

# Visual-JW 2019 & WSE 2019



November 21–22, 2019  
Hotel Hankyu Expo Park, Osaka, Japan

The 5th International Symposium  
on Visualization in Joining & Welding Science through  
Advanced Measurements and Simulation

&

The 8th International Conference  
of Welding Science and Engineering

in conjunction with

Symposium on the Research Activities of  
Joint Usage/Research Center on Joining and Welding

## FINAL PROGRAM

Organized by Joining and Welding Research Institute, Osaka University

Co-organized by Japan Welding Society

Chinese Welding Society

In the year 2019, the 5<sup>th</sup> International Symposium on Visualization in Joining & Welding Science through Advanced Measurements and Simulation (Visual-JW 2019) and the 8<sup>th</sup> International Conference of Welding Science and Engineering (WSE 2019) in conjunction with the Symposium on the Research Activities of Joint Usage / Research Center on Joining and Welding will be held on 21–22, November at the Hotel Hankyu Expo Park in Osaka, Japan.

The symposium aims to promote direct exchange of the latest scientific and technological information related to visualization of complex phenomena in material processing through advanced measurements and simulation. It will also provide a good opportunity to discuss on the future and the strategy regarding R&D of materials processing.

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Yongping LEI, Beijing University of Technology, China

Zhuguo LI, Shanghai Jiao Tong University, China

Aiping WU, Tsinghua University, China

Lianyong XU, Tianjin University, China

# SCHEDULE AT A GLANCE

## Registration

Thursday, November 21: 9:00–18:00

Friday, November 22: 8:30–15:00

## Thursday, November 21

Room	SEIUN				
9:50–10:00	Opening Ceremony				
10:00–10:30	Plenary Lecture 1				
10:30–11:00	Plenary Lecture 2				
11:00–11:30	Plenary Lecture 3				
11:30–12:30	Lunch at ORBIT HALL				
Room	A	Room	B	Room	C
Session Name	Visualization of Joining and Welding Process (1)	Session Name	Visualization of Additive Manufacturing (1)	Session Name	WSE Visualization of Joining and Welding Process (1)
12:30–12:50	JWP-1	12:30–12:50	AM-1	12:30–12:50	W-JWP-1
12:50–13:05	JWP-2	12:50–13:05	AM-2	12:50–13:05	W-JWP-2
13:05–13:20	JWP-3	13:05–13:20	AM-3	13:05–13:20	W-JWP-3
13:20–13:35	JWP-4	13:20–13:35	AM-4	13:20–13:35	W-JWP-4
13:35–13:50	JWP-5	13:35–13:50	AM-5	13:35–13:50	W-JWP-5
13:50–14:05	Coffee Break				
Session Name	Visualization of Joining and Welding Process (2)	Session Name	Visualization of Additive Manufacturing (2)	Session Name	WSE Visualization of Joining and Welding Process (2)
14:05–14:25	JWP-6	14:05–14:25	AM-6	14:05–14:25	W-JWP-6
14:25–14:40	JWP-7	14:25–14:40	AM-7	14:25–14:40	W-JWP-7
14:40–14:55	JWP-8	14:40–14:55	AM-8	14:40–14:55	W-JWP-8
14:55–15:10	JWP-9	14:55–15:10	AM-9	14:55–15:10	W-JWP-9
15:10–15:25	JWP-10	15:10–15:25	AM-10	15:10–15:25	
15:25–15:40	Break				
Session Name	Visualization of Joining and Welding Process (3)	Session Name	Visualization of Quality, Safety and Reliability	Session Name	WSE Visualization of Metallurgy in Joining and Welding
15:40–16:00	JWP-11	15:40–16:00	QSR-1	15:40–16:00	W-MTJW-1
16:00–16:15	JWP-12	16:00–16:15	QSR-2	16:00–16:15	W-MTJW-3
16:15–16:30	JWP-13	16:15–16:30	QSR-3	16:15–16:30	W-MTJW-4
16:30–16:45	JWP-14	16:30–16:45	QSR-4	16:30–16:45	W-MTJW-5
16:45–17:00	JWP-15	16:45–17:00	QSR-5	16:45–17:00	
17:00–17:15	Coffee Break				
17:15–18:15	Visual-JW and WSE Poster Session				
18:15–18:30	Break				
18:30–20:30	Banquet at ORBIT HALL				

11:30–18:30 Exhibition by Companies at Lobby (in front of the room for the Plenary Lectures)

Session Name	Visual-JW 2019 session
Session Name	WSE 2019 session

- Paper No. Keynote Lecture (20 min including discussion)
- Paper No. Invited Lecture Lecture (15 min including discussion)
- Paper No. General Presentation (15 min including discussion)

### Changes

No Presentation: W-JWP-10

Moved: W-MTJW-2 to November 22

# Friday, November 22

Room	A	Room	B	Room	C	Room	D
Session Name	Visualization of Joining and Welding Process (4)	Session Name	Visualization of Metallurgy in Friction Stir Welding	Session Name	WSE Visualization of Joining and Welding Process (3)	Session Name	Visualization of Nano and Micro Materials Processing
9:00–9:20	JWP-16	9:00–9:20	MTFSW-1	9:00–9:20	W-MTJW-2	9:00–9:20	NM-1
9:20–9:35	JWP-17	9:20–9:35	MTFSW-2	9:20–9:35	W-JWP-12	9:20–9:35	NM-2
9:35–9:50	JWP-18	9:35–9:50	MTFSW-3	9:35–9:50		9:35–9:50	NM-3
9:50–10:00	Break						
Session Name	Visualization of Advanced Material Processing	Session Name	Visualization of Metallurgy in Joining and Welding (1)	Session Name	WSE Visualization of Mechanics in Joining and Welding (1)	Session Name	Research Activities of Joint Usage / Research Center on Joining and Welding (1)
10:00–10:20	AMP-1	10:00–10:20	MTJW-1	10:00–10:20	W-MCJW-1	10:00–10:05	Opening Remark
10:20–10:35	AMP-2	10:20–10:35	MTJW-2	10:20–10:35	W-MCJW-2	10:05–10:25	RAJU-1
10:35–10:50	AMP-4	10:35–10:50	MTJW-3	10:35–10:50	W-MCJW-3	10:25–10:45	RAJU-2
10:50–11:05	AMP-5	10:50–11:05	MTJW-4	10:50–11:05	W-MCJW-4	10:45–11:05	RAJU-3
11:05–11:20		11:05–11:20	MTJW-5	11:05–11:20	W-MCJW-5	11:05–11:25	RAJU-4
11:20–11:35	Coffee Break					11:25–11:35	Coffee Break
Session Name	Visualization of Joining and Welding Process (5)	Session Name	Visualization of Metallurgy in Joining and Welding (2)	Session Name	WSE Visualization of Joining and Welding Process (4)	Session Name	Research Activities of Joint Usage / Research Center on Joining and Welding (2)
11:35–11:55	JWP-19	11:35–11:55	MTJW-6	11:35–11:55	W-JWP-14	11:35–11:55	RAJU-5
11:55–12:10	JWP-20	11:55–12:10	MTJW-7	11:55–12:10	W-JWP-15	11:55–12:15	RAJU-6
12:10–12:25	JWP-21	12:10–12:25	MTJW-8	12:10–12:25		12:15–12:35	RAJU-7
12:25–12:40	JWP-22	12:25–12:40	MTJW-9	12:25–12:40			
12:40–13:40	Lunch at SEIUN						
Session Name	Visualization of Joining and Welding Process (6)	Session Name	Visualization of Mechanics in Joining and Welding (1)	Session Name	WSE Visualization of Quality, Safety and Reliability (1)	Session Name	WSE Visualization of Additive Manufacturing (1)
13:40–14:00	JWP-23	13:40–14:00	MCJW-1	13:40–14:00	W-QSR-1	13:40–14:00	W-AM-1
14:00–14:15	JWP-24	14:00–14:15	MCJW-2	14:00–14:15	W-QSR-2	14:00–14:15	W-AM-2
14:15–14:30	JWP-25	14:15–14:30	MCJW-3	14:15–14:30	W-QSR-3	14:15–14:30	W-AM-3
14:30–14:40	Break						
Session Name	Visualization of Joining and Welding Process (7)	Session Name	Visualization of Mechanics in Joining and Welding (2)	Session Name	WSE Visualization of Mechanics in Joining and Welding (2)	Session Name	WSE Visualization of Quality, Safety and Reliability (2)
14:40–15:00	JWP-26	14:40–15:00	MCJW-4	14:40–15:00	W-MCJW-6	14:40–15:00	W-QSR-4
15:00–15:15	JWP-27	15:00–15:15	MCJW-5	15:00–15:15	W-MCJW-7	15:00–15:15	W-QSR-6
15:15–15:30	JWP-28	15:15–15:30	MCJW-6	15:15–15:30	W-MCJW-8	15:15–15:30	W-QSR-7
15:30–15:45	JWP-29	15:30–15:45	MCJW-7	15:30–15:45	W-MCJW-9	15:30–15:45	W-QSR-8
15:45–16:00	JWP-30	15:45–16:00	MCJW-8	15:45–16:00	W-MCJW-10	15:45–16:00	
16:00–16:15	Coffee Break						
Session Name	Visualization of Joining and Welding Process (8)	Session Name	Visualization of Mechanics in Joining and Welding (3)	Session Name	WSE Visualization of Advanced Material Processing	Session Name	WSE Visualization of Additive Manufacturing (2)
16:15–16:35	JWP-31	16:15–16:35	MCJW-9	16:15–16:35	W-AMP-1	16:15–16:35	W-AM-4
16:35–16:50	JWP-32	16:35–16:50	MCJW-10	16:35–16:50	W-AMP-2	16:35–16:50	W-AM-5
16:50–17:05	JWP-33	16:50–17:05	MCJW-11	16:50–17:05	W-AMP-3	16:50–17:05	W-AM-6

9:00–14:00 Exhibition by Companies at Lobby (in front of the room for the Plenary Lectures)

Session Name	Visual-JW 2019 session
Session Name	WSE 2019 session
Session Name	Symposium on Research Activities of Joint Usage / Research Center on Joining and Welding

Paper No. Keynote Lecture (20 min including discussion)

Paper No. Invited Lecture (15 min including discussion)

Paper No. General Presentation (15 min including discussion)

Paper No. Lecture on Research Activities of Joint Usage / Research Center on Joining and Welding (20 min including discussion)

### Changes

No Presentation: W-JWP-11, W-JWP-13, W-JWP-16, W-QSR-5

Moved: W-MTJW-2 from November 21

# TECHNICAL PROGRAM

## Opening Ceremony and Plenary Lectures

Thursday, November 21

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### SEIUN

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#### 9:50–10:00 Opening Ceremony

Chair Person: Hiroshige INOUE (Osaka University)

**Greetings:** Prof. Ninshu MA (Osaka University)  
The Conference Chairman  
Joining and Welding Research Institute, Osaka University

#### 10:00–11:30 Plenary Lectures

Chair Persons: Hiroshige INOUE (Osaka University)  
Liqun LI (Harbin Institute of Technology)

**Plenary Lecture 1:** “Metal Vapour in Arc Welding”  
Dr. Anthony Bruce MURPHY (CSIRO Manufacturing)

**Plenary Lecture 2:** “Bonding Development Advances for Need-based Design of Advanced Thermal Spray Ceramic Coatings”  
Prof. Chang-Jiu LI (Xi’an Jiaotong University)

**Plenary Lecture 3:** “International Standardization of Constraint-Based Assessment of Fracture for Steel Component”  
Prof. Fumiyoshi MINAMI (Osaka University)

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# Visualization in Joining & Welding Science through Advanced Measurements and Simulation (Visual-JW 2019)

— Oral Presentation —

Thursday, November 21

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## Room A

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### 12:30–13:50 Visualization of Joining and Welding Process (1) (JWP)

Chair Persons: Houichi KITANO (National Institute for Materials Science)  
Shinichi TASHIRO (Osaka University)

- JWP-1 **Keynote Lecture:** “Estimation of Appropriate Laser Irradiation Position in Laser Enhanced Ar-GMA Welding according to Welding Conditions”  
Houichi KITANO, Terumi NAKAMURA (National Institute for Materials Science)
- JWP-2 “Spatter Reduction of Titanium Alloy Gas Metal Arc Welding using Cathode Spot Control”  
Tae-Hyun LEE (Korea Institute of Industrial Technology, Hanyang University), Je-Hoon OH (Hanyang University), Dong-Hyuk KAM, Jason CHEON (Korea Institute of Industrial Technology)
- JWP-3 “Development of a Low Oxidation Method in Weld Metals for Narrow Groove GMA Welding with a Local CO<sub>2</sub> Adding Nozzle”  
Tomoaki NAKASHIMA (Nippon Steel Engineering Co., Ltd.), Yoshihiro OTA (Sankyu Inc.), Yuji KISAKA, Fumiaki KIMURA (Nippon Steel Engineering Co., Ltd.), Shinichi TASHIRO, Manabu TANAKA (Osaka University), Masahiro OHARA (Ehime University)
- JWP-4 “Observation of Droplet Properties in the Arc Atmosphere of GMAW”  
Koichi HOSOJ, Shigeki TAKAGI (AIRI Co.,LTD.), Manabu TANAKA (Osaka University)
- JWP-5 “Revealing Internal Flow Behavior in Underwater Wet FCAW using an X-Ray Transmission Method”  
Changsheng XU, Ning GUO, Jicai FENG (Harbin Institute of Technology)

### 14:05–15:25 Visualization of Joining and Welding Process (2) (JWP)

Chair Persons: Jason CHEON (KITECH)  
Yoshiaki MORISADA (Osaka University)

- JWP-6 **Keynote Lecture:** “The Experimental and Numerical Analysis Based Visualization of Hook-shaped Interlocking Formation on a Lap Joint between Al5083 and DP590 via Friction Stir Welding Process”  
Jason CHEON, Jin-young YOON, Minjung KANG (KITECH), Jungho CHO (Chungbuk National Univ.), Cheolhee KIM (KITECH)
- JWP-7 “Analysis of Ultrasonic Assisted FSW Process with Considering Acoustic Stress Work and Plastic Strain”  
Wenzhen ZHAO, ChuanSong WU (Shandong University)
- JWP-8 “Enhancing the Mechanical Properties of Dissimilar Aluminum and Copper Friction Stir Welding Joints by Ultrasonic Vibration Assistance”  
Najib Ahmad MUHAMMAD, ChuanSong WU (Shandong University)
- JWP-9 “Dissimilar Friction Welding of Ti-6Al-4V Alloy and SUS316L Stainless Steel”  
Huihong LIU, Yo AOKI, Yasuhiro AOKI, Hidetoshi FUJII (Osaka University)
- JWP-10 “A Novel Flat FSSW using Double Side Adjustable Tools and Its in-situ Observation by X-Ray Radiography”  
Xiaopei WANG, Yoshiaki MORISADA, Hidetoshi FUJII (Osaka University)

### 15:40–17:00 Visualization of Joining and Welding Process (3) (JWP)

Chair Persons: Junmiao SHI (Northwestern Polytechnical University)  
Yuji SATO (Osaka University)

- JWP-11 **Keynote Lecture:** "Relieving the Residual Stress in the ZrC-SiC Ceramic and TC4 Alloy Brazed Joint using Laser Deposited Functionally Graded Material Layers"  
Junmiao SHI, Jinglong LI (Northwestern Polytechnical University), Jikai FENG (Harbin Institute of Technology), Ninshu MA (Osaka University)
- JWP-12 "30 kW High Power Laser Welding Characteristics of Thick Plate Steel"  
Shenghao MENG, Wang TAO, Liqun LI, Lichen FENG (Harbin Institute of Technology), Ruisheng HUANG, Hao CAO (Harbin Welding Institute Limited Company)
- JWP-13 "Optimization of Process Conditions for Hot-Wire Laser Brazing on Steel / Al Alloy Dissimilar Joint"  
Akira TAKANO, Motomichi YAMAMOTO (Hiroshima University), Kenji SHINOZAKI (National Institute of Technology), Chikaumi SAWANISHI, Hiroshi MATSUDA (JFE Steel Corporation)
- JWP-14 "Basic Study on Copper Deposition Method to Tungsten with Blue and Infrared Diode Lasers"  
Jun SHIMOKA, Hisashi SERIZAWA, Yuji SATO, Takahiro HARA, Masahiro TSUKAMOTO (Osaka University), Hiroyasu TANIGAWA (Rokkasyo Fusion Institute)
- JWP-15 "In-situ Determination of the Critical Staining Condition for Solidification Cracking during Laser Beam Welding"  
Nasim BAKIR, Andrey GUMENYUK, Michael RETHMEIER (BAM Bundesanstalt für Materialforschung und -prüfung)
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## Room B

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### 12:30–13:50 Visualization of Additive Manufacturing (1) (AM)

Chair Persons: Junko UMEDA (Osaka University)  
Soshu KIRIHARA (Osaka University)

- AM-1 **Keynote Lecture:** “Monitoring and Control of the Heat Input and the Arc Plasma in GMA Wire Arc Additive Manufacturing”  
Sven-F. GOECKE, Götz-F. GOTTSCHALK, Sebastian BAUM (TH Brandenburg), Danny LUBOSCH, Georg FISCHER (GEFERTEC GmbH)
- AM-2 “Cryogenic High Strength and Ductile CrCoNi Medium Entropy Alloy Prepared by Selective Laser Melting”  
Kai FENG (Shanghai Jiao Tong University), Bolun HAN, Chengcheng ZHANG, Jie ZHU (Collaborative Innovation Center for Advanced Ship and Deep-Sea Exploration), Hiroyuki KOKAWA (Tohoku University), Zhuguo LI (Shanghai Jiao Tong University)
- AM-3 “Laser Surface Polishing of NiCrSiBC-6OKWC Ceramic-Metal Composite Deposited by Direct Metal Laser Deposition”  
Abhijit SADHU, Amit CHOUDHARY, Sagar SARKAR (Indian Institute of Technology Kharagpur), Pawar Sagar DADASAHEB, Masetty Krishna CHAITANYA, Muvvala GOPINATH (Indian Institute of Technology Hyderabad), Surjya K PAL, Ashish Kumar NATH (Indian Institute of Technology Kharagpur)
- AM-4 “Investigation of Residual Stress in Multi Arc-based Cooperative Metal Additive Manufacturing”  
Ru-wei GENG, Jun DU, Zheng-ying WEI (Xi’an Jiaotong University), Ninshu MA (Osaka University)
- AM-5 “Pure Copper Rod Formation by Laser Metal Deposition System with Blue Diode Lasers”  
Takahiro HARA, Masahiro TSUKAMOTO, Yuji SATO, Ritsuko HIGASHINO (Osaka University), Yoshinori FUNADA (Industrial Research Institute of Ishikawa), Kazuhiro ONO (Osaka University), Nobuyuki ABE (Industrial Research Institute of Ishikawa)

### 14:05–15:25 Visualization of Additive Manufacturing (2) (AM)

Chair Persons: Sven-F. GOECKE (TH Brandenburg)  
Yuji SATO (Osaka University)

- AM-6 “Microstructure, Mechanical and Acoustic Properties of 316L Stainless Steel Lattice Structures Manufactured by Selective Laser Melting”  
Xiaojing SUN, Jiandong WANG, Fengchun JIANG (Harbin Engineering University)
- AM-7 “Comparative Study of Solidification Behaviors of Weld Pool through Modelling of Heat Transfer and Fluid Flow During Single- and Multiple-layer Deposits of 2319-aluminum Alloy Based on Variable Polarity Gas Tungsten Arc Welding”  
Jun DU, Ruwei GENG, Zhengying WEI (Xi’an Jiaotong University), Ninshu MA (Osaka University)
- AM-8 “Assessment of Microstructure and Mechanical Properties in Laser Cladding, Surface Polishing and Welding Through Online Monitoring”  
Gopinath MUVALA, Ashish Kumar NATH (Indian Institute of Technology Hyderabad)
- AM-9 “Effects of Annealing on the Structure and Properties of FeCoCrNi Alloy Fabricated by Selective Laser Melting”  
Danyang LIN, Lianyong XU, Hongyang JING, Yongdian HAN, Lei ZHAO (Tianjin University)
- AM-10 “Development of New Material Model Considering Strain Hardening, Ultra-High Strain Rate Hardening, Thermal Softening and Recrystallization for Solid State Cold-Spray Additive Manufacturing”  
Qian WANG, Ninshu MA, Makoto TAKAHASHI (Osaka University), Xiaotao LUO, Changjiu LI (Xi’an Jiaotong University)



## 15:40–17:00 Visualization of Quality, Safety and Reliability (QSR)

Chair Persons: Dean DENG (Chongqing University)  
Kazufumi NOMURA (Osaka University)

- QSR-1      **Keynote Lecture:** “Investigation on Influence of Solid-State Phase Transformation on Welding Residual Stress of High Strength Low Alloy Steel Joints”  
Dean DENG, Qiao ZHENG, Suo LI (Chongqing University)
- QSR-2      “An Enhanced Gurson Model with Cohesive Traction-Separation Law to Realize Transition from Ductile to Brittle Fracture”  
Takuya KAGIMURA, Yuichi SHINTAKU (University of Tsukuba), Seiichiro TSUTSUMI (Osaka University), Kenjiro TERADA (Tohoku University)
- QSR-3      “Prediction of the Fatigue Life of Aluminum Alloy Joints by means of Cyclic Elasto-plasticity FEM Analyses”  
Seiichiro TSUTSUMI, Moe SANO, Riccardo FINCATO (Osaka University)
- QSR-4      “Effect of Heat Removal on Heat Input Parameter of Tempering Treatment for Resistance Spot Welded Steel Sheets”  
Akira SATO (Osaka Institute of Technology), Seiji FURUSAKO (Nippon Steel Corporation), Izuru NISHIKAWA, Muneyoshi IYOTA (Osaka Institute of Technology)
- QSR-5      “Development of In-Situ Measurement System for Welding Robot by Laser Ultrasonic with Microchip Laser”  
Kazufumi NOMURA, Taketo MATSUIDA, Satoshi OTAKI, Ryosuke KITA, Satoru ASAI (Osaka University)
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# Welding Science and Engineering (WSE 2019)

— Oral Presentation —

Thursday, November 21

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## Room C

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### 12:30–13:50 WSE Visualization of Joining and Welding Process (1) (W-JWP)

Chair Person: Lianyong XU (Tianjin University)

- W-JWP-1 **Keynote Lecture:** “Modeling the Interaction Mechanism of the Multi-physical Fields in Different Welding Processes”  
Chuansong WU, Lei SHI, Ji CHEN (Shandong University)
- W-JWP-2 **Invited Lecture:** “Research on Effect of Filling Wire on Weld Shape and Joint Mechanical Properties of Laser Welding Al-Li Alloy”  
Li CHEN, Shuili GONG, Enguang HE (AVIC Manufacturing Technology Institute)
- W-JWP-3 “Microstructure and Mechanical Properties of Ti-6Al-4V/Ti<sub>2</sub>AlNb Joint Brazed using TiZrCuNi Filler Metal”  
Lin YUAN, Jiangtao XIONG, Junmiao SHI, Jinglong LI (Northwestern Polytechnical University)
- W-JWP-4 “Interfacial Microstructure and Nano-mechanical Properties of Dissimilar 304/AZ31B Alloy Welding Joint”  
Tingting ZHANG, Wenxian WANG (Taiyuan University of Technology)
- W-JWP-5 “Effect of Ultrasonic Vibrations on Axial Force, Torque, Power and Joint Morphology during Friction Stir Welding of Al-Mg Alloys”  
Sachin KUMAR, Chuansong WU (Shandong University)

### 14:05–15:25 WSE Visualization of Joining and Welding Process (2) (W-JWP)

Chair Person: Chuansong WU (Shandong University)

- W-JWP-6 **Keynote Lecture:** “Mechanical Clinching Process with Preforming of Lower Sheet”  
Yohei ABE, Ken-ichiro MORI (Toyohashi University of Technology)
- W-JWP-7 **Invited Lecture:** “Effect of Mo Content on the Corrosion and Cavitation-erosion Behavior of High-entropy FeCoCrNiMo<sub>x</sub>B<sub>0.2</sub> Layer Cladded by Laser”  
Bing-qi XIE, Ye-feng BAO, Chong-hui ZHONG, Qi-ning SONG, Ke YANG and Yong-feng JIANG (Hohai University)
- W-JWP-8 “Numerical Simulation of Fluid Dynamics and Weld Formations in Oscillation Laser Welding of 5A06 Aluminum Alloy”  
Jianfeng GONG, Genchen PENG, Yu HAO, Shenghao MENG, Liqun LI (Harbin Institute of Technology)
- W-JWP-9 “Double-pass Laser Welding of Zero-gap Overlap Galvanized Steel Sheets”  
Shen LI, Tomiko YAMAGUCHI (Kyushu Institute of Technology)
- W-JWP-10 **No Presentation:** “Comparative Study on Laser/MIG Hybrid Welding and MIG Welding of High-nitrogen Austenitic Stainless Steel”  
Chen-Hong WANG (Xi’an Jiaotong University), Jun HOU (Xi’an coal mining machinery Co., Ltd), Lin-Jie ZHANG, Gui-Feng ZHANG, Jian-Xun ZHANG (Xi’an Jiaotong University)

**15:40–17:00 WSE Visualization of Metallurgy in Joining and Welding (W-MTJW)**

Chair Person: Yohei ABE (Toyohashi University of Technology)

- W-MTJW-1 **Keynote Lecture:** “Effects of Welding Process on Mechanical Properties of AA7075-T6 Ultra-thin Sheet Joints Fabricated by High Speed Micro Friction Stir Welding”  
Yu NI, Dingqiang QIN, Yue MAO, Xuan XIAO and Li FU (Northwestern Polytechnical University, Shaanxi Key Laboratory of Friction Welding Technologies)
- W-MTJW-2\* **Moved: Keynote Lecture:** “Atomistic Analysis on Interface Evolution during Solid State Welding between Aluminum Surfaces”  
Gaoqiang CHEN, Qingyu SHI (Tsinghua University)
- W-MTJW-3 “Strengthening Mechanism in Resistance Rivet Welded Aluminum/Steel Joints”  
Sizhe NIU (Shanghai Jiao Tong University), Yunwu MA (Osaka University), Ming LOU, Yongbing LI (Shanghai Jiao Tong University)
- W-MTJW-4 “Process Parameters and Material Flow during Refill Friction Stir Spot Welding for 2A12-T4 Aluminum Alloy”  
Li ZHOU (Harbin Institute of Technology), Gaohui LI, Haifeng ZHANG (Harbin Institute of Technology at Weihai), Jikai FENG (Harbin Institute of Technology)
- W-MTJW-5 “Effect of Alloy Compositions on Volume Expansion Accompanying Martensitic Transformation in Low Transformation Temperature Weld Metals”  
Zhongyuan FENG (Osaka University), Xinjie DI (Tianjin University), Shipin WU (Tianjin University of Technology and Education), Ninshu MA (Osaka University)

\* Presented at WSE Visualization of Joining and Welding Process (3) (W-JWP) session on November 22.

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# Visualization in Joining & Welding Science through Advanced Measurements and Simulation (Visual-JW 2019)

— Poster Presentation —

Thursday, November 21

## Visualization of Advanced Material Processing / Visualization of Joining and Welding Process

- PT-1 “Diode Laser Selective Surface Homogenization of Ni Thermal-Sprayed Layer”  
Min-Su KIM (Korea Institute of Industrial Technology), Eun-Joon CHUN (Kyoungnam University)
- PT-2 “Experimental Study on Novel MIG Welding Process with Duplex Current Feeding”  
Atsuhito AOKI (Kawasaki Technology), Shinichi TASHIRO (Osaka University), Hideaki KUROKAWA (Kawasaki Heavy Industries, Ltd.), Manabu TANAKA (Osaka University)
- PT-3 “Numerical Analysis of Friction Stir Welded V-Alloy/SUS316L Joint with New Particle Method based on MPS”  
Hisashi SERIZAWA, Hirotaka OGURA, Kenta MITSUFUJI, Fumikazu MIYASAKA (Osaka University)
- PT-4 *Withdrawn*
- PT-5 “Numerical Modelling and Its Validity for Coaxial One-Side Resistance Spot Welding of Metals and Plastics”  
Sendong REN, Yunwu MA (Osaka University), Shuhei SAEKI, Yoshiaki IWAMOTO (DENGENSHA TOA CO., LTD.), Kunio NARASAKI, Ninshu MA (Osaka University)
- PT-6 “Imaging Spectroscopy for Dynamic Transport of Chromium Vapor During a Helium TIG Welding Imaging Spectroscopy for Dynamic Transport of Chromium Vapor During a Helium TIG Welding”  
Keigo TANAKA, Masaya SHIGETA, Manabu TANAKA (Osaka University), Anthony B. MURPHY (CSIRO)
- PT-7 “Numerical Simulation of Droplet Transfer with Flux Column During Flux Cored Arc Welding by Three-dimensional Smoothed Particle Hydrodynamics Method”  
Ryo UENO (Osaka University), Hisaya KOMEN (Kumamoto University), Masaya SHIGETA, Manabu TANAKA (Osaka University)
- PT-8 “Glass-to-Glass Anodic Bonding using Conductive Intermediate Layers on Joint Surfaces of Both Glasses”  
Makoto TAKAHASHI (Osaka University)
- PT-9 “Joint Characteristics of Dissimilar Materials (AA50K52 Aluminium Alloy - DP59OK High Strength Steel) by Direct Current Pulsed Gas Metal Arc Welding”  
Seong Min HONG, Shinichi TASHIRO (Osaka University), Hee-Seon BANG (Chosun University), Manabu TANAKA (Osaka University)
- PT-10 “Numerical Analysis on Thermal Characteristics of Direct Current Pulsed Gas Metal Arc Welded Joints of AA50K52 Aluminium Alloy to DP59OK High Strength Steel”  
Seong Min HONG, Shinichi TASHIRO (Osaka University), Hee-Seon BANG (Chosun University), Manabu TANAKA (Osaka University)
- PT-11 “Investigation of Energy Propagation in Keyhole Plasma Arc Welding using a Coupled Plasma Arc-Keyhole-Weld Pool Model”  
Dongsheng WU, Shinichi TASHIRO (Osaka University), Xueming HUA (Shanghai Jiao Tong University), Manabu TANAKA (Osaka University)
- PT-12 “Plasma Surfacing of Corrosion Resistant Heat Resistant Steel on the Current of Direct and Reverse Polarity”  
Dmitry BELININ, Yuri SHITSYN, Sergey NEYLUBIN, Gleb PERMYAKOV (Perm National Research Polytechnic University)
- PT-13 “Methods for the Determination of Temperature Dependent Material Properties of Filler Metals for Hot-Wire Welding”  
Erik SPANIOL, Martin LOHSE, Martin HERTEL, Uwe FÜSSEL (Technische Universität Dresden)
- PT-14 “Computational Prediction of Penetration Shape in Horizontal Fillet MAG Welded Joint with Gap”  
Shingo SATO, Hisashi SERIZAWA, Fumikazu MIYASAKA (Osaka University)

- PT-15 "Development of Image Sensing Technology for In-Process Quality Control"  
Kazuki KASANO (Sumitomo Heavy Industries, LTD.), Yosuke OGINO, Satoru ASAI (Osaka University)
- PT-16 "Single Pass Full Penetration Welding of High-Strength Steel on Square-Groove Butt Joint using Hybrid Welding Process"  
Kazuya ISHIDA (Morita corporation), Shinichi TASHIRO, Masami MIZUTANI, Manabu TANAKA (Osaka University)
- PT-17 "Study on the Weld Bead Formation on Square-Groove Butt Joint using Hybrid Welding Process"  
Kazuya ISHIDA (Morita corporation), Shinichi TASHIRO, Masami MIZUTANI, Manabu TANAKA (Osaka University)
- PT-18 "A Unique CEL Numerical Method on Material Flow in a Molten Pool of Workpiece Vibration Assisted Welding"  
Habib Hamed ZARGARI, Kazuhiro ITO, Yoshiki MIKAMI (Osaka University), Abhay SHARMA (KU Leuven)
- PT-19 "Numerical and Experimental Observation of the Melt Pool Behavior for Laser Beam Welded Thick Plates in Partial Penetration Mode"  
Nasim BAKIR, Omer USTUNDAG, Andrey GUMENYUK, Michael RETHMEIER (BAM Bundesanstalt fur Materialforschung und -prufung)
- PT-20 "Simulation of Gas Metal Arc Welding Process Using Three-Dimensional Smoothed Particle Hydrodynamics Method"  
Hisaya KOMEN (Kumamoto University), Manabu TANAKA (Osaka University), Hidenori TERASAKI (Kumamoto University)
- PT-21 "Development of a Welding Condition Optimization Program for Narrow Gap SAW"  
Yohei ABE (Osaka University (Hitachi Zosen)), Takahiro FUJIMOTO (Hitachi Zosen), Mitsuyoshi NAKATANI (Osaka University (Hitachi Zosen)), Masaya SHIGETA, Manabu TANAKA (Osaka University)
- PT-22 "Numerical Investigation of the Variability of the Droplet Transfer Cycles in a Controlled Short-Circuit Transfer Process"  
Satoshi EDA, Yosuke OGINO, Satoru ASAI (Osaka University)
- PT-23 "An Investigation on Plasma-MIG Hybrid Welding Process of Thick Plate Aluminum"  
Toshifumi YUJI (University of Miyazaki), Shinichi TASHIRO (Osaka University), Hiroyuki KINOSHITA, Kentaro YASUI (University of Miyazaki), Toshio BOUNO (National Institute of Technology), Dongsheng WU, Ziang WU, Manabu TANAKA (Osaka University)
- PT-24 "Effects of the Exerted Ultrasonic Power on Microstructure and Mechanical Properties of Al/Mg Alloys FSW Joints"  
Junjie ZHAO, ChuanSong WU (Shandong University)
- PT-25 "Modeling Transient Development of Weld Pool and Keyhole in Ultrasonic Vibration Assisted Plasma Arc Welding"  
Junnan QIAO, ChuanSong WU, Yongfeng LI (Shandong University)
- PT-26 "Experimental Studies of Plume Under Fiber Laser Welding"  
Liu BENKANG, Wu GANG, Yu NAISEN (Dalian Minzu University), Yang YICHENG, Jiang BAO, Huang REISHENG (Harbin Welding Institute Limited Company)
- PT-27 "Joining of Alumina Ceramics Using Si-Mg Pastes for High-Temperature Application"  
Kazuyuki KOHAMA (Kyoto Municipal Institute of Industrial Technology and Culture)
- PT-28 "In-Process Monitoring of Weld Quality in Thin Plate Lap Welding by using Image Sensing"  
Seiya NITTA, Yosuke OGINO, Satoru ASAI (Osaka University)
- PT-29 "Development of a Supporting System of Layer Design in Multi-pass Robot Welding"  
Toshihiro OSUMI, Yosuke OGINO, Satoru ASAI (Osaka University), Shin-ichi SAKAMOTO, Takuro SANADA (SHIMIZU CORPORATION)
- PT-30 "Effect of Laser Wavelength on Welding of Pure Copper Sheet with Fiber and Blue Diode Lasers"  
Kento MORIMOTO, Masahiro TSUKAMOTO, Yuji SATO, Shin-ichiro MASUNO (Osaka University), Susumu KATO (Advanced Industrial Science and Technology), Tomomasa OHKUBO (Tokyo University of Technology), Kazuyuki AZUMI, Yoshihiko HAYASHI (Osaka Fuji Corporation), Nobuyuki ABE (Osaka University)
- PT-31 "Spectroscopic Measurement of the Arc and the Weld Pool in Robotic Welding"  
Daiki KOMAYA, Satoshi YAMANE (Saitama University)
- PT-32 "Effect of Electrode Radius on Expulsion in Two Pulsed Spot Welding"  
Hinako KINOSHITA, Satoshi YAMANE (Saitama University)

- PT-33 "Development of a High-Speed Welding Simulation Model by Using Machine Learning Technique"  
Yosuke OGINO, Satoru ASAI (Osaka University), Hoichi KITANO, Terumi NAKAMURA (National Institute for Material Science)
- PT-34 "Degradation Mechanism of Structural Adhesive under High Temperature and High Humidity Conditions"  
Hitomi ABIKO, Kosaku NAKAYAMA, Tatsuya KOBAYASHI, Ikuo SHOHJI (Gunma University), Yugo TOMITA, Tatsunori MATSUNAGA (SUBARU Co., Ltd.)
- PT-35 "Study on Suppressing Bead-Meandering of Pure Ar-MIG Arc Welding using External Magnetic Field"  
Noboru SAKURAI, Yasuyoshi KANEKO (Saitama University)
- PT-36 "Fundamental Plasma Diagnostic Study for Guiding TIG Arc Phenomenon by Laser Irradiation"  
Hiroyuki OKUDA, Kazufumi NOMURA, Satoru ASAI (Osaka University), Shohei IWATA, Yasushi KITANI, Kenji OI (JFE Steel Corporation)
- PT-37 "Numerical Analysis of Duplex Current Feeding MIG Welding Process"  
Shinichi TASHIRO (Osaka University), Atsuhito AOKI (Kawasaki Technology Co., Ltd.), Hideaki KUROKAWA (Kawasaki Heavy Industries, Ltd.), Manabu TANAKA (Osaka University)
- PT-38 "Numerical Simulation of Magnetic Blowout Process of Air Arc Plasma in Electrical Contacts"  
Shinichi TASHIRO (Osaka University), Shuichi ITODA, Takahiro MORICHI (Omron Corporation), Anthony B. MURPHY (CSIRO), Manabu TANAKA (Osaka University)
- PT-39 "Modeling of Xenon Short Arc Lamp Considering Behavior of Tungsten Vapour Evaporated from Electrodes"  
Shiro MAENAKA (YUMEX Inc.), Shinichi TASHIRO (Osaka University), Anthony B MURPHY (CSIRO), Kazunori FUJITA (YUMEX Inc.), Manabu TANAKA (Osaka University)
- PT-40 "Characterization of High-Frequency Linear Friction Welding Process for Al/Cu Dissimilar Joining"  
Tomoki MATSUDA, Hideo MOGAMI, Tomokazu SANO (Osaka University), Ryo YOSHIDA, Hisashi HORI (Nikkei Research & Development Center), Akio HIROSE (Osaka University)
- PT-41 "Investigation of Corrosion Resistance of Nickel-based Brazing Filler Metal for Stainless Steel by Electrochemical Measurement"  
Yusuke FUKAI, Tatsuya KOBAYASHI, Ikuo SHOHJI (Gunma University), Tetsuya ANDO (Muroran Institute of Technology), Takuya YOSHIDA, Tsuyoshi KASHIWASE, Noboru OTOMO (Atago Mfg, Co., Ltd)
- PT-42 "Investigation of High Temperature Fatigue Properties and Microstructures of Sn-Sb-Ag alloys"  
Kohei MITSUI, Tatsuya KOBAYASHI, Ikuo SHOHJI (Gunma University), Hirohiko WATANABE (Fuji Electric Co., Ltd.)
- PT-43 "Texture Randomization of Friction Stir Welded Mg Alloy"  
Nan XU, Wenfeng GUO, Siqi CAI, Qining SONG, Yefeng BAO (Hohai University)
- PT-44 "Studies on the Influences of Welding Position on the Weld Bead Formation in Laser Welding of a Titanium Alloy"  
Baohua CHANG, Zhang YUAN (Tsinghua University), Hao CHENG, Haigang LI (Aerospace Research Institute of Materials & Processing Technology), Dong DU, Jiguo SHAN (Tsinghua University)
- PT-45 "Corrosion and Cavitation Erosion Behaviors of the Cast and Friction Stir Processing Ni-Al Bronze in Sulfide-Containing Chloride Solution"  
Qining SONG, Nan XU, Yao TONG, Chenbo XU, Yue LIU, Yefeng BAO (Hohai University)
- PT-46 "Evaluation of the Influence of Additional Welding on Cruciform Joint Fatigue Life Extension"  
Koyo TAKATA, Seiichiro TSUTSUMI, Fincato RICCARDO (Osaka University)

### **Mechanics in Joining and Welding Process**

- PT-47 "An Effective Kt Formula for Butt Weld Joint with Backing Plate"  
Seiichiro TSUTSUMI, Koyo TAKATA, Masaki OGAWA (Osaka University)
- PT-48 "Numerical Study for the Effect of Additional Weld on Fatigue Strength in Out-of-Plane Gusset Joints"  
Seiichiro TSUTSUMI, Ayang BUERLIHAN, Riccardo FINCATO (Osaka University), Yuki KOTANI, Tadahisa TSUYAMA (Kawada Industries, Inc.)
- PT-49 "Effect of Pre-overload on Fatigue Life Extension of U-rib Steel Floor Slab Root"  
Seiichiro TSUTSUMI, Homare SHIBATA, Riccardo FINCATO (Osaka University), Takayuki YONEZAWA, Hiroshi SHIMANUKI (Nippon Steel Corporation)
- PT-50 "Numerical Simulation of Deformation Behavior during Chisel Testing of Resistance Spot Welds of High-strength Steel"  
Takuya OTSUKA, Yoshiki MIKAMI, Kazuhiro ITO (Osaka University)

- PT-51 "Effect of Grain Boundary Geometry on Opening and Sliding Behavior in Ni-base Alloy Weld Metal"  
Takumi OKUDA (Osaka University), Keisuke TORIGATA, Daisuke ABE (IHI Corporation), Yoshiki MIKAMI, Kazuhiro ITO (Osaka University)
- PT-52 "Residual Stress Analysis of Dissimilar Weld Joint between Cast Iron Pipe and Steel Flange"  
Tomohiro MURATA, Shigetaka OKANO (Osaka University), Shimpei TSUTSUMI, Kenji SAWADA, Koji NAKAMOTO (Kurimoto, Ltd.), Masahito MOCHIZUKI (Osaka University)
- PT-53 "Prediction of Welding Deformation of Automotive Components Using Large-scale Thermal Elastic Plastic Analysis"  
Kazuki IKUSHIMA, Taro UCHIMURA, Atsushi KAWAHARA (Osaka Prefecture University), Hitoshi KUWABARA (Toyota Motor Corporation), Hiroaki KANETAKE (Toyota Production Engineering Corporation), Masakazu SHIBAHARA (Osaka Prefecture University)
- PT-54 "Efficient Modeling of Welding Mechanics Using Mesh Superposition"  
Kazuki IKUSHIMA, Ryo ASHIDA, Masakazu Shibahara (Osaka Prefecture University)

### Metallurgy in Joining and Welding Process

- PT-55 "Effect of Ferrite Content and Chemical Composition on Weld Solidification Cracking Susceptibility of Stainless Steel with F mode Solidification"  
Seiya UENO, Kota KADOI, Shun TOKITA, Hiroshige INOUE (Osaka University)
- PT-56 "Influence of Oxide Particles on Toughness of Modified 9Cr-1Mo Steel Shielded Metal Arc Weld Metals with Different Ni+Mn Contents"  
Satoru NISHIKAWA, Shinji MURAYAMA, Kotone NUMAKURA (Iwate University)
- PT-57 "Dissimilar Friction Welding of Titanium Alloy to Nickel Alloy using Metal Interlayer"  
Tomo OGURA, Tomoya IMAI, Kazuyoshi SAIDA (Osaka University)
- PT-58 "A Comparative Study on Laser Welding Versus Friction Stir Welding of Ti-Ni Alloy"  
Abdollah BAHADOR, Junko UMEDA, Seiichiro TSUTSUMI, Hidetoshi FUJII, Katsuyoshi KONDOH (Osaka University)
- PT-59 "W Alloying due to WC Tool Wear during Friction Stir Processing for Fatigue Strength Improvement of High-Strength Low-Alloy Steel Joints"  
Shodai KOGA, Hajime YAMAMOTO, Kazuhiro ITO, Makoto TAKAHASHI, Yoshiki MIKAMI, Hidetoshi FUJII (Osaka University)
- PT-60 "Travel Distance of Stable WC-tool-wear Related W Alloying Varying with Friction Stir Processing Parameters on Low-carbon Steel Plates"  
Yudai IMAGAWA, Hajime YAMAMOTO, Kazuhiro ITO (Osaka University)
- PT-61 "Microstructure and Impact Toughness Relationship for Different Nickel Level of Electrode in Multi-pass FCA Welded SM570K-TMC Steel Joint"  
Winarto WINARTO, Herry OKTADINATA, Eddy S. SIRADJ, Dedi PRIADI, Ario S. BASKORO (Universitas Indonesia)
- PT-62 "Influence of Thermomigration on Microstructure and Properties of Cu/Sn-58Bi/Cu Solder Joint"  
Yu-An SHEN, Shiqi ZHOU, Jiahui LI, Hiroshi NISHIKAWA (Osaka University)
- PT-63 "Sn Steaming Phenomenon during Fluxless Soldering under a Formic Acid Atmosphere"  
Siliang HE, Runhua GAO, Jiahui LI, Sijie HUANG, Hiroshi NISHIKAWA (Osaka University)

### Nano and Micro Materials Processing

- PT-64 "Synthesis and Joining of Tailor-Made Ceramic Nanocrystals towards Energy and Environmental Applications"  
Satoshi OHARA (Osaka University), Kazuhiro YAMAMOTO (Nagaoka University of Technology), Masakuni OZAWA (Nagoya University)
- PT-65 "Relationship between Grinding Results in Wet Ball Milling and the Analysis of Ball Motions using DEM Simulation"  
Akira KONDO (Osaka University), Shingo ISHIHARA, Kizuku KUSHIMOTO (Tohoku University), Takahiro KOZAWA (Osaka University), Junya KANO (Tohoku University), Makio NAITO (Osaka University)
- PT-66 "Non-Autoclave Synthesis of Magnetite Nanocrystal Clusters and Their Magnetic Properties"  
Hiroya ABE (Osaka University), Kazuyoshi SATO (Gunma University), Takashi NAKA (NIMS), Yoshikazu SUZUKI (University of Tsukuba)

- PT-67 "Interface Chemistry Control for Enhancing Electrical Conductivity of Epoxy-based Adhesives Containing Silver Fillers Treated with a Triazole Surfactant"  
Shiho NAKAZAWA, Masahiro INOUE (Gunma University)
- PT-68 "Solutes Diffusion Mechanism and Electronic Structures in Alpha Titanium"  
Kazuki SHITARA (Osaka University, NIMS), Masato YOSHIYA, Junko UMEDA, Katsuyoshi KONDOH (Osaka University)

### **Quality, Safety and Reliability**

- PT-69 "In-Situ Monitoring Technique of the Welding Defects during GMA Welding by Using Laser Ultrasonic"  
Satoshi OTAKI, Taketo MATSUIDA, Kazufumi NOMURA, Satoru ASAI (Osaka University)
- PT-70 "Study of Burn-through Prediction in MAG Arc Welding Using Molten Pool Monitoring Technique"  
Takumi MATSUMURA, Kazufumi NOMURA, Satoru ASAI (Osaka University)
- PT-71 "Burn-through Prediction Using Deep Learning Model in Single Bevel Groove Welding"  
Koki FUKUSHIMA, Takumi MASTUMURA, Kazufumi NOMURA, Satoru ASAI (Osaka University)
- PT-72 "Probabilistic Analysis for Charpy Impact Toughness of Steel for Welded Structure in Ductile-to-Brittle Fracture Transition Temperature Range"  
Yasuhito TAKASHIMA, Fumiyoshi MINAMI (Osaka University)
- PT-73 "Prediction of Fatigue Notch Sensitivity of Medium and High-Strength Steels"  
Seiichiro TSUTSUMI, Yuki KIYOKAWA, Riccardo FINCATO (Osaka University)
- PT-74 "Effect of Blowholes on Fatigue Crack Initiation Life of Aluminum Alloy Lap-Joint"  
Gaku DAIMON, Seiichiro TSUTSUMI, Riccardo FINCATO (Osaka University)
- PT-75 "Ductile Damage Criterion for Sn-Ag-Cu Solder Failure Prediction Using Finite Element Method"  
Mai MORISHITA, Kunio NARASAKI, Ninshu MA, Hiroshi NISHIKAWA (Osaka University)

### **Additive Manufacturing**

- PT-76 "Influence of Processing Parameters and Nitrogen Solid-solution on Microstructures of Pure Titanium Materials Fabricated by Selective Laser Melting"  
Ammarueda ISSARIYAPAT, Junko UMEDA, Katsuyoshi KONDOH (Osaka University)
- PT-77 "Fundamental Study for In-situ Quality Measurement of WAAM Process by Laser Ultrasonic Technique"  
Taketo MATSUIDA, Ryosuke KITA, Satoshi OTAKI, Kazufumi NOMURA, Satoru ASAI (Osaka University)
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# Welding Science and Engineering (WSE 2019)

## — Poster Presentation —

Thursday, November 21

### WSE 2019

- W-PT-1 “Dynamic Keyhole Profile Induced Defects Formation during 20 kW Fiber Laser Deep Penetration Welding”  
Jijun XIN (Chinese Academy of Sciences), Wenhua DAI (Chinese Academy of Sciences, University of Science and Technology of China), Chao FANG (Chinese Academy of Sciences), Wuxiong YANG (Beijing University of Technology), Jing WEI (Chinese Academy of Sciences), Jiefeng WU, Yuntao SONG (Chinese Academy of Sciences, University of Science and Technology of China)
- W-PT-2 “Experimental and Numerical Simulation Study on Fracture Toughness of Stainless Steel Clad Plate Joint”  
Chang’an LI, Guoliang QIN (Shandong University)
- W-PT-3 “Resistance Spot Welding of Dissimilar DP590GA and AA6061 Metals”  
Zhengqiang ZHU, Teng LIU (Nanchang University), Fangjuan Qi (Suzhou University of Science and Technology), Yifeng TIAN, Xiaomin GE (Nanchang University)
- W-PT-4 “Laser Micro-welding of Stainless Steel Foils”  
Rongshi XIAO, Weizhi DU, Ting HUANG (Beijing University of Technology)
- W-PT-5 “Study on Deposition Characteristics of Assisted Wire Filling of Cable-type Welding Wire GMAW”  
Zhidong YANG, Zhiyu XIE, Chenfu FANG, Chenming LI, Xiong QIU, Xiaoting WANG, Fengxiang WANG, Haocheng WANG (Jiangsu University of Science and Technology)
- W-PT-6 “Phase-field Modeling of Dynamic Recrystallization Process during Friction Stir Welding of Aluminum Alloys”  
Chunliang YANG, ChuanSong WU (Shandong University)
- W-PT-7 “Thermo-mechanical Numerical Simulation of Linear Friction Welding of GH4169 Superalloy”  
Peihao GENG, Guoliang QIN (Shandong University)
- W-PT-8 **No Presentation:** “Fatigue Strength of 7A52 Aluminum Alloy MIG-VPPA Welded Joint after Ultrasound Impact Treatment”  
Furong CHEN, Nan LI (Inner Mongolia University of Technology)
- W-PT-9 *Withdrawn*
- W-PT-10 “Sintering of Pure Magnesium by Spark Plasma Sintering-Discussion of Densification Mechanism”  
Wenxian WANG, Zhifeng YAN, Tingting ZHANG (Taiyuan University of Technology)
- W-PT-11 “Texture Inhomogeneity and Fracture Behavior of Bobbin Tool Friction Stir Welded ZK60 Magnesium Alloy”  
Gaohui LI (Harbin Institute of Technology), Li ZHOU, Sanfeng LUO (Harbin Institute of Technology (Weihai))
- W-PT-12 “Microstructure Evolution during Laser Pressure Welding”  
Ting HUANG, Jingquan ZHANG, Sergey MIRONOV, Rongshi XIAO (Beijing University of Technology)
- W-PT-13 “Mechanism of the  $M_{23}C_6$  Carbide Evolution and the Liquation Crack Formation in the HAZ of Inconel 617B”  
Junhao SUN, Fenggui LU, Zhuguo LI (Shanghai Jiaotong University)
- W-PT-14 “New Insight into High Frequency Impacting and Rolling of 2A12 Aluminum Welded Joint Involving Nanocrystallization”  
Huijing ZHANG, Xiaohui ZHAO, Desheng XU, Yu LIU, Xiaoming QIU (Jilin University)
- W-PT-15 “Analysis of Microstructure Formation of Epitaxial MCrAlY Coating on Ni-base Superalloy Produced by Electron Beam Cladding”  
Wengqian WANG (Nanchang University), Tomiko YAMAGUCHI, Dechao ZHAO (Kyushu Institute of Technology), De WANG (Jiangxi Academy of Sciences), Yulong LI (Nanchang University)
- W-PT-16 “Research on Microstructures and Mechanical Properties of Additive Manufacturing (SLM) Components of Inconel 718 Superalloy”  
Jianqiang ZHANG, Sheng LIU, Chen ZHANG, Hui LI, Jungang WEN (Wuhan University)

- W-PT-17 "Microstructure and Mechanical Property Anisotropy in WAAM Wall Structure Using ER2319 Welding Wire"  
Mingye DONG, Aiping WU, Tianyi ZHAO (Tsinghua University), Quan LI (Capital Aerospace Machinery Corporation Limited), Yue ZHAO (Tsinghua University)
- W-PT-18 "Simulated and Experimental Study on Laser Metal Deposition of AlSi10Mg Alloy"  
Xian WANG, Liqun LI, Wang TAO (Harbin Institute of Technology)
- W-PT-19 "Effect of Heat Input on the Microstructure and Mechanical Properties of Additive Manufactured Magnesium Alloy (AZ31) by Gas Tungsten Arc"  
Xuwei FANG, Jiannan YANG, Hao BAI, Chuanqi REN, Ke HUANG, Bingheng LU (Xi'an Jiaotong University, National Innovation Institute of Additive Manufacturing)
- W-PT-20 "Efficient Thermo-mechanical Simulation Approaches for Arc and Wire Based Additive Manufacturing"  
Hui HUANG, Jian CHEN, Zhili FENG (Oak Ridge National Laboratory), Ninshu MA, Hidekazu MURAKAWA (Joining and Welding Research Institute)
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# Visualization in Joining & Welding Science through Advanced Measurements and Simulation (Visual-JW 2019)

— Oral Presentation —

Friday, November 22

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## Room A

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### 9:00–9:50 Visualization of Joining and Welding Process (4) (JWP)

Chair Persons: Martin HERTEL (Technische Universität Dresden)  
Shinichi TASHIRO (Osaka University)

- JWP-16 **Keynote Lecture:** “Numerical Simulation of a GMAW Hot-Wire Process using a Two-Dimensional Arc Deflection”  
Martin HERTEL, Erik SPANIOL, Martin LOHSE, Marcus TRAUTMANN, Uwe FÜSSEL (Technische Universität Dresden)
- JWP-17 “Investigation of Arc Interruption Behavior in Induction Heating Assisted Gas Metal Arc Welding Process Using Numerical Approach”  
Adeel IKRAM, Hyun CHUNG (Chungnam National University)
- JWP-18 **Invited Lecture:** “Numerical Study of Arc and Droplet for GMAW with External Compound Magnetic Field”  
Lin WANG, Ji CHEN, ChuanSong WU (Shandong University)

### 10:00–11:20 Visualization of Advanced Material Processing (AMP)

Chair Persons: Yasutaka ANDO (Ashikaga University)  
Huihong LIU (Osaka University)

- AMP-1 **Keynote Lecture:** “Deposition of Titanium Oxide Film by APS Using Vortex Arc Flow”  
Yasutaka ANDO, Yoshimasa NODA (Ashikaga University), Masaya SHIGETA, Manabu TANAKA (Osaka University), Hideya NISHIYAMA (Osaka University, Tohoku University)
- AMP-2 “In Situ Observation of Solidification Cracking for Stainless Steel during TIG Welding using Synchrotron X-Ray Imaging”  
Tomoya NAGIRA, Daisuke YAMASHITA, Masayoshi KAMAI, Hidetoshi FUJII (Osaka University)
- AMP-3 *Withdrawn*
- AMP-4 “Investigation of Process for Producing Carbide-containing Welding Fused Fluxes using Plasma Granulation”  
Arseniy O. ARTEMOV, Stanislav V. NAUMOV, Michael N. IGNATOV (Perm National Research Polytechnic University)
- AMP-5 “Experiment and Theory of Buckling Failure of Si Grating for Imprinting Mold”  
Masanari DATEKYU (Tohoku University), Ninshu MA (Osaka University), Wataru YASHORO, Hidemi KATO (Tohoku University)

### 11:35–12:40 Visualization of Joining and Welding Process (5) (JWP)

Chair Persons: Xiaoyu CAI (Harbin Institute of Technology)  
Shinichi TASHIRO (Osaka University)

- JWP-19 **Keynote Lecture:** “Ar-He Alternating Gas Shielded MIG Welding for Aluminum Alloy”  
Xiaoyu CAI, Sanbao LIN, Benze WANG (Harbin Institute of Technology), Hongbin DAI (Harbin University of Science and Technology), Chenglei FAN, Chunli YANG (Harbin Institute of Technology)
- JWP-20 “Droplet Transfer Behavior of Al-Cu Alloy in Pulsed Ultrasonic Assisted GMAW”  
Chao CHEN, Chenglei FAN, Xiaoyu CAI, Sanbao LIN, Chunli YANG (Harbin Institute of Technology)
- JWP-21 “Study on High Speed P-GMAW Process Regulated by Compound Magnetic-Field”  
Qiang CHEN, Ji CHEN, Chuansong WU (Shandong University)
- JWP-22 “Metal Transfer in Accordance with Arc Modes in Asynchronous Tandem GMA Welding”  
SangHoon KANG, Minjung KANG, Jason CHEON, Yong Hoon JANG, Cheolhee KIM (KITECH)

### 13:40–14:30 Visualization of Joining and Welding Process (6) (JWP)

Chair Persons: Jianping HE (Shanghai University of Engineering Science)  
Shinichi TASHIRO (Osaka University)

- JWP-23 **Keynote Lecture:** “Numerical Calculation on Temperature Distribution Characteristic of Hybrid Arc in Microplasma Arc Welding”  
Jianping HE, Jinan ZHANG, Hu ZHANG, Shenglan Lin-YANG, Fuxin WANG (Shanghai University of Engineering Science)
- JWP-24 Behavior of the Fusion Hole in Medium and Thick Plate TIG Welding Process with Reserved Butt Gap”  
Yu CAO, Jinqiang GAO (ShanDong University)
- JWP-25 “Characteristics of 431stainless Steel Coating by Extra High Speed Laser Cladding Technology”  
Liquan LI, Faming SHEN, Wang TAO (Harbin Institute of Technology), Wei WANG, Shuliang WANG (Acunity (Tianjin) Co, Ltd)

### 14:40–16:00 Visualization of Joining and Welding Process (7) (JWP)

Chair Persons: Kiyokazu YASUDA (Osaka University)  
Shinichi TASHIRO (Osaka University)

- JWP-26 **Keynote Lecture:** “Ultrasonic Joining of CFRTP to Selective Laser Melting SUS316L-Coated Titanium Alloy”  
Kiyokazu YASUDA, Rennosuke TAMURA (Osaka University)
- JWP-27 “Microstructure and Mechanical Properties of Ti-6Al-4V Titanium Alloy Joints Diffusion Bonded with Ag Interlayer”  
Yu PENG, Jinglong LI, Jiangtao XIONG, Junmiao SHI (Northwestern Polytechnical University)
- JWP-28 “Numerical Study of the Effect of Bubble Behaviors on the Temperature Filed of Underwater Wet Welding”  
Tao ZHANG, Qingjie SUN, Yibo LIU, Yan TENG, Shaojun HOU, Jikai FENG (Harbin Institute of Technology)
- JWP-29 “Approach for Automation of Line Heating by Combination of Reinforcement Learning and FEM Simulation”  
Manami MAEKAWA, Kazuki IKUSHIMA, Akira NOTSU (Osaka Prefecture University), Yoshihiko TANGO, Noboru KIJI (Japan Marine United Corporation), Masakazu SHIBAHARA (Osaka Prefecture University)
- JWP-30 “Effect of Keyhole Size on Weld Pool Dynamics in VPPA Keyhole Flat Welding of Aluminum Alloy by 3D X-ray Transmission in-situ Observation”  
Bin XU, Shujun CHEN (Beijing University of Technology), Shinichi TASHIRO (Osaka University), Fan JIANG (Beijing University of Technology), Van anh NGUYEN (Murata Welding Laboratories), Manabu TANAKA (Osaka University)

**16:15–17:05 Visualization of Joining and Welding Process (8) (JWP)**

Chair Persons: ChuanSong WU (Shandong University)  
Shinichi TASHIRO (Osaka University)

- JWP-31 **Keynote Lecture:** “Ultrasonic Vibration Induced Increment of Arc Pressure and Current Density in Plasma Arc Welding”  
ChuanSong WU, Cheng ZHANG, Shuoshuo TIAN, Chenyu ZHAO (Shandong University)
- JWP-32 “Numerical Simulation for Dynamic Behavior of Molten Pool and Fusion Hole in Thin Plate TIG Welding with Reserved Butt Gap”  
Min LU, Jinqiang GAO (ShanDong University)
- JWP-33 “Visual Observation of Fusion Hole in Thin Plate TIG Welding with a Reserved Gap”  
Chuanzong LI, Jinqiang GAO (ShanDong University)
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## Room B

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### 9:00–9:50 Visualization of Metallurgy in Friction Stir Welding (MTFSW)

Chair Persons: Yutaka S. Sato (Tohoku University)  
Tomoya NAGIRA (Osaka University)

- MTFSW-1 **Keynote Lecture:** “Effect of Friction Stir Processing on Microstructure of Cu with Dispersed Cr Particles”  
Yutaka S. SATO, Momoka HONDA (Tohoku University)
- MTFSW-2 **Invited Lecture:** “Microstructure and Mechanical Properties of Friction Stir Welding between AZ31 and AA6061 with Low Rotation Speed”  
Xuesong FU, Ke CHEN, Zhen ZHANG (Shanghai Jiao Tong University), Katsuyoshi KONDOH (Osaka University), Min WANG (Shanghai Jiao Tong University)
- MTFSW-3 “Microstructure and Mechanical Properties of Carbon Materials Reinforced Metal Matrix Composites Fabricated by Friction Stir Processing”  
Shuai ZHANG, Gaoqiang CHEN (Tsinghua University)

### 10:00–11:20 Visualization of Metallurgy in Joining and Welding (1) (MTJW)

Chair Persons: Winarto WINARTO (Universitas Indonesia)  
Shun TOKITA (Osaka University)

- MTJW-1 **Keynote Lecture:** “Effects of Heat Input on Microstructure, Hardness and Residual Stress of GMA Welded Dissimilar Butt Joints between Stainless Steel AISI316L and Marine Steel AH36”  
Winarto WINARTO, Adhi PRIHASTOMO, Eddy S. SIRADJ (Universitas Indonesia), M.R. MUSLIH (National Nuclear Energy Agency of Indonesia)
- MTJW-2 “Effect of Alloying Elements on Corrosion Resistance of Weld Metal of Austenitic Stainless Steels”  
Yudai KANNO, Shun TOKITA, Kota KADOI, Hiroshige INOUE (Osaka University)
- MTJW-3 “A Study on the Acicular Ferrite Formation in Steel Weld Metals for Gas Metal Arc Welding”  
Kyohei UTO, Koyo NAKAYAMA (Kumamoto University), Yuji KISAKA, Fumiaki KIMURA (Nippon Steel Engineering), Hidenori TERASAKI (Kumamoto University)
- MTJW-4 “Construction of Microstructural Diagram for Steel Based on Crystallography”  
Kazumasa TSUTSUI (Nippon Steel), Tatsuya MAEMURA (Kumamoto University), Kotaro HAYASHI, Koji MORIGUCHI (Nippon Steel), Shigekazu MORITO (Shimane University), Hidenori TERASAKI (Kumamoto University)”
- MTJW-5 “Study on Residual Stress by Neutron Diffraction in SM570-TMC Welded by Flux-Cored Wires Containing Different Ni”  
Herry OKTADINATA, Winarto WINARTO, Eddy S. SIRADJ, Dedi PRIADI (Universitas Indonesia), M.R. MUSLIH (National Nuclear Energy Agency of Indonesia)

### 11:35–12:40 Visualization of Metallurgy in Joining and Welding (2) (MTJW)

Chair Persons: Shotaro YAMASHITA (Osaka University)  
Kota KADOI (Osaka University)

- MTJW-6 **Keynote Lecture:** “Effect of Yield Strength on Solidification Cracking Occurrence by using U-type Hot Cracking Test”  
Shotaro YAMASHITA, Jae Hyoung LEE, Tomo OGURA, Kazuyoshi SAIDA (Osaka University)
- MTJW-7 “Evaluation of Solidification Cracking Susceptibility of Al alloys during Laser Welding”  
Kai TOMITA, Motomichi YAMAMOTO (Hiroshima University), Kenji SHINOZAKI (National Institute of Technology Kure College), Takuro AOKI, Tsuyoshi MATSUMOTO (Kobe steel)
- MTJW-8 “Effect of Microstructure of Base Metal on Microstructure and Solidification Cracking Susceptibility of Fully Austenitic Stainless Steel”  
Shun TOKITA, Kota KADOI, Yudai KANNO, Hiroshige INOUE (Osaka University)
- MTJW-9 “Microstructure Observation of High-Current Buried-Arc Welded Joint”  
Hayato BABA (DAIHEN), Reo HONDA (Kumamoto University), Tetsuo ERA (DAIHEN), Hisaya KOMEN (Kumamoto University), Manabu TANAKA (Osaka University), Hidenori TERASAKI (Kumamoto University)

### 13:40–14:30 Visualization of Mechanics in Joining and Welding (1) (MCJW)

Chair Persons: Thomas KANNENGIESSER (Bundesanstalt für Materialforschung und -prüfung (BAM))  
Seiichiro TSUTSUMI (Osaka University)

- MCJW-1 **Keynote Lecture:** “In-situ Observation of Stress Evolution and Cracking during High Strength Steel Welding”  
Thomas KANNENGIESSER, Arne KROMM, Thomas LAUSCH, Dirk SCHROEPFER, Andreas HANNEMANN (Bundesanstalt für Materialforschung und -prüfung (BAM))
- MCJW-2 “Online-Observation of Martensite Formation by Combined Use of Synchrotron Diffraction and Dilatometry”  
Arne KROMM, Thomas KANNENGIESSER (Bundesanstalt für Materialforschung und -prüfung (BAM))
- MCJW-3 “Measurement of Residual Stress Distribution at the Weld Root for a U-rib Specimen Using the Contour Method”  
Ramy GADALLAH, Seiichiro TSUTSUMI (Osaka University), Takayuki YONEZAWA, Hiroshi SHIMANUKI (Nippon Steel Corporation)

### 14:40–16:00 Visualization of Mechanics in Joining and Welding (2) (MCJW)

Chair Persons: Haichao CUI (Shanghai Jiao Tong University)  
Hisashi SERIZAWA (Osaka University)

- MCJW-4 **Keynote Lecture:** “Effective Evaluation of Low Cycle Fatigue Life for the Non-homogeneous Microstructure of Welded Joint”  
Haichao CUI, Jingchao WANG, Chendong SHAO, Fenggui LU (Shanghai Jiao Tong University)
- MCJW-5 “Effects of Repair Weld on The Deck-to-Vertical Stiffener Weld After Fatigue Cracking”  
Yixun WANG, Seiichiro TSUTSUMI (Osaka University), Zhongqiu FU (Hohai University)
- MCJW-6 “Experimental Study for the Effect of Additional Weld on Fatigue Strength in Out-of-Plane Gusset Welded Joints”  
Yuki KOTANI, Tadahisa TSUYAMA (Kawada Industries, Inc.), Seiichiro TSUTSUMI, Ayang BUERLIHAN (Osaka University)
- MCJW-7 “Fatigue Crack Initiation and Propagation Life Assessment of Butt Joint Considering the Effect of Corrosion”  
Seiichiro TSUTSUMI, Hirokazu NAGAHAMA, Riccardo FINCATO (Osaka University)
- MCJW-8 “Effect of Metal Type and Heating Condition on Joint Strength of Metal and Polymer Prepared by Arc Welding”  
Hiroaki KOBAYASHI, Makoto UCHIDA (Osaka City University), Houichi KITANO (National Institute for Materials Science), Yoshihisa KANEKO (Osaka City University)

**16:15–17:05 Visualization of Mechanics in Joining and Welding (3) (MCJW)**

Chair Persons: Houichi KITANO (National Institute for Materials Science)  
Hisashi SERIZAWA (Osaka University)

- MCJW-9 **Keynote Lecture:** “Simplified Analysis of Welding Heat Conduction Behavior Utilized Neural Network Technique”  
Houichi KITANO (National Institute for Materials Science), Yoshiki MIKAMI, Kazuhiro ITO (Osaka University),  
Terumi NAKAMURA (National Institute for Materials Science)
- MCJW-10 “Application of a Simple Simulation Model of Welding Deformation to the Large Welded Structure”  
Hiroki MURAKAMI, Takeshi TERASAKI, Katsumasa MIYAZAKI (Hitachi, Ltd.), Yoshihisa MAEDA (Hitachi  
Industrial Products, Ltd.), Shigetaka OKANO, Masahito MOCHIZUKI (Osaka University)
- MCJW-11 “Influence of Residual Stress and Deformation on Dynamic Characteristics”  
Sheng ZHAO, Yu LUO (Shanghai Jiao Tong University)
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## Room D

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**9:00–9:50 Visualization of Nano and Micro Materials Processing (NM)**

Chair Person: Chih-Ming CHEN (National Chung-Hsing University)  
Hiroshi NISHIKAWA (Osaka University)

- NM-1 **Keynote Lecture:** “Electroplating Formula Effects on the Cu-plated Solder Joints”  
Chien-Hung LIN (National Chung-Hsing University), Sheng-Jye CHERNG, Shien-Ping FENG (The University of Hong Kong), Chih-Ming CHEN (National Chung-Hsing University)
- NM-2 **Invited Lecture:** “Effect of Ni-P Bath Condition on the Interfacial IMC Growth at ENIG/SAC305 Solder Joint”  
Wonil SEO (Korea Institute of Industrial Technology, Hanyang University), Young-Ho KIM (Hanyang University), Min-Su Kim, Sehoon YOO (Korea Institute of Industrial Technology)
- NM-3 “Characteristics of Interfacial Reaction between Sn–Cu Solder Alloys with Trace Elements and Cu Substrates”  
Junghwan BANG, Dong-Yurl YU, Min-Su KIM, Sehoon YOO (Korea Institute of Industrial Technology), Hiroshi NISHIKAWA (Osaka University)
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# Research Activities of Joint Usage/Research Center on Joining and Welding

— Oral Presentation —

Friday, November 22

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## Room D

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### 10:00–11:25 Research Activities of Joint Usage/Research Center on Joining and Welding (1) (RAJU)

Chair Person: Masaya SHIGETA (Osaka University)

- RAJU-1 **Invited Lecture:** “Longer-lived Chemistry and Antimicrobial Activity of Plasma Activated Water”  
Jun-Seok OH (Osaka City University), Naoyuki IWATA, Giichiro UCHIDA (Meijo University), Kosuke TAKENAKA, Yuichi SETSUHARA (Osaka University), Mineo HIRAMATSU, Masafumi ITO (Meijo University)
- RAJU-2 **Invited Lecture:** “Study on Penetration Control of the Arc Welding Using External Magnetic Field –Influence of External Magnetic Field on Arc Shape and Heat Input–”  
Shoichi MATSUDA (University of the Ryukyus), Manabu TANAKA (Osaka University), Yasushi TANAHARA (Okinawa Industrial Technology Center)
- RAJU-3 **Invited Lecture:** “Uniform Laser-Induced Periodic Surface Structures on Titanium Irradiated with a Two-Color Femtosecond Double-pulse Laser Beam”  
Masaki HASHIDA, Yuki FURUKAWA, Shunsuke INOUE, Shuji SAKABE (Kyoto University), Shiuchiro MASUNO (Osaka University), Mitsuhiro KUSABA (Osaka Sangyo University), Hitoshi SAKAGAMI (National Institute for Fusion Science), Masahiro TSUKAMOTO (Osaka University)
- RAJU-4 **Invited Lecture:** “Creation of Functional Surfaces and Application for Joints”  
Shinji KOYAMA, Takako MURAOKA (Gunma University), Kohei OZAWA (Gunma University, DNP Co., Ltd.)

### 11:35–12:35 Research Activities of Joint Usage/Research Center on Joining and Welding (2) (RAJU)

Chair Person: Soshu KIRIHARA (Osaka University)

- RAJU-5 **Invited Lecture:** “Nanocrystals Technologies for Energy and Environmental Applications”  
Kazuyoshi SATO, Naokatsu KANNARI (Gunma University), Takeshi HASHISHIN (Kumamoto University), Hiroya ABE (Osaka University)
- RAJU-6 **Invited Lecture:** “Influence of Surface Oxide Film on Surface Activated Bonding for Dissimilar Metallic Materials”  
Kazuhiro OGAWA, Yudai TERUI, Yuji ICHIKAWA (Tohoku University)
- RAJU-7 **Invited Lecture:** “Numerical Simulation for Analysis and Design of Powder Processing”  
Junya KANO, Kizuku KUSHIMOTO, Shingo ISHIHARA (Tohoku University), Akira KONDO, Takahiro KOZAWA, Makio NAITO (Osaka University)

# Welding Science and Engineering (WSE 2019)

## — Oral Presentation —

Friday, November 22

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### Room C

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#### 9:00–9:50 WSE Visualization of Joining and Welding Process (3) (W-JWP)

Chair Person: Zhili FENG (Oak Ridge National Laboratory)

W-JWP-11 **No Presentation: Keynote Lecture:** “Oscillation Behavior Detection and Surface Tension Measurement of Weld Pool in GTAW”

Yu SHI, Chunkai LI, Yufen GU, Gang ZHANG, Ming ZHU (Lanzhou University of Technology)

W-MTJW-2\* **Keynote Lecture:** “Atomistic Analysis on Interface Evolution during Solid State Welding between Aluminum Surfaces”

Gaoqiang CHEN, Qingyu SHI (Tsinghua University)

W-JWP-12 “Computation of Residual Stresses in Friction Stir Based Welding Techniques”

Buchibabu VICHARAPU, Huihong LIU, Kunio NARASAKI, Ninshu MA, Hidetoshi FUJII (Osaka University)

W-JWP-13 **No Presentation:** “Lap Joining of Carbon Fiber Reinforced PEEK with A Resistance Interlayer”

Qian GUO, Lin-Jie ZHANG, Xian-Qing YIN, Jian-Xun ZHANG (Xi’an Jiaotong University)

\* Moved from WSE Visualization of Metallurgy in Joining and Welding (W-MTJW) session on November 21.

#### 10:00–11:20 WSE Visualization of Mechanics in Joining and Welding (1) (W-MCJW)

Chair Person: Hidekazu MURAKAWA (Osaka University)

W-MCJW-1 **Keynote Lecture:** “Creep Rupture Behavior and Lifetime Prediction for Weldments of Grade 91 Steel”

Wei ZHANG, Yiyu WANG (Oak Ridge National Laboratory), Yanfei GAO (The University of Tennessee), Zhili FENG (Oak Ridge National Laboratory)

W-MCJW-2 “Influence of Mechanical Shock Peening on Heat-affected Zone Liquefaction Cracking of K447A Laser Cladding Zone”

Zhenlin ZHANG, Yue ZHAO, Jiguo SHAN, Aiping WU (Tsinghua University)

W-MCJW-3 “Prediction of Thermal Fatigue Crack Propagation Behavior and the Evaluation of Thermal Fatigue Stability”

Jinnan WANG (Tsinghua University, Beijing National Innovation Institute of Lightweight Ltd, China Academy of Machinery Science and Technology), Yunbo CHEN (Beijing National Innovation Institute of Lightweight Ltd, China Academy of Machinery Science and Technology), Haiyan ZHAO, Muhammad Qasim ZAFAR, Chaochao WU (Tsinghua University), Cunjiang TANG, Xin WANG (Beijing National Innovation Institute of Lightweight Ltd)

W-MCJW-4 “Numerical Simulation and Sensitivity Analysis of 7XXX Aluminum Alloy Multipass Welding”

Jijin XU, Jie HONG, Shuai WANG, Hao LU (Shanghai Jiao Tong University)

W-MCJW-5 “Analysis and Observation of Solid State Cold-Spray Additive Manufacturing Using a New Material Model Considering Strain Hardening, Ultra-High Strain Rate Hardening, Thermal Softening and Recrystallization”

Qian WANG, Ninshu MA, Makoto TAKAHASHI (Osaka University), Xiaotao LUO, Changjiu LI (Xi’an Jiaotong University)

### 11:35–12:25 WSE Visualization of Joining and Welding Process (4) (W-JWP)

Chair Person: Qingyu SHI (Tsinghua University)

- W-JWP-14 **Keynote Lecture:** “Effects of Helium in Narrow Gap GMAW and Optimization of Shielding Gas Compositions”  
Sanbao LIN, Xiaoyu CAI, Chunli YANG, Chenglei FAN (Harbin Institute of Technology)
- W-JWP-15 “Thermo-Mechanical Coupling Simulation for the Refill Friction Stir Spot Welding of AA6061 Alloy and Q235 Steel”  
Mingrun YU (Harbin Institute of Technology, Harbin Institute of Technology at Weihai, Osaka University), Yitang TANG, Weiguang CHEN, Li ZHOU, Hongyun ZHAO (Harbin Institute of Technology at Weihai), Ninshu MA (Osaka University)
- W-JWP-16 **No Presentation:** “Estimating Weld Joint Penetration by Monitoring Weld Pool Surface Dynamic in GTAW”  
Gang ZHANG (Lanzhou University of Technology, University of Kentucky), Yu SHI, Ming ZHU, Ding FAN (Lanzhou University of Technology), Yuming ZHANG (University of Kentucky)

### 13:40–14:30 WSE Visualization of Quality, Safety and Reliability (1) (W-QSR)

Chair Person: Sanbao LIN (Harbin Institute of Technology)

- W-QSR-1 **Keynote Lecture:** “Failure Competition Behavior of 9Cr/617 Dissimilar Welded Joint during LCF Test at Elevated Temperature”  
Yaqi WANG (Shanghai Jiao Tong University), Xia LIU (Shanghai Electric Power Generation Equipment Co. Ltd.), Ninshu MA (Osaka University), Fenggui LU (Shanghai Jiao Tong University)
- W-QSR-2 **Invited Lecture:** “High-speed Tandem Pulsed TIG Welding Process Based on Coordination Control of Tandem Pulsed Welding Current”  
Guoliang QIN (Shandong University)
- W-QSR-3 “Evaluation of Singular Stress Field at Crack Tip Considering Welding Residual Stress Using Characteristic Tensor”  
Kei SAITO (JSOL Corporation, Osaka University), Tei HIRASHIMA (JSOL Corporation), Ninshu MA, Hidekazu MURAKAWA (Osaka University)

### 14:40–16:00 WSE Visualization of Mechanics in Joining and Welding (2) (W-MCJW)

Chair Person: Fenggui LU (Shanghai Jiao Tong University)

- W-MCJW-6 **Keynote Lecture:** “Numerical Study of Crack Growth in Welded Structures Using Characteristic Tensor Method”  
Hidekazu MURAKAWA (Osaka University)
- W-MCJW-7 **Invited Lecture:** “Numerical Simulation on the Creep Failure of Dissimilar Welded Joint between T91 and HR3C Heat-resistant Steels”  
Jianqiang ZHANG, Guodong ZHANG, Jialin GUO, Chuanhong LUO (Wuhan University)
- W-MCJW-8 “Evaluation of Material Toughness Using Instrumented Indentation Technique”  
Seunghun CHOI, Woojoo KIM, Dongil KWON (Seoul National University)
- W-MCJW-9 “A Novel Approach to Evaluate Residual Stress Using Instrumented Indentation Technique”  
Dongil KWON, SungKi CHOI, JunSang LEE, Kyungyul LEE, Seungha LEE (Seoul National University)
- W-MCJW-10 “Effect of Tool Rotation Speed on Microstructure Evolution and Mechanical Properties of Dissimilar Friction Stir Lap Weld”  
Amlan KAR, Yoshiaki MORISADA, Buchibabu VICHARAPU, Hidetoshi FUJII (Osaka University)

**16:15–17:05 WSE Visualization of Advanced Material Processing (W-AMP)**

Chair Person: Shuili GONG (AVIC Manufacturing Technology Institute)

- W-AMP-1 **Keynote Lecture:** “Integrated Modeling and Simulation of Electron Beam Selective Melting Process with Experimental Validation”  
Chaochao WU, Haiyan ZHAO, Muhammad Qasim ZAFAR, Jinnan WANG (Tsinghua University)
- W-AMP-2 “Fabrication of the AlFeCrCoNi High Entropy Alloy Coating by Resistance Seam Welding Method and Its Tribological Properties in Different Conditions”  
Dechao ZHAO, Tomiko YAMAGUCHI (Kyushu Institute of Technology)
- W-AMP-3 “Influence of Plate Deformation on Heat Source Distribution in Induction Line Heating”  
Lichun CHANG, Yao ZHAO, Hua YUAN (Huazhong University of Sciences and Technology), Xiaocai HU (Shanghai Waigaoqiao Shipbuilding Co., Ltd)
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## Room D

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### 13:40–14:30 WSE Visualization of Additive Manufacturing (1) (W-AM)

Chair Person: Li FU (Northwestern Polytechnical University)

- W-AM-1 **Keynote Lecture:** “Residual Stresses and Deformation of 2319 Aluminum Alloy Tubular Structure Fabricated by CMT WAAM”  
Aiping WU, Mingye DONG, Tianyi ZHAO (Tsinghua University), Quan LI, Fude WANG (Capital Aerospace Machinery Corporation Limited), Yue Zhao (Tsinghua University)
- W-AM-2 “Corrosion Behavior of FeCoCrNi High Entropy Alloy Fabricated by Laser Selective Melting”  
Danyang LIN, Lianyong XU, Hongyang JING, Yongdian HAN, Lei ZHAO (Tianjin University)
- W-AM-3 “Laser Cladding of In-situ Synthesized (Ti<sub>3</sub>Al+TiB)/Ti Composite for High Temperature Application”  
Yueqiao FENG, Kai FENG, Chengwu YAO, Zhuguo LI (Shanghai Jiao Tong University)

### 14:40–16:00 WSE Visualization of Quality, Safety and Reliability (2) (W-QSR)

Chair Person: Haiyan ZHAO (Tsinghua University)

- W-QSR-4 **Keynote Lecture:** “Enhanced Models of Creep Crack Initiation Prediction Coupled the Stress-Regime Creep Properties and Constraint Effect”  
Lianyong XU (Tianjin University, Tianjin Key Laboratory of Advanced Joining Technology)
- W-QSR-5 **No Presentation: Invited Lecture:** “Tear Strength Modeling and Improvement of Steel and Aluminum CMT Lap Joint”  
Jian LIN (Beijing University of Technology), Li LU (Suzhou Nuclear Power Research Institute), Ninshu MA (Osaka University), Yongping LEI, Fu GUO (Beijing University of Technology)
- W-QSR-6 “Fatigue Life Prediction of AZ31B Magnesium Alloy and Its FSW Joints Based on Energy Analysis”  
Zhifeng YAN, Wenxian WANG, Hongxia ZHANG (Taiyuan University of Technology)
- W-QSR-7 “A New Creep Interaction Factor to Characterize Multiple Cracks Interaction at Elevated Temperatures”  
Lei ZHAO, Lianyong XU, Yongdian HAN (Tianjin University)
- W-QSR-8 “Experimental Investigations of Creep-fatigue Crack Growth Behavior in Parent G115 Steel”  
Zhengxin TANG, Hongyang JING, Lianyong XU, Lei ZHAO, Yongdian HAN (Tianjin University)

### 16:15–17:05 WSE Visualization of Additive Manufacturing (2) (W-AM)

Chair Person: Aiping WU (Tsinghua University)

- W-AM-4 **Keynote Lecture:** “The Issue on Additive Manufacturing on Selective Melting and Direct Deposition”  
Shuili GONG, li CHEN, Feihu SHAN (AVIC Manufacturing Technology Institute)
- W-AM-5 “Full-Field Strain Distribution and Evolution Behavior During Wire Arc Additive Manufacturing by Digital Image Correlation In-Situ Measurement”  
Yue ZHAO, Jinlong JIA (Tsinghua University, Key Laboratory for Advanced Material Processing Technology), Quan LI (Capital Aerospace Machinery Corporation Limited), Aiping WU (Tsinghua University, Key Laboratory for Advanced Material Processing Technology)
- W-AM-6 “The Effects of Micro-segregation and Isothermal Temperatures on Nano Bainitic Microstructure and Mechanical Properties in Laser Cladded Coatings”  
Yanbing GUO (Shanghai Dianji University), Liqun LI (Harbin Institute of Technology), Zhuguo LI (Shanghai Jiao Tong University)

## Oral Presentation Guide

- (1) An LCD projector will be equipped for presentation at each room. Overhead projector for transparencies will be NOT available.
- (2) You are able to use your own laptop computer for your presentation. The projector is equipped with analog mini D-sub 15 pin and HDMI connectors. Please bring an adapter for interface conversion, if necessary.
- (3) A laptop computer with Windows 7 (64 bit) is also equipped in each room. PowerPoint 2013 (Office 2013) is installed. A USB memory is available for installation of your PowerPoint file to the laptop computer.
- (4) The presentation time for both Visual-JW 2019 and WSE 2019 sessions including discussion (5 min, approximately):
  - Plenary Lecture: 30 min
  - Keynote Lecture: 20 min
  - Invited Lecture: 15 min
  - General Presentation: 15 min
- (5) The presentation time for Symposium on the research activities of Joint Usage/Research Center on Joining and Welding is 20 min, including discussion (5 min, approximately).
- (6) You are requested to confirm if your presentation slides are properly projected on a screen before the session.

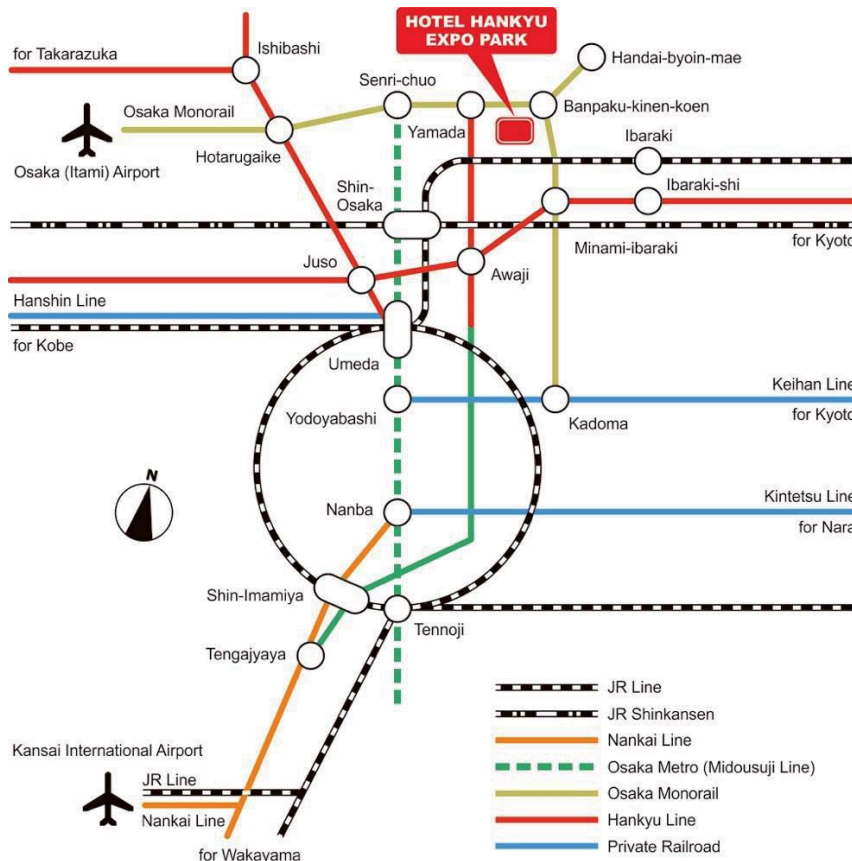
## Poster Preparation and Presentation Guide

- (1) **Language:** Poster must be written in English.
- (2) **Poster board size:** 900 mm in width and 2100 mm in height (standard A0 size can be posted).
- (3) **Preparation and Presentation:** Please find your board with your presentation number indicated in the final program. The number is displayed at the upper left on the board. Please finish pinning your poster and present your paper according to the schedule below.

Date		<b>November 21</b>
Finish pinning on the board by		<b>15:00</b>
Poster session		<b>17:15–18:15</b>
Numbering	Visual-JW 2019	<b>PT-1, 2, ...</b>
	WSE 2019	<b>W-PT-1, 2, ...</b>

- (4) **After Poster Session:** Please take off your poster from the board immediately.

# Venue



## HOTEL HANKYU EXPO PARK

1-5 Senri-Banpaku-koen Suita, Osaka 565-0826, Japan

TEL: +81-6-6878-5151 / FAX: +81-6-6878-3456

URL: <https://global.hankyu-hotel.com/hankyu-expopark/>

## Access to the Venue by Train

### From Osaka Umeda and Shin-Osaka Stations

- Take the Osaka Metro Midousuji line to Senri-chuo Station and change to the Osaka Monorail bound for Kadoma-shi or Saito-nishi. Get off at Banpaku-kinen-koen Station and walk for five minutes.

### From Osaka (Itami) International Airport

- Take the Osaka Monorail and get off at Banpaku-kinen-koen Station. The hotel is a five-minute walk away.

### From Kyoto Station

- Take the JR line and get off at Ibaraki Station. The hotel is a 10-minute bus or taxi ride away.
- Take the Hankyu Kyoto Line to Minami-ibaraki Station and transfer to the Osaka Monorail bound for Osaka International Airport. Get off at Banpaku-kinen-koen Station. The hotel is a five-minute walk from the Station.

### From Kansai International Airport

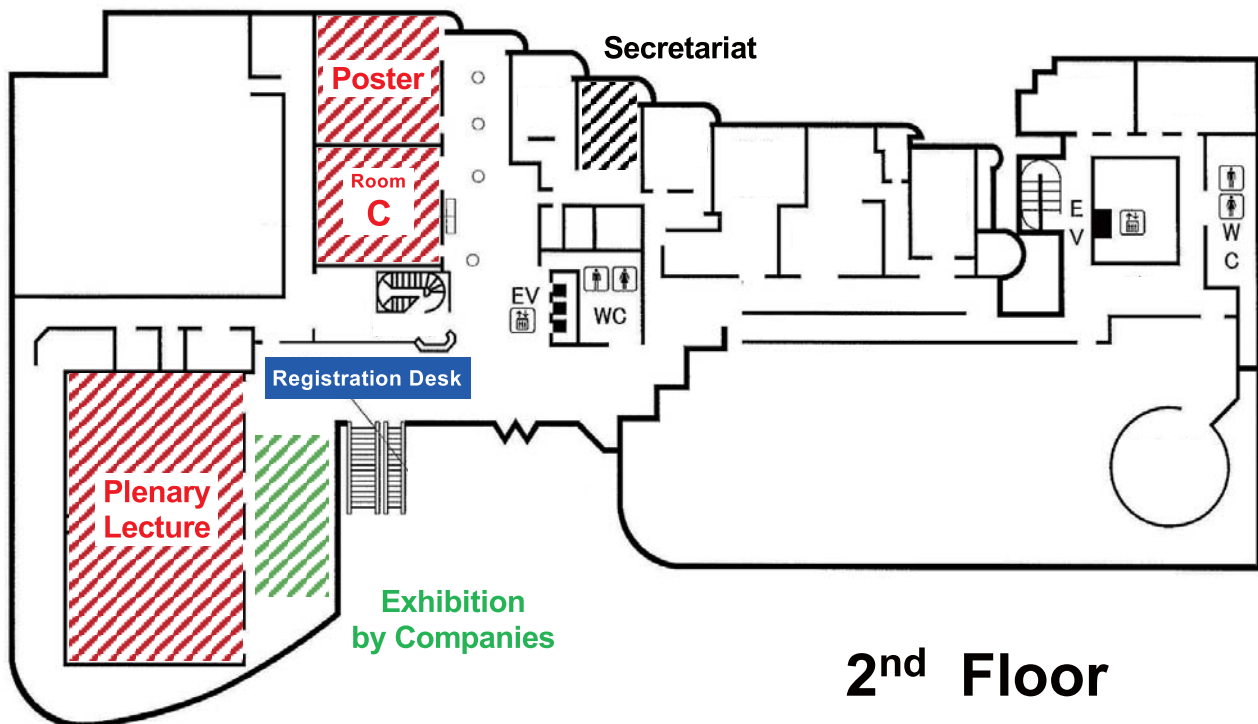
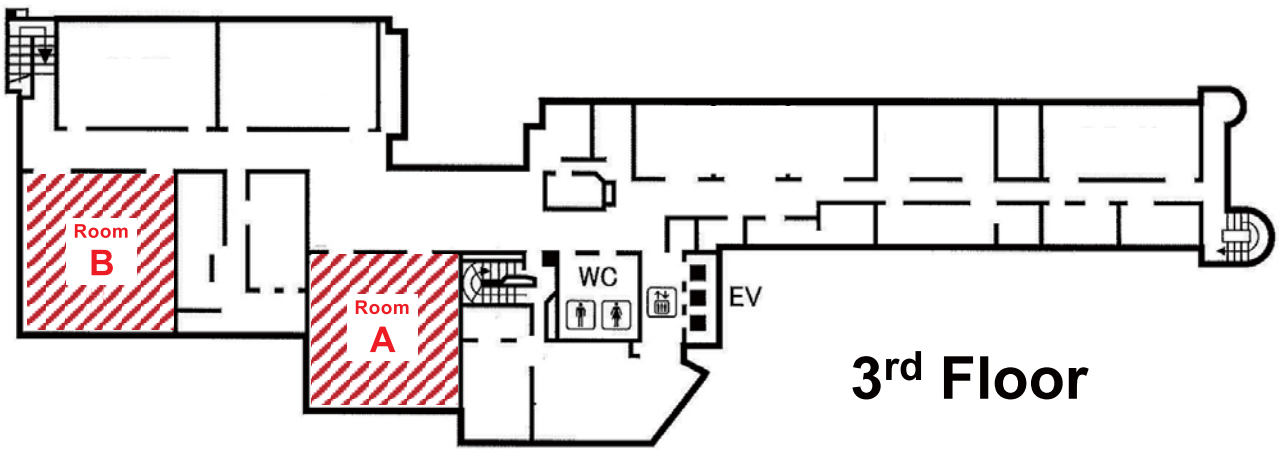
- Take the Nankai Line to Namba Station and change to the Osaka Metro Midousuji line to Senri-chuo Station. Then change to the Osaka Monorail bound for Kadoma-shi or Saito-nishi. Get off at Banpaku-kinen-koen Station and walk for five minutes.
- Take the bus to Itami Airport/Osaka Airport, and change to the Osaka Monorail bound for Kadoma-shi or Saito-nishi. Get off at Banpaku-kinen-koen Station and walk for five minutes.



# Presentation Room Location

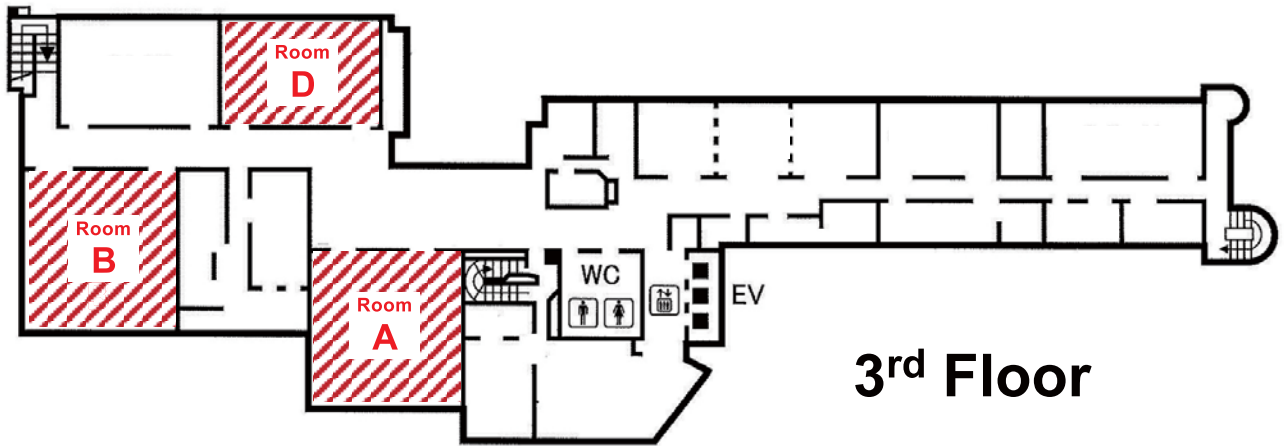
**Thursday,  
November 21**

3F	Rooms A and B
2F	Registration Desk, Plenary Lecture, Room C, Poster, Exhibition
1F	
B1F	Lunch, Banquet

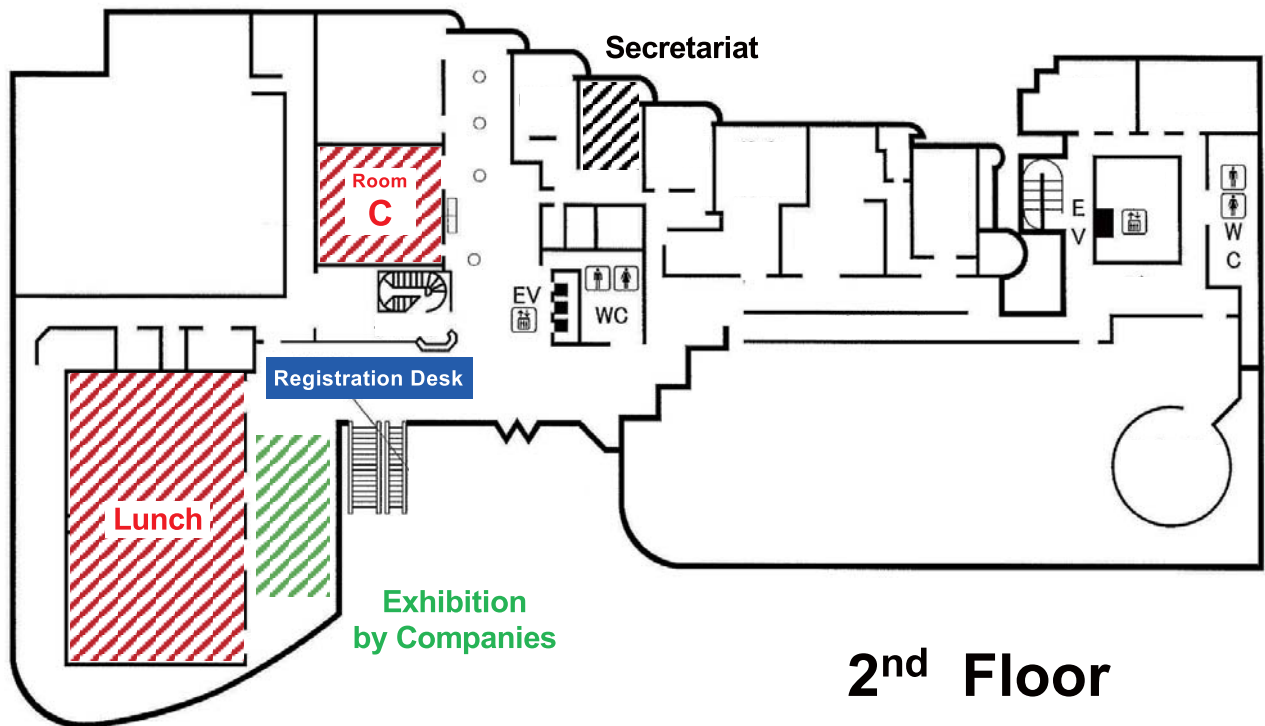


**Friday,  
November 22**

3F	Rooms A, B and D
2F	Registration Desk Room C, Exhibition, Lunch
1F	
B1F	



**3<sup>rd</sup> Floor**



**2<sup>nd</sup> Floor**

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Tel & Fax: +81 6 6879 8645

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