



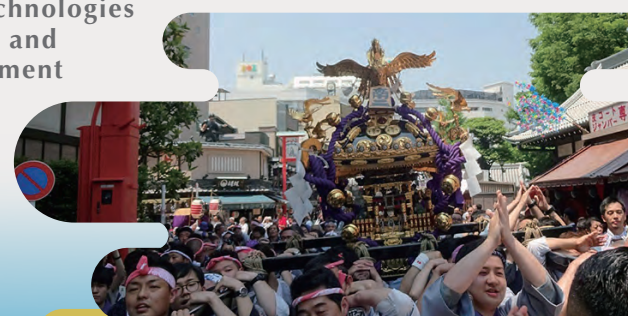
The 75th IIW Annual Assembly and International Conference

17-22 July 2022 | Tokyo Daiba, Japan

IC Collaborative Expo Corner in Japan International Welding Show

13-16 July 2022 | Tokyo Big Sight, Japan

Innovative Welding and Joining Technologies
to achieve Carbon Neutrality and
promote Sustainable Development



Hosted by



<https://www.iiw2022.com>

Supported by Tokyo Convention & Visitors Bureau

DAIHEN**OTC**

Creating Metal Artists



Robot controller
ALMEGA PREMIUM
Friendly series
FD19



Welding robot
ALMEGA PREMIUM
Friendly series
FD-B6



Welding machine
Welbee Inverter
M350LI



Opening the New Era of Welding

DAIHEN contributes a lot to the manufacturing technology of customers all over the world by world-leading welding & mechatronics technologies.

When supporting the welding machines, robots, peripherals, and systems, DAIHEN understands deeply the needs of customers, and will provide solutions enhancing customer's benefit and added value.

DAIHEN will continue to expand overseas bases around the world, and to improve the welding & mechatronics technologies which has been cultivated many years, furthermore. DAIHEN will support a wide range of global markets and connect people in the world by providing its own "DAIHEN Only-one Products" in the runup to other companies from Japan where is the country creating cutting-edge manufacturing technology.

DAIHEN Corporation

Welding & Joining Division
FA Robot Division

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<https://www.daihen.co.jp/>

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Welcome Message

On behalf of the organizing committee of the 75th IIW Annual Assembly and International Conference 2022 in Tokyo, Japan, I am honored to host the most influential event for the global fabrication industries involving in welding and joining technology, and delighted to welcome participants from all over the world.

Tokyo is the capital of Japan and the famous metropolis where many tower buildings stand close together at a glance. But inside there are plenty of unique cultures fostered and inherited from Edo period for longer than 400 years. Then, we are preparing the elaborate plans that all participants will find out and enjoy various Japanese cultures: sightseeing places, cuisine, entertainments, etc.

Obviously, we have been recognizing the climate change and struggling with the global environmental protection for long years. After the Paris Agreement was made in 2015, many countries positively set the policy for realizing it. In October 2020, Japanese government declared the goal of realizing a carbon-neutral, decarbonized society by 2050. Subsequently, the Green Growth Strategy was formulated to make explicit current challenges and future actions by several fields: Energy, Transport, Manufacturing, etc. Then, the International Conference “Innovative Welding and Joining Technologies to achieve Carbon Neutrality and promote Sustainable Development” will be firstly held to focus on direction of welding and joining technologies for global contribution to Carbon Neutrality.

Under careful COVID-19 control, you will real-meet each other and participate in fruitful and deep discussion in International Conference and Technical Commission meetings related with your expertise. I am sure that all participants will make globally strong network through friendly communications in technical meetings and various excited events.

I look forward to seeing you in Tokyo in July 2022 for the best IIW Conference and Assembly.



Yoshinori Hirata

Chairman of the Organizing Committee of the 75th IIW Annual Assembly and International Conference 2022 in Tokyo, Japan

Professor Emeritus, Dr. Eng., Osaka University

IIW 2022 International Conference on Welding and Joining

Innovative Welding and Joining Technologies to achieve Carbon Neutrality and promote Sustainable Development

The goal of “*carbon neutrality*”, zero net greenhouse gas emissions, by 2050 has been declared by more than 120 countries around the world, and political measures towards decarbonization have been proposed in each country. Welding and joining technologies, which are essential in manufacturing industries, need to join the tide of the times and metamorphose into new technologies amenable to attaining carbon neutrality.

The Japan Institute of Welding will host the IIW International Conference on Welding and Joining in Tokyo on 17-18 July 2022. The central theme of the conference is “Innovative Welding and Joining Technologies to achieve Carbon Neutrality and promote Sustainable Development”. The conference in Tokyo will be a historic and innovative event that leads the 75th IIW Annual Assembly in the week following the Japan International Welding Show (JIWS) 2022. The conference is scheduled for two days, Sunday 17th and Monday 18th. Furthermore, a panel discussion will take place on Monday 18th between the International Conference (IC) and the Technical Working Units (WUs) of IIW, connecting the two more smoothly and powerfully than ever before. After the panel discussion, all participants will be invited to a Japanese Evening event in conjunction with the “IC-WUs Exchange Reception”.

Participants will be exposed to leading-edge technologies and research in welding and joining at the new style IC linked to the JIWS 2022 before deepening their knowledge at the WUs in the Annual Assembly.

Topics of the IC will include:

- Additive Manufacturing Technology and Efficient Engineering
- Artificial Intelligence (AI) and Digital Transformation (DX)
- Hydrogen, Renewable and Nuclear Energy
- New Materials
- Future Technologies
- Other Fundamentals

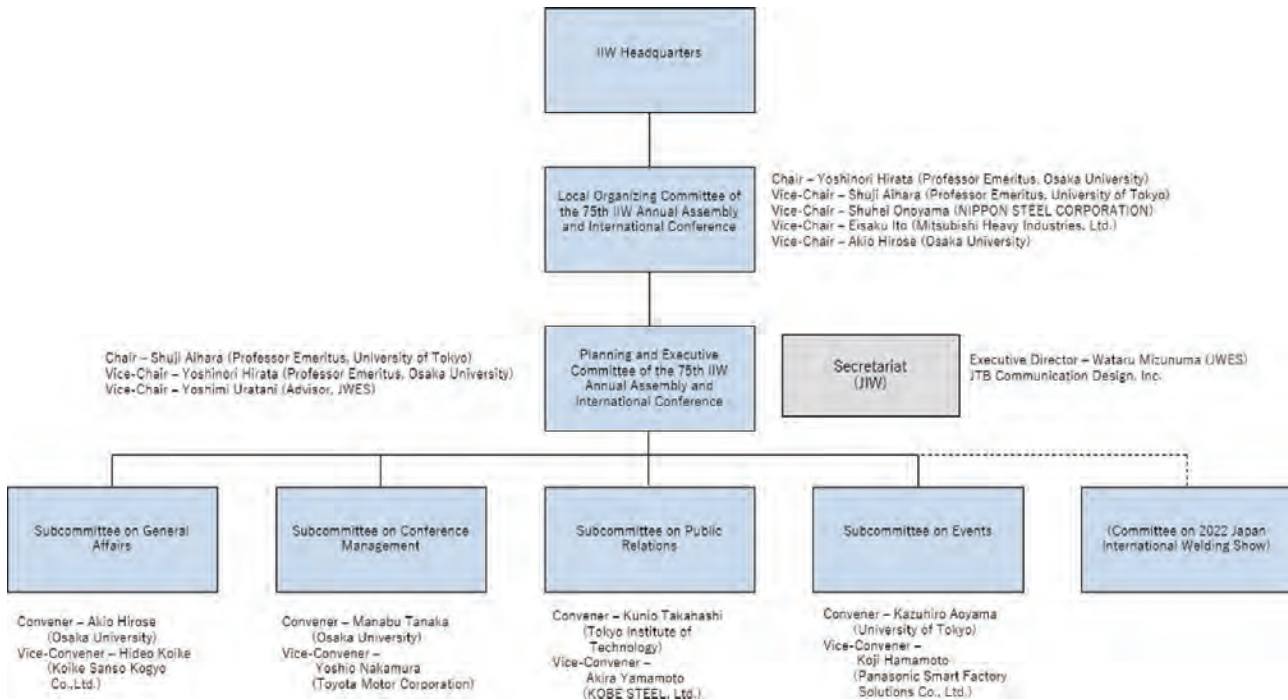


Manabu Tanaka

Chairman of the Conference Organizing Committee of the 75th IIW Annual Assembly and International Conference 2022 in Tokyo, Japan

Joining and Welding Research Institute, Osaka University

Local Organizing Committee



1) Local Organizing Committee of the 75th IIW Annual Assembly and International Conference

No.	Position	Name	Affiliation
1	Chair	Yoshinori Hirata	Osaka University
2	Vice-Chair	Shuji Aihara	The University of Tokyo
3	Vice-Chair	Shuhei Onoyama	NIPPON STEEL CORPORATION
4	Vice-Chair	Eisaku Ito	Mitsubishi Heavy Industries, Ltd.
5	Vice-Chair	Akio Hirose	Osaka University

2) Preparatory Committee (From November, 2019 to March, 2020)

No.	Position	Name	Affiliation
1	Chair	Shuji Aihara	The University of Tokyo

3) Planning and Executive Committee of the 75th IIW Annual Assembly and International Conference

No.	Position	Name	Affiliation
1	Chair	Shuji Aihara	The University of Tokyo
2	Vice-Chair	Yoshinori Hirata	Osaka University
3	Vice-Chair	Yoshimi Uratani	Advisor, The Japan Welding Engineering Society

4) Subcommittee on General Affairs

No.	Position	Name	Affiliation
1	Convener	Akio Hirose	Osaka University
2	Vice-Convener	Hideo Koike	Koike Sanso Kogyo Co.,Ltd.

5) Subcommittee on Conference Management

No.	Position	Name	Affiliation
1	Convener	Manabu Tanaka	Osaka University
2	Vice-Convener	Yoshio Nakamura	Toyota Motor Corporation

6) Subcommittee on Public Relations

No.	Position	Name	Affiliation
1	Convener	Kunio Takahashi	Tokyo Institute of Technology
2	Vice-Convener	Akira Yamamoto	KOBE STEEL, Ltd.

7) Subcommittee on Events

No.	Position	Name	Affiliation
1	Convener	Kazuhiro Aoyama	The University of Tokyo
2	Vice-Convener	Koji Hamamoto	Panasonic Smart Factory Solutions Co., Ltd.

IIW2022 Venues

Grand Nikko Tokyo Daiba

Address 2-6-1 Daiba, Minato-ku, Tokyo 135-8701 Japan
Phone +81-3-5500-6711
Website <https://www.tokyo.grandnikko.com/eng/>

Collaborative Event 2022 Japan International Welding Show

Venue

Tokyo Big Sight

Address 3-11-1 Ariake, Koto-ku, Tokyo 135-0063 Japan
Phone +81-3-5530-1111
Website <https://www.bigsight.jp/english/>

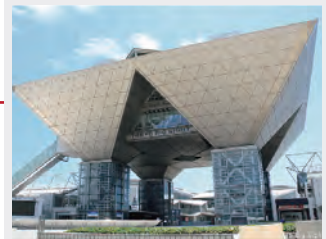
IIW2022: Venue



Grand Nikko Tokyo Daiba



2022 Japan International Welding Show: Venue



Tokyo Big Sight

Useful Information

Language

The official language of the 75th IIW Annual Assembly and International Conference is English.

Coffee Breaks and Lunch

Coffee and refreshments will be served during coffee breaks at 10:30-11:00 and 16:00-16:30 generally in the foyer on each floor. You can have lunch at a restaurant in the hotel or located within walking distance.

Dietary Requirements

Every effort will be made to accommodate people with special dietary requirements. However, advanced notification is required. Please indicate special dietary requirements at the time of registration.

Conference Badge

All delegates and exhibitors are requested to wear their name badges during the entire period of the IIW2022 and its social events.

Internet Access

The venue hotel Grand Nikko Tokyo Daiba has free Wireless Internet Access at all meeting rooms during the IIW2022. It can be accessed by connecting to:

Network name: GrandNikko

Password: daiba12

As login authentication is disconnected in 12 hours, please log in again in that case.

Measures against COVID-19

All delegates and exhibitors are requested to wear a mask during the entire period of the IIW2022 and its social events. If you do not have or wear it, you can get a new one at the registration desk. We also have several COVID-19 antigen test kits available.

Word of Caution

All delegates and speakers are advised to take their valuables with them during the coffee and lunch breaks to avoid any potential theft. The Organizing Committee will not be responsible for any losses incurred.

Disclaimer

While every attempt will be made to ensure that all features of the conference mentioned in this announcement will take place as scheduled, the IIW2022 Secretariat reserves the right to make last minute changes if they arise.

Liability

The IIW2022 Secretariat will not be liable for personal accidents or losses or damage to private property of registered participants of the IIW2022. Participants should make their own arrangements with respect to personal insurance.

Welcome to Tokyo

About Tokyo

Tokyo, Japan's capital, is one of the largest cities in the world with a population of roughly 14 million people. Tradition and innovation coexist in this city, where buildings and many aspects of the culture—kimono, kabuki, Japanese cuisine—retain their heritage while lifestyles continue to evolve. Rooted in Japanese culture, Tokyo, one of the world's leading tourist destinations, offers many faces and is full of allure, welcoming visitors with its exceptional hospitality. There is always something new to be discovered in Tokyo.

You can refer to the latest information on tourism in Tokyo, such as temporary closures and change of business hours of tourist facilities, and cancellation or postponement of each facility or event.

<https://www.gotokyo.org/en/>



Weather

July is hot and humid in Tokyo. The average high and low temperatures are 29°C/84°F and 22°C/72°F. However, the event site is well conditioned.

Currency

Japan uses Yen (JPY: ¥). Foreign currency may be changed at airports, hotels, and banks. There is an automatic currency exchange machine at the venue hotel Grand Nikko Tokyo Daiba. Card withdrawals can also be made at numerous ATMs, although not all ATMs accept foreign cards. Credit cards (Visa, Master, Diners, and Amex) are widely accepted in shops and restaurants.

Time Zone

Japan uses Japan Standard Time, which is the standard time zone for Japan and is UTC (Coordinated Universal Time)/GMT (Greenwich Mean Time) +9 hours.

Japan does not use daylight saving time. Also, there are no time differences within Japan. The time in the whole Japanese archipelago from Hokkaido to Okinawa is always the same.

Water

All throughout Japan, the tap water is safe to drink and that includes the water found in parks, gardens and public bathrooms.

If you prefer to drink bottled water when traveling in Japan it is also available and can be found in convenience stores or vending machines inexpensively. Bottled water in Tokyo can be mineral water or you can also purchase bottles of cold Japan tap water which are less expensive, and equally as good.

Telephones

You can use your mobile phone in Japan in SoftBank Mobile or DOCOMO's 5G (5th Generation) service area. All you have to do is bring your own SIM card and insert it to a rental phone or your own 3G handset. Rental phone service is also available upon arrival at Narita Airport or Haneda Airport. Toll Free Numbers start with 0120.

Emergency Contact

Dial 110 for police, 119 for Fire/Ambulance, 118 for Coast Guard, 7119 (free call) or 9110 (pay call) for Emergency question, and 171 for Safety Confirmation During Earthquake/Disaster.

Registration Desk and Exhibition

Registration Desk

For physical participants, the registration desk is located on the 1st floor of Grand Nikko Tokyo Daiba. Please collect your name badge and materials ahead of participating in the IIW2022. Please have your QR code ready for check-in that will be displayed on My Page in the registration form or sent to you by e-mail.

Opening Hours

Saturday 16 July 2022	13:00-18:00
Sunday 17 July 2022	8:00-18:00
Monday 18 July 2022	8:00-18:00
Tuesday 19 July 2022	8:00-18:00
Wednesday 20 July 2022	8:00-18:00
Thursday 21 July 2022	8:00-18:00
Friday 22 July 2022	8:00-12:00

Travel Desk

Information about the tours and transportation may be obtained from this desk. Located on the 1st floor of Grand Nikko Tokyo Daiba.

Opening Hours

Sunday 17 July 2022	8:00-18:00
Monday 18 July 2022	8:00-18:00
Tuesday 19 July 2022	8:00-18:00
Wednesday 20 July 2022	8:00-18:00
Thursday 21 July 2022	8:00-18:00
Friday 22 July 2022	8:00-12:00

Exhibition

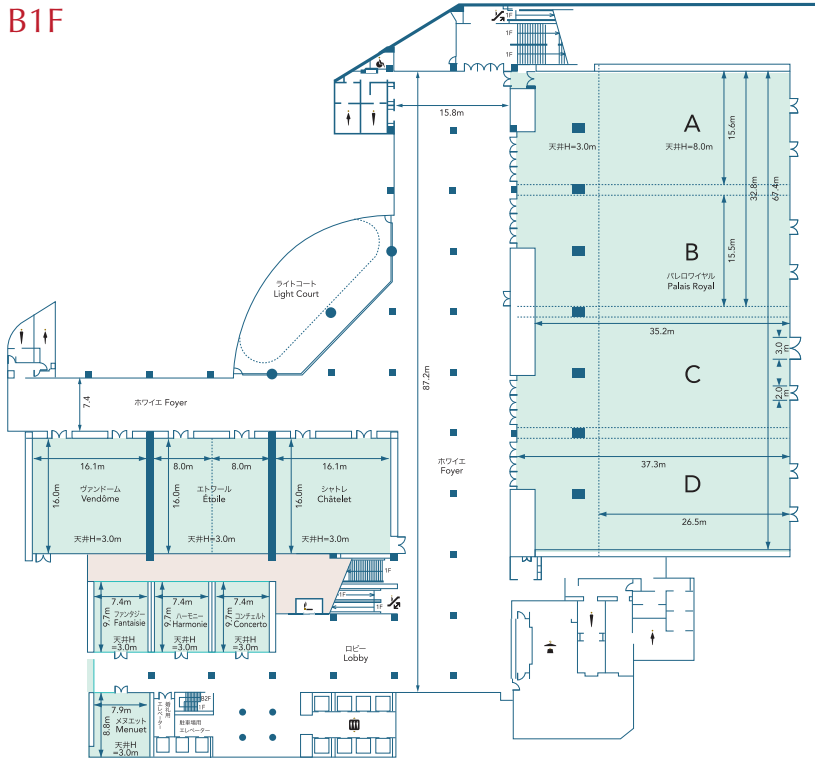
The Exhibition area is located in the foyer on the basement floor, next to the meeting rooms (see floor plan). Admission to the exhibition is included in the registration fee.

Opening Hours

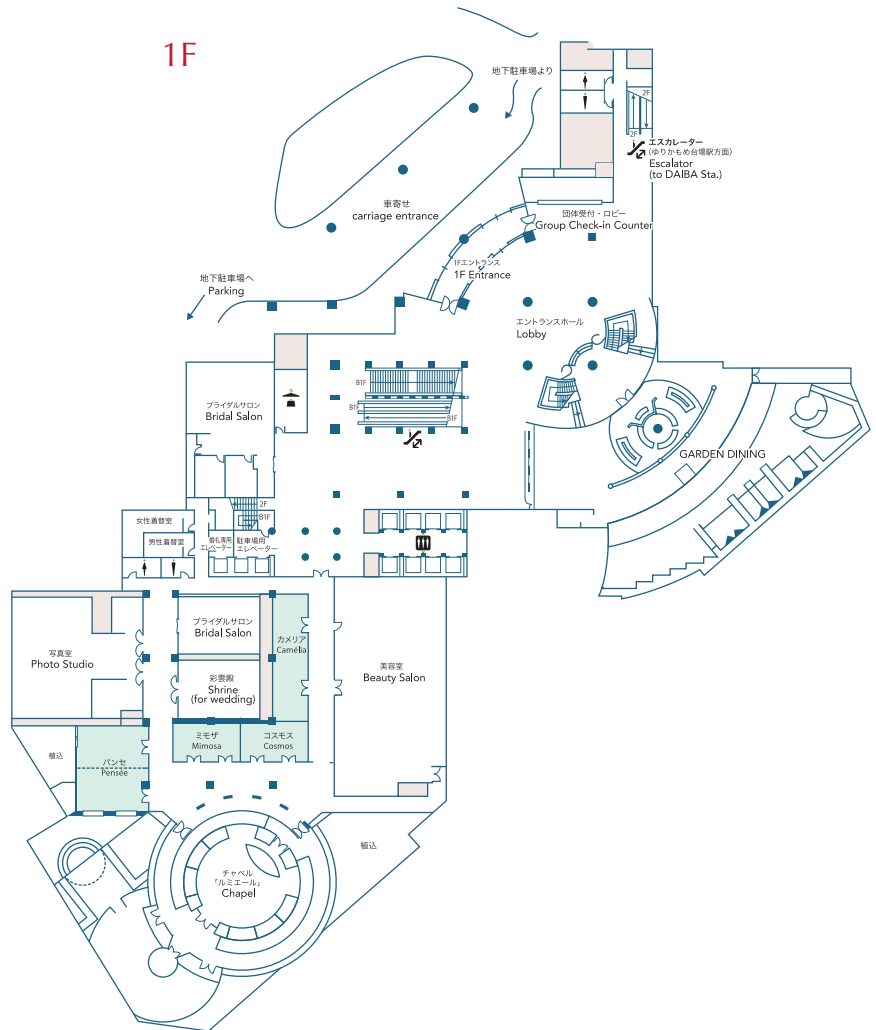
Sunday 17 July 2022	9:00-18:00
Monday 18 July 2022	9:00-18:00
Tuesday 19 July 2022	9:00-18:00
Wednesday 20 July 2022	9:00-18:00

Floor Plan

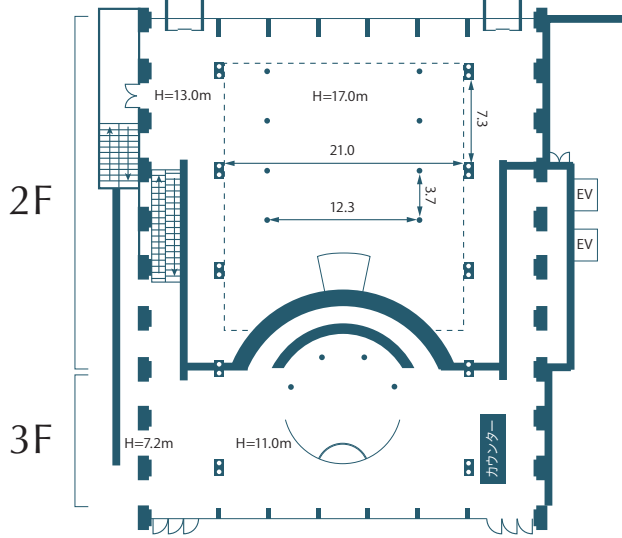
B1F



1F



2-3F



29F



Program Overview



Welder Education Seminar powered by IIW C-XIV and AWF

Date and Time : 16 July 2022 (Saturday) 10:00-12:00

Venue : East 7 hall (E7) at Tokyo Big Sight

Organizer : The Japan Welding Engineering Society

Japan Time	Program
10:00-10:10	Opening address by Mr. Wataru Mizunuma CEO of The Japan Welding Engineering Society
10:10-10:40	Welding Education in the United States -Q & A- Dr. Richard Polanin Professor, Illinois Central College President WRP Associates 2022 President, American Welding Society Vice Chairman, IIW C-XIV
10:40-11:10	Discussion on the Remote Distributed International Training and Competition -Q & A- Dr. Zhenying Liu CEO of Beijing Xinxing Science & Technology Co., Ltd. Deputy Director of China Welding Association Overlaying Committee Executive Director of China Building Materials Machinery Industry Association
11:10-11:40	Preparing Shipbuilding Industries Welders through Implementing Intensive of Welding Teaching and Training System at Kampuh Welding Indonesia -Q & A- Dr. Zaed Yuliadi General Manager, Kampuh Welding Indonesia
11:40-12:00	JWES Welder Training and Welder Certification System -Q & A- Mr. Shoichi Nomura Expert, Qualification and Certification Department The Japan Welding Engineering Society (JWES)

Measures against COVID-19

All delegates and exhibitors are requested to wear a mask during the entire period of the IIW2022 and its social events.

Saturday, 16 July 2022

Venue			Grand Nikko Tokyo Daiba	Tokyo Big Sight
Floor			Basement 1st Floor	East 7 hall (E7)
Time			Concerto	
JST	CEST	PST		
10:00	3:00	18:00		
				Welder Education Seminar powered by IIW/C-XIV and AWF
12:00	5:00	20:00		
14:00	7:00	22:00	BoD Meeting	
18:00	11:00	2:00		

Sunday, 17 July 2022

Venue			Grand Nikko Tokyo Daiba					
Floor			Basement 1st Floor					
Time			Palais Royal A	Palais Royal B	Palais Royal C	Palais Royal D	Vendôme	
JST	CEST	PST						
8:30	1:30	16:30						
9:30	2:30	17:30	General Assembly				C-XIII Fatigue of Welded Components and Structures	
10:30	3:30	18:30						
11:00	4:00	19:00						
12:00	5:00	20:00						
12:30	5:30	20:30			YP Ice Breaking Session			
13:30	6:30	21:30					C-XIII Fatigue of Welded Components and Structures	
14:30	7:30	22:30						
15:00	8:00	23:00	IC Opening					
15:15	8:15	23:15	IC Keynote Lecture 1-4					
15:30	8:30	23:30						
16:00	9:00	0:00					C-XIII Fatigue of Welded Components and Structures	
17:15	10:15	1:15						
18:00	11:00	2:00	IIW Opening Ceremony					
19:30	12:30	3:30			Welcome Reception			
22:00	15:00	6:00						

Monday, 18 July 2022

1. AM 2. AI & DX 3. Hydrogen 4. New materials 5. Future technology 6. Advanced technology

Venue			Grand Nikko Tokyo Daiba							
Floor			Basement 1st Floor							
Time			Palais Royal A	Palais Royal B	Palais Royal C	Palais Royal D	Châtelet	Étoile	Vendôme	Concerto
JST	CEST	PST								
8:30	1:30	16:30	IC Keynote Lecture 5-8							
9:30	2:30	17:30							Technical Visit Lecture	
10:30	3:30	18:30	Coffee Break							
11:00	4:00	19:00	IIW International Conference [AM] Process Control	IIW International Conference [AI & DX] Automation of Welding Process	IIW International Conference [Hydrogen] Welding Process	IIW International Conference [Future Technology] Welding Process/ NDT	IIW International Conference [New Materials] Dissimilar Resistance Spot Welding	IIW International Conference [AM] Process 1	IIW International Conference [Advanced Technology] Fatigue and Fracture 1	IIW International Conference [AM] Modeling and Simulation 1
12:30	5:30	20:30	Lunch Break							
14:00	7:00	22:00	IIW International Conference [AM] Materials and Properties 2	IIW International Conference [AI & DX] Optimization and Management	IIW International Conference [Hydrogen] Mechanical Behavior	IIW International Conference [Future Technology] Welding for Thick Plate	IIW International Conference [New Materials] Steel Welds	IIW International Conference [AM] Process 2	IIW International Conference [Advanced Technology] FSW	IIW International Conference [AM] Modeling and Simulation 2
16:00	9:00	0:00	Coffee Break							
16:30	9:30	0:30				IC-WUs Panel Discussion	IIW International Conference [Hydrogen] Material Behavior	IIW International Conference [AM] Other Topics	IIW International Conference [Advanced Technology] Laser Process	IIW International Conference [AM] Process 3
17:30	10:30	1:30								
18:00	11:00	2:00								
19:30	12:30	3:30	Japan Evening in conjunction with "IC-WU's Exchange Reception"							
22:00	15:00	6:00								

Grand Nikko Tokyo Daiba									
Basement 1st Floor				1st Floor	29th Floor				
Harmonie	Fantaisie	Menuet	Foyer	Pensée	Ginga	Hikari	Niji	Akatsuki	Akane
IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference
[New Materials] Brazing Materials	[AM] Materials and Properties 1	[Future Technology] Friction Welding	Poster Session	[Future Technology] High Power Beam 1	[AI & DX] Education and Training	[AI & DX] Automation	[Advanced Technology] Welding Residual Stress	[Future Technology] Metallurgy	[Advanced Technology] Assessment
Lunch Break									
IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	Special Session for Young Professionals	
[New Materials] Other Processes	[AM] Defects	[Future Technology] Arc Welding Process	Poster Session	[Future Technology] High Power Beam 2	[AI & DX] Inspection	[AI & DX] Prediction of Weld Quality	[AI & DX] Skill Evaluation of Welders		
Coffee Break									
IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	IIW International Conference	
[New Materials] Simulation and Calculation	[New Materials] Dissimilar FSW	[Future Technology] Other Dissimilar Joint	Poster Session	[Future Technology] Resistance Welding	[Advanced Technology] Fatigue and Fracture 2	[AI & DX] Sensing of Weld Quality	[Advanced Technology] Measurement and Inspection	[Future Technology] Fe-Al Dissimilar Joint	

Tuesday, 19 July 2022

Venue			Grand Nikko Tokyo Daiba							
Floor			Basement 1st Floor						29th Floor	
Time			Palais Royal A	Palais Royal B	Palais Royal C	Palais Royal D	Châtelet	Vendôme	Concerto	Ginga
JST	CEST	PST								
8:30	1:30	16:30	IAB-A			Additive Manufacturing Symposium	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-XVII Brazing, Soldering and Diffusion Bonding	C-XVI Polymer Joining and Adhesive Technology	C-II Arc Welding and Filler Metals
10:30	3:30	18:30	Coffee Break			Coffee Break				
11:00	4:00	19:00	IAB-A			Additive Manufacturing Symposium	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-XVII Brazing, Soldering and Diffusion Bonding	C-XVI Polymer Joining and Adhesive Technology	C-II Arc Welding and Filler Metals
12:30	5:30	20:30	Lunch Break			Lunch Break			WG-YP	Lunch Break
14:00	7:00	22:00	IAB-A IAB-B			Intelligent Manufacturing Symposium	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-VII Microjoining and Nanojoining	C-VIII Health, Safety and Environment	C-IX Behaviour of Metals Subjected to Welding
16:00	9:00	0:00	Coffee Break			Coffee Break				
16:30	9:30	0:30	IAB-B			Intelligent Manufacturing Symposium	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-VII Microjoining and Nanojoining	C-VIII Health, Safety and Environment	C-IX Behaviour of Metals Subjected to Welding
18:00	11:00	2:00								
19:30	12:30	3:30		Young Professional's Evening						
21:00	14:00	5:00								
22:00	15:00	6:00								

Grand Nikko Tokyo Daiba		
29th Floor		
Hikari	Niji	Akane
C-XIII Fatigue of Welded Components and Structures	C-X Structural Performances of Welded Joints - Fracture	
Coffee Break		
C-XIII Fatigue of Welded Components and Structures	C-X Structural Performances of Welded Joints - Fracture	
Lunch Break		
C-XIII Fatigue of Welded Components and Structures	C-V NDT and Quality Assurance of Welded Products	C-VI Terminology
Coffee Break		
C-XIII Fatigue of Welded Components and Structures	C-V NDT and Quality Assurance of Welded Products	C-VI Terminology
BoD's Dinner		

Wednesday, 20 July 2022

Venue			Grand Nikko Tokyo Daiba							
Floor			Basement 1st Floor							
Time			Palais Royal A	Palais Royal B	Palais Royal C	Palais Royal D	Châtelet	Étoile	Vendôme	Concerto
JST	CEST	PST								
8:30	1:30	16:30	IAB-B							
9:30	2:30	17:30					C-I Additive Manufacturing, Surfacing, and Thermal Cutting	C-XII Arc Welding Processes and Production Systems	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-XI Pressure Vessels, Boilers and Pipelines
10:30	3:30	18:30	Coffee Break				Coffee Break			
11:00	4:00	19:00	IAB-B							
12:30	5:30	20:30					C-I Additive Manufacturing, Surfacing, and Thermal Cutting	C-XII Arc Welding Processes and Production Systems	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-XI Pressure Vessels, Boilers and Pipelines
14:00	7:00	22:00					Lunch Break (Delegation mtg.)	German Delegation mtg.	Lunch Break (Delegation mtg.)	
16:00	9:00	0:00					IAB/MM	C-XII Arc Welding Processes and Production Systems	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-VIII Health, Safety and Environment
16:30	9:30	0:30						Coffee Break		
18:00	11:00	2:00					IAB Board	C-XII Arc Welding Processes and Production Systems	C-III Resistance Welding, Solid State Welding and Allied Joining Process	C-VIII Health, Safety and Environment
19:30	12:30	3:30	Closing Ceremony & Gala Banquet							
22:00	15:00	6:00								

Grand Nikko Tokyo Daiba							
Basement 1st Floor			1st Floor	29th Floor			
Harmonie	Fantaisie	Menuet	Pensée	Ginga	Hikari	Niji	Akane
	Technical Visit Lecture	C-XVI Polymer Joining and Adhesive Technology	C-XVII Brazing, Soldering and Diffusion Bonding	C-II Arc Welding and Filler Metals	C-XIII Fatigue of Welded Components and Structures	C-X Structural Performances of Welded Joints - Fracture Avoidance	
		Coffee Break					
		C-XVI Polymer Joining and Adhesive Technology	C-XVII Brazing, Soldering and Diffusion Bonding	C-II Arc Welding and Filler Metals	C-XIII Fatigue of Welded Components and Structures	C-X Structural Performances of Welded Joints - Fracture Avoidance	
Lunch Break (Delegation mtg.)					WG-RA	Lunch Break (Delegation mtg.)	
C-V NDT and Quality Assurance of Welded Products	C-XV Design, Analysis, and Fabrication of Welded Structures	C-XIV Education and Training	C-XVII Brazing, Soldering and Diffusion Bonding / C-VII Microjoining and Nanojoining	C-IX Behaviour of Metals Subjected to Welding	C-XIII Fatigue of Welded Components and Structures	C-IV Power Beam Processes	C-VI Terminology
Coffee Break							
C-V NDT and Quality Assurance of Welded Products	C-XV Design, Analysis, and Fabrication of Welded Structures	C-XIV Education and Training	C-XVII Brazing, Soldering and Diffusion Bonding / C-VII Microjoining and Nanojoining	C-IX Behaviour of Metals Subjected to Welding	C-XIII Fatigue of Welded Components and Structures	C-IV Power Beam Processes	C-VI Terminology

Thursday, 21 July 2022

Venue			Grand Nikko Tokyo Daiba							
Floor			Basement 1st Floor				1st Floor	29th Floor		
Time			Châtelet	Étoile	Vendôme	Concerto	Pensée	Ginga	Hikari	Niji
JST	CEST	PST								
8:30	1:30	16:30	C-XII Arc Welding Processes and Production Systems	C-VII Microjoining and Nanojoining	C-I Additive Manufacturing, Surfacing, and Thermal Cutting	C-XVIII Quality Management in Welding and Allied Processes	C-XVI Polymer Joining and Adhesive Technology	C-II Arc Welding and Filler Metals	C-XIII Fatigue of Welded Components and Structures	C-X Structural Performances of Welded Joints - Fracture Avoidance
9:30	2:30	17:30								
10:30	3:30	18:30	Coffee Break							
11:00	4:00	19:00	C-XII Arc Welding Processes and Production Systems	C-VII Microjoining and Nanojoining	C-I Additive Manufacturing, Surfacing, and Thermal Cutting	C-XVIII Quality Management in Welding and Allied Processes	C-XVI Polymer Joining and Adhesive Technology	C-II Arc Welding and Filler Metals / C-VIII Health, Safety and Environment	C-XIII Fatigue of Welded Components and Structures	C-X Structural Performances of Welded Joints - Fracture Avoidance
12:30	5:30	20:30	Lunch Break (Delegation mtg.)	AA Org.	Lunch Break (Delegation mtg.)					
14:00	7:00	22:00	C-XII Arc Welding Processes and Production Systems	C-XI Pressure Vessels, Boilers and Pipelines	C-VIII Health, Safety and Environment	C-IV Power Beam Processes	C-XV Design, Analysis, and Fabrication of Welded Structures	C-IX Behaviour of Metals Subjected to Welding	C-XIII Fatigue of Welded Components and Structures	WitW Board
16:00	9:00	0:00	Coffee Break							
16:30	9:30	0:30	C-XII Arc Welding Processes and Production Systems	C-XI Pressure Vessels, Boilers and Pipelines	C-VIII Health, Safety and Environment	C-IV Power Beam Processes	C-XV Design, Analysis, and Fabrication of Welded Structures	C-IX Behaviour of Metals Subjected to Welding	C-XIII Fatigue of Welded Components and Structures	WitW Board
18:00	11:00	2:00								
19:00	12:00	3:00								
20:00	13:00	4:00								

Technical Commissions & Working Units

BOARD/Board of Directors

TMB	Technical Management Board
CEO	Chief Executive Officer
WG-GOV	Governance
WG-FAR	Finances, Audit & Risks

CEO/Chief Executive Officer

WG-RA	Regional Activities
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TMB/Technical Management Board

WiW EdBoard	Welding in the World Editorial Board
WG-TWU	Technical Working Units
WG-STAND	Standardization
WG-YL	Young Leaders

International Authorization Board

IAB Groups

IAB Board	Board of IAB
IAB/Group A	Education, Training and Qualification
IAB/Group B	Implementation, Authorization
IAB/MM	IAB Members Meeting

Commissions

C-I	Additive Manufacturing, Surfacing, and Thermal Cutting
C-II	Arc welding and Filler Metals
C-III	Resistance Welding, Solid State Welding and Allied Joining Process
C-IV	Power Beam Processes
C-V	NDT and Quality Assurance of Welded Products
C-VI	Terminology
C-VII	Microjoining and Nanojoining
C-VIII	Health, safety and environment
C-IX	Behaviour of Metals Subjected to Welding
C-X	Structural Performances of Welded Joints - Fracture Avoidance
C-XI	Pressure Vessels, Boilers and Pipelines
C-XII	Arc Welding Processes and Production Systems
C-XIII	Fatigue of Welded Components and Structures
C-XIV	Education and Training
C-XV	Design, Analysis, and Fabrication of Welded Structures
C-XVI	Polymer Joining and Adhesive Technology
C-XVII	Brazing, Soldering and Diffusion Bonding
C-XVIII	Quality Management in Welding and Allied Processes

IIW2022 International Conference

IIW 2022 International Conference on Welding and Joining

“Innovative Welding and Joining Technologies to achieve Carbon Neutrality and promote Sustainable Development”

Conference Presentations

4 Keynote Lectures on Sunday, 17 July

- ◆ Green Growth Strategy in the Context of Carbon Neutrality (tentative)
Shinichi Kihara
Deputy Director-General for Technology and Environment, Industrial Science and Technology Policy and Environment Bureau, METI, Japan
- ◆ [MISSION NET ZERO] Initiatives of Mitsubishi Heavy Industries Group for Energy Transition
Eisaku Ito
Mitsubishi Heavy Industries, Ltd., Japan
- ◆ Additive Manufacturing: Building the Future One Layer at a Time
Josh Mook
GE Additive, USA
- ◆ Transformative Change in the Automotive Industry
Brian J. Krinock
Toyota Motor North America, USA

4 Keynote Lectures on Monday, 18 July

- ◆ Renewable Energy Revolution by Power Generation with Floating Offshore Wind Turbine
Hideyuki Suzuki
The University of Tokyo, Japan
- ◆ Zero-emission Transition in Shipping
Hiroaki Sakashita
NIPPON KAIJI KYOKAI (ClassNK), Japan
- ◆ Towards the Future of Net-zero Aviation
Noriko Morioka
IHI Corporation, Japan
- ◆ Construction DX Initiatives
Shimz Smart Site
Next Generation Building construction System
Masahiro Indou
Shimizu Corporation, Japan

Over 100 oral presentations at Around 17 Parallel sessions on Monday 18th

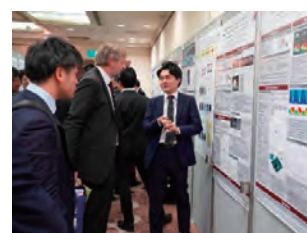
- ◆ Additive Manufacturing Technology and Efficient Engineering
- ◆ Artificial Intelligence (AI) and Digital Transformation (DX)
- ◆ Hydrogen (including fuel ammonia), Renewable and Nuclear Energy, Electrification
- ◆ New Materials
- ◆ Future Technologies
- ◆ Other Fundamentals

Around 30 poster presentations at Poster Sessions on Monday 18th

- ◆ The same topics with parallel sessions, mainly for young professionals & students

Collaboration with IIW journal “Welding in the World”

- ◆ “Welding in the World” publishes a Typical Collection for International Conference and includes 15~20 papers.



Collaborative Event

Related Event 2022 Japan International Welding Show

Date	13-16 July 2022	Organizer	The Japan Welding Engineering Society Sanpo Publications Incorporated
Venue	Tokyo Big Sight, Tokyo, Japan		

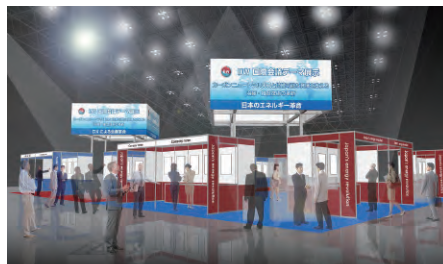
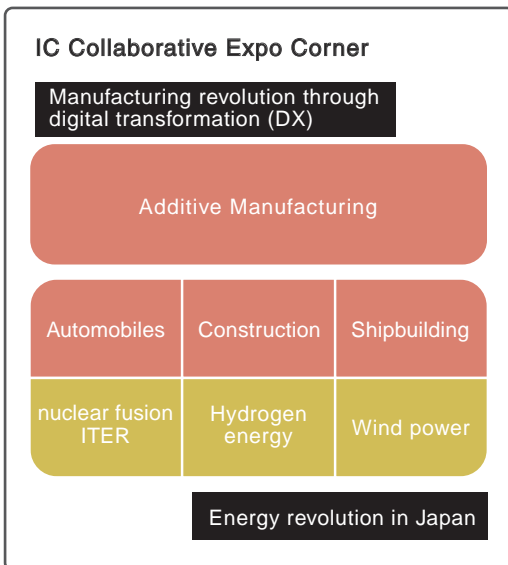
The Common Theme for both International Conference on Welding and Joining and the “Collaborative Expo Corner” in Japan International Welding Show

Innovative Welding and Joining Technologies to achieve Carbon Neutrality and promote Sustainable Development

- **What are the goals which each industry aims to realize carbon neutrality?**
 - ▶ To exhibit and grasp the future of industry at the “Collaborative Expo Corner”
- **What innovation would be required in welding and joining technologies to achieve goals?**
 - ▶ To understand the presentation at the International Conference

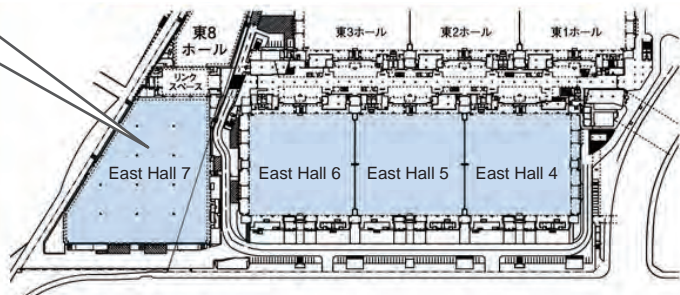
The special “Collaborative Expo Corner” in the Japan International Welding Show

The special exhibition will be set up within the Japan International Welding Show.



The venue plan of the Japan International Welding Show (East Hall 4 to East Hall 7)

The expo corner will be set up in the venue.



International Conference Program

Measures against COVID-19

All delegates and exhibitors are requested to wear a mask during the entire period of the IIW2022 and its social events.

Sunday, 17 July

15:00-15:15 **International Conference Opening Ceremony** **Palais Royal A/B (B1F)**

Speech

(1) Chairman of the Conference Organizing Committee (Manabu Tanaka)

(2) Acting President of IIW (Dr. Sorin Keller)

15:15-17:15 **Plenary Session I**

Chairs: Stephan Egerland, Fronius International

Mitsuru Ohata, Osaka University

Keynote Lecture 1

Green Growth Strategy in the Context of Carbon Neutrality (tentative)

Shinichi Kihara

Deputy Director-General for Technology and Environment, Industrial Science and Technology Policy and Environment Bureau, METI, Japan

Keynote Lecture 2

[MISSION NET ZERO] Initiatives of Mitsubishi Heavy Industries Group for Energy Transition

Eisaku Ito

Mitsubishi Heavy Industries, Ltd., Japan

Keynote Lecture 3

Additive Manufacturing: Building the Future One Layer at a Time

Josh Mook

GE Additive, USA

Keynote Lecture 4

Transformative Change in the Automotive Industry

Brian J. Krinock

Toyota Motor North America, USA

Monday, 18 July

8:30-10:30 **Plenary Session II** **Palais Royal A (B1F)**

Chairs: Robert E. Shaw, Jr., Steel Structures Technology Center, Inc.
Tomoya Kawabata, The University of Tokyo

Keynote Lecture 5

Renewable Energy Revolution by Power Generation with Floating Offshore Wind Turbine

Hideyuki Suzuki
The University of Tokyo, Japan

Keynote Lecture 6

Zero-emission Transition in Shipping

Hiroaki Sakashita
NIPPON KAIJI KYOKAI (ClassNK), Japan

Keynote Lecture 7

Towards the Future of Net-zero Aviation

Noriko Morioka
IHI Corporation, Japan

Keynote Lecture 8

Construction DX Initiatives Shimz Smart Site Next Generation Building construction System

Masahiro Indou
Shimizu Corporation, Japan

11:00-12:30 **[AM] Process Control** **Palais Royal A (B1F)**

Chairs: Abhay Sharma, KU Leuven
Soshu Kirihara, Osaka University

Invited Lecture 1

Innovative Aerospace and Space Structures made by Additive Manufacturing

Christoph Leyens^{1,2}, Frank Brückner^{2,3}, Elena López²
¹Technische Universität Dresden, Institute of Materials Research, Germany, ²Fraunhofer Institute for Material and Beam Technology IWS, Germany, ³Department of Engineering Sciences and Mathematics, Luleå University of Technology, Sweden

A-1 Controlled Droplet-on-Demand Deposition in Plasma–MIG Process: A Numerical Simulation Study

Angshuman Kapil¹, Nithin Kayarthaya², Vatsalya Sharma³, Patrick Van Rymenant⁴, Abhay Sharma¹
¹KU Leuven, Faculty of Engineering Technology, Department of Materials Engineering, Campus de Nayer, Belgium, ²KU Leuven, Faculty of Engineering Technology, Campus de Nayer, Belgium, ³Centre for Mathematical Plasma Astrophysics (CmPA), KU Leuven, Belgium, ⁴KU Leuven, Faculty of Engineering Technology, Department of Mechanical Engineering, Campus de Nayer, Belgium

A-2 In-Situ Process Analysis of Laser Welding by Temporally and Spatially Mapped Radiation Reflection Measurements
Moritz Wittemer, Andreas Wimmer, Katrin Wudy
Technical University of Munich, Germany

11:00-12:30 **[AI & DX] Automation of Welding Process** **Palais Royal B (B1F)**
Chairs: Satoru Asai, Osaka University
Ryoichi Tsuzuki, Kawasaki Heavy Industries, Ltd.

Invited Lecture 2

Evolution of Solutions Provided by i³-Mechatronics - Sustainable Manufacturing Supported by Evolution of Robots -
Kazuhiro Haniya
Yaskawa Electric Corporation

D-1 Automatic Welding with the Skilled Welding Operators Technique due to the Utilization of Image Processing and Machine Learning
Yasutaka Banno¹, Kenta Nakao², Naoki Suda³, Yasushi Nishijima³, Mayu Kubo¹
¹Research & Innovation Center, Mitsubishi Heavy Industries, Ltd., Japan, ²ICT solution Headquarters, Mitsubishi Heavy Industries, Ltd., Japan, ³Nuclear Energy Systems, Mitsubishi Heavy Industries, Ltd., Japan

D-2 Automation of Welding Bead Length and Width Measurement by Semantic Segmentation and Image Recognition Algorithms
Haruki Eguchi, Masashi Yoshida, Wanyu Tie, Michio Sakurai, Toru Sakai, Daichi Higashi, Yoshihiko Yagi
Panasonic Connect Co., Ltd., Japan

11:00-12:30 **[Hydrogen] Welding Process** **Palais Royal C (B1F)**
Chairs: Yoshiki Mikami, Osaka University
Hoyos Elizabeth, Universidad EIA

Invited Lecture 3

Technical Developments for Realization of Hydrogen Society, Focusing on Welding and Gas Cutting
Kunihiko Koike, Yoshifumi Yoshida, Hiroshi Tsujigami
Iwatani Corporation, Japan

H-1 Vehicle to Arc (V2Arc) The High Efficiency Arc Welding/Cutting Equipment Supplied Primary Power from Electric Vehicles
Kosaku Yamaguchi
DAIHEN Corporation, Japan

H-2 Identification and Feasibility Evaluation of a Friction Stir Welding Application in the Colombian Energy Sector
Elizabeth Hoyos¹, Maria Camila Serna¹, Santiago Escobar¹, Jeroen De Backer²
¹Universidad EIA, Envigado, Colombia, ²TWI Technology Centre, Yorkshire, UK

11:00-12:30 **[Future Technology] Welding Process/NDT** Palais Royal D (B1F)
Chairs: Hiroyuki Shimizu, KOBE STEEL
Keiji Kadota, Daihen Corporation

Invited Lecture 4

Contribution to Carbon Neutrality by MHI Nuclear Engineering Systems and Supporting Welding Technology

Yurugi Kanzaki
Mitsubishi Heavy Industries, Ltd., Japan

F-1 Nondestructive Detection of Unwelded Parts of T-joints by Magnetic Flux Leakage Testing with High Sensitivity Sensors

Yohei Miyamoto¹, Mikihiro Hirohata¹, Minoru Hayashi², Keiji Tsukada²
¹*Osaka University, Japan*, ²*Okayama University, Japan*

F-2 Multi-faceted Evaluation of Dissimilar Joining between High Tensile Strength Steel Plate and Aluminum Plate using Useful New Non-destructive Method

Yusuke Futamata, Tsuginosuke Hashimoto, Naoshi Kakio, Satoshi Yoshimi
Shimadzu Corporation, Japan

11:00-12:30 **[New Materials] Dissimilar Resistance Spot Welding** Châtelet (B1F)
Chairs: Kazuhiro Ito, Osaka University JWRI
Yu-Jun Xia, Shanghai Jiao Tong University

Invited Lecture 5

Structural Adhesive Bonding of Fiber Reinforced Composite Parts

Bernd Mayer^{1,2}, Holger Fricke¹
¹*Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Germany*, ²*Faculty of Production Engineering, University of Bremen, Germany*

M-1 MFDC Resistance Spot Welding of Aluminum to Steel / Effects of Welding Program Pulses, Electrode Shape and Polarity on Microstructure and Strength

Mario Saeglitz, Sandra Jacobs
Hochschule Darmstadt, University of Applied Sciences, Germany

M-2 Collaborative Simulation of Nugget Growth and Process Signals for Resistance Spot Welding

Yu-Jun Xia¹, Tian-Le Lv¹, Hassan Ghassemi-Armaki², Yong-Bing Li¹, Blair E. Carlson²
¹*Shanghai Jiao Tong University, China*, ²*General Motors Global R&D, USA*

11:00-12:30 **[AM] Process 1** Étoile (B1F)
Chairs: Fiona Spirrett, Osaka University JWRI
Josh Mook, GE Additive

A-6 New Approaches in Additive Manufacturing - The Final Steps in DED with Powder and Wire towards Guaranteed Quality and *First Time Right*

Markus Kogel-Hollacher¹, Christian Staudenmaier¹, Steffen Boley², Heinz-Ingo Schneider³, Daniel Regulin⁴
¹*Precitec GmbH & Co. KG, Germany*, ²*Institut für Strahlwerkzeuge, Universität Stuttgart, Germany*, ³*Siemens AG Additive Manufacturing, Germany*, ⁴*Siemens AG Functional Materials & Manufacturing Processes, Germany*

A-7 **Development of Metal Additive Manufacturing Technology for Gas Turbine Hot Parts**
Shuji Tanigawa, Masaki Taneike, Ryuta Ito, Takanao Komaki, Norihiko Motoyama,
Masahito Kataoka
Mitsubishi Heavy Industries, Ltd., Japan

A-8 **Determination of Shielding Gas for Multi-material Arc Directed Energy Deposition Additive Manufacturing**
Fereidoon Marefat¹, Aref banaee², Angshuman Kapil¹, Patrick Van Rymenant³,
Abhay Sharma¹
¹*KU Leuven, Faculty of Engineering Technology, Department of Materials Engineering, Belgium,* ²*KU Leuven, Faculty of Engineering Technology, Belgium,* ³*KU Leuven, Faculty of Engineering Technology, Department of Mechanical Engineering, Belgium*

11:00-12:30 **[Advanced Technology] Fatigue and Fracture 1** **Vendôme (B1F)**
Chairs: Hiroto Shoji, Osaka University
Sun Xing , TWI Ltd

Invited Lecture 6

Panasonic GREEN IMPACT for Manufacturers' Futures
Atsuto Shimada
Panasonic Connect Co., Ltd., Japan

O-1 **[Cancelled] Fatigue Testing And Modelling Of Flare Bevel Groove Welded Aluminum T-Joints**

O-2 **Ageing Effect on Fatigue Performance of Offshore Structures by Fracture Mechanics Method**
Xing Sun, Matthew Doré
Fatigue and Fracture Integrity Management, TWI Ltd. Cambridge, UK

11:00-12:30 **[AM] Modeling and Simulation 1** **Concerto (B1F)**
Chairs: Yosuke Ogino, Osaka University
Kiyokazu Yasuda, Osaka University

A-15 **[Cancelled] ANN Based Approach To Control The Dimensional Accuracy In Wire Arc Additive Manufacturing Process**

A-16 **Transition Strategy Optimization of Inconel625-HSLA Steel Functionally Graded Material Fabricated by Wire Arc Additive Manufacturing**
Jiarong Zhang¹, Xinjie Di^{1,2}, Chengning Li^{1,2}, Lingzhi Ba¹
¹*Tianjin University, China,* ²*Tianjin Key Laboratory of Advanced Joining Technology, China*

A-17 **Surface Roughness of an Additively Manufactured AISi10Mg Aluminum Alloy: Deep-Learning Based Prediction and Experimental Validation**
Waqas Muhammad^{1,2}, Jidong Kang², Olga Ibragimova¹, Kaan Inal¹
¹*University of Waterloo, Canada,* ²*CanmetMATERIALS, Canada*

- 11:00-12:30 **[New Materials] Brazing Materials** **Harmonie (B1F)**
- M-11** **[Cancelled] Study on Brazing Behavior of Diamond with Nickel Base Boron Free Solder**
- M-12** **[Cancelled] Effects Of HF And Zr On Microstructure And Properties Of Ni-based Boron Free Solder And Brazed Diamond Joint**
- M-13** **[Cancelled] Effect Of Cr Content On Microstructure, Melting Characteristics And Mechanical Properties Of Ni-based Boron Free Solder**
- 11:00-12:30 **[AM] Materials and Properties 1** **Fantaisie (B1F)**
Chairs: Shotaro Yamashita, Osaka University
 Tao Yuan, Beijing University of Technology Faculty of Materials and Manufacturing
- A-25** **Microstructure and Properties of TNZT-TiB₂ Composite Processed by Laser-Powder Bed Fusion**
 Rodolfo L. Batalha^{1,2}, Paulo J. Morais¹, Ana M. G. M. Cabral¹, Vitor Eduardo Pinotti², Omar O. S. Alnoaimy³, Weverson C. Batalha², Tobias Gustmann⁴, Konrad Kosiba⁴, Simon Pauly⁵, Claudemiro Bolfarini², Claudio S. Kiminami², Piter Gargarella²
¹Instituto de Soldadura e Qualidade, Porto Salvo, Portugal, ²Federal University of São Carlos, São Carlos, Brazil, ³Fraunhofer Institute for Machine Tools and Forming Technology, Dresden, Germany, ⁴Leibniz Institute for Solid State and Materials Research Dresden, Dresden, Germany, ⁵University of Applied Sciences Aschaffenburg, Aschaffenburg, Germany
- A-26** **Effects of Notch-load-defect Interactions on the True Stress-logarithmic Strains and Strain Hardening of L-PBF 18Ni300**
 Shahriar Afkhami¹, Kalle Lipiäinen¹, Vahid Javaheri², Mohsen Amraei^{3,4}, Antti Salminen⁴, Timo Björk¹
¹Laboratory of Steel Structures, LUT University, Finland, ²Materials and Mechanical Engineering, University of Oulu, Finland, ³Laboratory of Laser Processing & Additive Manufacturing, LUT University, Finland, ⁴Mechanical and Materials Engineering, University of Turku, Finland
- A-27** **Inhomogeneous Formation of Microstructure in a Martensitic Stainless Steel during Wire Arc Additive Manufacturing**
 Zhiwei Lyu¹, Yutaka S. Sato¹, Shun Tokita¹, Yue Zhao², Jinlong Jia², Aiping Wu²
¹Tohoku University, Japan, ²Tsinghua University, China
- 11:00-12:30 **[Future Technology] Friction Welding** **Menuet (B1F)**
Chairs: Hidetoshi Fujii, Osaka University
 Javaheri Vahid, University of Oulu
- F-6** **Linear Friction Welding of AA1050-H24 Joint and AA5052-H34 Joint**
 Jeong-Won Choi¹, Weihao Li², Kohsaku Ushioda², Motomichi Yamamoto¹, Hidetoshi Fujii²
¹Graduate School of Engineering, Hiroshima University, Japan, ²Joining and Welding Research Institute, Osaka University, Japan

- F-7 **[Cancelled] Effect of magnetizing parameters on friction stir welded steel plate using a micro-magnetic technique**
- F-8 **[Cancelled] Evaluation of Tungsten Carbide Tool Material During Friction Stir Cladding of Copper on Steel Substrate**
- 11:00-12:30 **[Future Technology] High Power Beam 1** **Pensée (1F)**
Chairs: Yuji Sato, Osaka University
 Oving Peter, TECHMETA Engineering
- F-15 **Mitigation of Liquation Cracking in Laser Welding of Pairs of L-PBF Processed and Wrought Plates of Inconel 718**
 Juan Simon-Muzas¹, Christian Brunner-Schwer², Michael Rethmeier^{1,2,3}, Kai Hilgenberg¹
¹Bundesanstalt für Materialforschung und -prüfung (BAM), Germany, ²Fraunhofer Institute for Production Systems and Design Technology, Germany, ³Institute of Machine Tools and Factory Management, Technische Universität Berlin, Germany
- F-16 **Development of Low Distortion Fillet Welding Technology Combining Hot-wire and High-power Diode Laser on 9%-NiSteel for LNG-fueled Ship**
 Yuma Ozeki¹, Motoki Nakamura¹, Jeong-Won Choi¹, Motohiro Okushima², Suo Saruwatari², Manabu Mizumoto³, Motomichi Yamamoto¹
¹Graduate School of Advanced Science and Engineering, Hiroshima University, Japan, ²Plate & Construction Products Unit, Nippon Steel Corporation, Japan, ³R&D Division, Nippon Steel Welding and Engineering Co., Ltd., Japan
- F-17 **New Electron Beam Welding Technique to Weld Niobium SCRF Cavities from the Inside for Optimal Cavity Performance**
 Peter Oving¹, Samuel De Sousa¹, Franck Oudot¹, Takeshi Dohmae², Akira Yamamoto²
¹TECHMETA Engineering, France, ²KEK, Japan
- 11:00-12:30 **[AI & DX] Education and Training** **Ginga (29F)**
Chairs: Satoshi Yamane, Saitama University
 Schmelzer Aimée, Artwelding GmbH
- D-6 **Step Change in Welding Simulation to Qualify Professional Welders at Siemens Mobility Krefeld (Germany) in the Regulated Field of Welding Technology**
 Michael Schumann¹, Antonio Claveria²
¹Siemens Mobility, Germany, ²Seabery Soluciones, Spain
- D-7 **Worldwide Welder Shortage and Approaches to Overcome the Crisis**
 A. Schmelzer¹, A. König¹, E. Margeta², A. Fernandez³, F. Benus Jr.⁴, Ž. Habek⁵
¹SVS, Schweizerischer Verein für Schweißtechnik, Switzerland, ²Industrijsko-obrtnička škola, Croatia, ³Seabery, Spain, ⁴Learn Virtual Europe, Hungary, ⁵Udruga za cjeloživotno strukovno obrazovanje STRUKA, Croatia.
- D-8 **Welding Simulators - Green Training for Top Welders**
 E. Margeta¹, A. Fernandez², F. Benus Jr.³, A. Schmelzer⁴, A. König⁴, Ž. Habek⁵
¹Industrijsko-obrtnička škola, Croatia, ²Seabery, Spain, ³Learn Virtual Europe, Hungary, ⁴SVS, Schweizerischer Verein für Schweißtechnik, Switzerland, ⁵Udruga za cjeloživotno strukovno obrazovanje STRUKA, Croatia

- 11:00-12:30 **[AI & DX] Automation** **Hikari (29F)**
Chairs: Fumikazu Miyasaka, Osaka University
Tomokazu Sano, Osaka University
- D-13 Vision-based AI-Algorithm for Seam Tracking and Distance Control of Fillet Welds in Gas Metal Arc Welding**
Mobina Mobaraki¹, Klaske Van Heusden², Ahmad Ashoori⁴, Guy A. Dumont¹, Kwang Moo Yi³, Amin Ghasemazar⁴, Mahyar Asadi⁴
¹*Electrical and Computer Engineering Department, University of British Columbia, Canada,* ²*Mechanical, School of Engineering, University of British Columbia, Canada,* ³*Computer Science Department, University of British Columbia, Canada,* ⁴*Novarc Technologies, Canada*
- D-14 Application of Deep Learning to Seem Tracking in Plasma Arc Welding**
Jidong Lu, Ning Li, Satoshi Yamane
Graduate School of Science and Engineering, Saitama University, Japan
- D-15 Explainable Deep Learning for Welding Defect Detection**
Masashi Yoshida, Haruki Eguchi, Toru Sakai, Michio Sakurai, Yoshihiko Yagi
Panasonic Connect, Japan
- 11:00-12:30 **[Advanced Technology] Welding Residual Stress** **Niji (29F)**
Chairs: Hisaya Komen, Osaka University
Methong Titinan, King Mongkut's University of Technology Thonburi
- O-13 Numerical Study on the Effect of Peening Tool's Movement on Deformed Profile and HFMI-induced Residual Stresses**
Peiyuan Dai¹, Phyo Myat Kyaw¹, Naoki Osawa¹, Sherif Rashed², Donghui Ma³, Jun Okada³, Masahito Honnami³, Xiao Li⁴
¹*Osaka University, Japan,* ²*CAE Lab, Japan,* ³*Hitachi Zosen Corporation, Japan,* ⁴*Xi'an Shiyou University, China*
- O-14 Mechanism for Stress Relaxation and Long-term Stability of the Compressive Stress Introduced by WJP and Buffing Stress Improving Treatments**
Lina Yu¹, Kazuyoshi Saida¹, Kazutoshi Nishimoto¹, Naoki Chigusa²
¹*Osaka University, Osaka, Japan,* ²*The Kansai Electric Power Co., Inc., Osaka, Japan*
- O-15 Study on Joint Characteristics in Laser Butt Welding of AMed and Bulk Ti6Al4V Plates**
Yasuhiro Okamoto¹, Togo Shinonaga¹, Yoshito Takemoto¹, Akira Okada¹, Akihiro Ochi¹, Ryuya Kishimoto¹, Sisa Pityana², Nana Arthur², Peter Omoniyi^{3,4}, Rasheedat Mahamood^{3,4}, Martin Maina⁵, Esther Akinlabi^{3,6}
¹*Okayama University, Japan,* ²*National Laser Centre, CSIR, South Africa,* ³*University of Johannesburg, South Africa,* ⁴*University of Ilorin, Nigeria,* ⁵*Jomo Kenyatta University of Agriculture and Technology, Kenya,* ⁶*Pan Africa University for Life and Earth Sciences Institute, Nigeria*

- 11:00-12:30 **[Future Technology] Metallurgy** **Akatsuki (29F)**
Chairs: Kota Kadoi, Osaka University
Tomków Jacek, Gdansk University of Technology
- F-25 Effect of Water Salinity on Properties of Multipass Underwater Wet Welded Joints**
Jacek Tomków, Dariusz Fydrych, Jerzy Łabanowski
Gdańsk University of Technology, Faculty of Mechanical Engineering and Ship Technology, Poland
- F-26 Effect of Dilution Ratio in a Hard Facing Weld Metal on Solidification Cracking Susceptibility**
Jesada Kaewwichit¹, Rittichai Phaoniam², Bovornchok Poopat¹
¹*Industrial and Manufacturing Systems Engineering, Department of Production Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi, Thailand,* ²*Department of Mechanical and Industrial Engineering, Faculty of Engineering, Rajamangala University of Technology Krungthep, Thailand*
- F-27 Laser Pressure Welding Induced Microstructure Associated with Corrosion Resistance of Al-Li Alloy 2198**
Tianbo Zhao^{1,3}, Yutaka S. Sato¹, Ting Huang², Rongshi Xiao²
¹*Department of Materials Processing, Graduate School of Engineering, Tohoku University, Japan,* ²*High-Power and Ultrafast Laser Manufacturing Lab, Faculty of Materials and Manufacturing, Beijing University of Technology, China,* ³*currently Fabrication Sect., Manufacturing Dept., Mitsui E&S Machinery Co., Ltd., Japan*
- 11:00-12:30 **[Advanced Technology] Assessment** **Akane (29F)**
Chairs: Ninshu Ma, Osaka University
Jarmai Karoly, University of Miskolc
- O-19 Sustainability Assessment of Welding Processes: A Review**
Elisaveta Doncheva, Jelena Djokikj, Nikola Avramov, Martin Petreski, Aleksandra Krstevska
University of ss.Cyril and Methodius, Faculty of Mechanical Engineering – Skopje, Skopje, North Macedonia
- O-20 Transformation of Proprietary Welding Data Software from a PC-based Application to a Cloud-enabled Container Application using Standard Interfaces**
Timo Steinbring
Carl Cloos Schweißtechnik GmbH, Germany
- O-21 Calculation of the Welding Costs and Times using Various Heat Resistant Steels at Pressure Vessels**
Károly Jármai¹, Antal Erdős²
¹*University of Miskolc, Hungary,* ²*BorsodChem Zrt., Hungary*
- 14:00-16:00 **[AM] Materials and Properties 2** **Palais Royal A (B1F)**
Chairs: Tomokazu Sano, Osaka University
Soshu Kirihaara, Osaka University
- Invited Lecture 7**
Opportunities in New Metallic Materials in Metal Additive Manufacturing
Moataz M. Attallah
University of Birmingham, UK

A-3 Influence of Process Parameters on the Geometry, Microstructure and Properties of Waam Deposited High Strength Steel Walls

A. Babu, E. Trodini, I. M. Richardson, M.J.M Hermans
TU Delft, Delft, Netherlands

A-4 Directed Energy Deposition of Invar using Pre-alloyed Wire Compositions and Feasibility Study of In-situ Alloying using Fe and Ni Elemental Wires

Romali Biswal¹, Goncalo Pardal¹, Craig Coppen², Stewart Williams¹
¹*Cranfield University, UK*, ²*Royal IHC limited, UK*

A-5 [Cancelled] Influence of Heat Treatment on the Microstructure and Hardness of 17-4PH ADAM Welded Stainless Steels

14:00-16:00 **[AI & DX] Optimization and Management** **Palais Royal B (B1F)**
Chairs: Shinji Kodama, Nippon Steel Corporation
Kazuhiro Aoyama, The University of Tokyo

Invited Lecture 8

Paradigm Changes in the Welding Automation for Heavy Industry using Cutting-edge Digital Technologies

Yoshihide Inoue
Welding Business, KOBE STEEL, LTD., Japan

D-3 Optimization of Welding Process and Factory Layout in Aero Engine Manufacturing

Ryoichi Tsuzuki
Kawasaki Heavy Industries, Ltd. Aerospace System Company, Japan

D-4 Toward Total Welding Quality Management System based on Shipbuilding Monitoring System

Kazuhiro Aoyama¹, Chenwei Gui¹, Zeli Zhou¹, Hideaki Suetsugu², Byunghoo Jung³, Mikito Shirai⁴
^{a1}*The University of Tokyo, Japan*, ²*Namura Information System Co. Ltd, Japan*, ³*Purdue University, USA*, ⁴*MARINE NEXT Co., Ltd., Japan*

D-5 Development of Welding Operations Visualization Technology for Acceleration of Digital Transformation in Heavy Industrial Factory

Kasano Kazuki, Matsui Rintaro
Sumitomo Heavy Industries, LTD., Japan

14:00-16:00 **[Hydrogen] Mechanical Behavior** **Palais Royal C (B1F)**
Chairs: Tomoya Kawabata, The University of Tokyo
Gaspar Marcell, University of Miskolc

Invited Lecture 9

International Liquefied Hydrogen Supply Chain

Katsuya Morimoto
Kawasaki Heavy Industries, Ltd., Japan

- H-3 Deterioration of HAZ Toughness by Residual Sn and Its Allowable Content for Electric Furnace Steels**
Tomoya Kawabata¹, Saki Hayashi¹, Masayuki Yoshimoto², Masayuki Yamamoto², Toshiyuki Numata³, Kouji Yamada³
¹The University of Tokyo, Japan, ²Chubu Steel Plate Co., Ltd., Japan, ³FaB-Tec Japan Corporation, Japan
- H-4 Effect of Stress Field on TRIP Behavior and Its Influence on Fracture Behavior of Commercial Stainless Steels at Cryogenic Temperature**
Ritsuki Morohoshi, Tomoya Kawabata
The University of Tokyo, Japan
- H-5 Physical Simulation Based HAZ Characterization of Different Pipeline Steel Grades**
Marcell Gáspár, Raghawendra Sisodia
University of Miskolc, Institute of Material Science and Technology, Hungary

14:00-16:00 **[Future Technology] Welding for Thick Plate** Palais Royal D (B1F)
Chairs: Motomichi Yamamoto, Hiroshima University
Shigetaka Okano, Osaka University

Invited Lecture 10

Forefront of ITER Project, the Dream Nuclear Fusion Energy

Masanori Mochimaru

Toshiba Energy Systems & Solutions Corporation, Japan

F-3 Application of High-precision Assembly Technology for Large Structures by Laser Beam Welding

Tomoyuki Nishiyama, Takashi Kagawa, Shuho Tsubota, Masahiro Kimura

Mitsubishi Heavy Industries, Ltd., Japan

F-4 Development of Narrow-gap Welding for Ultra-thick Cast Steel Using Hot-wire Method and High-power Diode Laser

Keita Marumoto¹, Yuta Sato¹, Akira Fujinaga², Taleshi Takahashi², Hikaru Yamamoto², Jeong-Won Choi¹, Motomichi Yamamoto¹

¹Hiroshima University, Japan, ²Hitachi Construction Machinery Co., Ltd., Japan

F-5 The Optimization of High-Efficiency and Low Heat Input Hot-wire Gas Metal Arc Welding for Thick Steel Plate in Shipbuilding Industry

Nattasak Suwannatee¹, Somchai Wongthaisong², Rittichai Phaoniam²,

Shinichiro Shinohara³, Jeong-Won Choi¹, Motomichi Yamamoto¹

¹Hiroshima University, Japan, ²Rajamangala University of Technology Krungthep, Thailand,

³Tsuneishi Shipbuilding Co., Ltd, Japan

14:00-16:00 **[New Materials] Steel Welds** Châtelet (B1F)
Chairs: Hiroaki Mori, Osaka University
Raghawendra Pratap Singh Sisodia, University Of Miskolc

Invited Lecture 11

New Stainless Steel HRX19[®] with both High Strength and Superior Hydrogen Embrittlement Resistance for High Pressure Hydrogen Gas Application

Takahiro Osuki¹, Kana Jotoku¹, Jun Nakamura¹, Tomohiko Omura¹, Takahiro Izawa¹, Hiroyuki Hirata²

¹Nippon Steel Corporation, Japan, ²Osaka University, Japan

- M-3 Simulated Heat Affected Zone Ferrite Content Influence on Toughness for Standard Duplex and New Duplex Stainless Steel Grade with Enhanced Weldability**
Anne Higelin¹, Sandra Le Manchet¹, Gilles Passot¹, John Grocki²
¹Centre de Recherche des Matériaux au Creusot, Industeel – ArcelorMittal, France,
²Industeel-ArcelorMittal USA
- M-4 A Study on Creep and Mechanical Properties at High Temperature of SMAW Welds for Modified Cr-Mo-X Steel**
Sanghyun Bae¹, Yongchul Kim¹, and Stephen Liu²
¹KISWEL R&D Center, South Korea, ²Colorado School of Mines, U.S.A.
- M-5 The Influence of Filler Material on Microstructural and Mechanical Properties of Diode Laser Welded DP1000**
Raghawendra Sisodia, Marcell Gáspár
Institute of Materials Science and Technology, University of Miskolc, Hungary

14:00-16:00

[AM] Process 2

Étoile (B1F)

Chairs: Houichi Kitano, National Institute for Materials Science
Fiona Spirrett, Osaka University

- A-9 Process Integrated Closed-loop Control in Wire-Arc-Additive-Manufacturing**
Lennart Vincent Hölscher, Thomas Hassel, Hans Jürgen Maier
Institut für Werkstoffkunde (Materials Science), Leibniz Universität Hannover, Germany
- A-10 Parametric Study of Melt Pool Geometry in Hybrid Plasma Arc-laser Melting Process for Additive Manufacturing Application**
Chong Wang, Wojciech Suder, Jialuo Ding, Stewart Williams
Cranfield University, UK
- A-11 Cold Metal Transfer-based Twin Wire Arc Additive Manufacturing of Iron Aluminides**
Tirupataiah Kasani, Nasina Venkaiah, Degala Venkata Kiran
Indian Institute of Technology Tirupati, India
- A-12 Experimental and Theoretical Analysis of Heat Accumulation in Laser Wire Direct Energy Deposition**
Christian Hagenlocher^{1,2}, Patrick O'Toole¹, Steffen Boley², Wei Xu^{1,3}, Milan Brandt¹, Mark Easton¹, Andrey Molotnikov¹
¹RMIT Centre for Additive Manufacturing, RMIT University, Australia, ²Institut für Strahlwerkzeuge, University of Stuttgart, Germany, ³School of Engineering, Deakin University, Australia

14:00-16:00

[Advanced Technology] FSW

Vendôme (B1F)

Chairs: Yutaka Sato, Tohoku University
Hoyos Elizabeth, Universidad EIA

Invited Lecture 12

Challenge to Welding and Joining Technology for Applying Multi-Material in Electric Vehicle Production

Tomoyuki Ueyama¹, Shinichi Hasegawa¹, Testuo Era¹, Hidetoshi Fujii²
¹DAIHEN (OTC) Corporation, Japan ²Joining and Welding Research Institute Osaka University, Japan

- O-3 Evaluation Strategy via Comparison of a Heat-input Model for the Friction Stir Welding Process**
Sara Montoya¹, Laura M. Moreno-Durango¹, Elizabeth Hoyos¹, Yesid Montoya¹, Hernan Alvarez²
¹Universidad EIA, ²Envigado, Colombia, Universidad Nacional de Colombia, Colombia
- O-4 Study on the Vertical Material Flow and Influencing Factors during Friction Stir Welding of Aluminium Alloys**
Yang Han, Shujun Chen, Xiaoqing Jiang
Beijing University of Technology, China
- O-5 Avoiding Void Formation in Friction Stir Welding of High Hard Armor (HHA) Steel**
Paul Lyda, Rafael Giorjao, Antonio J. Ramirez
Ohio State University, USA

14:00-16:00 **[AM] Modeling and Simulation 2** **Concerto (B1F)**
*Chairs: Katsuya Kugai, KINDAI University Technical College
Fumikazu Miyasaka, Osaka University*

- A-18 Composite Bead Models for Capturing Process Complexities in Weld-Deposition Based Additive Manufacturing**
Angshuman Kapil, Abhay Sharma
KU Leuven, Faculty of Engineering Technology, Department of Materials Engineering, Campus de Nayer, Belgium
- A-19 Design of Biomimetic Prickles for Heterogenous Joints by Additive Manufacturing**
Kiyokazu Yasuda, Riku Miura, Tai Wang
Osaka University, Japan
- A-20 Avoiding False Detection of Arc Sensors in Short-circuit Transitions –Quantification of Welding Phenomena in the Absence of Instability Factors –**
Katsuya Kugai, Nobuhiro Nakamura
Kindai University Technical College, Japan
- A-21 Development of Numerical Model for LFW Process Model by Particle Method**
Toya Kitamura, Fumikazu Miyasaka
Osaka University, Japan

14:00-16:00 **[New Materials] Other Processes** **Harmonie (B1F)**
*Chairs: Shinji Fukumoto, Osaka University
Wataru Takahara, Osaka University*

- M-14 Deteriorated Characteristics on the Fatigue Strength of Dissimilar A6061/ Galvannealed Steel Joints Fabricated by Friction Stir Spot Welding**
A.Toshimitsu Yokobori, Jr¹, Toshihito Ohmi^{1,2}, Go Ozeki¹, Ikuo Shohji³, Tsutomu Katsumata⁴and Toru Matsubara⁴
¹Advanced Comprehensive Research Organization Teikyo University, Japan, ²Department of Mechanical Engineering Shonan Institute of Technology, Japan, ³Graduate School of Science and Technology, Gunma University, Japan, ⁴ Palmeso co.jp, Japan
- M-15 Dissimilar and Hybrid Structures Via Magnetic Pulse Welding**
S. Marya, G. Racineux
Research Institute in Civil and Mechanical Engineering, Ecole Centrale de Nantes, France

- M-16** [Cancelled] Optimization Of Ti/Al Interface Zone At TA2/A5150 Joints By Growing K2Ti6O13 Whiskers On Titanium Surface
- M-17** **Partial Cleaning of Aluminium Sheet Surfaces for Thermal Joining**
Daniel Rudolph
Audi AG, Germany
- 14:00-16:00 **[AM] Defects** **Fantaisie (B1F)**
Chairs: Bernd Mayer, Fraunhofer Institute for Manufacturing Technology and Advanced Materials
Patrick O'Toole, RMIT
Kota Kadoi, Osaka university
- A-28** **Microstructure and Cracking in WAAM'ed Aluminium Alloys by Integrated Analytical and Process Modelling**
Patrick O'Toole¹, Alexandra Kingsbury¹, Johannes Kronsteiner², Hugo Drexler², Mark Easton¹, Andrey Molotnikov¹, Amir Horr², Martin Bielik³
¹RMIT Centre for Additive Manufacturing, RMIT University, Australia, ²Light Metals Technologies LKR, Austrian Institute of Technology, Austria, ³RHP-Technology GmbH, Automotive, Austria
- A-29** **Research on the Mechanism of Liquation Cracks in Wire-Arc Additive Manufacturing of Aluminum Alloy**
Min Xu, Shujun Chen, Tao Yuan
Institute of Intelligent Forming Equipment and System, Faculty of Materials and Manufacturing, Beijing University of Technology, China
- M-6** **Fabrication of micron-sized protrusions on metal surface for metal/polymer easy disassembly joining by selective laser melting technology**
Tai Wang¹, Kiyokazu Yasuda¹, Hiroshi Nishikawa²
¹Materials and Manufacturing Science Division, Graduate School of Engineering, Osaka University, Japan, ²Joining and Welding Research Institute, Osaka University, Japan
- M-7** **Welding Repair for Ni Base Superalloy**
Masahiko Mega, Koji Tsukimoto, Shuji Tanigawa, Sachio Shimohata, Masashi Kitamura
Manufacturing Technology Research Department, Research & Innovation Center, Mitsubishi Heavy Industries, Ltd., Japan
- 14:00-16:00 **[Future Technology] Arc Welding Process** **Menuet (B1F)**
Chairs: Hisashi Serizawa, Osaka University
Shinichi Tashiro, Osaka University
- F-9** **Development of Highly Productive Welding Process for Stainless-steel using High-current GMAW**
Tomoya Igarashi¹, Hayato Baba¹, Keiji Kadota¹, Tetsuo Era¹, Tomoyuki Ueyama¹, Manabu Tanaka²
¹Welding Research Department, Welding & Joining Division, DAIHEN Corporation, Japan, ²Joining and Welding Research Institute, Osaka University, Japan

- F-10** **Influence of Metal Deposition Modes on The Side Wall Fusion and Properties of Narrow Gap Gas Metal Arc Welded Joints**
Sudheer Kumar Polamuri, Degala Venkata Kiran, Nasina Venkaiah
Indian Institute of Technology Tirupati, India
- F-11** **[Cancelled] Effect of Electrode Tip Angle on Penetration, Bead Width, Distortion, and Atmospheric Contamination During Pulse GTA Welding of Grade-2 Titanium Alloy (CP-Ti)**
- O-9** **Measurement of Electron Density Distribution of AC-GTA in like Mars Atmosphere**
Kai Aoyama¹, Shinichiro Shobako¹, Tomohiko Yamashita¹, Noboru Terajima¹,
Hisaya Komen², Manabu Tanaka²
¹National Institute of Technology Kagawa College, Japan, ²Joining and Welding Research Institute, Osaka University, Japan
- 14:00-16:00 **[Future Technology] High Power Beam 2** **Pensée (1F)**
Chairs: Christoph Leyens, Fraunhofer Institute for Material and Beam Technology
Lind Jannik, University of Stuttgart IFSW
Yuji Sato, Osaka University
- F-18** **Superimposed Intensity Distributions to Reduce Spatter Formation at High Feed Rates during Laser Welding**
Jannik Lind^{1,2}, Michael Jarwitz¹, Christian Hagenlocher¹, Jonas Wagner¹, Rudolf Weber¹,
Thomas Graf¹
¹Institut für Strahlwerkzeuge (IFSW), Germany, ²Precitec GmbH & Co. KG., Germany
- F-19** **Electron Beam Welding of Copper Electrical Conductors for Electric Vehicles**
Alex O'Farrell
Cambridge Vacuum Engineering, UK
- F-20** **Interaction of Protective Gas with Process Emissions in Vacuum Laser Welding**
Max Nentwich¹, Alex O'Farrell², Wojciech Suder¹
¹Cranfield University, UK, ²Cambridge Vacuum Engineering, UK
- F-21** **Influence of Beam Shaping on the Process Efficiency during Laser Welding**
Jonas Wagner¹, Christian Hagenlocher¹, Jannik Lind¹, Rudolf Weber¹, Nina Armon²,
Roey Susid², Oded Tsion², Eyal Shekel², Thomas Graf¹
¹Institut für Strahlwerkzeuge (IFSW), Germany, ²Civan Advanced Technologies Ltd., Israel
- 14:00-16:00 **[AI & DX] Inspection** **Ginga (29F)**
Chairs: Kazufumi Nomura, Graduate School of Engineering Osaka University
Satoyuki Tanaka, Hiroshima University
- D-9** **Application of Phased Array Ultrasonic Testing for Tube-to-Tubesheet Weld of Heat Exchanger using Deep Learning**
Kaoru Shinoda¹, Masamitsu Abe¹, Takeru Katayama¹, Ryota Ioka², Takahiro Wada²,
Naoto Shinmura³, Joichi Murakami⁴, Hiroshi Hattori⁵
Carbon Neutral Solution Business Headquarters, Hitachi Zosen Corporation, ¹Kumamoto, Japan, ²R & D Headquarters, Hitachi Zosen Corporation, Osaka, Japan, ³Kyusyu Division, Nichizo Tech Inc., Kumamoto, Japan, ⁴Technical Consulting Headquarters, Nichizo Tech Inc., Osaka, Japan, ⁵Technical Development Department, Nichizo Tech Inc., Osaka, Japan

D-10 Study of Fracture Behaviours on a Tube-to-Tubesheet Weld Joint for a Heat Exchanger
Thin Thin Htut¹, Satoyuki Tanaka¹, Donghui Ma², Jun Okada², Masahito Honnami²,
Kaoru Shinoda³, Masamitsu Abe³, Takeru Katayama³
¹Graduate School of Advanced Science and Engineering, Hiroshima University, Japan, ²R
& D Headquarters, Hitachi Zosen Corporation, Japan, ³Carbon Neutral Solution Business
Headquarters, Hitachi Zosen Corporation, Japan

D-11 A Study for Automatic Inspection of Leg Length and Undercut in the T-shaped Joint using Deep Learning
Norihiro Watanabe^{1,2}, Kento Yamasaki¹, Koji Gotoh²
¹Oshima Shipbuilding Co., Ltd, Japan, ²Kyushu University, Japan

D-12 In-line Detection of Internal Defects for Lap Joint welding of Galvanized Steel Sheet by Laser Ultrasonic Technique
Keiji Kadota^{1,2}, Taketo Matsuida³, Kazufumi Nomura³, Tetsuo Era^{1,2}, Satoru Asai²
¹Daihen corporation, Japan, ²Joining and Welding Research Institute, Osaka University,
Japan ³Graduate School of Engineering, Osaka University, Japan

14:00-16:00 **[AI & DX] Prediction of Weld Quality** **Hikari (29F)**
Chairs: Hidenori Terasaki, Kumamoto University
Satoshi Minamoto, National Institute for Materials Science

D-16 Development of Analysis Method to Predict Creep Life from Welding Process and Study of Appropriate Heat Source Parameters
Kesisuke TORIGATA¹, Takaaki MATSUOKA¹, Daisuke ABE², Hitoshi IZUNO³,
Masahiko DEMURA³
¹IHI Corporation Technology & Intelligence Integration, Japan, ²IHI Corporation Human
Resources, Japan, ³National Institute for Materials Science Research and Services Division
of Materials Data and Integrated System, Japan

D-17 Optimization of HAZ Shape Factors by Bayesian Inference for Creep Performance Improvement of Heat-Resistant Steel Welded Joint
Hitoshi Izuno¹, Masahiko Demura¹, Masayoshi Yamazaki¹, Yoh-ichi Mototake²,
Kenji Nagata³, Daisuke Abe⁴, Keisuke Torigata⁵
¹Research and Services Division of Materials Data and Integrated System, National Institute
for Materials Science, ²The Institute of Statistical Mathematics, ³Materials Data Platform
Center, National Institute for Materials Science, ⁴Human Resources, IHI Corporation,
⁵Technology & Intelligence Integration, IHI Corporation

D-18 Optimization of Process Conditions to Maximize Creep Rupture Time in Steel Welds
Satoshi Minamoto, Koyo Daimaru, Hitoshi Izuno, Masahiko Demura
National Institute for Materials Science (NIMS), Japan

D-19 Establishment of Process–structure–property Linkage for Generation of Virtual Micrograph using Deep Learning Method
Satoshi Noguchi, Junya Inoue
The University of Tokyo, Japan

14:00-16:00	<p>[AI & DX] Skill Evaluation of Welders</p> <p><i>Chairs:</i> Koutarou Inose, IHI Corporation Koji Gotoh, Kyushu University</p>	Niji (29F)
D-23	<p>Beginners' Welding Plate Evaluation Using Convolutional Neural Network</p> <p>Shigeru Kato¹, Shunsaku Kume², Takanori Hino¹, Tomomichi Kagawa¹, Hajime Nobuhara², Hironori Kumeno¹</p> <p>¹Niihama-College, National Institute of Technology, Japan, ²University of Tsukuba, Japan</p>	
D-24	<p>Sensing of Welder's Motion and Its Relationship with Welding Quality for Semi-Automatic Arc Welding</p> <p>Kazutoshi Sugie¹, Tanaka Akihideo², Takahashi Isamu¹, Okizaki Naoya¹, Miyagi Masanori¹, Seung Hwan C. Park¹</p> <p>¹Research & Development Group, Hitachi, Ltd., Japan, ²Industry & Distribution Business Unit, Hitachi, Ltd., Japan</p>	
D-25	<p>Development of a Prototype 3D Measuring and Judging System to Improve the Accuracy of Visual Inspection of Weld Bead Appearance and to Digitise Inspection Results for Welder Qualification Tests</p> <p>Tomoya Uchimura¹, Yosuke Koba¹, Tomomichi Simizu², Junichi Hirata², Hiroyuki Kobayashi², Koji Gotoh¹</p> <p>¹Kyushu University, Japan, ²Nippon Kaiji Kyokai (ClassNK), Japan</p>	
D-26	<p>Effect of Torch Movement on Weld Quality in Wemi-automatic CO₂ Arc Welding</p> <p>Ryo Hasegawa, Taiki Kato, Shoji Sasaki, Hiroshi Murai</p> <p>Aomori Prefectural Industrial Technology Research Center, Hachinohe Industrial Research Institute, Aomori, Japan</p>	
14:00-16:00	<p>Special Session for Young Professionals</p> <p><i>Chair:</i> Shun Tokita, Tohoku University</p>	Akatsuki (29F)
YP-1	<p>Introduction of Young Professional Group in JWS (WELNET) and Current Stage of the Numerical Simulation Technique of Arc Welding Process</p> <p>Yosuke Ogino</p> <p>Graduate school of Engineering, Osaka University, Japan</p>	
YP-2	<p>Optimization of Powder Catchment Efficiency in Welding and Additive Manufacturing</p> <p>M. R. Grams^{1,2}, G. Wood², P. F. Mendez¹</p> <p>¹University of Alberta, Edmonton, Canada, ²Apollo-Clad Laser Cladding, Leduc, Canada</p>	
YP-3	<p>A Novel Hybrid Welding Process to Improve the Welded Joint Quality of Aluminum Alloys</p> <p>Titinan Methong</p> <p>Department of Production Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi, Thailand</p>	
16:30-17:30	<p>IC-WUs Panel Discussion</p> <p><i>Chair:</i> Stephan Egerland</p> <p><i>Overview of WUs by TMB Chairman:</i> Stephan Egerland</p> <p><i>Activity from Group 1 (Processes):</i> Jorge dos Santos</p> <p><i>Activity from Group 2 (Structural integrity):</i> Majid Farajian</p> <p><i>Activity from Group 3 (Industry support):</i> Carl Peters</p>	Palais Royal D (B1F)

Proposal from IIWWG-YP: Kittichai Sojiphan
Proposal from Special Session for YP: Hiroto Shoji
The future strategy of WUs by TMB Chairman: Stephan Egerland

- 16:30-18:00 **[Hydrogen] Material Behavior** **Châtelet (B1F)**
Chairs: Yoshiki Mikami, Osaka University
Tianbo Zhao, Mitsui E&S Machinery Co., Ltd.
- H-6** **Effect of Welding Parameters on Delayed Cracking of Welded Type 630 Stainless Steel**
Tianbo Zhao, Koki Maeda, Shozo Ono
Manufacturing Dept., Mitsui E&S Machinery Co., Ltd., Japan
- H-7** **Experimental Set-up for In-situ Measurement of Hydrogen Diffusion during GMAW Operation**
Blanc Nicolas¹, Soulié Fabien¹, Delmas Josselin² Robin Vincent², Bordreuil Cyril¹
¹*Laboratoire de Mécanique et Génie Civil, Université de Montpellier, CNRS, France,*
²*EDF-R&D, Département PRISME Performance, Risque Industriel, Surveillance pour la Maintenance et l'Exploitation, France*
- H-8** **Electron Beam Brazing and Welding Of Components For Wendelstein 7-X Facing The High Energy Plasma**
Guido Reuter, Hannes Kendziora
PTR Strahltechnik GmbH, Germany
- 16:30-18:00 **[AM] Other Topics** **Étoile (B1F)**
Chairs: Hisaya Komen, Osaka University
Antti Salminen, University of Turku
- Invited Lecture 13**
Qualification Pathways for Additively Manufactured Metallic Components –Basic Research to Deployment
Sudarsanam Suresh Babu
University of Tennessee, Knoxville, USA
- A-13** **A Comparative Study of the Carbon Footprint of Am-Based Remanufacturing vs. Traditional Machining of Metal Components**
Michel Honoré¹, Peter T. Nielsen¹, Søren Kølle Hansen²
¹*FORCE Technology, Denmark,* ²*Danish AM-Hub, Denmark*
- A-14** **Investigations Into The Processability Of Glass Materials By Additive Manufacturing Techniques**
Fiona Spirrett¹, Ruth Goodridge², Ian Ashcroft², Kyriaki Datsiou^{1,2}, Soshu Kirihara¹
¹*Osaka University, Osaka, Japan,* ²*University of Nottingham, Nottingham, UK*
- 16:30-18:00 **[Advanced Technology] Laser Process** **Vendôme (B1F)**
Chairs: Shotaro Yamashita, Osaka University
Ebrahimi Amin, Delft University of Technology
- O-6** **Reduction of Porosity in Laser Arc Hybrid Welding of Aluminum Alloys**
Noriyuki Matsuoka, Yutaro Shintome, Toshiyuki Mishima, Michio Sakurai
Panasonic Connect Co., Ltd., Japan

- O-7** **Bead Shape Effect On Solidification Cracking During Hot-wire Laser Welding On Narrow-gap Joint of Ni-base Alloy**
Kenshi Arima, Jeong-Won Choi, Motomichi Yamamoto
Graduate School of Advanced Science and Engineering, Hiroshima University, Japan
- O-8** **Numerical Study of the Effects of Laser Beam Shaping on Molten Metal Flow Behaviour in Laser Melting**
Amin Ebrahimi, Ian M. Richardson, Marcel J.M. Hermans
Department of Materials Science and Engineering, Delft University of Technology, The Netherlands
- 16:30-18:00 **[AM] Process 3** **Concerto (B1F)**
*Chairs: Shun Tokita, Tohoku University
Katsuya Kugai, KINDAI University Technical College*
- A-22** **Wire-based Laser Direct Energy Deposition Process for Nuclear Equipment**
Yasutaka Banno¹, Hironobu Tanaka¹, Shuho Tsubota¹, Yasuyuki Fujiya¹, Masahiro Kimura²
¹Research & Innovation Center, Mitsubishi Heavy Industries, Ltd., Japan, ²Nuclear Energy Systems, Mitsubishi Heavy Industries, Ltd., Japan
- A-23** **Effect of the Location on the Fracture Toughness of Wire Arc Additively Manufactured Components Using Different Welding Wires**
Kadir Dağyikan, Uğur Gürol, Mustafa Koçak
^aIstanbul Gedik University, Istanbul, Turkey, ^bGedik Welding Inc., Istanbul, Turkey
- A-24** **[Cancelled] Effect of Friction Stir Processing on Microstructure and Mechanical Properties of Al-Cu Alloy Produced by Wire Arc Additive Manufacturing**
- 16:30-18:00 **[New Materials] Simulation and Calculation** **Harmonie (B1F)**
*Chairs: Kunio Takahashi, Tokyo Institute of Technology
Wataru Takahara, Osaka University*
- M-18** **Computation of Distortions in Steel-Aluminum Joints**
Anton Evdokimov, Ralf Ossenbrink, Nikolay Doynov, Vesselin Michailov
Brandenburg University of Technology, Germany
- M-19** **Tensile Behaviour of the Weld HAZ in Ultra-high Strength Steels**
Mohsen Amraei¹, Shahriar Afkhami², Vahid Javaheri³, Antti Salminen¹, Xiao-Ling Zhao⁴, Timo Björk²
¹Department of Mechanical and Materials Engineering, University of Turku, Finland, ²Laboratory of Steel Structures, LUT University, Finland, ³Materials and Mechanical Engineering, University of Oulu, Finland, ⁴Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, China
- M-20** **A Method to Evaluate Liquid Surface Tension from a Shape of Sessile Drop in Gravity**
Kunio Takahashi
Tokyo Institute of Technology, Japan

- 16:30-18:00 **[New Materials] Dissimilar FSW** **Fantaisie (B1F)**
Chairs: Tomoki Matsuda, Osaka University
 Sviatoslav Motrunich, E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine
- M-8** **[Cancelled] Effect of Alloy Element Content on Properties of Aluminum/Steel Filled Friction Stir Welded Joints**
- M-9** **[Cancelled] Study on the Effect of Ce Content on the Friction Stir Welding with Filler Wire Welded Joints Performance of Aluminum Alloy and Steel**
- M-10** **Fatigue Life of Thin Sheet Joints of Dissimilar AA2024 and AA5056 Produced by Friction Stir Welding Technology**
 Sviatoslav Motrunich, Illia Klochkov, Anatoliy Poklaytsky, Viktor Fedorchuk
Paton Welding Institute, Kyiv, Ukraine
- 16:30-18:00 **[Future Technology] Other Dissimilar Joint** **Menuet (B1F)**
Chairs: Hajime Yamamoto, Osaka University
 Dejans Arnout, KU Leuven, Department of Mechanical Engineering
- F-12** **Dissimilar Joining of Mg/Al Light Metals by Explosive Welding**
 Mami Mihara-Narita¹, Konosuke Asai¹, Hisashi Mori², Yasumasa Chino³, Hisashi Sato¹, Yoshimi Watanabe¹
¹Nagoya Institute of Technology, Japan, ²UACJ Corporation, Japan, ³National Institute of Advanced Industrial Science and Technology, Japan
- F-13** **Copper-Aluminium Joining by Novel Locked Projection Welding Process**
 Arnout Dejans, David Moens, Patrick Van Rymenant
KU Leuven, Dept. of Mechanical Engineering, Belgium
- F-14** **Development of Metal and Thermoplastic Dissimilar Materials Joining using Laser Process**
 Takaaki Miyauchi, Ryoji Tamaki, Shinichi Hasegawa, Tomoyuki Ueyama
Dept. of joining Technology Development, DAIHEN Corporation, Japan
- 16:30-18:00 **[Future Technology] Resistance Welding** **Pensée (1F)**
Chairs: Muneyoshi Iyota, Osaka Institute of Technology
 Mikno Zygmunt, Lukasiewicz Research Network, Instytut Spawalnictwa
- F-22** **Development of Resistance Spot Welding Technology Applying Adaptive Control for Narrow Pitch Spot Welding**
 Chikaumi Sawanishi, Yasuaki Okita, Katsutoshi Takashima
JFE Steel Corporation, Japan
- F-23** **Microstructure and Mechanical Properties of Ring Mash Welding in Chromium Molybdenum Steel**
 Yasuo Kadoya¹, Yuki Oshino¹, Hironobu Nishimura¹, Satoshi Yamane²
¹Origin Co.Ltd., Japan, ²Saitama University, Japan
- F-24** **Resistance Projection Welding of Nuts with Respect to Projection Height**
 Zygmunt Mikno, Szymon Kowieski
Sieć Badawcza Łukasiewicz /Łukasiewicz Research Network/ - Instytut Spawalnictwa; Poland

- 16:30-18:00 **[Advanced Technology] Fatigue and Fracture 2** **Ginga (29F)**
Chairs: Kazuma Shimizu, Osaka University
 Lina Yu, Osaka University
- O-10 Fatigue Strength of Weld Root at Ship Structural Joints**
 Norio Yamamoto¹, Toshihiro Fujii²
¹*Nippon Kaiji Kyokai, Japan,* ²*Oshima Shipbuilding, Japan*
- O-11 Numerical and Experimental Evaluation on Residual Stress Related to Fatigue Life at the Weld Root of Plug Joint**
 Yukihide Yoshihara¹, Naoki Osawa¹, Hidekazu Murakawa²
¹*Osaka University, Japan,* ²*Joining and Welding Research Institute of Osaka University, Japan*
- O-12 Revealing Ductile-to-brittle Transition Mechanism and Enhancing the Cryogenic Ductility of Tin (Sn) for Cryogenic Electronics**
 Xiaoliang Ji^{1,2}, Rong An², Wei Zhou¹, Yishu Wang¹, Fu Guo^{1,3,4}, Chunqing Wang²
¹*Faculty of materials and manufacturing, Beijing University of Technology, Beijing, China,* ²*State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin, China,* ³*Key Laboratory of Advanced Functional Materials, Beijing University of Technology, Beijing, China,* ⁴*College of Robotics, Beijing Union University, Beijing, China*
- 16:30-18:00 **[AI & DX] Sensing of Weld Quality** **Hikari (29F)**
Chair: Kazufumi Nomura, Graduate School of Engineering Osaka University
- D-20 Robust Device for Observation and Classification of Weld Pool Behavior**
 T.Boutin^{1,2}, I.Bendaoud¹, J.Delmas², D.Borel², C.Bordreuil¹
¹*University of Montpellier, France,* ²*EDF R&D, France*
- D-21 Weld Appearance Inspection of Excess Metal Using DETR**
 Taiga Ishikawa, Kotaro Kii, Hironori Kumeno, Daisuke Tanaka, Takanori Hino, Shigeru Kato
National Institute of Technology, Niihama College, Japan
- D-22 A Study on Quality Control Utilizing Stress Concentration Factor of Welded Joints Calculated with On-site Measurement Data for Chemical Tanker Construction**
 Hironori Ogata¹, Yuichi Yamamoto¹, Hiromi Ando¹, Masayuki Kaneko¹, Ryotaro Muta¹, Kazuyuki Matsumoto², Motomichi Yamamoto³, Tadakazu Tanino⁴, Hiroshi Yajima⁵
¹*USUKI SHIPYARD CO., LTD., Japan,* ²*Nippon Kaiji Kyokai, Japan,* ³*Hiroshima University, Japan,* ⁴*National Institute of Technology, Kurume College, Japan,* ⁵*Yajima Material Integrity Laboratory, Japan*
- 16:30-18:00 **[Advanced Technology] Measurement and Inspection** **Niji (29F)**
Chairs: Shinichi Tashiro, Osaka University
 Vairis Achilles, Hellenic Mediterranean University
- O-17 Evaluation Of Large-Scale Diffusion Bonded Interfaces By Means Of High Frequency Scanning Acoustic Microscopy**
 Jan Pfeiffer, Patrick Müller, Philipp Schindler
PVA Löt- und Werkstofftechnik GmbH, Germany

- O-18 Study of the Interfacial Temperature Development for Various Friction Welding Processes**
Alexander Bikmeyer¹, Achilles Vairis², Wenya Li³
¹Ufa State Petroleum Technical University, Russia, ²Hellenic Mediterranean University, Greece, ³Northwestern Polytechnical University, China
- 16:30-18:00 **[Future Technology] Fe-Al Dissimilar Joint** **Akatsuki (29F)**
Chair: Yosuke Ogino, Osaka University
- F-28 Development of High-speed Brazing Technology Combining Hot-wire and High-power Diode Laser for Steel/Aluminum Alloy Dissimilar Joint (1st Report) - Study of Influential Factors on Strength of Flare-V Groove Joint Brazed by High-speed Brazing Process -**
T. Ito¹, K. Tomita², K. Taniguchi², S. Igi², J. Choi¹, M. Yamamoto¹
¹Graduate School of Advanced Science and Engineering, Hiroshima University, Japan, ²Steel Research Laboratory, JFE Steel Corporation, Japan
- F-29 Development of High-speed Brazing Technology Combining Hot-wire and High-power Diode Laser for Steel/Aluminium Alloy Dissimilar Joint (2nd Report) - Evaluation of the Effect of Coating on Microstructural Evolution during High-speed Brazing Process -**
Kai Tomita¹, Tamaki Ito², Koichi Taniguchi¹, Satoshi Igi¹, Jeongwon Choi², Motomichi Yamamoto²
¹JFE Steel Corporation, Japan, ²Hiroshima University, Japan
- 11:00-18:00 **Poster Session** **Foyer (B1F)**
- PA-1 Thermal-mechanical Coupling Analysis for CDFW of U75V Rail Steel by Numerical Simulation and Experimental Validation**
Han Zhang^{1,2}, Zhiming Zhu^{1,2}
¹Department of Mechanical Engineering, Tsinghua University, China, ²Key Laboratory for Advanced Materials Processing Technology, Ministry of Education of China, Tsinghua University, China
- PA-2 Nanoparticles Joining Mechanisms in Stereolithographic Additive Manufacturing**
Soshu Kirihara, Fiona Spirrett
Joining and Welding Research Institute, Osaka University, Japan
- PA-3 Mechanical Property Analysis of High Hardness Die Steel using Flux Cored-Wire Arc Manufacturing (FC-WAAM)**
Chang Jong Kim, Seok Kim, Young Tae Cho
Changwon National University, South Korea
- PA-4 [Cancelled] Mechanical Strength Characterization of Additively Manufactured Composites via Rotational Toolpath in FDM 3D Printing**
- PA-5 Additive Manufacturing of Gas Turbine Blades Through Arc Heat Source Prediction and Control**
Gwang Ho Jeong¹, Seok Kim^{1,2}, Young Tae Cho^{1,2}
¹Department of Smart Manufacturing Engineering, Changwon University, South Korea, ²Department of Mechanical Engineering, Changwon University, South Korea

- PA-6 Structural Analysis of AISI 316LSi Multilayer Joint Made by Wire Arc Additive Manufacturing**
Milan Marônek, Katarína Bártoová, Jozef Bárta, Tomáš Gracik
Slovak University of Technology, Faculty of Materials Science and Technology, Slovakia
- PA-7 Proposal of New Weibull Stress Equation Based on The Damage Assessment for Steel Structures Subjected to Cyclic Pre-Strain**
Rafael Magalhães de Melo Freire¹, Naoya Oie¹, Tomoya Kawabata¹, Shunsuke Takagi²
¹*The University of Tokyo, Japan*, ²*Tokyo Electric Power Company Holdings Incorporated, Japan*
- PA-8 Effect of Offset Value of Microstructure and Properties of Aluminum/Steel Fluxless Cutting-assisted Welding Brazing Joint**
Huibin Xu, Pan Tan, Bangjin Li, Donghua Yang
Chongqing University of Technology, China
- PA-9 Hardness Distribution Prediction of High Strength Steel Spot Welds**
Tadashi Kasuya¹, Takaaki Kondo², Kei Saito², Junya Inoue¹, Manabu Enoki¹
¹*The University of Tokyo, Japan*, ²*Nissan Motor Corp., Japan*
- PA-10 Influence of Oxygen Partial Pressure on Surface Tension of Liquid Titanium**
Yusaku Seimiya¹, Ryo Shinazawa¹, Tomohiro Katsumi¹, Yu Kudo¹, Takehiko Ishikawa^{2,3}, Shumpei Ozawa¹
¹*Graduate School of Engineering, Chiba Institute of Technology, Japan*, ²*Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, Japan*, ³*SOKENDAI (The graduate University for Advanced Studies), Japan*
- PA-11 Interface Microstructure Evolution of Dissimilar Aluminium and Medium Carbon Steel Friction Stir Welded Joints using Zn Interlayers**
Mohamed Saleh, Yoshiaki Morisada, Kohsaku Ushioda, Hidetoshi Fujii
Joining and Welding Research Institute, Osaka University, Japan
- PA-12 Metals as Carbon Dioxide Atmosphere Fuel Materials**
Wataru Takahara, Akio Hirose
Osaka University, Japan
- PA-13 Intermetallic Compound Formation on Al/Fe Interface Produced by Surface Activated Bonding**
Shun Tokita¹, Ryo Nagase¹, Yutaka S. Sato¹, Kazuhiro Ogawa², Yuji Ichikawa²
¹*Department of Materials Processing, Graduate School of Engineering, Tohoku University, Japan*, ²*Fracture and Reliability Research Institute, Graduate School of Engineering, Tohoku University, Japan*
- PA-14 Microscale Tensile Testing to Identify Dominant Factors for Macroscopic Fracture Strength of Friction Stir Spot Welded Joints between 6061 Aluminum Alloy and Steel**
Tomoki Matsuda, Toshiya Ogaki, Mitsuru Ohata, Akio Hirose
Osaka University, Japan
- PA-15 Loading Mode Effect on Brittle Fracture Toughness under Large-scale Yielding**
Kazuma Shimizu, Mitsuru Ohata, Hiroto Shoji
Osaka University, Japan

- PA-16 Dissimilar Welding of New High Oxidation Material - THOR 115 with Grade 92**
 Michał Urzyszczyk¹, Krzysztof Kwieciński², Hanna Purzyńska³, Marek St. Węglowski²
¹ZELKOT – Brzezina, Urzyszczyk Sp.j., Poland, ²Łukasiewicz – Institute of Welding, Poland,
³Łukasiewicz - Institute for Ferrous Metallurgy, Poland
- PB-1 Flaw Detection and Evaluation in Friction Stir Welded Joints of Aluminium Alloy AA5083 by High Resolution Computed Radiography and Microcomputer Tomography**
 Luis C. Fabrício Filho¹, Armando H. Shinohara¹, Thigo S. Coutinho², Gustavo D. Donatelli²
¹Federal University of Pernambuco, Brazil, ²Fundação CERTI, Brazil
- PB-2 Data Science Techniques to Extract Information from Image Data**
 Hiromichi Nagao^{1,2}, Shin-ichi Ito^{1,2}, Ryosuke Kaneko^{1,2}
¹Earthquake Research Institute, The University of Tokyo, Japan, ²Graduate School of Information Science and Technology, The University of Tokyo, Japan
- PB-3 Integrated Framework of Microstructure-Based Simulation for Fatigue Life Prediction of Welded Joints**
 Takayuki Shiraiwa, Fabien Briffod, Manabu Enoki
 The University of Tokyo, Japan
- PB-4 Evaluation of Bending Specimens in Standard Qualification Test for Welding Technique using Deep Learning**
 Tetsuya Uedera¹, Taiga Motoki², Keigo Matsuura¹, Kenji Shinozaki³
¹National Institute of Technology Kure College, Japan, ²Hiroshima University Graduate School, Japan, ³Professor Emeritus Hiroshima University, Japan
- PB-5 A Study on the Selection of Seam Tracking Signals in Tandem Welding**
 Bo Wook Seo¹, Seok Kim^{1,2}, Young Tae Cho^{1,2}
¹Department of Smart Manufacturing Engineering, Changwon University, South Korea,
²Department of Mechanical Engineering, Changwon University, South Korea
- PB-6 [Cancelled] Durability of anticorrosive coated steel-CFRP structural adhesive joint under high temperature and high humidity**
- PB-7 Behavior of Hydrogen in Duplex Stainless Steel Weld Metal Investigated by Means of Hydrogen Microprint Technique**
 Toya Hada¹, Toshiaki Manaka¹, Takanori Hino¹, Masaki Uno²
¹National Institute of Technology (KOSEN), Niihama College, Japan, ²Shikoku Welding Electrode Co. Ltd., Japan
- PB-8 Effect of Laser Peening with Portable Laser Peening Device on the Fatigue Properties of HT780 Butt-welded Joints**
 Tomoharu Kato¹, Yoshihiro Sakino¹, Yuji Sano^{2,3,4}, Yoshio Mizuta³, Satoshi Tamaki⁴,
 Tomonao Hosokai³
¹Kindai University, Japan, ²Institute for Molecular Science, Japan, ³Osaka University, Japan,
⁴LAcubed Co., Ltd., Japan
- PB-9 Development of Cold Spot Joining (Solid State Resistance Spot Joining) Method for Various Steels**
 Hidetoshi Fujii¹, Takumi Aibara¹, Masayoshi Kamai¹, Yoshiaki Morisada¹, Takaaki Miyauchi²,
 Shinichi Hasegawa²
¹Osaka University, Japan, ²DAIHEN Corporation, Japan

- PB-10 Study on Mechanical Properties of Advanced Multi-Material Dissimilar Lap Joints**
Hisashi Serizawa
Osaka University, Japan
- PB-11 Hairpin Welding of Pure Copper Wire using Hybrid Laser System with Blue Diode Laser and Single-mode Fiber Laser**
Shumpei Fujio¹, Yuji Sato², Keisuke Takenaka², Rika Ito², Masahiro Tsukamoto²
¹*Graduate School of Engineering, Osaka University, Japan,* ²*Joining and Welding Research Institute, Osaka University, Japan*
- PB-12 [Cancelled] Pulsed Laser-Arc Hybrid Welding: High Speed Camera Investigation Of The Power Sources Synchronization Effects**
- PB-13 Experimental Study of Dominant Factors for Droplet Ejection from Tungsten Electrode during AC TIG Welding**
Kenta Iida¹, Hisaya Komen¹, Masaya Shigeta², Manabu Tanaka¹
¹*Joining and Welding Research Institute, Osaka University, Japan,* ²*Graduate School of Engineering, Tohoku University, Japan*
- PB-14 Effect of Rapid Cooling on Residual Stress and Fatigue Strength**
Hong-Xi Wang¹, Yoshihiro Sakino², Wataru Kodama¹
¹*Graduate School of Systems Engineering, Kindai University, Japan,* ²*Faculty of Engineering Department, Kindai University, Japan*
- PB-15 Simulation of Heat Source Characteristics during Arc Spot Welding with Constricted Nozzle**
Hisaya Komen¹, Manabu Tanaka¹, Akihisa Murata², Tadasuke Murata²
¹*Joining and Welding Research Institute, Osaka University, Japan,* ²*Murata Welding Laboratory Co., Ltd., Japan*
- PB-16 Numerical Investigation of Influencing Factors of Slag Transportation Process during Metal Active Gas Welding using Incompressible Smoothed Particle Hydrodynamics Method**
Takamasa Fukazawa¹, Hisaya Komen¹, Masaya Shigeta², Manabu Tanaka¹, Mitsugi Fukahori³, Naoko Saito³, Tetsuo Yamada³
Joining and Welding Research Institute, Osaka University, Japan, ²*Graduate School of Engineering, Tohoku University, Japan,* ³*Mazda Motor Corporation, Japan*

Social Plans

Measures against COVID-19

All delegates and exhibitors are requested to wear a mask during the entire period of the IIW2022 and its social events.

Sunday, 17 July 2022

13:00-14:30 Young Professional Ice Breaking Session

Venue: Palais Royal C (B1F)

A casual networking event for young professionals in buffet style.

Dress Code: Business Attire



18:00-19:30 IIW Opening Ceremony

Venue: Palais Royal A/B (B1F)

19:30-22:00 Welcome Reception

Venue: Palais Royal C/D (B1F)

A welcome party where all delegates gather and meet for the first time.

Dress Code: Business Attire

Monday, 18 July 2022

19:30-22:00 Japan Evening

Venue: Palais Royal A/B/C/D (B1F)

A buffet styled party with the theme of "Japan". The delegates can discover Japanese culture with decorations, musical performances, and traditional food and drinks.

Dress Code: Business Casual



Tuesday, 19 July 2022

19:30-21:00 Board Directors' Dinner

Venue: Hikari (29F)

Dinner for the Board Directors

Dress Code: Business Attire



19:30-22:00 Young Professionals' Evening

Venue: Palais Royal B/C (B1F)

A dinner for the young professionals.

Dress Code: Casual

Wednesday, 20 July 2022

19:30-22:00 Closing Ceremony & Gala Banquet

Venue: Palais Royal A/B/C/D (B1F)

Dinner party to summarize and conclude the whole event.

Dress Code: Formal



Technical Visits

* The price is subject to change.

18, 20 and 21 July 2022

Reception at Grand Nikko Tokyo Daiba	--	Specially Lecture	--	Tokyo Gate Bridge	--	Lunch at Tokyo Solamachi (your own arrangement)	--	Tokyo Sky Tree	--	Grand Nikko Tokyo Daiba
9:30-9:45		9:45-10:30		11:00-12:00		12:30-14:00		14:00-16:20		17:00

■ Req. to Run Tour : 20 guest(s)

■ JPY 16,400/per person

Special Lecture

Presented by Obayashi corporation which is one of the companies building TOKYO SKYTREE. You can learn their techniques and challenges they faced during its construction by joining the technical visit.

Date and Time: 9:30-10:30 on 18, 20 and 21 July

Venue: Vendôme (18 July), Fantaisie (20 July), Akane (21 July)

Tokyo Gate Bridge

A bridge with a total length of 2618m and known as the "Dinosaur Bridge." After passing the bridge by a coach, you can walk along the promenade of the bridge, and see the bridge with truss structure and SBHS up close.

* SBHS: Steels for Bridge High-performance Structure

It is high-performance steel material made in line with thermal processing control technology advancements, also it ensures high yield strength and improves weldability.



Tokyo Sky Tree

The tallest self-standing broadcasting tower in the world with 634m, which was completed in 2012. A limited area which usually visitors cannot enter will be specially open for technical visit participants and you can see the foundation of the tower and the welded part up close.



©TOKYO-SKYTREE

IIW Member Countries

The IIW members worldwide

IIW currently has 51 member countries, with some countries having several welding associations or organisations sharing joint membership.

	AUSTRALIA		PAKISTAN
	AUSTRIA		PEOPLE'S REPUBLIC OF CHINA
	BELGIUM		POLAND
	BULGARIA		PORTUGAL
	CAMEROON		REPUBLIC OF KAZAKHSTAN
	CANADA		REPUBLIC OF KOREA
	CROATIA		ROMANIA
	CYPRUS		RUSSIAN FEDERATION
	CZECH REPUBLIC		SERBIA
	DENMARK		SINGAPORE
	FINLAND		SLOVAK REPUBLIC
	FRANCE		SLOVENIA
	GERMANY		SOUTH AFRICA
	GHANA		SPAIN
	GREECE		SWEDEN
	HUNGARY		SWITZERLAND
	INDIA		THAILAND
	INDONESIA		THE NETHERLANDS
	IRAN		TUNISIA
	ITALY		TURKEY
	JAPAN		UKRAINE
	MALAYSIA		UNITED KINGDOM
	MEXICO		UNITED STATES OF AMERICA
	MOROCCO		VIETNAM
	NEW ZEALAND		
	NIGERIA		
	NORWAY		

For the latest list, please visit the website below:

<http://iiwelding.org/iiw-members>

Sponsors

PLATINUM

DAIHEN Corporation

DAIHEN contributes a lot to the manufacturing technology of customers all over the world by world-leading welding & mechatronics technologies. When supporting the welding machines, robots, peripherals, and systems, DAIHEN understands deeply the needs of customers, and will provide solutions enhancing customer's benefit and added value. DAIHEN will continue to expand oversea bases around the world, and to improve the welding & mechatronics technologies which has been cultivated many years, furthermore. DAIHEN will support a wide range of global markets and connect people in the world by providing its own "DAIHEN Only-one Products" in the run-up to other companies from Japan where is the country creating cutting-edge manufacturing technology.



Iwatani Corporation

Founded in 1930, Iwatani Corporation began its business by selling oxygen, carbide, and welding rods. Since then, Iwatani has provided a wide range of products, including energy, industrial gases, materials, and food products, based on our corporate philosophy: Become a person needed by society, as those needed by society can prosper. Our main business, the Energy business delivers consumer LPG to households across Japan which we hold the largest share of the retail and wholesale market. Also, Iwatani has accumulated a lengthy history and extensive experience with and expertise in commercial hydrogen activities with a 70% share of the hydrogen market in Japan. Iwatani's Machinery business involves an extensive lineup of technologies, including semiconductor production equipment, robots and welding equipment. Combining options such as gas supply, gas equipment maintenance, materials supply, and machinery and equipment, we propose optimal solutions that meet the diverse needs of customer production processes.



Mitsubishi Heavy Industries, Ltd.

Mitsubishi Heavy Industries (MHI) Group is one of the world's leading industrial groups, spanning energy, logistics & infrastructure, industrial machinery, aerospace and defense.

MHI Group combines cutting-edge technology with deep experience to deliver innovative, integrated solutions that help to realize a carbon neutral world, improve the quality of life and ensure a safer world.

For more information, please visit www.mhi.com or follow our insights and stories on www.spectra.mhi.com



NIPPON STEEL CORPORATION

Nippon Steel is Japan's largest and one of the world's leading integrated steel producers. Beyond its 6 steelworks in Japan, Nippon Steel makes a wide range of value added steel products in more than 15 countries.

The Nippon Steel group has four businesses segments: steelmaking and steel fabrication, engineering and construction, chemicals and materials, and system solutions. Steelmaking business generates close to 90% of revenue, and other three business segments, which are derived from the steelmaking business, support and generate synergy with the steelmaking business, while providing excellent products and services to society.

The Nippon Steel Group's values are to ""Pursue world leading technologies and manufacturing capabilities, and contribute to society by providing excellent products and services."" Nippon Steel contributes to achieving the United Nation's SDGs, through providing solutions to social problems by its high value added steel products, and through environmental management initiatives "Eco Process" "Eco Solutions" "Eco Products" and "Innovating technology Development".



NIPPON STEEL WELDING & ENGINEERING CO., LTD.

NIPPON STEEL WELDING & ENGINEERING is a subsidiary company of NIPPON STEEL which is Japan's largest and one of the world's leading integrated steel producers. Over 80 years, we supply the various welding consumables used for FCAW, SMAW, GMAW, GTAW and welding equipment included plasma welding. We are the first and only Japanese manufacturer to mass produce the Seamless Flux Cored Wire since 1981, which has excellent performance and quality. We promise to provide appropriate solutions and make a breakthrough for your welding situation.



Panasonic Connect Co., Ltd.

Panasonic Connect Co., Ltd. was established on April 1, 2022 as part of the Panasonic Group's switch to an operating company system. With roughly 28,500 employees worldwide and annual sales of JPY818 billion (approx. USD7.5 billion) the company plays a central role in the growth of the Panasonic Group's B2B solutions business and provides new value to its customers by combining advanced hardware, intelligent software solutions, and a wealth of knowledge in industrial engineering accumulated in its over 100-year history. The company's purpose is to "Change Work, Advance Society, Connect to Tomorrow." By driving innovation in the supply chain, public services, infrastructure, and entertainment sectors, Panasonic Connect aims to contribute to the realization of a sustainable society and to ensure well-being for all.



SHIMADZU CORPORATION

Shimadzu corporation is a comprehensive analytical, measuring and testing instruments manufacturer with a history of 145 years.

Our various analytical instruments, testing machines and non-destructive inspection equipment contribute to research & development and quality control in the fields of welding and joining.

At this IIW2022 Tokyo, we propose a new non-destructive inspection equipment MIV which utilizes ultrasonic optical imaging technology.

MIV makes it easy to inspect defects near the surface, such as poor jointing of dissimilar material, coating, painting or thermal spraying peeling, which are difficult with conventional non-destructive inspection.

During IIW2022, we will be demonstrating with samples made by joining and adhering dissimilar materials, so please come to the Shimadzu booth.



GOLD

German Machinery Trading Co., Ltd

German Machinery Trading Co., Ltd (GMT) has over 45 years of expertise supplying high-performance equipment and specialized solutions. We focus on applications in orbital welding, weld preparation, and the rolling & bending of tube and vessels. With our Founders Core Value focusing on SDG's, it remains engrained throughout our organization. We proudly and actively support the Semiconductor, Aerospace, Pharmaceutical, Food, Power-Energy, and CO2 free-Hydrogen Energy markets in Japan. "We believe that high-quality after-sales services, maintenance, and technical assistance come first for all of our clients" says GMT's President, Mr. Yasuyuki Tsutsumihara. Come visit us at <http://e-gmt.co.jp/>



IHI Corporation

IHI Corporation is a comprehensive heavy-industry manufacturer working to create value for customers in four main areas: Resource, Energy and Environment; Social Infrastructure and Offshore Facilities; Industrial Systems and General-purpose Machinery; and Aero Engine, Space and Defense. IHI's history extends back to the establishment of Ishikawajima Shipyard, Japan's first modern shipbuilding facility, in 1853. The name IHI Corporation was adopted in 2007 to help strengthen the company's global brand.

IHI is deeply committed to contributing to society through technology, combining diverse engineering capabilities to meet expanding global needs for energy, urbanization and industrialization, and transportation efficiency.



The Japan Welding Material Association

The Japan Welding Material Association(JWMA) is promoting the production, distribution, application and trading of welding material, which is essential for the development of economy, industries, improvement of people's living. In addition, JWMA collects and provides various statistics of welding material industry, and works on improvement of technology, quality and environment issues to develop Japanese welding material industry.

The Japan Welding
Material Association

Kawasaki Heavy Industries, Ltd.

Together with about 100 group companies in Japan and overseas, Kawasaki Heavy Industries oversees the formation of a "technology corporate group." Our technological capabilities, polished over a history that exceeds a century, send diverse products forth into wide-ranging fields that go beyond land, sea, and air, extending from the ocean depths to space. Through the development of unique and broad businesses unmatched elsewhere, we will continue to create new values that solve the issues facing our customers and society.

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Powering your potential

KISWEL LTD.

Always with you KISWEL

Thriving to become a leading solutions provider within the welding Industry, KISWEL continuously places its top priority on Providing sound solutions to the welding needs of its customers regardless of place and time.

 **KISWEL**

SILVER

ClassNK (Nippon Kaiji Kyokai)

Established in 1899, ClassNK (Nippon Kaiji Kyokai) is a classification society dedicated to safety and environmental protection through third-party certification. ClassNK has conducted diverse technical services including surveys and classifications of ships and marine structures based on its own rules, statutory certifications on behalf of more than 100 flag states. ClassNK has committed to provide the industry with its full support to pave the way for digitalization and decarbonization challenges through the expanding certification service and R&D with industry partners.

ClassNK

DENGESHA TOA CO.,LTD.

Since its foundation in 1935, DENGESHA TOA has made enormous contribution to aircraft production in early years of our company and to the prosperity of the automobile industry in later years by supplying numerous high performances, high efficiency welders. We have provided various other industries including steel, construction material, and household appliance, with superior welding technology for production to help modernize and advance wide variety of industries.

We will make further advancement to become leading manufacturer of joining machine.



JFE Steel Corporation

Challenging spirit, flexibility and sincerity.

JFE Steel contributes to society with world's most innovative technology.



Kobe Steel, Ltd.

At Kobe Steel's Welding Business, quality is considered one of the pillars of our management strategy. Working from this basic tenet, and drawing on our strengths as a general welding product manufacturer specialist in technologies such as welding materials; welding robots, equipment, and power sources; as well as the welding process, our goal is to always be the most reliable welding solutions company in the world.



NISSAN TANAKA Corporation

Since our establishment in 1917, we have contributed to the industry as a leading company in various cutting equipment and gas control equipment.

In 2002, we expanded our industrial gas and welding equipment business as NISSAN TANAKA and provide a wide range of accurate solutions with further synergies.

As a future-oriented company, we continue to provide cutting, welding, and gas control products to satisfy customer needs.

We make efforts to provide environmentally-friendly products and services, and continuously promotes environmental activities.



Yaskawa Electric Corporation

Since its founding in 1915, our company has focused on the development of innovative technologies and products in the field of electric motors, the world's first and foremost.

By offering solutions that utilize digital data, as well as products developed based on our company's core technologies of motion control, robotics, and power conversion, we aim to help customers solve their management issues and create new added value toward the realization of a sustainable society.



Fronius Japan K.K.



BRONZE



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The Power of Dreams

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DAIDO STEEL CO., Ltd.

DAIDO STEEL started the mass production of solid wire for the first time in Japan in 1955.

We supply various kinds of welding wires such as mild steel, stainless steel and titanium as a pioneer of the solid wire for gas shield arc welding.



Denyo Co., Ltd.

Since our founding in 1948, Denyo continues to create engine-driven welders that meet customers' demands. Denyo products are used not only in construction and manufacturing but also at oil, gas, and mining worksites. With Denyo, you'll find exceptional performance and a ruggedness unique to all our products.

The Denyo logo consists of the word "Denyo" in a bold, italicized, red sans-serif font, with a registered trademark symbol (®) to the upper right.

Hitachi, Ltd.

Hitachi, Ltd. contributes to a sustainable society with a higher quality of life by driving innovation through data and technology as the Social Innovation Business. Hitachi is focused on strengthening its contribution to the Environment, the Resilience of business and social infrastructure as well as comprehensive programs to enhance Security & Safety.

The Hitachi logo features the word "HITACHI" in a bold, black, sans-serif font, with the tagline "Inspire the Next" in a smaller, black, sans-serif font below it.

JAPAN POWER ENGINEERING AND INSPECTION CORPORATION

JAPEIC is a safety review agency authorized by the ministry of Economy, Trade and Industry. We have been engaged in inspection and research activities for the purpose of ensuring power plant safety. We deliver safety and hope in the new century with our high quality reliable technology.

The JAPEIC logo features the word "JAPEIC" in a bold, blue, sans-serif font, with the full name "JAPAN POWER ENGINEERING AND INSPECTION CORPORATION" in a smaller, blue, sans-serif font below it.

Koike Sanso Kogyo Co.,Ltd.

KOIKE was founded in 1918 and company provide industry leading technology in Gas, Welding and Cutting to the worldwide. Furthermore, KOIKE's original Dual Beam Control(DBC)-FIBER technology creates future of cutting.

The Koike logo features a red square icon with a white stylized shape inside, followed by the word "KOIKE" in a bold, red, sans-serif font.

Komatsu Ltd.

Komatsu is a construction machinery company that develops and manufactures full lineup of machinery from utility class to mining class and meets variety of customer needs. In addition, Komatsu is developing various businesses such as industrial machinery and a leading company representing each industry.

The Komatsu logo features the word "KOMATSU" in a bold, blue, sans-serif font.

SAMPO PUBLICATIONS, INC.

SANPO PUBLICATIONS, INC is a specialized publishing company develops all media related to welding.

The Sanpo logo features the word "SANPO" in a bold, green, sans-serif font, with "PUBLICATIONS, INC." in a smaller, green, sans-serif font below it.

USUKI SHIPYARD CO., LTD.

We, Usuki Shipyard are building vessels and steel structures with "Usuki Technology".



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The Iwatani logo is displayed in a bold, red, sans-serif font in the top left corner of the advertisement.

Iwatani

Move the World with Hydrogen.

We live in challenging times.

Will we find the energy we need to carry us through the next century?

Our answer is yes. We have hydrogen—an inexhaustible energy source.

Hydrogen when burned emits zero CO₂. In its capacity to generate power, it easily surpasses countless other energy sources.


Various sectors have great expectations for hydrogen to lead the way in decarbonization efforts, including the power, automotive, railroad, shipbuilding, and steel industries.

We firmly believe something the world truly needs is sure to become ubiquitous.

Based on this conviction, we must forge ahead.

Looking ahead to 2050 from the perspective needed to establish a carbon-neutral society...

Reshape society, power the era, and move the world with hydrogen.

A wide-angle photograph of a city skyline at sunset, with buildings illuminated by the warm glow of the setting sun. The sky transitions from orange to a deep blue.

Japan has the energy that can change the future.

No.1 Share in Hydrogen*

Iwatani
Iwatani Corporation

*Iwatani Corporation's Japan market share (hydrogen sales) is approximately 70%. [Excludes on-site piping; As of May 2022, based on Iwatani data]

MOVE THE WORLD FORWARD  RD **MITSUBISHI
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MISSION NET ZERO

Mitsubishi Heavy Industries Group will contribute
to the realization of net zero for society as a whole.



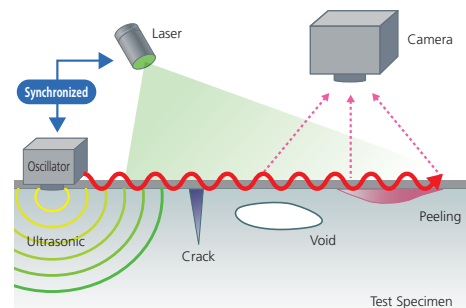
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Ultrasonic optical flow detector
超音波光探傷装置
MIV-X



The principle of ultrasonic optical flow imaging
超音波光イメージングの原理



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**Trustworthy
Solutions
for the Future**

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Transform the movement of both people and freight utilizing new mobility products and systems

Frontier

Japan's largest liquefied hydrogen storage tank (Kobe Airport Island)



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Implement initiatives for decarbonization, utilizing hydrogen-based solutions and other innovations



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Starting today.

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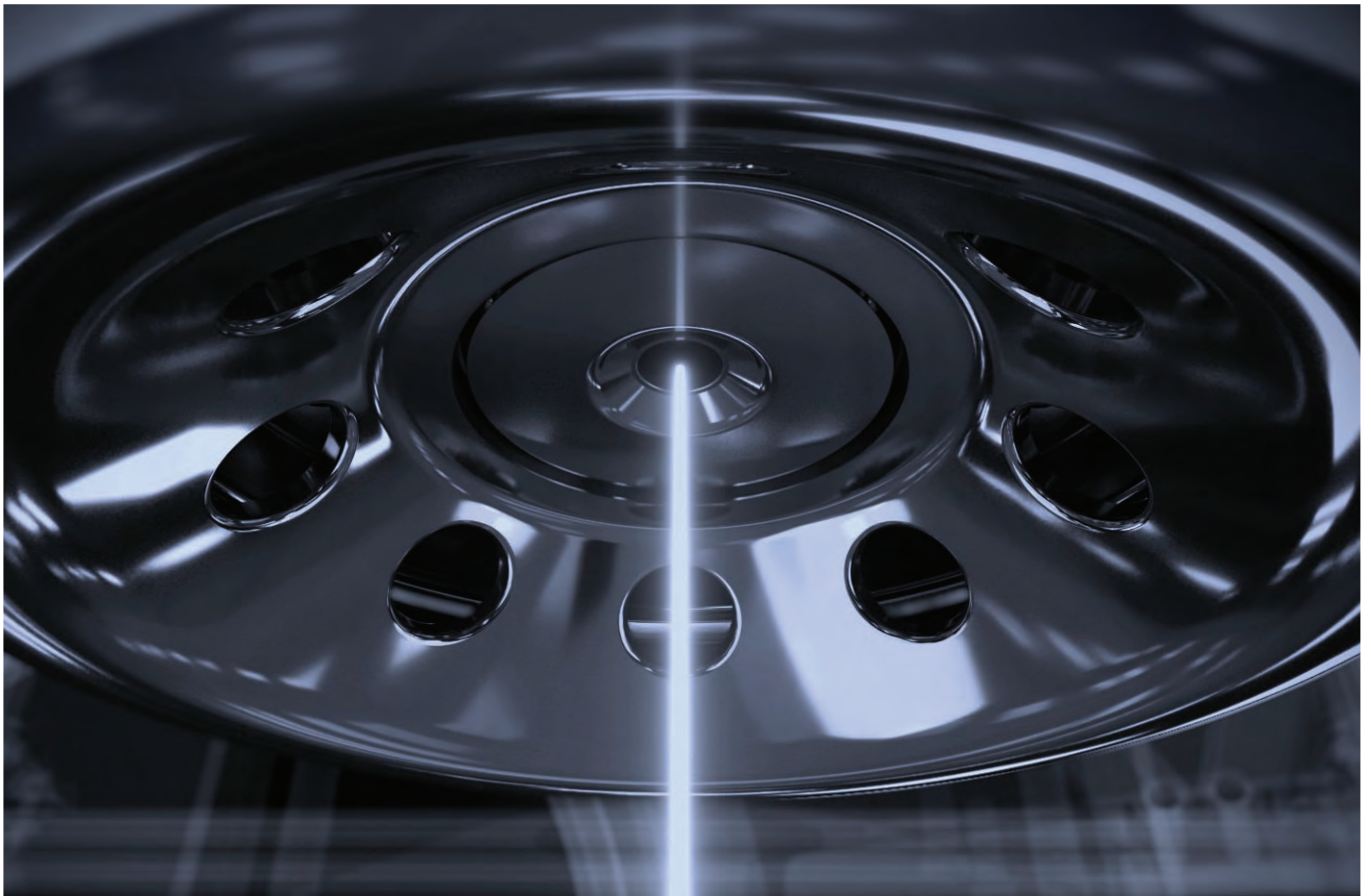
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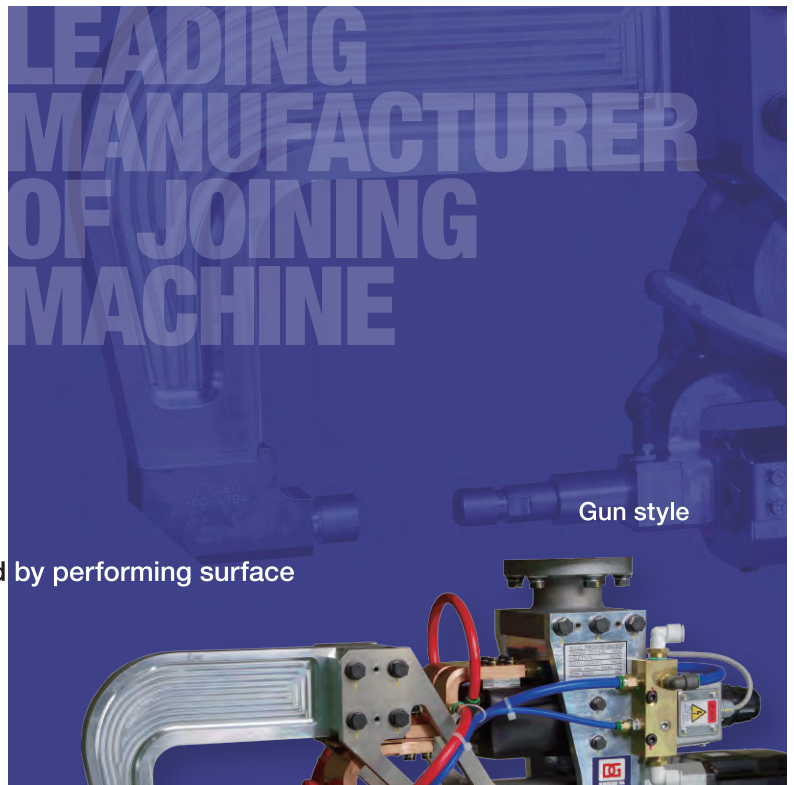
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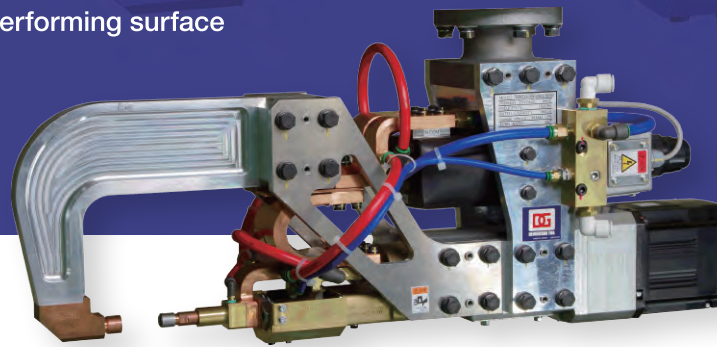


Metal / resin joining machine

High joining strength can be achieved by performing surface Treatment suitable for each material.



Gun style



Stationary style

Merit

Line joining

Approx, 8x40mm is joined

Low initial cost

Uses Resistance welding controls

Quick joining

Joining time : 5sec/joining

High strength joining

Max, strength : 50MPa

The material by which joining is possible

Metal SPCC / Galvanized Steel / Aluminum alloy / Stainless Steel etc.

Resin PA6 / PP / PPS / PES / PC / PMMA / ABS / PET etc.

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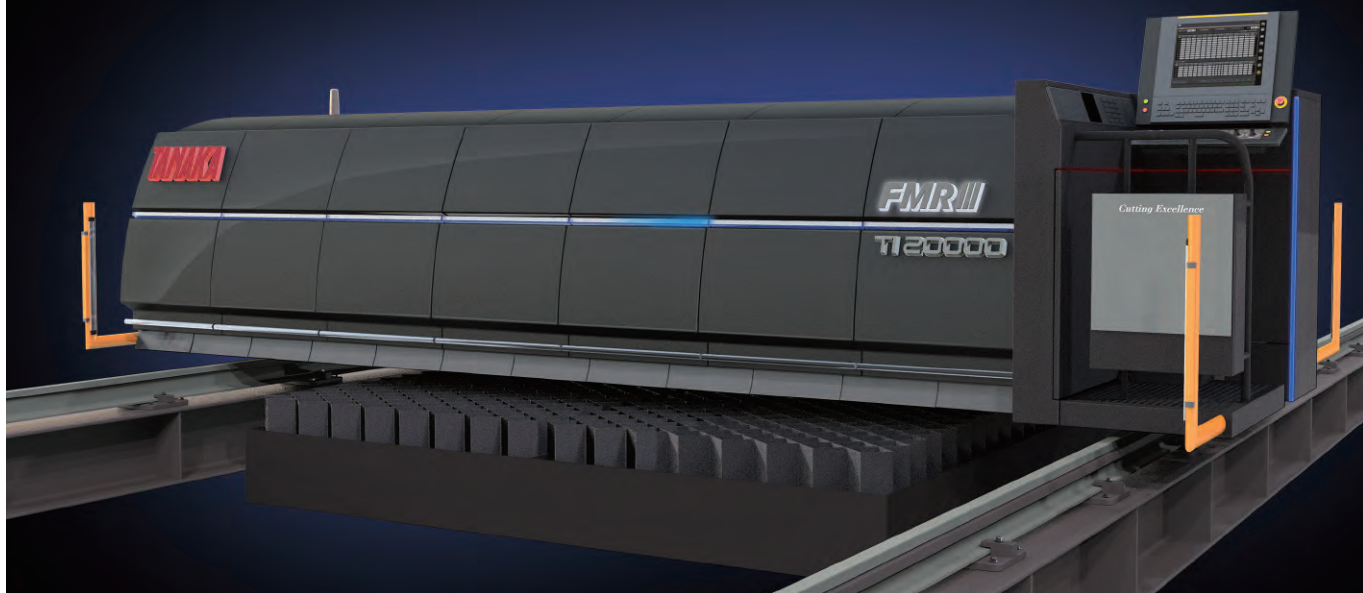
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Make Our Earth Green



NIPPON STEEL
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initiative

Onward, onward toward achieving carbon neutral Nippon Steel is taking up the challenge of transforming steelmaking

Nippon Steel has pioneered the development and practical implementation of breakthrough technologies ahead of peers in other countries.

This is for helping to solve global environmental issues and for Japan's steel industry to continue leading the world, and to maintain and even strengthen the competitiveness of industries as a whole.

We will also expand our high-performance product capabilities to meet the needs for carbon neutrality.

We firmly believe that "Green Transformation"—a transformation to steelmaking that contributes to CO₂ emission reduction—will support a prosperous and beautiful future.

We are making utmost efforts for the realization of a carbon neutral society.

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