was inundated with media requests and notable outlets included The Huffington Post, International Business Times, Gizmodo, MTV, The Independent, The Times of India and news website Inquisitor, which has a reach of 1,200,000 Facebook followers and 10 million visitors each month.

A prototype of the world's first 'bionic bra' received similar attention to the fishing line muscles development. The UK's The Sunday Times and UK Express picked up on the development, with local media, including Radio Australia and ABC Illawarra, conducting interviews with Prof Gordon Wallace and 7 News and Weekend TODAY interviewing Profs Wallace and Julie Steele.

Other notable news items for ACES were research on the 3D printing of body parts, which included an interview on ABC Radio's PM and reporting by International Business Times and Business Insider Australia. 3D printed jewellery and hydrogel printing that may lead to printing human cartilage were also popular news stories of 2014.

Interest in the international master's degree in biofabrication was promising. The story ...'first to offer a degree in the 3D printing of replacement body parts' was broadcast from over 50 TV stations (duration 2mins 18 secs) and over 50 radio stations (duration 2mins 34 secs). 24 hours after the launch was published readership numbers of the actual story in the Brisbane Times was 264; Canberra Times 292 and Daily Telegraph 616.

Opinion Pieces

Researchers engaged in public debate issues pertaining to new technology in their area of expertise. Opinion pieces written for The Conversation: CI Douglas MacFarlane "To shift away from fossil fuels, we need to copy plants" attracted 2357 readers; CI Geoffrey Spinks piece "Fishing for artificial muscles nets a very simple solution" 3273 readers and CIs Wallace & Officer on "Graphene can pave the way for Australian manufacturing" 5742 readers (all figures as of 27.1.15).

CI Rob Sparrow wrote "The Turing Triage Test: When is a Robot Worthy of Moral Respect?" Published in The Critique December 30. <http://www.thecritique.com/articles/the-turing-triage-test-when-is-a-robot-worthy-of-moral-respect/>

Website

A new ACES website "Exploring New Dimensions" at electromaterials.edu.au went live on 20 September 2014.

Statistics for total visits, including new visits and returning visits is shown in the chart labeled electromaterials.edu.au. Page views were 2531, 8230, 6487 and 7831 respectively for the months September through to December 2014.

Website Analytics

- 58% of visitors to electromaterials.edu.au were new visitors
- 51% were in Australia, followed by the US, South Korea, China, Iran and Germany
- After the home page (15% of content views), the most visited content was Team (People), Blog (News and Stories), Jobs, PhD Opportunities and Events.
- The majority (58%) of web traffic came via google searches, 31% of visitors arrived from other websites (mostly the ACES IPRI node website, University of Wollongong Science, Medicine and Health faculty website, University of Wollongong main website, Monash University website and the Australian Research Council website).
- 20% of users arrived directly (typing in the URL) and 9% of users came from social media; overwhelmingly from ACES Facebook.

Social Media

Facebook

ACES Facebook page likes increased 47%, from 366 at 1st January 2014 to 539 at 31 December 2014.

66% of ACES Facebook followers are men (about 10% higher than Facebook average), and the best represented age group across men and women is 25-34 years old (around double the average rate this age group is represented on Facebook).

The majority (275) of ACES Facebook followers are in Australia, followed by the US, India, Pakistan, South Korea and the UK.

A profile story on a visiting researcher from a research institute in France was seen by the highest number of people – over 29,000.

A post on the Masters of BioFabrication course was seen by 12,000 people.

The highest rate of engagement with a post was 40% for a post about the launch of ACES: The New Dimensions by Senator Fierraventi-Wells.

29% of users engaged with a post featuring 'behind the scenes' photos of a photo shoot that took place for the New Dimensions Magazine.

Twitter

At the end of 2014, the ACES Twitter account has 165 followers, up from 81 at the end of 2013, an increase of 104%.

ACES Magazine

A magazine New Dimensions, which covers profiles on ACES staff, research features, and case studies, was distributed to more than 600 ACES stakeholders.

VISIBILITY TO THE COMMUNITY

Key Performance Indicators	2014
Number & nature of public awareness/outreach programs Target 2014: 3	7 - see commentary in this section
Number of talks given by Centre staff open to the public 2014 Target: 2	19

Out and About

Science Gallery Dublin
16 May 2014

The Science gallery in Dublin was full with people from many countries of all ages and backgrounds to hear Prof Gordon Wallace give a lecture 'Printing Parts for Bodies' discussing the newest directions in research in wearables and implantables, including facial reconstruction, customised implants, and bionic bras; along with a demo of the 3D printing technology (from UOW) that's making it all possible. ACES/UOW's ability to customise body parts has been improved dramatically by the advent of 3D bioprinting. This involves the creation of customised wearables or implants by printing, layer by layer, often complex 3D structures.

The Science gallery in Dublin is a place where science and art collide. The Science Gallery is a world first. A new type of venue where today's white-hot scientific issues are thrashed out and you can have your say. A place where ideas meet and opinions collide. Since opening in 2008, over one million of you have visited us

in Dublin - ranking them among the top ten free cultural attractions in Ireland. They are all about opening science up to passionate debate and to encourage public opinion.

3D Print Sydney
Powerhouse Museum, Sydney, 10 June 2014

ACES ran this public event in Sydney as a follow-up to the sold-out 3D Print Wollongong event in December 2013.

Hosted by award winning science communicator Bernie Hobbs, the event featured short talks from Profs Gordon Wallace and Susan Dodds (ACES Director and Chief Investigator respectively), Dr Stephen Beirne (Australian National Fabrication Facility based at ACES) and digital artist Louis Pratt.

Pitched at a novice level of knowledge on 3D printing, content for the 185 attendees included 3D printing of living human cells, in-surgery printing of bio-materials into damaged bone and cartilage, printing joints on demand, printing art, and the ethical implications of all these emerging technologies.

Risky business 2: This time it's personal
Hammond Care, Sydney
27 June 2014

CI A/Prof Robert Sparrow was an invited speaker in the debate on the topic "Should we fear robots in care" as part of the session on the role of assistive technology in dementia care.

The Enterprising Australians launch,
Questacon Technology Learning Centre,
Canberra

10 July 2014

Prof Maria Forsyth was an invited speaker and presented ACES research at this event.

HotHouse Event

Powerhouse Museum, Sydney

18 June 2014

Prof Gordon Wallace presented on Graphene & 3D Printing.



Donabate College, Ireland

18 May 2014

UOW members visited this college with the Australian Ambassador to donate a 3D printer 'made in Wollongong' to Donabate Community College in North Dublin.

The aim was to deliver the message about 3D Bioprinting to this facility, linking science, engineering and fabrication tools. This school has links with an Australian school where they work together on a project called F1 in schools. During this project they touched on 3D printing and with the donation of the 3D printer are expanding their use of 3D printing in this project even further.

BILL WHEELER SYMPOSIUM

Leon Kane-Maguire Theatre, UOW Innovation Campus, North Wollongong, 21 August 2014



Katharina Schirmer, Prof Stephen O'Leary, Mrs Jo Williams, Prof Gordon Wallace

Bill Wheeler was an active member of the Illawarra community who took a keen interest in new bionics research at the University of Wollongong (UOW). In Bill's honour, each year UOW's flagship science research centre, the Intelligent Polymer

Research Institute, hosts the Bill Wheeler Symposium during which the public are invited to learn about and celebrate the impressive achievements in bionics research at the University.

This year, 73 guests enjoyed a feature presentation from leading cochlear implant surgeon, Prof Stephen O'Leary, in addition to a moving talk from Illawarra local Jo Williams, mother of one of the youngest bi-lateral cochlear implant recipients, plus ACES Director, Prof Gordon Wallace.

The Bill Wheeler Award was presented to PhD student Katharina Schirmer, in recognition of her outstanding work in bionics research. Katharina won \$2000 to fund a trip to the MRS Conference in Boston, USA, at which she presented her work.

REMSTEP Project visits ACES at Deakin University
Deakin University, Clayton Campus
24 July 2014

Twenty undergraduate students studying to become High School science teachers are working with ACES Deakin University to learn about the important role that chemistry plays in research.

The Reconceptualising Mathematics and Science Education Project (REMSTEP) involves four Victorian Universities – Deakin, Monash, Melbourne and La Trobe – and stems from Australia's Chief Scientist's desire to increase science, technology, engineering and mathematics competencies in school children.

ACES researchers and students discuss their work, including thermal energy harvesting, ionic liquid electrolytes, metal-air batteries, corrosion, molecular modelling and carbon dioxide separation.

IPRI Open Day for National Science Week
UOW Innovation Campus, North Wollongong
18 August 2014

As part of National Science Week, ACES headquarters hosted a public open day, running lab tours throughout the day. The event was sold out in advance, with 80 guests learning about the work ACES undertakes in the University of Wollongong labs.

Launch of 3D BioPrinting eBook
Questacon – The National Science and Technology Centre
1 October 2014

A launch event was held for 3D BioPrinting: Printing Parts for Bodies, an eBook written by ACES researchers including Prof Gordon Wallace and Dr Cathal O'Connell.

Hosted by Questacon Director Prof Graham Durant, a 3D printing 'pop up exhibit' was set up in a public exhibition area of Questacon and Prof Gordon Wallace spoke on 3D BioPrinting for the 45 attendees.

Materials Science Development at the Advanced Manufacturing Forum,
Sydney
16 October 2014

Local business leaders joined with advanced manufacturing experts, academics and government in a bid to establish an Advanced Manufacturing Business Centre specialising in robots and robotics in the Sutherland Shire.

Speaking at the Sutherland ShireBiz forum at Burraneer, Parliamentary Secretary to the Minister for Industry Bob Baldwin welcomed the move.

"The development of a Sutherland Advanced Manufacturing Business Centre is a wonderful initiative; it shows an enormous sense of commitment that sits squarely on the page with our national agenda," Mr Baldwin said.

Prof Wallace spoke to the audience on ACES research and the ANFF 3D additive manufacturing capabilities at UOW.

The event was very successful with over 110 senior business leaders attending. The press coverage was very positive (<http://www.justcronullnews.com/2014/10/17/ideas-1588/>).

Completion Ceremony - Nationally Recognised 3D Printing Training for 17 Teachers at Figtree High School
16 October 2014

Prof Gordon Wallace was invited to talk about 3D printing – additive manufacturing at the Modfab completion ceremony, held at Figtree High School. All teachers who had completed their nationally recognised statement of attainment were presented with their certificates. Present at the ceremony were the high school principals and teachers from the Illawarra, some industry representatives, members from Manufacturing Skills Australia and The Hon Sharon Bird MP Member for Cunningham.

Keira Men's Probus Club
Gwynneville
20 October 2014

CI Prof Geoffrey Spinks presented ACES research at their monthly meeting.

Outreach program puts smiles on teachers' faces at Ulladulla
29 October 2014

A university outreach program has ensured that Ulladulla High School is set to join in the engineering and medical revolution taking place through the use of 3D printers.

A high-end user of 3D printers, A/Prof Marc in het Panhuis ACES CI and Associate Dean (International) in the Faculty of Science, Medicine and Health at UOW has donated a 3D printer to the South Coast school.

Together with two of his PhD students (Reece Gately and Holly Warren – now a RF in ACES), the UOW team has provided training to students in using the printer and the teachers (Joshua Westerway and Andrew Lake) who will be incorporating it into the curriculum through the school's design classes.

The high school has already been training the students in Computer Aided Design (CAD) program which prepared them to start 3D printing their projects.

"I have been working with the school during this year to provide staff and students with ideas and projects how to put what they teach into practice and also showing them where it can lead in terms of research," A/Prof in het Panhuis said.

A/Prof in het Panhuis is partnered with Ulladulla High School through Scientists and Mathematicians in Schools. This is a national program that creates and supports long-term partnerships between teachers and scientists. It is supported by the Australian Government Department of Education through the Maths and Science Participation Program and the Making Career Connections initiative.

"My research activities are funded through the Federal Government (Australian Research Council) and I strongly believe that it is my duty to give back to the community by engaging with, and exciting the next generation of young scientists," Panhuis said.

"Therefore I made a specific request to the Scientist and Mathematicians in Schools administrator to be linked with a high school in a regional/rural area, as I am aware of their problems in partnering with scientists.

"It's amazing to see how much difference this donation is making to the school. You can see the smiles on the teachers' faces."

3D printing is an integral part of in het Panhuis' research activities and that of ACES in which he is a Chief Investigator. For example, his own team is using a similar 3D printer to build a robotic prosthetic hand.

Wine, Cheese and Printed Body Parts
Bar Lourinha, Melbourne
10 November 2014

An evening event was held for the Melbourne launch of the 3D BioPrinting: Printing Parts for Bodies an eBook written by ACES researchers including Prof Gordon Wallace and Dr Cathal O'Connell.

Hosted by Prof Mark Cook (University of Melbourne), the event featured short talks from Prof Peter Choong (St Vincent's Hospital Melbourne) and Prof Gordon Wallace (ACES) plus a display of working 3D printers for the 42 attendees.

Balwyn Rotary Club
Melbourne
11 November 2014

CI Prof Mark Cook presented his research and spoke about how ACES is tackling the problems associated with epilepsy.

Engineers Australia
Illawarra Sutherland Regional Group
Annual General Meeting, Wollongong
12 November

CI Prof Geoffrey Spinks presented ACES research.

Royal Society of Victoria
Melbourne
13 November 2014

CI Prof Doug MacFarlane gave a talk on Sustainable Energy Technologies for the Sustainocene.

Meeting with Prime Minister of the Netherlands
18 November 2014

Two UOW academics of Dutch heritage were among guests who met the Prime Minister of the Netherlands Mark Rutte during his recent visit to Australia hosted by Australian PM, Tony Abbott.

Mr Rutte met Dutch representatives from industry, culture and academia which included UOW and ACES CI A/Prof Marc in het Panhuis. Marc's invitation was as a result of his links with the Dutch Consul-General Willem Cosijn

OUTREACH PROGRAM PUTS SMILES ON TEACHERS' FACES AT ULLADULLA HIGH



A/Prof Marc in het Panhuis (2nd from right) with Reece Gately (1st from right), ACES RF Holly Warren (3rd from right) and classmates with the donated 3D printer at Ulladulla High School. Photo: Joshua Westerway.

18 June 2014

20 Ulladulla High School students from the South Coast of NSW got a taste of life as a scientist at UOW as they toured the world-class research facilities at Innovation Campus; including a demonstration of how 3D printing is used in the production of plastic and metal components for biomedical applications.

The event, hosted by UOW's Faculty of Science, Medicine and Health and the ARC Centre of Excellence for Electromaterials Science, is part of a national CSIRO initiative that aims to

inspire the next generation of scientists and mathematicians and foster relationships between school teachers and researchers.

ACES CI A/Prof Marc in het Panhuis, who is also a chemical engineer, said the event series, Scientists in Schools, is a fantastic opportunity to encourage bright young minds to follow a career in science.

"Australia needs more young people to take up careers in science and maths. They will be the ones in the future who will find a cure for cancer and help the world deal with climate change."

During their visit, the Ulladulla High School students were challenged to build and test a security device based on radio frequency identification (RFID) technology, which features in swipe cards (to gain access to buildings), in microchips (to help identify pets), and retail security (to stop thieves).

ACES RF Holly Warren and UOW PhD student Reece Gately ran an electrical mystery competition, in which students were asked to identify a number of simple electronic devices used in research at UOW.

when he visited UOW and the pair discussed strengthening links between the Netherlands and Australia.

A/Prof in het Panhuis is particularly keen to develop stronger links with the University of Maastricht, which is highly ranked internationally.

The Dutch PM was informed about a proposed dual degree concept with the University of Maastricht centred on an International Master of Science degree in the area of Biotechnology.

"He was positive and enthusiastic about the idea and thought it was good to pursue," said Prof in het Panhuis who is making his second trip to the University of Maastricht this year.

At Gundaroo Public School
15 December 2014

CI Prof Michelle Coote gave a 1 hour chemistry workshop with the Kindergarten class at Gundaroo Public School.

Opening the doors at ACES

Hosted Canberra High School Students at ANU

8 August 2014

ACES CI Prof M.L. Coote gave a 2 hour presentation entitled "Chemistry by Computer" to Canberra high school students in the ANU Extension program.

Hosted Engineering students from UOW at ACES/IPRI

20 & 27 August 2014

Dr Steven Harvey and a group of 20 UOW engineering students undertaking the subject in additive manufacturing were given an insight into 3D manufacturing as well as a lab tour of ACES/IPRI additive manufacturing facilities.

Hosted students Cedars Christian School, Illawarra at ACES/IPRI

29 August 2014

A group of 16 students and four teachers from Cedars Christian School in the Illawarra enjoyed a hands-on science experience at the ACES' University of Wollongong labs in August 2014.

The year 11 students visited six stations during their visit, at which they learned about solar chargers that can work indoors, how damaged nerves can be repaired, 3D printing, the wonder-material graphene, soft robotics, and electron microscopy.

The visit came about following a visit to the labs by one of the school teachers during the annual ACES Open Day during National Science Week.

Ashwood College visited the ACES laboratories at Deakin University

10 September 2014

As part of ACES's ongoing commitment to improve science education, 16 Year 12 Chemistry students from Ashwood College visited the ACES laboratories at Deakin University, Burwood Campus hosted 16 year 12 Chemistry students who undertook two workshops – one on electrodeposition and the other on spectroscopy.

The year 12 Chemistry class teacher and the students appreciated the time committed by ACES staff (Dr. Cristina Pozo-Gonzalo, Dr. Anthony Somers, Dr. Matthias Hilder and Ms. Yafei Zhang) and the access to the laboratory; and especially enjoyed the quality images the simple desktop SEM can deliver.

Powerhouse Museum curators at ACES/IPRI

23 September 2014

Angelique Hutchison & Matthew Connell, Curators from Powerhouse Museum visited ACES/IPRI to discuss a possible 3D printing exhibition for 2015.

Modfab Pty Ltd a 3D printing – tour of ACES/IPRI

23 September 2014

Ben & Heike Roberts brought along a group of local teachers for a tour of the ACES/ANFF additive fabrication facilities and to discuss Modfab Pty Ltd a 3D printing pilot program for Illawarra schools & TAFE.

Work experience at ACES/IPRI

8-12 December 2014

Few teens can brag to their mates that they own a 3D printed mobile phone case. Aaron Porteous can – and he designed his! "I've been learning how 3D printing works and how the 3D modelling software works and I've been using both," he said. "I've got a phone case that I designed. Aaron said the project was enjoyable, but tricky.

ACES/ IPRI hosted work experience student Aaron Porteous from The Illawarra Grammar School. The 16-year-old was interested in studying science at university. Research Fellow and Aaron's supervisor for the week, Dr Stephen Beirne said Aaron had achieved a lot in his exciting week at ACES/IPRI working with the equipment that is part of the Materials Node of the Australian National Fabrication Facility.

ACES and Wollongong Science Centre

Two undergraduate students, from Science and Engineering fields at the University of Wollongong, were employed by ACES for six weeks to research and develop a 3D Printing outreach program, incorporating ACES research, to be run by the Wollongong Science Centre. The Wollongong Science Centre ran a show in September 2014 for 150 Year 9 students. The show was well received by teachers and students. The Science centre will be actively promoting it to schools in 2015.

Two ACES PhD students have been working with the science centre in 2014 on developing a display introducing nanotechnology for battery use. They also were working to produce a demonstration of a flexible electrochromic energy storage device that could be used in a Science Centre display.

ACES and Questacon

At the request of Questacon – The National Science and Technology Centre, ACES was pleased to host a production team in the University of Wollongong labs to film fabrication equipment at work as well as interview researchers and students. The resulting footage is on exhibit, along with physical samples and written information also provided by ACES, in the Ian Potter Foundation Technology Learning Centre's 'Enterprising Australians' exhibit.

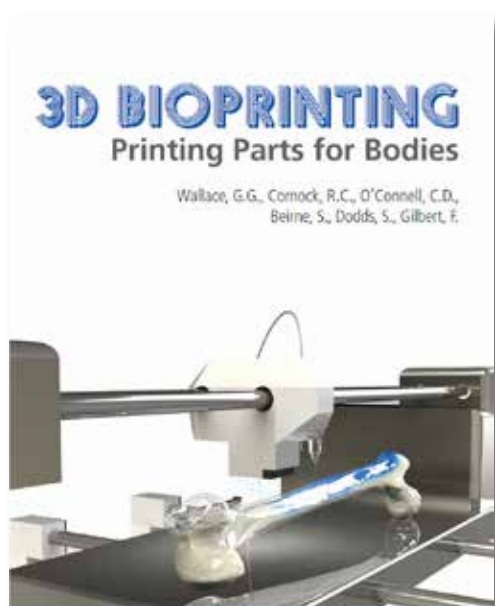


PUBLICATIONS

Key Performance Indicators	2014
Journal articles output: Target 2014: 50	80 Journal publications (July-Dec)
Quality of journal articles 2014 Target: At least 50% of journal articles in journals with impact factor >2.9	57 (72%) Journal articles with impact factor >2.9
Citation data for publications 2014 Target: At least 50% of journal articles in journals with impact factor >2.9	120 publications with ACES in the address line for 2014 (Web of Science 9.2.15) 1.64 Average cites per publication
Conference publication output 2014 Target: 10	8 Published Conference Presentations 53 Unpublished Conference Presentations
Relevant interdisciplinary research 2014 Target: 30% of journal publications each year will be apportioned across at least 2 FOR codes at the 2 digit level	68% <i>Note: ERA ARC Journal List FOR codes were used. The entire 2014 ACES publications list was included for calculation.</i>
Contribution to the National Research Priorities 2014 Target: : 20% of ACES publications to contribute to National Research Priority of Frontier Technologies for Building & Transforming Australian Industries in the goal areas of Advanced Materials, Frontier Technologies, Breakthrough Sciences.	>60% 15 publications were coded multidisciplinary 70 coded for materials chemistry 41 coded for engineering; of which two are coded manufacturing engineering and seven materials engineering.
Effectiveness of the Centre in bringing researchers together to form an interactive and effective research team 2014 Target: 35% of ACES publications co-authored with international collaborators 2014 Target: 15% of ACES publications co-authored with national collaborators	50% publications co-authored with international collaborators 41% publications co-authored with national collaborators

e-Book

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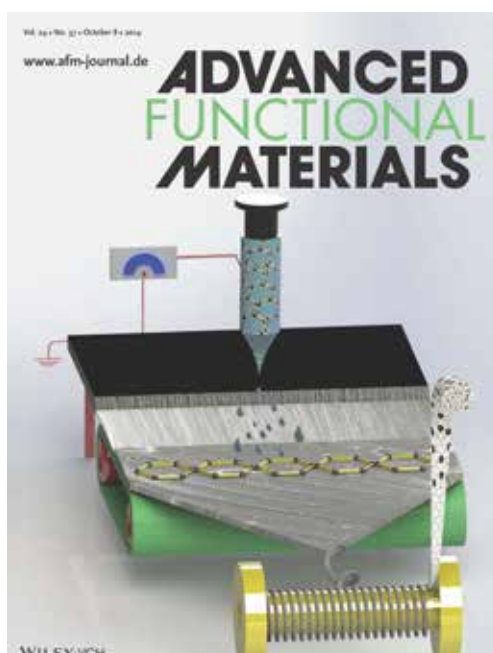
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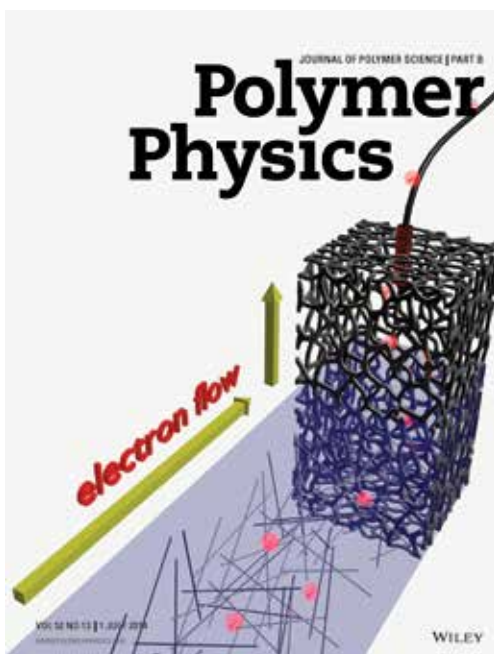
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Conference Publications

1. B. Monaghan, R. Longbottom, M. Reid, O. Aladejebi (S), A. Jayasekara and M. in het Panhuis, A New Approach to Investigating Coke Reactivity, in *Celebrating the Megascale: Proceedings of the Extraction and Processing Division Symposium on Pyrometallurgy in Honor of David G.C. Robertson* (eds P. J. Mackey, E. J. Grimsey, R. T. Jones and G. A. Brooks), John Wiley & Sons, Inc., Hoboken, NJ, USA. doi: 10.1002/9781118889657.ch51
2. P. Calvert, M. in het Panhuis, G. Spinks, R. Gorkin III, L. Stevens (S), S.E. Bakarich (S), P. Balding (S) and D.M. Kirchmayer (S) "Strong tough gels for 3D tissue constructs", *Material Research Society Symposium Proceedings 1622* (2014), 49-53.
3. M. in het Panhuis, Electrical conductivity and impedance behaviour of hydrogel materials, *SPIE Proceedings, 9171, Nanobiosystems: Processing, characterisation and Applications VII, 917103* (August 2014); doi:10.1117/12.2066370.
4. D.M. Kirchmayer (S) and M. in het Panhuis, Biopolymer Based Tough and Self-Recovering Ionic-Covalent Entanglement Hydrogels, *Material Research Society Symposium Proceedings*, accepted for publication on 28 June 2014.
5. Sparrow, R. "Making everybody too good?" 13th Conference of the International Society for Utilitarian Studies (ISUS), Japan, 21 August.
6. Sparrow, R. "Grappling With The Universal Protoplasm" in *Ethics for the Future of iPS/Stem Cells: Proceedings of the 2014 Uehiro-Carnegie-Oxford Ethics Conference*, ed. Julian Savulescu and Misao Fujita. The Uehiro Foundation on Ethics and Education, Tokyo.
7. Sparrow, R. "Enhancement and Obsolescence: Avoiding an "Enhanced Rat Race", *The Kennedy Institute of Ethics Journal* forthcoming, accepted August 22, 2014.
8. L. Florea, K. Wagner, P. Wagner, D. L. Officer, G. G. Wallace, F. Benito-Lopez, D. Diamond, "Negative phototaxis behavior of organic droplets in channels", *Proceedings of the 17th International Conference on Miniaturized Systems for Chemistry and Life Sciences, 17th, Freiburg, Germany, 2014, 3, 1391.*

PRIZES AND AWARDS

ACES member	Award/Prize	Commentary
ACES CIs	Awarded a Centre of Excellence for Electromaterials Science	CE 140100012 (2014-2020: \$25m Director Wallace, G.)
Alici ,Gursel (CI)	Awarded a Chinese Academy of Sciences Visiting Professor Fellowship.	This prestigious fellowship with Prof Jie Yang from Intelligent Mechanism and Robotics Laboratory at the University of Science and Technology of China (USTC) in Hefei is for support for up to five months to be undertaken in 2015. The project to be undertaken is on smart actuators for robotics and mechatronics applications, and robotic drug delivery systems.
Alici, Gursel (CI)	Appointed as Visiting Professor at the School of Mechanical and Biomedical Engineering, City University, Hong Kong	CI Alici spent six months at City University, 15 July 14-15 Jan 15, invited and sponsored by Prof Ning Xi to work on soft robotics.
Coote, Michelle (CI)	Fellow Australian Academy of Science	For her work in developing and applying accurate computational chemistry for modelling radical polymerisation processes.
Coote, Michelle (CI)	Awarded ARC Discovery	DP150104454 (2015-17:\$409,900 Coote, ML) This project aims to use a complementary combination of theory and experiment to develop novel structured Lewis acids for controlling the stereochemistry in free-radical polymerisation, and to utilise the recently discovered propagation catalysis conferred by simple Lewis acids to minimise defect structures and thereby improve the thermal and photostability of polymers.
Gilbert, Frederic (ECR)	Awarded ARC DECRA	DE150101390-(2015-17:\$363,536 Gilbert, F.) The use of novel, invasive, synthetic, biomedical brain technologies such as predictable brain devices, 3D printed biomaterials, additive-bio-fabricated materials, and drug delivery systems have raised unprecedented ethical issues for research. This project aims to explore how research trial guidelines can address the ethical issues raised by new brain applications.
Gilbert, Frederic (ECR)	University of Tasmania, Research Enhancement Grants Scheme (REGS) 2015	2015: Deep Brain Stimulation and Postoperative Self-Adjustment Phenomenon, \$11,267
in het Panhuis, Marc (CI)	Admitted as Fellow of Royal Society of Chemistry	For his ongoing research in the area of Materials Science, in particular hydrogel materials (soft, tough gels and their 3D printing capabilities).
Jalili, Rouhollah (ECR)	University of Wollongong 'AIM for Gold' grant 2014	Fabrication of band gap tunable large sheets of monolayer transition-metal dichalcogenides , \$12,000
Mozer, Attila (CI)	Appointed Associate Visiting Professor Shinshu University, Japan	This six month appointment is to strengthen research collaborations in existing areas or research and to expand into new areas of carbon fibres, carbon dioxide reduction and water splitting plus developing advanced characterisation tools for 3D manufacturing.
Officer, David (CI)	Awarded ARC Discovery	DP150104532 (2015-17: \$394,700 Officer, D.L.; Wagner, P.; Wagner, K.K; Diamond, D.; Gordon, K.C.; Florea, L.) This project will explore the potential and limits of chemopropulsion and its use as a driving mechanism for cargo-carrying vehicles in fluids.
Schirmer, Katharina (Wallace ALF PhD)	2014 Bill Wheeler Student Award Winner	Receives \$2,000 of community-raised funds to travel to USA to present her work on developing 3D structures for nerve regeneration.

ACES member	Award/Prize	Commentary
Spiccia, Leone (CI)	Awarded ARC Discovery	DP 150102741 (2015-17: \$424,000 L Spiccia, C Hogan, P Barnard and J Jasieniak) for project Electrochemical Resonance Energy Transfer.
Spiccia, Leone (CI)	Awarded a Helmholtz Association International Fellowship	The fellowships are awarded by the Helmholtz Association, one of Germany's largest scientific organisations. In addition to receiving prize money valued at €20,000 each, each fellow is invited to conduct research at one or more Helmholtz Centres in Germany.
Spinks, Geoffrey and Moulton, Simon (CIs)	Part of the team awarded Grand Challenges Exploration Grant from Gates Foundation	The team (Robert Gorkin, Sina Nancy, Geoff Spinks, Simon Moulton, Chris Gilbey and Jason McArthur) were awarded \$100K to work on an idea for 12 months to produce a new generation of condoms using hydrogels and complementary expertise in team.
Wagner, Pawel (SRF)	Appointed Associate Visiting Professor Shinshu University, Japan	This six month appointment is to strengthen research collaborations in existing areas or research and to expand into new areas of carbon fibres, carbon dioxide reduction and water splitting.
Wallace, Gordon (CI)	Appointed Distinguished Visiting Professor Shinshu University, Japan	
Wallace, Gordon (CI)	Awarded an Honorary Doctorate in Chemical Engineering, Hanbat National University	
Wallace, Gordon (CI)	Appointed as a Distinguished Professor at University of Wollongong (2014-2019).	Has demonstrated outstanding research leadership and excellent scholarly performance, including significant personal and professional contributions to the University's capacity to achieve its cultural and strategic agenda.
Wang, Caiyun (SRF)	University of Wollongong 'AllIM for Gold' grant	2014: Robust conducting polymer nanowires anchored graphene aerogels for Mg-Air batteries, \$11,000

FINANCIAL STATEMENT

Statement of Operating Income and Expenditure for year ended 31 December 2014. The Centre opened on 30 June 2014.

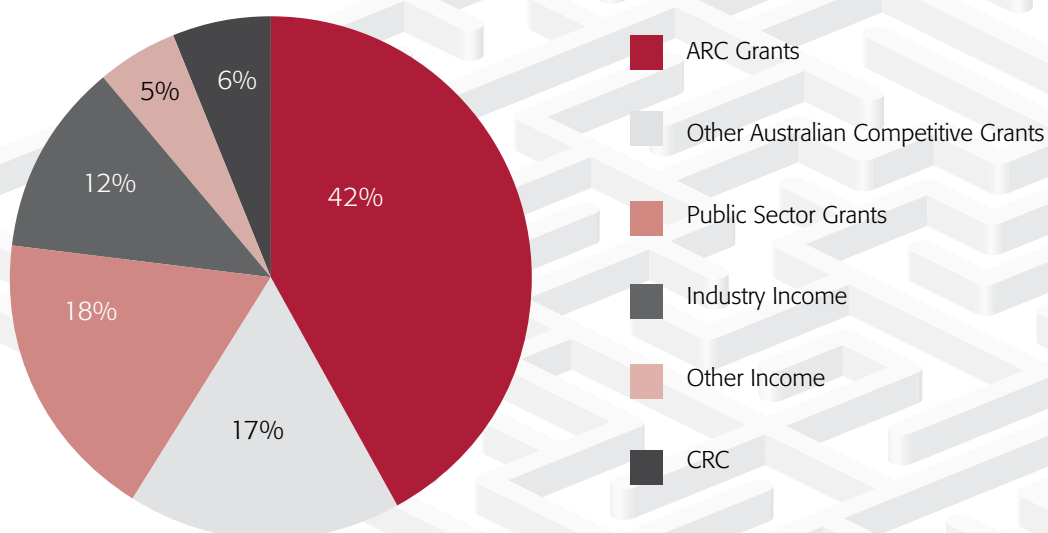
ACES member	KPI \$ Commitment 2014	* Income 2014 \$	Expenditure 2014 \$
ARC Centre Grant distributed as follows:			
University of Wollongong	-	1,905,721	360,719
Deakin University	-	698,122	209,636
Monash University	-	545,966	39,604
University of Tasmania	-	243,144	54,950
University of Melbourne	-	134,254	45,759
Australian National University	-	152,155	87,689
NSW State Government Dept I&I (RAAP)	-	500,000	6,544
Interest (RAAP grant)	-	7,012	0
University of Wollongong	966,672	257,425	257,425
Deakin University	330,000	104,795	90,593
Monash University	255,351	210,872	41,837
University of Tasmania	120,422	166,922	12,349
Australian National University	50,718	50,719	0
University of Melbourne	50,000	0	0

*Income \$ as per financial statement submitted to administrating organisation.

	KPI in-kind contribution 2014	Actual July-Dec 2014 \$
University of Wollongong	471,713	237,867
Deakin University	386,549	180,953
Monash University	143,297	62,848
University of Tasmania	120,500	50,436
University of Melbourne	358,814	100,836
Australian National University	88,000	51,500
Dublin City University	63,300	108,101
Warwick University	41,000	29,237
Freidrich Alexander University	40,000	25,000
Hanyang University	31,000	14,000
Yokohama University	30,500	16,000

OTHER DEVELOPMENTS

Key performance indicators	2014
<p>Other research income secured by Centre staff (research income from ARC grants, other Australian competitive grants, grants from the public sector, industry and CRCs and other research income separately)</p> <p>The target set for 2014 was \$250,000 of which</p> <ul style="list-style-type: none"> • 70% ARC grants • 20% other Australian competitive grants • 10% Industry /CRC 	<p>2014 income : \$9,085,796</p> <ul style="list-style-type: none"> – 42% ARC grants – 17% Other Australian Competitive grants – 18% Public Sector grants – 18% industry (12%)/ CRC (6%) – 5% Other
<p>Number of new organisations collaborating with, or involved in, the Centre</p> <p>2014 Target: 0</p>	None in 2014
<p>Comment on additional successful funding for new equipment or facilities</p>	<ul style="list-style-type: none"> – ANFF materials node, a partnership with ACES at UOW, purchased a Twin Screw Extruder \$179,450. – LEIF 2014 Prof Shi Xue Dou, Dr Germanas Peleckis; Prof Xiaolin Wang; Prof Roger Lewis; Prof Geoff Spinks (ACES CI) collaborating with UNSW, Uni Sydney, Deakin: \$420,000- New Generation Cryogen-Free Physical Property Measurement System.
<p>Additional laboratory space available at the various nodes</p>	No additional laboratory space during 2014.



ARC Grants	Other Australian Competitive Grants	Public Sector Grants	Industry Income	Other Income	CRC
\$3,850,984	\$1,539,069	\$1,659,013	\$1,069,764	\$470,709	\$496,257

Appendix 1: ACES Membership

Position within ACES	Name	FTE 2014
University of Wollongong		
Executive Research Director	Wallace, Gordon	70
Chief Investigator, Theme leader	Officer, David	40
Chief Investigator	Spinks, Geoffery	20
Chief Investigator, Theme leader	Alici, Gursel	20
Chief Investigator	Innis, Peter	20
Chief Investigator	Kapsa, Robert	30
Chief Investigator	in het Panhuis, Marc	20
Chief Investigator	Higgins, Michael	20
Chief Investigator, Theme Coordinator	Mozer, Attila	20
Chief Investigator	Crook, Jeremy	100
Chief Investigator	Moulton, Simon	20
Chief Operations Officer	Campbell, Toni	100
Senior Research Fellow	Gilmore, Kerry	100
Senior Research Fellow	Wang, Caiyun	100
Senior Research Fellow	Wagner, Pawel	50
Research Fellow	Tomaskovic-Crook, Eva	100
Research Fellow (ECR)	Jalili, Rouhallah	100
Research Fellow (ECR)	Mutlu, Rahim	100
Research Fellow (ECR)	Walker, Ashley	100
Research Fellow (ECR)	Holly Warren	100
Research Fellow (ECR)	Zhang, Binbin	100
Fabrication Technician	Thompson, Fletcher	100
Communications Officer	Foxon-Phillips, Natalie	80
Administration Assistant	House, Karla	100

Deakin University		
Deputy Director, Chief Investigator	Forsyth, Maria	40
Chief Investigator, Research Training Director	Pringle, Jennifer	60
Chief Investigator	Howlett, Patrick	30
Chief Investigator, Theme Coordinator	Wang, Xungai	20
Chief Investigator	Hancock, Linda	20
Research Fellow	Fang, Jian	100
Research Fellow (ECR)	Lazar, Manoj	50
Research Fellow	Pozo-Gonzalo, Cristina	100
Research Fellow (ECR)	Jonsson, Erlendar	100
Research Fellow (ECR)	Zhang, Yafei	40
Research Engineer	Xie, Zhigang (Armstrong)	100

Position within ACES	Name	FTE 2014
Monash University		
Chief Investigator, Theme leader	MacFarlane, Douglas	40
Chief Investigator	Spiccia, Leone	20
Chief Investigator	Zhang, Jie	20
Chief Investigator	Sparrow, Robert	20
Research Fellow (ECR) (start 2015)	Guo, Si-Xuan	100
Research Fellow (ECR)	Zhou, Fengling	100

University of Tasmania		
Chief Investigator, Theme leader	Dodds, Susan	15
Chief Investigator, Theme leader	Paull, Brett	30
Research Fellow (ECR)	Gilbert, Frederic	80
Research Fellow (ECR)	MacDonald, Niall	100

Australian National University		
Chief Investigator, Theme Coordinator	Coote, Michelle	40
Research Fellow	Haworth, Naomi	100

University of Melbourne		
Chief Investigator, Theme leader	Cook, Mark	15
Research Fellow (ECR)	Bourke, Justin	100

Dublin City University		
Partner Investigator	Diamond, Dermot	10

Friedrich Alexander University of Erlangen, Nuremberg		
Partner Investigator	Guldi, Dirk	15

Hanyang University		
Partner Investigator	Kim, Seon Jeong	10

University of Warwick		
Partner Investigator	Unwin, Patrick	5

Yokohama University		
Partner Investigator	Watanabe, Masayoshi	10

Appendix 2: ACES PhD Students

Name	Country of Origin	PhD Title	Scholarship
University of Wollongong			
Mehropouya, Fahimeh (start 2014)	Iran	Polymeric nanodispersion and growth factors	ACES ARC
Chen, Zhi (start 2015)	China	Bio inks for stem cells	ACES ARC
Puckert, Christina (start 2014)	Germany	SPM characterisation - understanding cell-material interactions using Bio-AFM	ACES ARC
Wright, Cody (start 2014)	USA	Electro-printing	ACES ARC
Barsby, Tom (start 2014)	UK	Electrical stimulation 3D structures – stem cell effects. Fabrication of a soft gel Neural Micro Tissue construct base prototype for modelling neural function studies in neural dysfunction.	ACES ARC
Deakin University			
Biddulph, Shannon (start 2014)	Australia	3D assembly/integration of electroactive components - focus on the integration and testing of O ₂ reduction electrocatalysts into 3D matrices	ACES ARC
Rao, Rosie (start December 2014)	China	3D nanostructured Electrolytes	ACES Deakin
Al-Masri, Danah (start 2014)	Jordan	3D electrocatalysts for thermal energy harvesting.	ACES Deakin
Begic, Srdan (start 2015)		Characterisation and modelling of 3D electrolytes & active metal interphases	ACES Top up
Monash University			
Hoogeveen, Dijon (start 2014)	New Zealand	Dye-Sensitized Photocathodes Catalysing Light Driven Reduction	ACES Monash
Li, Fengwang (start September 2014)	China	Photoelectrocatalytic and electrocatalytic reduction of CO ₂ using novel 2D materials	ACES- ARC (50%) ACES- Monash (50%)
Cabral, Diogo (start 2014)	Brazil	Novel redox couples for redox flow batteries	ACES Monash
University of Tasmania			
Milanova, Valentina (start 2015)		3D fabricated micro-fluidic manifolds – design and characterisation.	ACES UTas
Australian National University			
Lee, Richard	Singapore	Studying reactive oxygen chemistry and its role in oxidative degradation in materials and biology.	ACES (previously funded by grant rolled into the Centre)
Noble, Benjamin	Australia	Used a combination of theory and experiment to study stereoregulation in radical polymerisation.	ACES (previously funded by grant rolled into the Centre)

Appendix 3: ACES Visibility to Stakeholders

It is important to raise the Centre's visibility outside the academic sector, with the aim to (a) showcase ACES research skills, technologies and facilities as well as to (b) understand how ACES can better facilitate pathways and connections to maximise their research impact.

The end goal for undertaking the meetings listed below is to work towards:

- (i) ACES being recognised as an authority on electromaterials science
- (ii) to develop more strategic research alliances with industry partners to increase research funding and licensing opportunities
- (iii) to identify funding opportunities to advance ACES technologies through the R&D pipeline to become investor ready
- (iv) to identify strategic alliances to build upon and strengthen ACES research capacity and capabilities
- (v) to negotiate collaborative and material exchange agreements to further advance the scientific discoveries.

Below is a list of meetings for 2014 (at ACES/UOW unless otherwise stated) that are additional to those written about in the main body of this report.

1. Pia Winberg, Shoalhaven Marine & Freshwater Centre, University of Wollongong, Shoalhaven Campus, 6 January.
2. Russell Jones, GSK, ACES IAC member, 7 January.
3. Dr Malhotra & Dr SSV Ramakumar from Indian Oil, March at ACES/Deakin.
4. Mr. Patrick Carey, Managing Director CPE Systems, March at ACES/Deakin.
5. Dr Serguei Zavorine & Dr Michael Moser, Cytec, 30 April – 1 March 14 at ACES/Deakin.
6. Jennifer Fawcett & Ross Anderson, Cook Medical, 2 June.
7. Michael deSouza & Neil Sharwood, Australian 3D Manufacturing Association 6 June.
8. Ed Howell, Amblyoptica, 27 June.
9. Dr. Myung Hwan Kim (Executive Vice President) and Mr. Kim Jong Hee (Senior manager/ Technology Planning Team), Battery Research & Development/Energy Solution Company, LG Chem, Daejeon, Korea at ACES/Deakin 21 July.
10. John Tuckwell Senior Adviser, Research & Innovation, Trade, Economics and Agriculture, Delegation of the European Union to Australia, 28 July.
11. Lee Anderson, Neil Wilson, David Forbes, Johnathon Choi from Romar, 28 July.
12. Conroy Bradley, Caitlin Dubler, Matt Wilson, The Third Dimension Popup Project, Mini- Maker Farie at Powerhouse museum, Sydney, 29 July.
13. Angus Amour, CEDA, 6 August.
14. Dr Derek Zwart from Essential Oils of Tasmania visited CI Prof Brett Paull on 14 August.
15. Dr Gabrielle McMullin, Vascular Surgeon, South Sydney Vascular Centre, 16 August.
16. Dr Allan Rennie, Director Lancaster Product Development Unit, Lancaster University (UK) for 2 days 25-26 August.
17. Prof Stephen Worthley & Dr Jurgen Michaelis, Biolnnovations SA, 29 August.
18. Mr Michel Abeysekera, CEO Supacore, 4 September.
19. Brendan Swifte, Managing Director – Geofabrics, 4 September.
20. Ms Glenys Beauchamp, Secretary of the Commonwealth Department of Industry, 11 September.
21. Mr Aapo Skorulis, NSW State Manager, AusIndustry - Business Services, 11 September.
22. Stephanie Moroz, Chief Executive Officer, Nano-Nouvelle Pty Ltd, 15 September.
23. Angelique Hutchison & Matthew Connell, Curators from Powerhouse Museum, 23 September.
24. Ben & Heike Roberts, Modfab Pty Ltd, plus a group of local teachers, for 3D printing pilot program for Illawarra schools & TAFE, 23 September.
25. Romar engineering, ACES/IPRI site visit October.
26. Delgates from the AusBiotech (NSW BioBeers & Bubbles Event) at ACES/UOW, 9 October.
27. Jessica Fitzsimon, Category Manager Essentials, 2XU Pty Ltd, 30 October.
28. Dr Darren Jones from ThermoFisher Scientific visited CI Prof Brett Paull on 14 November for discussion of collaboration and research support in area of separation technologies.
29. Amperex Tehcnology Limited, Nigde, China visited Deakin ACES node to discuss battery technology, 16 November.
30. Yosse Goldberg, Director Coral Sea Petroleum, 17 November.
31. Tim Beresford, Executive Director Investment, Austrade, 26 November.
32. Dylan Barker, Acting Coordinator Questacon Smart Skills, 1 December.
33. Randall Wood, Director Smith and Nasht, 8 December.
34. Dr John Gerofi , Managing Director Enersol, 9 December.
35. Delegation of 9 senior people from PetroChina, China visited 9 December.
36. Chris Baker, Dermatologist (SVHM), 19 December.

Appendix 4: ACES Media Summaries

168 web stories for ACES Jan-June 2014 and a further 83 July-Dec 2014 (listed Appendix 3Table 1).

There was 19 print stories for ACES Jan-June 2014 and a further 23 stories July-Dec 2014 (listed Appendix 3Table 2).

10 ACES Radio interviews Jan – June 2014 featuring ACES work or the researchers and 5 July – Dec 2014 (listed Appendix 3Table 3).

TV appearances featuring ACES researchers or their work numbered 2 Jan-June and 4 July-Dec 2014 (listed appendix 3 Table 4).

Table 1: ACES Web Media Summary 2014

Date	Source	Description	Journalist	Page#/web link
3 Jan 14	Financial Review	It's time for politicians to get technical	Paul Smith	http://www.afr.com/p/technology/it_time_for_politicians_to_get_technical_lvXSciGjk9dkjmmRh03lVL
10 Jan 14	labonline.com.au	3D electromaterials centre to be established- The ARC Centre of Excellence for Electromaterials Science (ACES) has received \$25 million to further develop work on smart nanomaterials by creating 3D devices with capabilities more advanced than those of their 2D counterparts.		http://www.labonline.com.au/news/65070-3d-electromaterials-centre-to-be-established
11 Jan 14	SBS News	Surgeons use 3D printers, seaweed to repair damaged bones. Interviews with Prof Gordon Wallace and Prof Peter Choong about new BioPen.	Rhiannon Elston	http://www.sbs.com.au/news/article/2014/01/11/surgeons-use-3d-printers-seaweed-repair-damaged-bones
15 Jan 14	Materials Research Society	Researchers Fabricate Powerful, Multifunctional Torsional Micro-Muscles from Vanadium Dioxide	Joseph Bennington-Castro	http://www.materials360online.com/newsDetails/43845
16 Jan 14	Fast Company	A Handheld 3-D Printer Lets Surgeons Draw New Cells. Biology works in 3-D, so why not your doctor? The BioPen could make it easier for doctors to repair tissue or bones in cases of injury or even aging.		http://www.fastcoexist.com/3024941/a-handheld-3-d-printer-lets-surgeons-draw-new-cells
16 Jan 14	Medical Design Technology	Making Biomaterials from Seaweed for Implants - University of Wollongong researchers are growing jobs and materials from the sea for medical treatments through a project in the Shoalhaven area to farm and process seaweeds that will then be used for biomaterials such as cell carriers in medical implants.	University of Wollongong	http://www.mdtmag.com/news/2014/01/making-biomaterials-seaweed-implants
18 Jan 14	SMH Good Weekend magazine	Graphene, material of the future. Feature article about development and applications for graphene including interview with Prof Gordon Wallace	Lisa Clausen	http://www.smh.com.au/technology/material-of-the-future-20140113-30pbb.html
20 Jan 14	The Sydney Morning Herald Technology	Multitalented graphene is wowing scientists the world over. Lisa Clausen reports on those at the forefront of game-changing Australian research.		http://www.smh.com.au/technology/material-of-the-future-20140119-30pbb.html
23 Jan 14	Australia Unlimited	New advances in research on the use of smart nano-materials in biotech and clean energy will be made possible by a \$25 million funding boost from the Australian Government.		http://www.austrade.gov.au/invest/investor-updates/2014/australian-government-injects-25-million-into-nano-material-research

Date	Source	Description	Journalist	Page#/web link
27 Jan 14	Stories by Williams	After filling the damaged bone with the cells – mixed with a biodegradable seaweed extract to hold everything together- an ultraviolet light on the pen sets the gel in place. After the cells are in place, they multiply and eventually form functioning tissue. The device can also be used to apply growth factors to stimulate cell growth and other drugs (like cortisone) directly to where they are needed.	storiesbywilliams	http://storiesbywilliams.com/2014/01/27/the-future-is-here-handheld-3-d-bioprinter/
27 Jan 14	NanotechPortal	The most powerful artificial muscles from carbon nanotubes	Jobin George Maxin	http://nanotechportal.blogspot.com.au/2014/01/the-most-powerful-artificial-muscles.html
28 Jan 14	The Conversation	Graphene can pave the way for Australian manufacturing	Gordon Wallace and David Officer	http://theconversation.com/graphene-can-pave-the-way-for-australian-manufacturing-21993
17 Feb 14	Silicon Investor	If the rising price of oil is hurting your budget, don't worry. Scientists in Australia have found a way to turn seawater into fuel. Lester Ranby has more in this Reuters report.	donpat	http://www.siliconinvestor.com/readmsg.aspx?msgid=29393559
20 Feb 14	ABC News	Farewell to the Port Kembla copper stack, an industrial icon. Prof Gordon Wallace interviewed about new electromaterials.	Nick McLaren	http://www.abc.net.au/news/2014-02-20/ode-to-the-stack/5271150
20 Feb 14	Digital Journal	Op-Ed: Fishing line turned into cheap, powerful artificial muscle. Artificial muscles have been created by Australian scientists using spun fishing line. The very high tensile fishing line can act as "muscles", powered by heat.	Paul Wallis	http://www.digitaljournal.com/tech/science/op-ed-fishing-line-turned-into-cheap-powerful-artificial-muscle/article/372116
20 Feb 14	Australian Research Council	Fishing line artificial muscles. ACES press release.	Nat Foxon Phillips	http://www.arc.gov.au/media/profiles.htm
21 Feb 14	ABC Science Online	Spun fishing line turned into muscle	Dani Cooper	http://www.abc.net.au/science/articles/2014/02/21/3948996.htm
21 Feb 14	The Conversation	Fishing for artificial muscles nets a very simple solution	Geoff Spinks	https://theconversation.com/fishing-for-artificial-muscles-nets-a-very-simple-solution-23417
21 Feb 14	Science World Report	Posted Prof Spinks' piece in the Conversation	Geoff Spinks	http://www.scienceworldreport.com/articles/13036/20140220/fishing-for-artificial-muscles-nets-a-very-simple-solution.htm
21 Feb 14	Digital Journal	Fishing line turned into cheap, powerful artificial muscle	Paul Wallis	http://www.digitaljournal.com/tech/science/op-ed-fishing-line-turned-into-cheap-powerful-artificial-muscle/article/372116
21 Feb 14	Slashdot	Fishing line as artificial muscle		http://science.slashdot.org/story/14/02/21/0336251/fishing-line-as-artificial-muscle
21 Feb 14	Hispanic Business.com	Scientists hook a big one with ordinary fishing line		http://www.hispanicbusiness.com/2014/2/21/scientists_hook_a_big_one_with.htm

Date	Source	Description	Journalist	Page#/web link
21 Feb 14	ABC PM	Fishing line twisted into artificial muscle	Ashley Hall	http://www.abc.net.au/news/2014-02-21/fishing-line-twisted-into-artificial-muscle/5276574
21 Feb 14	Science Magazine	Artificial Muscles from Fishing Line and Sewing Thread		http://www.sciencemagazinedigital.org/sciencemagazine/21_february_2014/?pg=70#pg70
21 Feb 14	Science Blog	'Researchers create powerful muscles from fishing line, thread		http://scienceblog.com/70601/researchers-create-powerful-muscles-from-fishing-line-thread/#JwPfZJRy8WwLD0vs.97
22 Feb 14	freewnewspos.com	Artificial muscles made with fishing line can lift 100 times more weight than human muscles		http://www.freewnewspos.com/news/article-turkey/c/1336898/oggi/artificial-muscles-made-with-fishing-line-can-lift-100-times-more-weight-than-human-muscles-video
22 Feb 14	International Business Times	Artificial muscles made with fishing line can lift 100 times more weight than human muscles	Charles Poladian	http://www.ibtimes.com/artificial-muscles-made-fishing-line-can-lift-100-times-more-weight-human-muscles-video-1557320
22 Feb 14	Cosmos	Fishing line proves a smart yarn		http://www.cosmosmagazine.com/features/editors-choice-lasers-kestrels-smart-yarn-elephants/
25 Feb 14	Concrete Online - The University of East Anglia's official student newspaper	Flexing Fishing Lines- Materials scientists have shown that powerful artificial muscles can be made cheaply using nylon fibres that are commonly used to make fishing lines and sewing thread.	Mabon Elis	http://www.concrete-online.co.uk/flexing-fishing-lines/
25 Feb 14	Clips - Centre for layered Polymermic Systems	Fishing Line Muscles – Polymer Fibers with Shape-Memory Mimic Muscle Fibers - Researchers are using the structure of polymer fibers and their shape-memory characteristics to mimic muscle fibers.		http://www.stc-clips.org/fishing-line-muscles-polymer-fibers-with-shape-memory-mimic-muscle-fibers/
28 Feb 14	Australian Research Council	Fishing line flexes its muscles - It might be difficult to believe that something as ordinary and inexpensive as the humble fishing line can be used to produce "muscles" with super-human strength.		http://www.arc.gov.au/media/feature_articles/mar14_Fishing_line.html
03 Mar 14	Science World Report	Power Up! Samsung Galaxy S5's Battery Boost And More	Ara Sarafian	http://www.scienceworldreport.com/articles/13253/20140303/power-up-samsung-galaxy-s5s-battery-boost-and-more.htm
05 Mar 14	The University of Sydney	Print your own Robot and other Awesome Adventures in 3D printing	Natalie Foxon	http://sydney.edu.au/science/outreach/inspiring/news/3d-print-robot.shtml
10 Mar 14	Singularity HUB	Superstrong artificial muscles developed from fishing line and sewing thread - We tend to dream of a future enabled by miraculous materials—nanoscale honeycomb lattices of strong, ultralight superconducting metals. Carbon nanotubes and graphene come to mind. Fishing line and sewing thread? Not so much.	Jason Dorrier	http://singularityhub.com/2014/03/10/superstrong-artificial-muscles-developed-from-fishing-line-and-sewing-thread/

Date	Source	Description	Journalist	Page#/web link
10 Mar 14	MikroNano.org	Smart Textiles with Graphene Oxide	Mikronano	http://mikronano.org/2014/03/smart-textiles-with-graphene-oxide/#.U-sFFvnoTVE
26 Mar 14	NCI	NCI researchers among Australia Best-Michelle Coote (ACES CI) listed		http://nci.org.au/2014/03/26/nci-researchers-among-australias-best/
11 Apr 14	BioNews	FFF BioPen Heralds Seaweed Bioprinting Industry		http://biofabris.com.br/en/fff-biopren-heralds-seaweed-bioprinting-industry/
17 Apr 14	Spraybase	Electrospinning: My first Experience. Mentions the 5 months spent at IPRI/ACES learning to spin fibres.	Gillian Hendy	http://www.spraybase.com/blog/2014/4/17/electrospinning-my-first-experience
3 May 14	International Business Times	Australian Scientists on the Verge of Medical Breakthrough: Reproducing Body Parts Through 3D Printing. By using 3D printing to duplicate a person's own cells, human body parts can be constructed.	Frances Samson	http://au.ibtimes.com/articles/464214/20130503/3d-printing-living-tissues-australian-scientists-breakthrough.htm#.UB4w_noTVE
9 May 14	QUT News	Aussie universities leading the way in 3D printed body part technology	Joseph Cooney	http://www.qutnews.com/2014/05/09/aussie-universities-leading-the-way-in-3d-printed-body-part-technology/#.VlfGQaO4amQ
9 May 14	3Dprint.com	3D bioprinting master's degree offered for first time ever	Randall Desmond	http://3dprint.com/3461/biofabrication-masters-degree/
9 May 14	Noodles	Mastering better health solutions using 3D-printing techniques.		
Prof Wallace quoted in ACES/ IPRI press release.		http://www.noodles.com/viewNoodl/23048548/university-of-wollongong/mastering-better-health-solutions-using-3d-printing-technique#sthash.jYZYaimm.dpuf		
9 May 14	Business Insider Australia	By using 3D printing to duplicate a person's own cells, human body parts can be constructed. That is the belief of some Australian scientists who are now on the verge of completing such ambitious medical breakthrough.	Chris Pash	http://www.businessinsider.com.au/australia-is-getting-the-worlds-first-masters-degree-in-biofabrication-the-3d-printing-of-body-parts-2014-5
9 May 14	Health Canal	Master 3D Printers to grow replacement body parts: breast, bone and cartilage		http://www.healthcanal.com/medical-breakthroughs/50642-master-3d-printers-to-grow-replacement-body-parts-breast-bone-and-cartilage.html
9 May 14	Medical Design Technology	Photos of the Day: Body Parts 3D Printed by Masters Photo of Gordon Wallace and Johnson Chung 3D printing	Queensland University of Technology	http://www.mdtechmag.com/news/2014/05/photos-day-body-parts-3d-printed-masters
9 May 14	Illawarra Mercury	UOW Program uses 3D Printing to regrow human tissue	Angela Thompson	http://www.illawarramercury.com.au/story/2272006/uow-program-uses-3d-printing-to-regrow-human-tissue/
9 May 14	QUT Queensland University of Technology	Master 3D printers to grow replacement body parts: breast, bone and cartilage		https://www.qut.edu.au/news/news?news-id=72257 http://www.news.qut.edu.au/cgi-bin/WebObjects/News.woa/wa/goNewsPage?newsEventID=72257

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9 May 14	3Ders	Master course of 3D bioprinting human body parts launched		http://www.3ders.org/articles/20140509-master-course-of-3d-bio-printing-human-body-parts-launched.html
10 May 14	Medical Design Technology	Master 3D Printers to grow replacement body parts		http://www.mdtmag.com/news/2014/05/master-3d-printers-grow-replacement-body-parts
10 May 14	ABC News	Seaweed extracts used to help reproduce human bone, repair tissue	Sean Murphy	http://www.abc.net.au/news/2014-05-11/seaweed-used-to-reproduce-bone-and-human-tissue/5441612
11 May 14	PrimeTV	Seaweed extracts used to help reproduce human bone, repair tissue		Seaweed extracts used to help reproduce human bone, repair tissue
11 May 14	ABC News	Australian researchers have successfully used seaweed to help regenerate bone and damaged human tissue in medical trials which could lead to new treatments for serious diseases such as cancer and schizophrenia.	Sean Murphy	http://www.sciencemaginedigital.org/sciencemagazine/21_february_2014/?pg=70#pg70
11 May 14	Business Insider Australia	Australian Researchers May Have Found A Way To Regenerate Body Parts, And It Involves Seaweed	Sarah Kimmorley	http://www.businessinsider.com.au/australian-researchers-may-have-found-a-way-to-regenerate-body-parts-and-it-involves-seaweed-2014-5
12 May 14	Ferret	Australian universities lead world with medical 3D printing course launch	Brent Balinski	http://www.ferret.com.au/articles/news/australian-universities-lead-world-with-medical-3d-printing-course-launch-n2514222#HwZj8dpSgr4zBFqz.99
12 May 14	The New Daily	Australian researchers use seaweed extracts to regenerate human bone and tissue.	Susannah Guthrie	http://thenewdaily.com.au/news/2014/05/12/seaweed-used-reproduce-human-bone/
15 May 14	Gizmodo	Australian researchers may have found a way to regenerate body parts, and it involves seaweed	Sarah Kimmorley	http://www.gizmodo.com.au/2014/05/australian-researchers-may-have-found-a-way-to-regenerate-body-parts-and-it-involves-seaweed/
15 May 14	Silicon Republic, Ireland	Just press Print - 3D bioprinting enables wearable and medical innovations - A conference at Dublin City University (DCU) is highlighting how 3D 'bioprinting' enables innovation in wearable and medical	Claire O'Connell	http://www.siliconrepublic.com/innovation/item/36897-just-press-print-3d/
16 May 14	Australian Life Scientist	Biofabrication course a world first		http://lifescientist.com.au/content/life-sciences/news/biofabrication-course-a-world-first-1154970291
16 May 14	Science Gallery	Printing parts for Bodies, with Gordon G. Wallace		https://dublin.sciencegallery.com/events/2014/05/printingpartsbodiesgordongwallace
16 May 14	The Australian	Absolutely bio-fabulous; 'bioprinting' to regrow damaged body parts	Natasha Bita	http://www.theaustralian.com.au/news/health-science/absolutely-biofabulous-bioprinting-to-regrow-damaged-body-parts/story-e6frg8y6-1226919277874?nk=1e5e5415a46096827c3eec43d0f9de0b

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16 May 14	3D Bioprinting Conference	The world's first master's degree in 3D bioprinting	Kim van der Sangen	http://www.3dbioprintingconference.com/3d-bioprinting/the-worlds-first-masters-degree-in-3d-bioprinting/
20 May 14	Seagreens	Seaweed extract could repair damaged tissue, treat diseases		http://seagreensonline.com/seaweed-extract-could-repair-damaged-tissue-treat-diseases/
21 May 14	Investor Intel	Want to fix that liver or cartilage? Just turn on the printer.	Robin Bromby	http://investorintel.com/3d-print-intel/want-fix-liver-cartilage-just-turn-printer/
21 May 14	labonline.com.au	Heating block systems support synthesis research - Monash University's School of Chemistry has invested in a range of Asynt DrySyn Multi heating block systems to support its groundbreaking research in photovoltaics, water splitting and nanoimaging.		http://www.labonline.com.au/case_studies/67589-Heating-block-systems-support-synthesis-research
26 May 14	AsianScientist	3D Printed Seaweed For Medical Implants- Seaweed-derived gels could be a new source of biocompatible material for medical implants that also has a positive impact on the environment. Researchers from the University of Wollongong hope to combine industrial seaweed farming and 3D printing to make biocompatible medical implants.		http://www.asianscientist.com/in-the-lab/3d-printed-seaweed-medical-implants-2014/
29 May 14	think3D	3D printing in Australia, the island continent		http://www.think3d.in/3d-printing-in-australia-the-island-continent/
3 June 14	Bill & Melinda Gates Foundation	The Gates Foundation's Grand Challenges Explorations initiative rewards bold ideas to tackle global health and development challenges. Robin Gorkin IPRI received funding to develop male condoms from ACES hydrogel materials.		http://www.gatesfoundation.org/Media-Center/Press-Releases/2014/06/GCE-Round-12
4 June 14	The Daily Telegraph	Australian researchers excited over \$100,000 grant to develop next generation condom that 'looks and feels' like skin	Leigh van Den Broeke	http://www.dailytelegraph.com.au/news/nsw/australian-researchers-excited-over-100000-grant-to-develop-next-generation-condom-that-looks-and-feels-like-skin/story-fni0cx12-1226943289266?nk=3d722db2b972ff4473088e846cb0bdfc
4 June 14	University of Wollongong	UOW researchers win Gates Foundation grant to develop next generation condoms		http://www.uow.edu.au/research/news/UOW172794
4 June 13	Illawarra Mercury	Next generation condom gives latex the flick: UOW research	Emma Spillett	http://www.illawarramercury.com.au/story/2329030/next-generation-condom-gives-latex-the-flick-uow-research/
4 June 13	Business Insider Australia	Bill Gates Gave An Australian University \$100,000 To Make A Condom That Feels Nicer On Men- Researchers at the University of Wollongong have been given \$100,000 from the Bill & Melinda Gates Foundation to build a better condom.	Simon Thomson	http://english.sina.com/technology/2014/0604/706310.html

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4 June 14	Xinhuanet	Aussie engineers tout condom that feels like skin	Xinhua	No link
5 June 14	702 ABC Sydney	Gordon interviewed by James Valentine about 3D BioPrinting and 3D Print Sydney	James valentine	http://www.huffingtonpost.com/2014/06/05/bill-gates-condom_n_5447065.html
5 June 14	The Huffington Post	Sensational! Bill Gates Funds Skin-Like Condom That Could Actually Make Sex Feel Better	Ron Dicker	http://campusmorningmail.com.au/ua-attacks-fred-hilmer-returns-fire/
5 June 14	Campus Morning Mail	Condomania	Stephen Matchett	http://www.lastampa.it/2014/06/05/scienza/benessere/il-nuovo-preservativo-come-una-seconda-pelle-1eglu9go125p9aohEjcsO/pagina.html
5 June 14	La Stampa (Italy)	Il nuovo preservativo è come una seconda pelle		http://english.sina.com/technology/2014/0604/706310.html
5 June 14	Australia News 24 (Blog)	Australian-based scientist given \$100000 by Bill Gates to develop 'next ... - Daily Mail	Ryan Lipman	http://australiannews24.blogspot.com.au/2014/06/australian-based-scientist-given-100000_5.html
5 June 14	RT	Get it on! Scientists turned on by next-generation 'skin-like' condoms		http://rt.com/news/163740-gates-next-generation-condoms/
5 June 14	Gizmodo India	Bill Gates Puts In \$100,000 In A Project That Is Developing Skin-Like Condom	Gizmodo India Bureau	http://www.gizmodo.in/indiamodo/Bill-Gates-Puts-In-100000-In-A-Project-That-Is-Developing-Skin-like-Condom/articleshow/36110155.cms
5 June 14	CondomWorld.it	Il Preservativo del Futuro		http://www.condomworld.it/blog/7-il-preservativo-del-futuro.aspx
5 June 14	The Huffington Post	Sensational! Bill Gates Funds Skin-Like Condom That Could Actually Make Sex Feel Better	Ron Dicker	http://timeli.info/item/1813447/Huff_Post_Healthy_Living/Sensational_Bill_Gates_Funds_Skin_Like_Condom_That_Could_Actually_Make_Sex_Feel_Better
5 June 14	News Reader	Get it on Scientists turned on by next-generation skin-like condoms		http://web.shafaqna.com/international/rt/item/12145-get-it-on-scientists-turned-on-by-next-generation-skin-like-condoms.html
5 June 14	infospecial.net (Indoniasia)	Bill Gates Danai Rp 1,2 Miliar untuk Kondom Masa Depan	Kamis	http://m.infospesial.net/35041/bill-gates-danai-rp-1-2-miliar-untuk-kondom-masa-depan/
5 June 14	International Business Times	Aussie Researcher Gets \$100,000 Award from Gates Foundation to Develop Condom That Feels Like Skin	Vittorio Hernandez	http://au.ibtimes.com/articles/554806/20140605/aussie-researcher-gets-100-000-award-gates.htm#.VAaavfnoTVE
5 June 14	tekno.com (Vietnam)	Bill Gates Danai Penelitian Kondom Gaya Baru	Kamis	http://www.tempo.co/read/news/2014/06/05/061582702/Bill-Gates-Danai-Penelitian-Kondom-Gaya-Baru
6 June 14	Daily Mail Australia	Australian-based scientist given \$100,000 by Bill Gates to develop 'next-generation condom'	Ryan Lipman	http://www.dailymail.co.uk/news/article-2648333/Scientist-given-100-000-Bill-Gates-develop-condom.html

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6 June 14	Gizmodo	Bill Gates Gave An Australian University \$100,000 To Make A Condom That Feels Nicer On Men- Researchers at the University of Wollongong have been given \$100,000 from the Bill & Melinda Gates Foundation to build a better condom.	Simon Thomson	http://www.gizmodo.com.au/2014/06/bill-gates-gave-an-australian-university-100000-to-make-a-condom-that-feels-nicer-on-men/
6 June 14	Medical Daily	New Condom Made Of Hydro-Gel And 'Feels Like Skin' Is Being Developed: Another Design Funded By The Gates Foundation	Sabrina Bachai	http://www.medicaldaily.com/new-condom-made-hydro-gel-and-feels-skin-being-developed-another-design-funded-gates-foundation
6 June 14	WinBeta	Bill Gates' foundation funds skin-like condoms to fight AIDS	Moin Anjum	http://www.winbeta.org/news/bill-gates-foundation-funds-skin-condoms-fight-aids
6 June 14	OMG Ghana	Bill Gates is funding development for a skin-like condom that might actually make sex even better	OMGGhanaStaff	http://omgghana.com/bill-gates-funding-development-skin-like-condom-might-actually-make-sex-even-better/
6 June 14	MTV	So This Is What Condoms Might Look Like In The Future	Marty Beckerman	http://www.mtv.com/news/1840365/bill-gates-new-condom/
6 June 14	APD Asia Pacific Daily	Aussie engineers tout condom that feels like skin		http://en.apdnews.com/news/94959.html
6 June 14	Inquisitor	Bill Gates funds new condom research [Video]		http://www.inquisitr.com/1285237/bill-gates-funds-new-condom-research-video/
6 June 14	index (Hungary)	Bill Gates story		http://index.hu/tudomany/2014/06/06/bill_gates_elvezetesebb_ovszer_fejlesztet_tamogatja/
6 June 14	The Independent (UK)	Bill Gates funding 'next generation' of skin-like super thin condoms to fight AIDS - Bill and Melinda Gates Foundation help fund development of a new generation of condoms using hydrogels	Maria Tadeo	http://www.independent.co.uk/news/business/news/bill-gates-funding-next-generation-of-skinlike-super-thin-condoms-to-fight-aids-9499427.html
7 June 14	SceneStr.	Better sex with a condom? Bill Gates backs it up	Majella McMahon	http://www.scenestr.com.au/lifestyle/lifestyle-all/better-sex-with-a-condom-bill-gates-backs-it-up
7 June 14	The Times of India	Skin-like condoms for better sex- Bill Gates, the world's richest man, has awarded an Australian university \$100,000 in funding to develop skin-like condoms that can make men "want to wear one."	Maria Tadeo	http://timesofindia.indiatimes.com/home/science/Skin-like-condoms-for-better-sex/articleshow/36174981.cms
7 June 14	datanews-knack.be (Belgium)	Bill Gates investeert 100.000 dollar in nieuwe generatie condoms	Kevin Van der Auwera	http://datanews.knack.be/ict/nieuws/bill-gates-investeert-100-000-dollar-in-nieuwe-generatie-condooms/article-4000650419093.htm
7 June 14	TopNews (USA)	Bill Gates for skin-like condoms	Prakash Sharma	http://topnews.us/content/261797-bill-gates-skin-condoms
8 June 14	International Business Times	Bill Gates Funds for Developing Condom that Feels Like Skin [VIDEO]	Parismita Goswami	http://www.ibtimes.co.in/bill-gates-funds-developing-condom-that-feels-like-skin-video-601810

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8 June 14	China.org.cn	Chinese scientists to develop world's thinnest condom	Li Jingrong	http://www.china.org.cn/china/2014-07/08/content_32891409.htm
9 June 14	North County Leader	Science gets a boost at Donabate Community College	North County Leader	http://www.northcountyleader.ie/index.php/schools/15765-science-gets-a-boost-at-donabate-community-college.html
9 June 14	The Verge	Next-generation condoms might feel like human skin- Researchers hoping to replace latex with hydrogel	Cassandra Khaw	http://www.theverge.com/2014/6/9/5792818/hydrogel-condom-research-university-of-wollongong
9 June 14	Nairobi Wire	Bill Gates Gives Scientists \$100,000 To Develop Next Generation Condom	Ken	http://nairobewire.com/2014/06/bill-gates-gives-scientists-sh100000-develop-next-generation-condom.html?utm_source=rss&utm_medium=rss&utm_campaign=bill-gates-gives-scientists-sh100000-develop-next-generation-condom
9 June 14	TrendHunter Tech	Human Skin-Like Contraceptives- The Hydrogel Condom is the Next Generation in Pleasure & Protection	Meghan Young	http://www.trendhunter.com/trends/hydrogel-condom
9 June 14	Before it's news	New Condoms That Feel Like Human Skin Could Save Lives	Peter Z. Sheer	http://beforeitsnews.com/alternative/2014/06/new-condoms-that-feel-like-human-skin-could-save-lives-2971844.html
9 June 14	WRRV	Bill Gates is improving your sex life	Deune	http://wrrv.com/bill-gates-is-improving-your-sex-life/
9 June 14	Hands on Today	NEXT-GENERATION CONDOMS MIGHT FEEL LIKE HUMAN SKIN	Handyman	http://www.handson.today/Nextgeneration_condoms_might_feel_like_human_skin/
9 June 14	truthdig	New Condoms That Feel Like Human Skin Could Save Lives	Peter Z. Sheer	http://www.truthdig.com/eartothe-ground/item/new-condoms-that-feel-like-human-skin-could-save-lives_20140609
9 June 14	publimetr (Mexico)	FOTOS: Conozcan los impresionantes condones del futuro- Científicos de la Universidad de Wollongong, Australia, trabajan en un proyecto para sustituir los condones de látex por condones de hidrogel, que aportarían una mayor sensibilidad.	Cesar Acosta	http://www.publmetro.com.mx/vida/fotos-conozcan-los-impresionantes-condones-del-futuro/XeSnfiljNFsOlqPRNe8Arq0JDRgwA/
9 June 14	BN Saude (Portugal)	Nova camisinha pode ser parecida com pele humana	Segunda	http://www.bahianoticias.com.br/saude/noticia/11865-nova-camisinha-pode-ser-parecida-com-pele-humana.html
9 June 14	terra (Portugal)	Próxima geração da camisinha pode ser similar a pele humana		http://tecnologia.terra.com.br/proxima-geracao-da-camisinha-pode-ser-similar-a-pele-humana,4574c07a4e086410VgnVCM3000009af154dORCRD.html
9 June 14	COFELLOW	Bill & Melinda Gates Foundation sponsors next-generation condoms that feels like human skin	Princeton	http://www.cofellow.com/noteworthy/bill-melinda-gates-foundation-sponsors-next-generation-condoms-that-feels-like-human-skin/

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9 June 14	BWN BizWatchNigeria	Next-Gen Condoms Might Feel Just Like Human Skin		http://bizwatchnigeria.ng/next-gen-condoms-feel-human-skin/
10 June 14	3D Printing from scratch	Seaweed Can Be Used For 3D Printed Medical Implants		http://3dprintingfromscratch.com/2014/06/seaweed-can-be-used-for-3d-printed-medical-implants/
10 June 14	Salon	Scientists creating skin-like, pleasurable condoms out of hydrogels- Scientific innovation plus sexual health: These condoms could be tough, safe and still feel great	Sarah Gray	http://www.salon.com/2014/06/09/scientists_creating/
10 June 14	psfk Technology	Future condoms mimic the feeling of human skin - Researchers are working on replacing latex with a material called "tough hydrogel."	Leah Gonzalez	http://www.psfk.com/2014/06/next-generation-condom.html#!bKUGHC
10 June 14	ABC 7News Denver	New condoms 'more like human skin'- Hydrogel condoms nix rubber, may be biodegradable	Clint Davis	http://www.thedenverchannel.com/news/new-condoms-more-like-human-skin
10 June 14	Medical Legends	SKIN LIKE 'NEXT GENERATION' CONDOMS FOR BETTER SEX		http://medicallegends.blogspot.com.au/2014/06/skin-like-next-generation-condoms-for.html
10 June 14	WATCHLOUD	Next Generation Condom Made Out of Skin-Like Material, Feels Like Nothing's There	Kymmi Ceelive	http://watchloud.com/next-generation-condoms/
10 June 14	Go News (Vietnam)	Bao cao su the he moi se khong khien ban mat cam giac	Tinh te	http://news.go.vn/cong-nghe/tin-1791783/bao-cao-su-the-he-moi-se-khong-khien-ban-mat-cam-giac.htm
10 June 14	Levif.be (France)	Bill Gates investit 100.000 dollars dans une nouvelle génération de préservatifs		http://datanews.levif.be/ict/actualite/bill-gates-investit-100-000-dollars-dans-une-nouvelle-generation-de-preservatifs/article-4000653275684.htm
10 June 14	BaoMoi.com (Vietnam)	Bao cao su the he moi se khong khien ban mat cam giac	Tinh te	http://www.baomoi.com/Bao-cao-su-the-he-moi-se-khong-khien-ban-mat-cam-giac/82/14027734.epi
11 June 14	Museums & Galleries of NSW	Last night, in preparation for the 3D Symposium we are hosting with the Education Studio, Macquarie University M&G attended 3D Print Sydney at the Museum of Applied Arts and Sciences. Along with demonstrations of 3D scanning and printing, the audience was treated to a series of short talks from a scientist, engineer, surgeon, artist and ethicist revealing their projects around the technology. The message was clear; 3D is poised to change human life in unprecedented ways in the future—and that future is closer than you think.		http://mgns.org.au/sector/news/future-3d/
11 June 14	Think INC	Covering Windows': Bill & Melinda Gates fund UOW researchers' next-gen condom development	Vlad Louchkov	http://thinkinc.org.au/covering-windows-bill-melinda-gates-fund-uow-researchers-next-gen-condom-development/

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11 June 14	start up smart	The self-lubricating skin-like condom that has piqued the interest of Bill Gates	Kye White	http://www.startupsmart.com.au/planning/business-ideas/the-self-lubricating-skin-like-condom-that-has-piqued-the-interest-of-bill-gates/2014061112481.html
11 June 14	Secret Men's Business	Bill Gates wants to build a new love glove- Bill Gates has a mission, you guys.	Whitney Higginson	http://www.smbmag.com.au/bill-gates-condoms/
11 June 14	DesignTaxi	Significantly Enhances Sexual Pleasure	Jillian Wong	http://designtaxi.com/news/366331/Skin-Like-Next-Generation-Condom-Significantly-Enhances-Sexual-Pleasure/?interstitial_shown=1
11 June 14	Sciences et Avenir Santé (France)	Le préservatif qui valait 100.000 dollars	Par Hugo Jalinière	http://www.sciencesetavenir.fr/sante/20140610.OBS0014/un-preservatif-de-nouvelle-generation-finance-par-bill-gates.html
11 June 14	HITEK.fr (France)	LE PRÉSERVATIF DU FUTUR FINANCÉ PAR BILL GATES	William	http://hitek.fr/actualite/preservatif-futur-finance-bill-gates_2943
11 June 14	Tin Moi (Vietnam)	Công nghệ dùng bao cao su như không dùng		http://www.tinmoi.vn/cong-nghe-moi-dung-bao-cao-su-nhu-khong-dung-011309515.html
11 June 14	Paredro (Spanish)	LA SIGUIENTE GENERACIÓN EN DISEÑO DE CONDONES MEJORA SIGNIFICATIVAMENTE EL PLACER SEXUAL		http://www.paredro.com/la-siguiente-generacion-en-diseno-de-condones-mejora-significativamente-el-placer-sexual/
11 June 14	metronews (France)	Bill Gates prédit l'abandon du latex dans les préservatifs du futur	Alexandra Bresson	http://www.metronews.fr/info/bill-gates-predit-l-abandon-du-latex-dans-les-preservatifs-du-futur/mnfkIP7JNeNUbuQHHs/
11 June 14	wolipop (Indonesia)	Kondom Masa Depan: Terbuat dari Bahan yang Terasa Mirip Kulit Manusia	Eny Kartikawati	http://wolipop.detik.com/read/2014/06/11/152256/2605293/227/kondom-masa-depan-terbuat-dari-bahan-yang-terasa-mirip-kulit-manusia?u18=1
12 June 14	smartcompany	The self-lubricating skin-like condom that has piqued the interest of Bill Gates	Kye White	http://www.smartcompany.com.au/growth/innovation/42352-the-self-lubricating-skin-like-condom-that-has-piqued-the-interest-of-bill-gates.html#
12 June 14	Crimsonelite	Comdoms future: Made of material that feels similar human skin	Huge	http://crimsonelite.info/condoms-future-made-of-material-that-feels-similar-human-skin/
12 June 14	UTUSANRIAU.CO (Indonesia)	Kondom Masa Depan dari Bahan Mirip Kulit Manusia		http://m.utusanriau.co/index.php?/detail/4/4378
12 June 14	TG Techno	Research news - UOW researchers win Gates Foundation grant to make next generation condoms		http://tgtechno.com/nanotechnologyzone/index.php/news/research-news/1672-uow-researchers-win-gates-foundation-grant-to-make-next-generation-condoms
12 June 14	Medical Design Technology	Researchers Win Gates Foundation Grant to Make Next Generation Condoms	University of Wollongong	http://www.mdtmag.com/news/2014/06/researchers-win-gates-foundation-grant-make-next-generation-condoms

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13 June 14	Scanpix	3D Printing - Changing Everthing!		http://www.scanpix.com.au/Blog/tabid/69/articleType/ArticleView/articleId/28/3D-Printing--Changing-Everything.aspx
13 June 14	XBIZ Newswire	Video: Bill Gates Donates \$100K to 'Sensational' Condom	Lila Gray	http://newswire.xbiz.com/view.php?id=180541
13 June 14	Xfanz	Video: Bill Gates Donates \$100K to 'Sensational' Condom	Lila Gray	http://www.xfanz.com/news/180542
14 June 14	MyHealth	Skin-like, self-lubricating condoms in the works		http://www.ctvnews.ca/health/skin-like-self-lubricating-condoms-in-the-works-1.1868818
14 June 14	The Rakyat Post	Non-latex, skin-like condoms in the works		http://www.therakyatpost.com/life/2014/06/14/non-latex-skin-like-condoms-works/
16 June 14	UPI	3-D printing: cool new tool or total game-changer? "We can print buildings to any digital design our customers bring us," WinSun CEO Ma Yihe said. "It's fast and cheap."	Brooks Hays	http://www.upi.com/Science_News/2014/06/16/3-D-printing-cool-new-tool-or-total-game-changer/7161400527768/
17 June 14	Canoe.ca	Skin-like, self-lubricating condoms are in the works		http://lifewise.canoe.ca/SexRomance/
17 June 14	MYTECHNEWS (Germany)	Hydrogel - Das eigene Kondom drucken gefälligst? : Wissenschaft News	Martin Jacobs	http://www.mytechnews.de/science/item/62-hydrogel-nanotechnologie
17 June 14	RA- Rede Angola (Portugal)	Nova geração de preservativos- Principal objectivo é prestar auxílio a países de África e Ásia,	Rede Angola	http://www.redeangola.info/nova-geracao-de-preservativos/
17 June 14	NNL Net News Letter	3-D printing technology transforms dentistry, real estate and more - It wouldn't be an understatement to say the Internet has changed everything. But what's next?	Brooks Hays	http://www.netnewsledger.com/2014/06/17/3d-technology-changes-our-world/
17 June 14	inSing.com	Skin-like, self-lubricating condoms are in the works	AFP	http://features.ingsing.com/feature/skin-like-self-lubricating-condoms-are-in-the/id-e5453101/
17 June 14	TheGailyGrind	BIO-MATERIAL CONDOMS MADE FROM "TOUGH HYDROGELS" MAY MAKE SAFE SEX MORE PLEASURABLE	Adrian Garcia	http://www.thegailygrind.com/2014/06/17/bio-material-condoms-made-tough-hydrogels-may-make-safe-sex-pleasurable/
17 June 14	LADYCLEVER	Latex No Longer? The Future of Condoms - The future of condoms is likely to be a different one if Bill Gates has anything to say about it.	Kate Ferguson	http://ladyclever.com/health-fitness/latex-no-longer-the-future-of-condoms/
18 June 14	Green Capital	The Graphene revolution. On the 18th of June, Professor Gordon Wallace joins us at Sydney's Powerhouse Museum as part of HotHouse STUFF. Here's a look at what he'll be talking about.	Andrew Tovey	http://greencapital.org.au/the-graphene-revolution/?doing_wp_cron=1397730159.5816628932952880859375
18 June 14	ABC Science Online	Rock salt lithium could make batteries safer - Japanese researchers may have unlocked the key to a new generation of lithium ion batteries that overcome concerns about fire risk.	Dani Cooper	http://www.abc.net.au/science/articles/2014/06/18/4015857.htm
18 June 14	Instinct Magazine	Next-Gen Condoms Could Feel Like Human Skin	Jonathan Higbee	http://instinctmagazine.com/post/next-gen-condoms-could-feel-human-skin

Date	Source	Description	Journalist	Page#/web link
18 June 14	centric TV	Skin-Like Condom Said To Make Sex Better - Bill Gates funds \$100,000 alternative rubber for more sensation	Gerren Keith Gaynor	http://www.centrictv.com/whats-good/good-living/2014/06/18/skin-like-condom-said-to-make-sex-better.html
18 June 14	TheCelebrityCafé.com	Bill Gates awards \$100,000 to new Australian condom design	Jorie Goins	http://thecelebritycafe.com/feature/2014/06/bill-gates-awards-100000-new-australian-condom-design
19 June 14	Mamamia	Thursday's news in under 5 minutes - 11. Bill Gates funding condoms. Features picture of ACES hydrogel material that is the basis for the proposed condom.		http://www.mamamia.com.au/news/iraq-crisis/
19 June 14	all4women	Skin-like, self-lubricating, 'invisible' condoms are being developed	AFP-Relax News	http://www.all4women.co.za/relationships/skin-like-self-lubricating-invisible-condoms-are-being-developed
20 June 14	The Australian	AdelaideX is not a striptease club- Playing it straight More on the proposed hydrogel based condom grant.		http://www.theaustralian.com.au/higher-education/adelaidx-is-not-a-striptease-club/story-e6frgcjx-1226960885434?nk=3d722db2b972ff4473088e846cb0bdf
21 June 14	dr. dorree	AIDS Will BE ERADICATED: A MESSAGE OF HOPE	DL	http://drdorree.com/aids-will-eradicated-message-hope/
23 June 14	Materia.nl	The human skin condom		http://materia.nl/article/human-skin-condom/
23 June 14	NDTV	Gen-Next Condoms May Feel Like Human Skin	Press Trust of India	http://www.ndtv.com/article/world/gen-next-condoms-may-feel-like-human-skin-546428
24 June 14	FirstPost.com	Next-gen condoms will feel more like human skin: Report		
26 June 14	FCMI- Female Condom Market Intelligence	New hydrogel skin-like condom promises to revolutionize sexual sensations		
29 June 14	Bintang Pasutri Blog	Now a condom that will increase your sexual pleasure!		
30 June 14	ACES	Renowned stem cell expert joins ACES bionics team		
1 July 14	Innovation Excellence	An Innovator has an Obligation to ... Learn! Prof Gordon Wallace quoted.	Kim Chandler McDonald	http://www.innovationexcellence.com/blog/2014/07/01/an-innovator-has-an-obligation-to%E2%80%A6-learn/
1 July 14	el Hospital	Inician estudios para reemplazar el látex de los condones		http://www.elhospital.com/temas/Inician-estudios-para-reemplazar-el-latex-de-los-condones+98728?tema=10000013
1 July 14	el Hospital	Inician estudios para reemplazar el látex de los condones		http://www.elhospital.com/temas/Inician-estudios-para-reemplazar-el-latex-de-los-condones+98728?tema=10000013
1 July 14	Cochlear Awareness Network	How Cochlear implants changed her life	Sue Young	http://www.c-a-network.com/stories/sue/sueyoung.php

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8 July 14	Monash University	Outstanding Monash chemist to strengthen international research ties – ACES CI Prof Leone Spicica receives prestigious award.		http://monashsciencenews.blogspot.com.au/2014/07/outstanding-monash-chemist-to.html
10 July 14	Sarah Henderson MP	Deakin receives \$2.54 million to collaborate on research ACES CI Xungai Wang received ARC LEIF funding.	Sarah Henderson	http://sarahhenderson.com.au/2014/07/10/deakin-receives-2-54-million-to-collaborate-on-research/
22 July 14	edublogs.com	PhD students using drones to help lifesavers at sea	India Lloyd	http://www.uowblogs.com/globalchallenges/2014/07/22/phd-students-using-drones-to-help-lifesavers-at-sea/#more-411
24 July 14	Manufacturers' Monthly	Australia's manufacturing future is high tech	Geoffrey Spinks	http://www.manmonthly.com.au/features/australia-s-manufacturing-future-is-high-tech
25 July 14	Sport NSW	Helping professional athletes kick academic goals. A new course that will help budding sports stars balance academic aspirations with their sporting dreams has been launched.	Cassie Butcher	http://www.sportnsw.com.au/epages/shop.sf/en_AU/?ObjectPath=/Shops/sportnsw/Categories/News/Helping_professional_athletes_kick_academic_goals#MainText
29 July 14	TG Techno	UOW supporting easy access to materials and business innovation		http://www.tgtechno.com/nanotechnologyzone/index.php/news/business-news/2178-uow-supporting-easy-access-to-materials-and-business-innovation
30 July 14	SP2TECH	UOW in race to get super material graphene to market. Prof David Officer (ACES CI) pictured and quoted.	Angela Thompson	http://sp2tech.com/?p=43
31 July 14	Australian Mining	UOW joins the great graphene development race. The University of Wollongong has joined the graphene race with a \$25 million federal funding grant and a new patenting agreement.	Ben Hagemann	http://www.miningaustralia.com.au/news/uow-joins-the-great-graphene-development-race
31 July 14	Ferret.com.au	UOW joins the great graphene development race	Ben Hagemann	http://www.ferret.com.au/artides/news/uow-joins-the-great-graphene-development-race-n2516279
12 Aug 14	Illawarra Mercury	UOW in race to get super material graphene to market - Research into the super material graphene has entered a new phase at the University of Wollongong, following a \$25 million funding injection and a new patenting agreement.	Angela Thompson	http://www.illawarramercury.com.au/story/2454134/uow-in-race-to-get-super-material-graphene-to-market/
15 Aug 14	Illawarra Mercury	UOW campus lab ready to welcome public - Laymen will rub shoulders with experts in lab coats at UOW's Innovation Campus on Monday as research facilities are opened for public tours.	Angela Thompson	http://www.illawarramercury.com.au/story/2491152/uow-campus-lab-ready-to-welcome-public/?cs=12
15 Aug 14	Second Australia	UOW campus lab ready to welcome public - Professor Gordon Wallace at the Innovation Campus that's ready to open its door to members of the public.		http://www.secondau.com/news/uow-campus-lab-ready-to-welcome-public

Date	Source	Description	Journalist	Page#/web link
18 Aug 14	Illawarra Mercury	UOW research brings self-charging solar phones a step closer - A paper-thin solar panel that could be used to create self-charging mobile phones is in development at the University of Wollongong.	Angela Thompson	http://www.illawarramercury.com.au/story/2496424/uow-research-brings-self-charging-solar-phones-a-step-closer/
20 Aug 14	ABC Science Online	Nano 'yarn' next step in biomedical implants	Tim Dean	http://www.abc.net.au/science/articles/2014/08/20/4067171.htm
20 Aug 14	Dnews	Nano 'yarn' to power biomedical implants	Tim Dean	http://news.discovery.com/tech/nanotechnology/nano-yarn-to-power-biomedical-implants-1408201.htm
20 Aug 14	Fragments of Science	Nano 'yarn' next step in biomedical implants	Maria Schnee	http://www.scoop.int/t/fragments-of
20 Aug 14	Nanotechnology news	Nano 'yarn' next step in biomedical implants	Tim Dean	http://nanotech.einnews.com/article__
21 Aug 14	HNGN	Scientists create nano yarn to power biomedical implants	John Nassivera	http://www.hngn.com/articles/39819/20140821/scientists-create-nano-yarn-to-power-biomedical-implants.htm
21 Aug 14	edublogs.com	Innovation Works! finalists developing cost-friendly electronic circuits -Electronic tags are everywhere in modern life. From the supermarket, to our cars and offices, and even our pets, electronic tags are used to store and access information, track movements of goods, and even allow contactless payment.	India Lloyd	http://www.uowblogs.com/globalchallenges/2014/08/21/innovation-works-finalists-developing-cost-friendly-electronic-circuits/#more-440
22 Aug 14	The Guardian	Crown casino: Coalition defends 'back-door' deal to extend licence - In return for the concessions, Crown will make more than \$900m in payments to the government. Prof Linda Hancock (ACES CI) interviewed and quoted.	Melissa Davey	http://www.theguardian.com/society/2014/aug/22/crown-casino-coalition-defends-back-door-deal-to-extend-licence
23 Aug 14	mivision	Made to Order: Will 3D Printed Eyewear Take Over the Market?	Melanie Kell	http://www.mivision.com.au/made-to-order-will-3d-printed-eyewear-take-over-the-market/
25 Aug 14	University of Wollongong-Campus News	Research may spell demise of product barcodes		http://media.uow.edu.au/news/UOW178208.html
28 Aug 14	Casino org	Packer's Crown Buys 36-Year Licensing Deal for \$847 million	David Sheldon	http://www.casino.org/news/packers-crown-buys-36-year-licensing-deal-847-million
1 Sept 14	Yahoo! News	Drones set to revolutionise surf lifesaving	David Eccleston	https://au.news.yahoo.com/a/24868639/drones-set-to-revolutionise-surf-lifesaving/
1 Sept 14	Deakin University Australia Worldly	Electrolyte scientists dare to dream. Maria Forsyth and Gordon Wallace pictured.	Deakin Research Communications	http://www.deakin.edu.au/research/stories/2014/09/01/electrolyte-scientists-dare-to-dream
1 Sept 14	Online Casino	Crown Casino Gaming License Extended Until 2050	Jacob Marshe	http://www.onlinecasino.com.au/news/crown-casino-gaming-license-extended-2050-5195/

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1 Sept 14	Micro Fabricator	3D Printing a custom designed flute		http://microfabricator.com/articles/view/
2 Sept 14	E Sun	3D Printing a custom designed flute		http://www.esun3d.net/xwxx.aspx?id=286&Typeld=9
2 Sept 14	Walter Technology	3D Printing a custom designed flute		http://www.walterled.com/html_news/3D-Printing-a-Custom-Designed-Flute-8.html
9 Sept 14	3D Printing News	3D Printed Fibre Reinforced Hydrogel	Ben Roberts	http://www.3dprintingnews.com.au/3d-printed-fibre-reinforced-hydrogel/
11 Sept 14	UOW	3D printers have a certain ring about them. Story about printing of jewellery at ACES.		http://media.uow.edu.au/news/UOW179622.html
15 Sept 14	3DPrint.com	Australian scientist improves 3D printing to fortify hydrogels for cartilage	Bridge Butler Millsaps	http://3dprint.com/15237/3d-printing-hydrogels/
15 Sept 14	3Ders	Scientists and metalsmith teamed up to use 3D printing to create jewellery		http://www.3ders.org/articles/20140915-scientists-and-metalsmith-teamed-up-to-use-3d-printing-to-create-jewellery.html
15 Sept 14	Micro Fabricator	Scientists and metalsmith teamed up to use 3D printing to create jewellery		http://microfabricator.com/articles/view/id/54175b1f313944c3678b46c1/scientists-and-metalsmith-teamed-up-to-use-3d-printing-to-create-jewellery?ev=7&evp=tl
15 Sept 14	Infohightech (French)	Hydrogels printed in 3D and fibre reinforced strength could mimic human cartilage	Bernard Neumeister	http://www.infohightech.com/des-hydrogels-imprimes-en-3d-et-renforces-de-fibres-pourraient-imiter-la-force-du-cartilage-humain/
15 Sept 14	3Dprintboard.com	Fortified hydrogel printing achieved - may lead to human cartilage 3D printing	NA	http://3dprintboard.com/showthread.php?5981-Fortified-Hydrogel-Printing-Achieved-May-Lead-to-Human-Cartilage-3D-Printing
16 Sept 14	3Dfactories	Developed a method for 3D printing human tissue		http://translate.google.com.au/translate?hl=en&sl=zh-CN&u=http://oa.zol.com.cn/479/4791877.html&prev=search
16 Sept 14	Engineering.com	3D printers have a certain ring about them. Story about printing of jewellery at ACES.		http://www.engineering.com/3DPrinting/3DPrintingArticles/ArticleID/8500/3D-Printers-Have-a-Certain-Ring-About-Them.aspx
16 Sept 14	TG Techno	Toughening up hydrogels for 3D printed cartilage		http://tgtechno.com/nanotechnologyzone/index.php/news/research-news/2716-toughening-up-hydrogels-for-3d-printed-cartilage
16 Sept 14	UOW	Engineering students build knowledge and careers layer by layer. Story on engineering students' visit to ACES.		http://media.uow.edu.au/news/UOW179884.html
17 Sept 14	Stampa 3D forum (Italian)	3D printing and medicine, replicating human cartilage	NA	http://translate.google.com.au/translate?hl=en&sl=it&u=http://www.stampa3d-forum.it/stampa-3d-e-medicina-cartilagine-umana/&prev=search

Date	Source	Description	Journalist	Page#/web link
17 Sept 14	Inside 3DP	A metalsmith and a biomedical researchers use metal 3D printers to make titanium jewellery	Shanie Phillips	http://www.inside3dp.com/metalsmith-biomedical-researcher-using-metal-3d-printers-make-titanium-jewelry/
18 Sept 14	Med Device online	3D printed hydrogels with cartilage-like toughness	Chuck Seegert	http://www.meddeviceonline.com/doc/d-printed-hydrogels-with-cartilage-like-toughness-0001
25 Sept 14	Optometry Australia	Printing 3D living implants could become reality	Helen Carter	http://www.optometrists.asn.au/blog-news/2014/9/25/printing-3d-living-implants-could-become-reality.aspx
1 Oct 14	UOW	New ebook tells the story of an impending revolution in medicine		http://media.uow.edu.au/releases/UOW181253.html
1 Oct 14	Questacon demonstrates 3D printing of body parts	Story about the launch of the 3D BioPrinting eBook at Questacon in Canberra	Ian Warden	http://www.canberratimes.com.au/act-news/questacon-demonstrates-3d-printing-of-body-parts-20141001-10oewc.html
1 Oct 14	Council of Australasian Museum Directors	3D body parts printed - republished from The Canberra Times		http://camd.org.au/3d-body-parts-printed/
2 Oct 14	Manufacturers' Monthly	University of Wollongong experts discuss bioprinting revolution in new book	Brent Balinski	http://www.manmonthly.com.au/news/university-of-wollongong-experts-discuss-bioprinti
2 Oct 14	Inside 3DP	The wonders of 3D bioprinting: printing parts for bodies	Dennis Mitzner	http://www.inside3dp.com/wonders-3d-bioprinting-printing-parts-bodies/
3 Oct 14	MDTmag.com	Impending 3D printing revolution in medicine	UOW	http://www.mdtmag.com/news/2014/10/impending-3d-printing-revolution-medicine
14 Oct 14	Manufacturers' Monthly	Material of the Month part 2: graphene	Brent Balinski	: http://www.manmonthly.com.au/features/manufacturers-monthly-material-of-the-month-part-2
20 Oct 14	ARCHway	CEO Column mentions ACES		http://www.arc.gov.au/media/feature_articles/Oct14_ceo_column.html
22 Oct 14	Christian Today	Nylon muscles: as seen on a 'Catalyst' TV program	Dr Mark Tonson	http://www.christiantoday.com.au/article/nylon.muscles.as.seen.on.a.catalyst.tv.program/18120.htm
23 Oct 14	Face of Engineering Takes On A New Look	Story about a new 3D printing subject at UOW, mentions Prof. Gursel Alici and ACES		http://media.uow.edu.au/news/UOW182678.html
27 Oct 14	Mod Fab	Monfab and Figtree High on WIN news		http://www.modfab.com.au/modfab-figtree-high-win-news/
31 Oct 14	Robohub	Repeat of podcast on Geoff Spinks' fishing line muscle research		http://robohub.org/robots-podcast-nylon-fishing-line-actuator/
2 Nov 14	Ulladulla High School	UOW partnership pivotal - 3d printer donated		http://www.ulladulla-h.schools.nsw.edu.au/news/partnership-pivotal-3d-printer-donated
2 Nov 14	Robots Podcast	Geoffrey Spinks on artificial muscles. Prof Spinks featured in an audio podcast, speaking about his artificial muscle research.	Ron Vanderkley	http://robots.net/

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9 Nov 14	The Conversation	To shift away from fossil fuels, we need to copy plants - opinion piece by Prof. Doug MacFarlane		http://theconversation.com/to-shift-away-from-fossil-fuels-we-need-to-copy-plants-33636
10 Nov 14	Laboratory Equipment	Artificial photosynthesis could replace fossil fuels - republished from Monash University.		http://www.laboratoryequipment.com/news/2014/11/artificial-photosynthesis-could-replace-fossil-fuels
10 Nov 14	Monash Science news	Creating Fuel From Sunlight - story about Doug MacFarlane's artificial photosynthesis research.		http://monashsciencenews.blogspot.com.au/2014/11/creating-fuel-from-sunlight.html
19 Nov 14	www.ddayin.com	3D printing can simulate human cartilage fibre reinforced hydrogel	NA	http://translate.googleusercontent.com/translate_c?depth=1&hl=en&prev=search&rurl=translate.google.com.au&sl=zh-CN&u=http://www.ddayin.com/index.php/blogLog/view/23%3F%3D%25E5%258F%25A-F%25E6%25A8%25A1%25E6%258B%259F%25E4%25BA%25BA%25E7%25B1%25BB%25E8%25BD%25AF%25E9%25AA%25A8%25203D%25E6%2589%2593%25E5%258D%25B0%25E5%25A2%259E%25E5%25BC%25BA%25E7%25BA%25A4%25E7%25BB%25B4%25E6%25B0%25B4%25E5%2587%259D%25E8%2583%25B6&usg=ALkJrh1a9oZJB1n4FytDZqUeWOTMzE_Hg
19 Nov 14	Hospimedica.es	Hardened printing technology of synthetic hydrogels	Spanish Bio Research editorial team	http://translate.google.com.au/translate?hl=en&sl=es&u=http://www.hospimedica.es/tecnicas_quirurgicas/articles/294755788/tecnologia_de_impresion_endurece_hidrogeles_sinteticos.html&prev=search
24 Nov 14	ARC News	Brain building with stem cells		http://www.arc.gov.au/media/profiles.htm
26 Nov 14	3D Printing The Future	3D Printing Presentation at Embiggen Books - Cathal O'Connell mentioned as author of 3D BioPrinting eBook in context of a story about a public 3D Printing forum.		http://3dthefutureblog.wordpress.com/
27 Nov 14	ARC News	World-first bionic bra inches closer to reality		http://www.arc.gov.au/media/profiles.htm
1 Dec 14	ABC online - Religion and Ethics	Ethics enhanced? Evaluating the fanciful future of Julian Savulescu and Ingmar Persson. Opinion piece by Prof. Rob Sparrow (ACES CI)		http://www.abc.net.au/religion/articles/2014/12/01/4139618.htm
3 Dec 14	ResearchCareer	New tech lets locals clasp bra of the future	NA	http://www.researchcareer.com.au/news/new-tech-lets-locals-clasp-bra-of-the-future
4 Dec 14	Spectrum	Electronic Jell-O. Story about 3D printed gels, featuring A/Prof Marc in het Panhuis (ACES CI).	Neil Savage	http://spectrum.ieee.org/tech-talk/semiconductors/materials/electronic-jello
5 Dec 14	3Ders	Could 3D printable edible sensors replace a check-up at the doctors?	Alec	http://www.3ders.org/articles/20141205-could-3d-printable-edible-sensors-replace-a-check-up-at-the-doctor.html
5 Dec 14	3Dprint.com	3D printed electronic 'jell-o' could become a useful edible diagnostic tool	Debra Thimmesch	http://3dprint.com/28709/3d-printed-hydrogel-diagnostic/
5 Dec 14	3D Printing Industry	3D printed conductive jell-o: would you eat it?	Michael Molitch-hou	http://3dprintingindustry.com/2014/12/05/3d-printed-conductive-jell-o/

Date	Source	Description	Journalist	Page#/web link
6 Dec 14	Mweb	Researchers create auto-adjusting bionic bra		http://www.mweb.co.za/TechnoZone/ViewArticle/tabid/3432/Article/17117/Researchers-create-auto-adjusting-Bionic-Bra.aspx
6 Dec 14	Everyday Future	Short blog on A/Prof. in het Panhuis' edible printed gels research		http://everydayfuture.com/
7 Dec 14	Gizmag	Responsive 'bionic bra' adjusts to breast movement	Karen Sprey	http://www.gizmag.com/responsive-bionic-bra-breast-movement/35088/
7 Dec 14	Scoop	Could 3D printable edible sensors replace a check-up at the doctors?		http://www.scoop.it/t/solomo-
7 Dec 14	Wopular	Edible electronics - Short blog on A/Prof. in het Panhuis' edible printed gels research		http://www.wopular.com/comment/reply/28238537
8 Dec 14	3Ders.org	3D printing aids in creating world's first bionic bra		http://www.3ders.org/articles/20141208-3d-printing-aids-in-creating-world-first-bionic-bra.html
8 Dec 14	UberGizmo	Bionic bra adjusts itself automatically	Edwin Kee	http://www.ubergizmo.com/2014/12/bionic-bra-adjusts-itself-automatically/
8 Dec 14	3D Printing News Today	Researchers looking to 4D printing to create biosensors from edible gels		http://3dprinting.einnews.com/article__detail/238622622?lcode=fxVkc39fHyojY-XNvPBrQ%3D%3D

Table 2: ACES Print Media Summary 2014

Date	Source	Description	Journalist	Page#/web link
1 Jan 2014	UOW Research and Innovation News	\$30M tops off UOW's best ARC funding year ever. Story about ACES new funding as significant part of UOW's ARC funding success.		
1 Jan 2014	UOW Research and Innovation News	Profile of ACES research fellow Dorna Esrafilzadeh.		
1 Jan 2014	UOW Research and Innovation News	3D printing educational outreach program. Story about a show developed by ACES for the Wollongong Science Centre.		
7 Jan 2014	Prevention Magazine	"The future of medicine" featuring interview with Prof Gordon Wallace about 3D printing human tissues	Bonnie Cleaver	73
18 Jan 2014	SMH Good Weekend magazine	Making Biomaterials from Seaweed for Implants - University of Wollongong researchers are growing jobs and materials from the sea for medical treatments through a project in the Shoalhaven area to farm and process seaweeds that will then be used for biomaterials such as cell carriers in medical implants.	Lisa Clausen	
1 Feb 2014	ATSE Focus magazine	Two Fellows in ARC grants. Story about renewed ARC funding for ACES.		
21 Feb 14	Illawarra Mercury	Everyday thread reveals hidden strengths	Lisa Wachsmuth	http://www.illawarramercury.com.au/story/2102897/everyday-thread-reveals-hidden-strengths/?cs=300

Date	Source	Description	Journalist	Page#/web link
21 Feb 14	Illawarra Mercury	Future holds stacks of possibilities for Illawarra	Ben Langford	http://www.illawarramercury.com.au/story/2105045/future-holds-stacks-of-possibilities-for-illawarra/?cs=12
22 Feb 14	Illawarra Mercury	Tomorrow's technology rises as old industry tumbles	Ben Langford	
25 Feb 14	ANFF Newsletter	Fishing line artificial muscles. ACES press release.	Nat Foxon Phillips	
10 Mar 14	Sydney Morning Herald	Australia falls behind in race for graphene	Drew Turney	http://www.smh.com.au/it-pro/business-it/australia-falls-behind-in-race-for-graphene-20140310-hvgvs.html
1 April 14	UOW Connect Magazine	\$49M ARC Funding record for UOW. ACES described as one of the Centres at UOW receiving part of record funding for the Uni.		
1 April 14	UOW Connect Magazine	Biopen to re-write surgical technique		
1 April 14	UOW Connect Magazine	The Future in Miniature: Technology provides a stack of options. A story about the demolition of the Port Kembla copper stack and the future options for Wollongong for technology and industry		
1 April 14	UOW Research and Innovation News	Fishing line gets superhuman in the field of artificial muscles. Story about Prof Spinks' artificial muscle research.		
9 May 14	Brisbane Times	3D printing pushes medical boundaries	Cameron Atfield	http://www.brisbanetimes.com.au/queensland/3d-printing-pushes-medical-boundaries-20140509-zr6x9.html
10 May 14	Illawarra Mercury	Biofabrication added to UOW's programs	Angela Thompson	
10 May 14	Illawarra Mercury	UOW Program uses 3D Printing to regrow human tissue	Angela Thompson	
2 June 14	MX	Story about 3D Printing and 3D Print Sydney event		
1 July 14	UOW Research and Innovation News	3D Print Sydney. Story about the ACES event at the Powerhouse Museum in Sydney.		
1 July 14	UOW Research and Innovation News	Celebrating science communication. ACES PhD student Binbin Zhang finalist in the CRC Researcher Showcase competition.		
1 July 14	UOW Research and Innovation News	ACES announces new international Masters in BioFabrication.		
1 July 14	UOW Research and Innovation News	How technology is transforming medicine: keynote for NSW GPs. Story about Professor Gordon Wallace's presentation at the Sydney General Practitioner Conference & Exhibition.		
1 July 14	UOW Research and Innovation News	Hydrogels herald next generation condom. Story about new hydrogel condoms being developed using ACES materials.		

Date	Source	Description	Journalist	Page#/web link
1 July 14	UOW Research and Innovation News	UOW scientist joins Fellow ranks of Royal Society of Chemistry. Story about success of ACES CI Marc in het Panhuis.		
1 July 14	UOW Research and Innovation News	ACES Director awarded Hanbat University Honorary Doctorate		
1 July 14	UOW Research and Innovation News	Wired for sounding out bionic ear innovations. Story about the upcoming Bill Wheeler Symposium.		
1 July 14	UOW Research and Innovation News	\$25M for science research and innovation in the Illawarra. Story about the launch of ACES new ARC Centre of Excellence.		
31 July 14	Illawarra Mercury	Funding boosts rush to market graphene		
6 Aug 14	Optometry Australia Magazine/newsletter	Prof Gordon Wallace interviewed about 3D printing and the impact on the optometry industry		
6 Sept 14	Geelong Advertiser	Breakthrough - Researchers see the 'lyte' - Artificial muscles built into clothing, growing new nerves and a bionic bra are some of the cutting-edge applications being worked on in the little-known realm of electrolyte research.		
15 Sept 14	Illawarra Mercury	UOW metal researchers mix science with jewellery.	Emma Spillett	http://www.illawarramercury.com.au/story/2560207/uow-metal-researchers-mix-science-with-jewellery/
1 Oct 14	UOW Research and Innovation News	Promotion of the 2015 International Electromaterials Science Symposium		
1 Oct 14	UOW Research and Innovation News	Teen tragedy inspires bionics research career. Mentions ACES in the story about Katharina Schirmer, winner of the 2014 Bill Wheeler Award.		
1 Oct 14	ATSE Focus magazine	ACES gets another seven years' cash.		
1 Oct 14	UOW Research and Innovation News	Profile of ACES Chief Investigator, Jeremy Crook		
29 Oct 14	Milton Ulladulla Times	Ulladulla students impressed with 3D printer	Glenn Ellard	http://www.ulladullatimes.com.au/story/2656239/science-students-find-their-futures-in-print/
1 Nov 14	UOW Connect Magazine	Gates Foundation Funding: Hydrogel (developed by ACES) key to better condoms		
30 Nov 14	Sunday Times	Revolution in bra design - Gordon Wallace quoted about the development of the bionic bra	Ian Walker	
1 Dec 14	Illawarra Mercury	Bionic bra team seeks supportive partner'	Lisa Wachsmuth	http://www.illawarramercury.com.au/story/2735182/uows-bionic-bra-team-seeks-supportive-partner/
1 Dec 14	ATSE Focus magazine	Taking a traditional craft into a new age. Review of 3D BioPrinting eBook.		

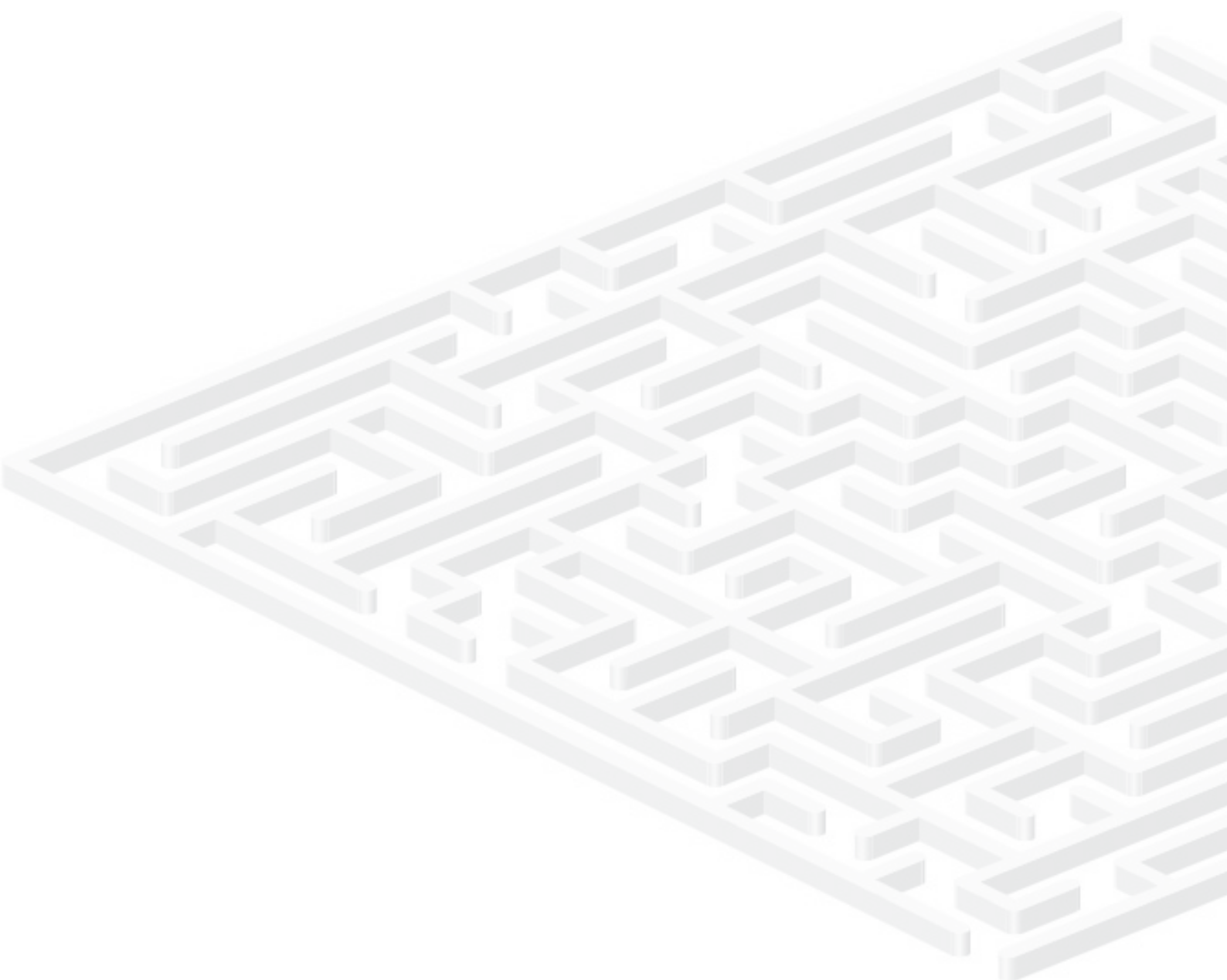
2 Dec 14	Illawarra Mercury	Stem cell modelling to aid schizophrenia: University of Wollongong researchers. ACES CI Jeremy Crook pictured and quoted.	Angela Thompson	http://www.illawarramercury.com.au/story/2737678/stem-cell-modelling-to-aid-schizophrenia-uow-researchers/?cs=300
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Table 3: ACES Radio Media Summary 2014

Date	Source	Description	Journalist	Page#/web link
22 Jan 14	ABC Statewide	Interview with Prof Gordon Wallace about ACES graphene research and potential applications	Steve Chase	
20 Feb 14	ABC Illawarra	Gordon Wallace joined ABC commentator Nick Rheinberger on air during the demolition of the Port Kembla stack	Nick Rheinberger	
21 Feb 14	ABC PM	Interview with Prof Geoff Spinks regarding Fishing line artificial muscles Science research.	Ashley Hall	
25 Feb 14	ABC Illawarra	Interview with Prof Geoff Spinks regarding Fishing line artificial muscles Science research.	Nick Rheinberger	
8 May 14	ABC North and West	Interview with Prof. Gordon Wallace on 3D Printing	Ann Jones	
9 May 14	i98	New masters degree in Biofabrication	Cathy	
9 May 14	ABC radio 'PM'	Implanting 3D printed body parts	Caroline Winter	http://www.abc.net.au/pm/content/2014/s4001756.htm
13 May 14	2MC Drive	New masters degree in Biofabrication	Keira	
3 Jun 14	2MCE	Interview with Prof. Gordon Wallace on research with seaweed extracts	Reece Middleton	
5 Jun 14	702 ABC Sydney	Gordon interviewed by James Valentine about 3D BioPrinting and 3D Print Sydney	James Valentine	
1 July 14	Community Broadcasting Foundation	Interview with Prof. Gordon Wallace on 3D Printing	Stacey Holten	
31 July 14	ABC Illawarra News	The University of Wollongong has received \$25m to develop the next generation of batteries, solar cells and medical implants. The money will fund the research at the Australian Research Council Centre of Excellence for Electromaterials Science.	Newsreader	
31 July 14	ABC Illawarra	The new technology to generate fuels from water could soon start at a new manufacturing plant in the Illawarra, the AquaHydrex. The technology was developed at the [University of Wollongong's] Innovation Campus.		
31 July 14	ABC Illawarra	Interview with Prof Gordon Wallace, University of Wollongong, by Louise Negline, ABC, about the launch of the new funding by the Australian Centre of Excellence for Research in Electromaterials Science	Nick Rheinberger	
Oct 14	JJJ - Sunday Night Safran	Prof Susan Dodds (ACES CI) did an interview with John Safran on transhumanism.	John Safran	
9 Nov 14	Radio National	A space mess – ACES CI Prof. Rob Sparrow interviewed about 'space ethics'		http://www.abc.net.au/radionational/programs/philosopherszone/a-space-mess/5867642

Table 4: ACES Television Media Summary 2014

Date	Source	Description	Journalist
11 Jan 14	SBS News	Surgeons use 3D printers, seaweed to repair damaged bones. Interviews with Prof Gordon Wallace and Prof Peter Choong about new BioPen.	Rhiannon Elston
21 Feb 14	Win News	Interview with Prof Geoff Spinks regarding Fishing line artificial muscles Science research.	
31 July 14	WIN Wollongong News	A \$25m Federal Government grant to the Australian Research Council at University of Wollongong's Centre of Excellence for Electromaterials Science has put the university at the forefront of international...	Geoff Phillips newsreader
3 Dec 14	ABC News 24	Robots and the threat to humanity. ACES CI Prof. Rob Sparrow interviewed.	
11 Dec 14	ABC 7:30 Report	Prof Linda Hancock (ACES CI) was interviewed regarding money laundering through Casinos.	
13 Dec 14	Weekend TODAY	Aussie prototype 'bionic bra' detects breast movement and adjusts support	





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