

Final Program

IWJC—Korea 2007

International Welding
Joining Conference-Korea 2007
May 10-12, 2007
COEX Convention Center, Seoul, Korea

“Collocated with Welding Korea 2007 Exhibition”

Organized by

Korean Welding and Joining Society [KWJS]

Technical Co-Sponsored by

American Welding Society
Chinese Welding Society
Japan Welding Society
Welding Technology Institute of Australia
Institute De Soldadura E Qualdage
CESOL
Welding Research Institute-Industrial Institute SR
Singapore Welding Society
Welding Institute of Thailand

Sponsored by

- Korea Research Foundation (KRF)
- Korean Federation of Science and Technology Societies (KOFST)
- Korea Tourism Organization (KTO)
- Seoul Convention & Visitors Bureau
- Korea Welding Industry Cooperative
- Hyundai Heavy Industries Co., Ltd
- Hyundai Welding Co., Ltd.
- KISWEL LTD.
- ESAB SeAH Corp.
- POSCO
- Daewoo Shipbuilding & Marine Engineering Co., Ltd.
- Samsung Heavy Industries
- CHOSUN WELDING CO., LTD.
- Hanjin Heavy Industries & Construction Co., Ltd.
- HYUNDAI MIPO DOCKYARD CO., LTD.
- Hyundai Samho Heavy Industries Co., Ltd.
- Korea Institute of Industrial Technology (KITECH)
- Research Institute of Industrial Science & Technology (RIST)
- I.W.S. Co., Ltd.
- KOBE WELDING OF KOREA CO., LTD.
- Dong Il Ceramics Co., Ltd.
- Germanischer Lloyd
- HYUNDAI MOTOR COMPANY
- TRUMPF Korea
- MIYACHI KOREA CORP.
- Rofin Baasel Korea Co., Ltd.
- TAESHIN GAS & WELDING CO., LTD.
- HBL Corporation
- HANA ENGINEERING CO., LTD.

Organization

Honorary Conference Chair

Y. B. Chae
(President, Korea Federation of Science and Technology Societies)

Conference Co-Chairs

D. H. Park (Univ. of Ulsan)
S. J. Na (KAIST)

Program Committee

Co-Chairs

C. Lee (Hanyang Univ.)
J. B. Lee (POSCO)

Members

[National]

W. S. Chang (RIST)
M. S. Han (DSME)
J. S. Jeon (KIMM)
J. P. Jung (Univ. of Seoul)
B. Y. Kang (KITECH)
C. Y. Kang (Pusan Nat'l Univ.)
M. J. Kang (KITECH)
J. D. Kim (Korea Maritime Univ.)
J. S. Lee (POSCO)

[International]

K. Nogi (Osaka Univ., Japan)
S. Yamane (Saitama Univ., Japan)
S. Rhee (Hanyang Univ., Korea)
P. Dong (Battelle, USA)
W. Mohr (EWI, USA)
Y. C. Kim (Osaka Univ., Japan)
T. Takemoto (Osaka Univ., Japan)
S. Yi (Samsung Electro-mechanics Co., Ltd., Korea)
Y. Zhou (Univ. of Waterloo, Canada)
W. S. Chang (RIST WRC, Korea)
S. Katayama (Osaka Univ., Japan)
K. Loeffler (Trumpf Lasersystems, Germany)
Z. Xianhui (Harbin Welding Institute, China)
B. Du (Harbin Welding Institute, China)
S. K. Kim (KEPRI, Korea)
S. Labbe (Olympus NDT, Canada)

M. Matsumoto (JNES, Japan)

Finance Committee

Chair

S. M. Cho (Pukyung Nat'l Univ.)

Members

H. S. Bang (Chosun Univ.)
J. H. Kim (KITECH)
S. W. Kim (ESAB SeAH Corp.)

Organizing Committee

Co-Chairs

B. Y. Lee (Hankuk Aviation Univ.)
S. Rhee (Hanyang Univ.)

Members

H. S. Chang (Myongji Univ.)
J. D. Kim (Korea Maritime Univ.)
C. K. Lee (Seoul Nat'l Univ. of Tech.)
Y. E. Shin (Choongang Univ.)
J. W. Yoon (Donguei Univ.)

National Advisory Board

C. S. Kang (Seoul Nat'l Univ.)
S. W. Kang (Pusan Nat'l Univ.)
Y. S. Kim (Korea Maritime Univ.)
K. W. Um (Hanyang Univ.)
D. S. Um (Pusan Nat'l Univ.)
C. H. Lee (POSTECH)
Y. H. Lee (Chungnam Nat'l Univ.)
S. H. Chung (Chonbuk Nat'l Univ.)

International Advisory Board

W. A. Baeslack (The Ohio State Univ., USA)
D. L. Olson (Colorado School of Mines, USA)
H. Murakawa (Osaka Univ., Japan)
N. Ekere (The Univ. of Greenwich, UK)
H. Kokawa (Univ. of Tohoku, Japan)
M. Kutsuna (Nagoya Univ., Japan)
N. Yurioka (NSC(retired), Japan)

Information on Technical Programs

Information for Session Chairs

The chairs of each session are expected to arrive at the session room at least 10 minutes before the session starts, and to check the attendance of speakers in the session according to the schedule. Keynote Speaker and Invited Speaker have 25 minutes for presentation and 5 minutes for discussion. Each speaker has 20 minutes, including both presentation and discussion. The chair may ask speakers who bring their own laptops to have compatibility test before the session begins.

Information for Oral Presentations

Presenters at all session are required to report to the session chair before the session starts. All presenters are limited to 20 minutes including presentation and discussion. The session chair will ring the bell once at 15 minutes after start, and twice at 20 minutes. It is important to stay on schedule so people moving between sessions can hear the presentations they make a special effort to attend. The session room will be equipped with a laptop computer with an LCD projector. Presenters are expected to load their presentations from their own CD-ROMs or USB memory sticks before the beginning of the session.

Information for Poster Presentations

Poster session will be held at Lobby (3F) on May 10, during 16:10-18:10. The board of size 95 cm (width) by 240 cm (height) will be provided for the display of each paper. Each paper's code will be shown on the board. The presenter can put up the materials on the board by using adhesive tape from 12:50, on May 10 and please remove it after the session. All presenters are required to preside at their poster panel during the session for anticipated discussion with participants.

Technical Program

May 10, 2007 (Thursday)

May 10 (Thursday) 09:20-10:40

Room 311

PL. Plenary Session

Chairs Changhee Lee - Hanyang Univ., Korea
Jong-Bong Lee - POSCO, Korea

- | | | |
|-------------|-----|--|
| 09:20-10:00 | PL1 | MIG/MAG Weld Staring Quality and Gas Waste Problem and Suggested and Solution
Gerald D. Ultrachi (American Welding Society, USA) |
| 10:00-10:40 | PL2 | The Development Status of Welding Technology in China
Ping Shan (Chinese Welding Society, China) |

May 10 (Thursday) 11:00-12:50

Room A (311A)

TA1. Fusion Welding-STS and Nonferrous Alloy

Chairs Jongsub Lee - POSCO, Korea
Hiroaki Mori - Osaka Univ., Japan

- | | | |
|-------------|-------|---|
| 11:00-11:30 | TA1-1 | [Keynote] Advances in the Joining of Titanium Alloys and Titanium Aluminides
W. A. Baeslack (The Ohio State Univ., USA) |
| 11:30-11:50 | TA1-2 | Development of Evaluation Method for Solidification Cracking Susceptibility of Inconel 600/SUS347 Dissimilar Laser Weld Metal by In-situ Observation
K. Shinozaki, M. Yamamoto, A. Kawasaki, T. Tamura, and P. Wen (Hiroshima Univ., Japan) |
| 11:50-12:10 | TA1-3 | Effect of Interstitial Elements on the Toughness of Ferritic Stainless Steel Weld Zone
Won-Bae Lee, Jeong Kil Kim, Joon Sik Park, In Su Woo, and Jong Bong Lee (POSCO, Korea) |
| 12:10-12:30 | TA1-4 | Mechanical Approach for Prediction of Microcracking in Multipass Weld Metal of Ni-Base Alloy 690
Kazuyoshi Saida, Masashi Sakamoto, and Kazutoshi Nishimoto (Osaka Univ., Japan) |
| 12:30-12:50 | TA1-5 | Metallurgical Investigations of Laser Welding of AISI 304 Stainless Steel
A. Gharedaghi, S. A. A. Akbari Mousavi, M. Mastoori, and K. Abbasi (Univ. of Tehran, Iran) |

May 10 (Thursday) 11:00-12:10 Room B (311B+C)

TB1. Metallurgy

Chairs Woong-Seong Chang - RIST WRC, Korea
Hahn Choo - The Univ. of Tennessee, USA

- 11:00-11:30 TB1-1 **[Keynote]Microstructural Evolution in 304 Austenitic Stainless Steel during Friction Stir Welding**
Hiroyuki Kokawa (Tohoku Univ., Japan), Seung Hwan C. Park (Hitachi Ltd., Japan), Yutaka S. Sato (Tohoku Univ., Japan), Kazutaka Okamoto, Satoshi Hirano, and Masahisa Inagaki (Hitachi Ltd., Japan)
- 11:30-11:50 TB1-2 **Experimental Simulation of Recrystallized Microstructure in Friction Stir Welded Al Alloy using Plane-Strain Compression Test**
Kunitaka Masaki, Yutaka S. Sato (Tohoku Univ., Japan), Masakatsu Maeda (Osaka Univ., Japan), and Hiroyuki Kokawa (Tohoku Univ., Japan)
- 11:50-12:10 TB1-3 **Linear Friction Welding of Ti-6Al-4V Alloy: Microstructure Characterization**
T.J. Ma, W.-Y. Li, Q.Z. Xu, Y. Zhang, J.L. Li, S.Q. Yang (Northwestern Polytechnical Univ. China), and H.L. Liao (Univ. de Technologie de Belfort-Montbéliard, France)

May 10 (Thursday) 11:00-12:30 Room D (310B+C)

TD1. Welding Distortion Analysis I

Chairs Myoung Soo Han - Daewoo Shipbuilding & Marine Engineering Co. Ltd., Korea
William Mohr - EWI, USA

- 11:00-11:30 TD1-1 **[Keynote]Computational Welding Mechanics for Industrial Applications**
Hidekazu Murakawa (Osaka Univ., Japan)
- 11:30-11:50 TD1-2 **Development of Module to Predict the Welding Deformation of Large Steel Structures**
J.U. Park (Chosun Univ., Korea), M. S. Chun (Samsung Heavy Industry Co., Ltd., Korea), and H. G.Suk (Kangwong Nat'l Univ., Korea)
- 11:50-12:10 TD1-3 **Angular Distortion Reduction by In-process Control Welding Using Back Heating Source**
Shigetaka Okano, Masahito Mochizuki, and Masao Toyoda (Osaka Univ., Japan)
- 12:10-12:30 TD1-4 **The Effect of Welding Techniques on the Distortion of the Weldments**
Adem Kurt (Gazi Univ., Turkey), Ilyas Uygur (Duzce Univ., Turkey), and Hakan Ates (Gazi Univ., Turkey)

May 10 (Thursday) 11:00-12:30 Room E (304A)

TE1. Examination

Chairs Jinsoo Jeon - KIMM, Korea
Kinya Mitani - Nichizotech Inc., Japan

- 11:00-11:30 TE1-1 **[Keynote]Welding Safety Management Review System for Electric Structures of Nuclear Power Stations in Japan**
Mitsuyoshi Matsumoto (JNES, Japan)
- 11:30-11:50 TE1-2 **A Study on the Effect of Feedrate on the Fatigue Life of Al7075-T6 Specimens before and after Shotpeening**
H.T. Kim and K.H. Shin (Seoul Nat'l Univ. of Tech., Korea)
- 11:50-12:10 TE1-3 **Characterization of Weldments and Materials using Thermoelectric Power Measurements**
Y. D. Park (Dong-Eui Univ., Korea), A. N. Lasseigne-Jackson, J. E. Jackson, B. Mishra, D. L. Olson, and T. Koenig (Colorado School of Mines, USA)
- 12:10-12:30 TE1-4 **J-integral Estimation for the 3-D Through-thickness Centre-cracks in Welds of Structural Steels**
C. H. Lee (Korea Railroad Research Inst., Korea) and K. H. Chang (Chung-Ang Univ., Korea)

May 10 (Thursday) 11:00-12:50 Room F (304B)

TF1. Laser Joining & Welding

Chairs Jong Do Kim - Korea Maritime Univ., Korea
Yuji Sano - Toshiba Corp., Japan

- 11:00-11:30 TF1-1 **[Keynote]4th Wave of Modernization by Photon/Electron Technology and Development of Advanced Laser Integrated Manufacturing System**
Muneharu Kutsuna (Nagoya Univ., Japan)
- 11:30-11:50 TF1-2 **Laser Peening without Coating to Mitigate Stress Corrosion Cracking and Fatigue Failure of Welded Components**
Yuji Sano (Toshiba Corp., Japan), Yoshihiro Sakino (Osaka Univ., Japan), Naruhiko Mukai, Minoru Obata, Itaru Chida, Takuya Uehara, Masaki Yoda (Toshiba Corp., Japan), and You-Chul Kim (Osaka Univ., Japan)
- 11:50-12:10 TF1-3 **Laser Joining Applications. Highest Efficiency using Diode Lasers**
Michael Nagel (Laserline GmbH, Germany)
- 12:10-12:30 TF1-4 **UV Laser Bonding of Optical Devices on Polymers**
Joohan Kim and Hyangtae Kim, Chulku Lee (Seoul Nat'l Univ. of Tech., Korea)
- 12:30-12:50 TF1-5 **Requirements for Laser Processing Heads during Welding with High Beam Quality**
Bjoern-Christian Hugo Wedel (Highyag Lasertechnologie GmbH, Germany)

May 10 (Thursday) 14:00-15:50 Room B (311B+C)**TB2. Weld Simulation**

Chairs Dong Won Oh - KNR System, Korea
Manuel Marya - Schlumberger Technology Corp., USA

- 14:00-14:30 TB2-1 **[Keynote]Welding of 00Cr12 Ferrite Stainless Steel**
Bing Du, Yuli Jia, Baojin Zhou, and Yujun Xu (Harbin Welding Inst., China)
- 14:30-14:50 TB2-2 **Development of Welding Distortion Analysis using Residual Strain as Boundary Condition**
Yunsok Ha, Sihoon Cho, and Taewon Jang (Samsung Heavy Industries Co., Ltd., Korea)
- 14:50-15:10 TB2-3 **Analysis of the Redistribution of Welding Deformation Due to External Loading Conditions Using Layered Shell Elements**
Young Chun Jo, Hyun Soo Ryu (Seoul Nat'l Univ., Korea), Ha Cheol Song (Mokpo Nat'l Univ., Korea), Chang Doo Jang (Seoul Nat'l Univ., Korea), Joong Kyoo Kang, Myoung Soo Han, Yooil Kim, and Joo Ho Heo (DSME Co. Ltd., Korea)
- 15:10-15:30 TB2-4 **A Numerical Study on Nonequilibrium Heat Transfer and Crater Formation in Thin Metal Films Irradiated by Femtosecond Pulse Laser**
H. S. Sim (Chung-Ang Univ., Korea), K. G. Kang (Seoul Nat'l Univ., Korea), S. H. Lee, J. M. Kim, and Y. E. Shin (Chung-Ang Univ., Korea)
- 15:30-15:50 TB2-5 **Effect of Micro Structure in Fuel Cell Electrode on Concentration of Species in Reaction Layer**
Masahiko Sugimura, Kiyokazu Yasuda, Michiya Matsushima, and Koza Fujimoto (Osaka Univ., Japan)

May 10 (Thursday) 14:00-15:50 Room C (310A)**TC2. Arc Physics and Simulation**

Chair Jong-Man Kim- Daewoo Shipbuilding & Marine Engineering Co., Ltd., Korea
Juergen Bruckner- Master of Metallurgy, Austira

- 14:00-14:30 TC2-1 **[Keynote]Engineered Weld Design: Are Composite Welds Likely In The Future?**
D.L. Olson (Colorado School of Mines, USA), Y.D. Park (Dong-Eui Univ., Korea), J.E. Jackson, and A.N. Lasseigne-Jackson (Colorado School of Mines, USA)
- 14:30-14:50 TC2-2 **Predictions of Current Attachment at Thermionic Cathode for TIG Arcs**
Manabu Tanaka, Kentaro Yamamoto, Shinichi Tashiro (Osaka Univ., Japan), and John J Lowke (CSIRO, Australia)
- 14:50-15:10 TC2-3 **Numerical Modeling of Welding Arc with Complex System between Arc Plasma and Molten Electrode**
Kentaro Yamamoto, Manabu Tanaka, Shinichi Tashiro, Kazuhiro Nakata (Osaka Univ., Japan), Keiichi Suzuki, and Kei Yamazaki (Kobe Steel, Ltd., Japan)
- 15:10-15:30 TC2-4 **Numerical Analysis of Arc Plasma with Metal Transfer in GMAW**
Y. Hirata and K. Ohnishi (Osaka Univ., Japan)
- 15:30-15:50 TC2-5 **Modelling the Heat and Fluid Flow in the Welded Pool from High Power Arc Sources**
Ioan Sorin Leoveanu (Transylvania Univ. Brasov, Romania) and Gheorghe Zgura (Polytechnical Univ. Bucharest, Romania)

May 10 (Thursday) 14:00-15:30 Room D (310B+C)**TD2. Structural Fatigue and Fatigue Damage**

Chair Jong Seong Kim - Korea Power Engineering Comany, Korea
Hidekazu Murakawa - Osaka Univ., Japan

- 14:00-14:30 TD2-1 **[Invited]Analysis of Solder Fatigue in Electronic Packaging using the Mesh Insensitive Structural Stress Method**
Jeong K. Hong and Pingsha Dong (Battelle, USA)
- 14:30-14:50 TD2-2 **Applicability Evaluation of SS(Structural Stress) Method on Actual Project**
Kwang Seok Kim, Joong Kyoo Kang, Joo Ho Heo, and Sung Geun Lee (DSME Co. Ltd., Korea)
- 14:50-15:10 TD2-3 **Fatigue Damage Model for Nnumerical Assessment of Fatigue Characteristics**
Jae Myung Lee, Chi Seung Lee (Pusan Nat'l Univ., Korea), and Min Sung Chun (Samsung Heavy Industries.Co., Ltd., Korea)
- 15:10-15:30 TD2-4 **Assessment of Fatigue Failure Modes in Fillet Weldments using Structural Stress Approach**
Jeong Hwan Kim, Myung Hyun Kim, and Sung Won Kang (Pusan Nat'l Univ., Korea)

May 10 (Thursday) 14:00-15:50 Room E (304A)**TE2. Pb-free Solder I**

Chairs Jae Pil Jung - Univ. of Seoul, Korea
Y.(Norman) Zhou - Univ. of Waterloo, Canada

- 14:00-14:30 TE2-1 **[Keynote]A study of the Effect of Solder Volume on Inter-metallic Layer Growth Rate**
B. Salam, H. Da, and N. N. Ekere (Univ. of Greenwich, UK)
- 14:30-14:50 TE2-2 **Characteristics of Solder Alloys**
Ryoe Wada, Michio Endo, and Susumu Nanao (Univ. of Tokyo, Japan)
- 14:50-15:10 TE2-3 **Life Prediction of Solder Joint for Chip Resistor Soldered with Sn-3.0Ag-0.5Cu and Sn-37Pb under Thermal Cycling**
Won Sik Hong, Noh-Chang Park (KETI, Korea), Whee Sung Kim (Hankuk Aviation Univ., Korea), Byeong Suk Song (KETI, Korea), and Kwang-Bae Kim (Hankuk Aviation Univ., Korea)
- 15:10-15:30 TE2-4 **Reliability Assessment of Lead Free Soldered PWBs**
Il-Je Cho, Kyu-Sang Chae, Soon-Tae Kim (LG Electronics, Korea), Olaf Wittler (Fraunhofer IZM, Korea), and Young-Eui Shin (Chung-Ang Univ., Korea)
- 15:30-15:50 TE2-5 **Estimation of Thermal Fatigue Resistance of Sn-Bi(-Ag) and Sn-Ag-Bi-Cu Lead-Free Solders Using Strain Rate Sensitivity Index**
Kiyokazu Yasuda (Osaka Univ., Japan), Ikuro Shohji (Gunma Univ., Japan), and Tadashi Takemoto (Osaka Univ., Japan)

May 10 (Thursday) 16:10-18:10

Lobby

Poster Session

- P1 Effect of Strain Rate on Microstructural Evolution of Nano-Grained Copper in Accumulative Roll-Bonding Process**
Seong-Hee Lee (Mokpo Nat' l Univ., Korea), Seung Zeon Han, and Cha Yong Lim (KIMM, Korea)
- P2 Welding Technology of Lightweight Alloys**
Sang Cheol Kil and Hwan Tae Kim (KISTI, Korea)
- P3 Characterization of Microstructure of Fine WC-6.5Co Cladding Layer by Electric Resistance Welding**
Jinwoo Lee, Youngho Lee, Sangjin Kim (Chungnam Nat'l Univ., Korea)
- P4 A Study on the Energy Absorption Characteristics of CFRP Side Member for Fuel-efficiency Improvement and Crush Safety**
Kil Sung Lee, Cheon Seok Cha, Ji Hoon Kim, and In Young Yang (Chosun Univ., Korea)
- P5 Manufacturing and Mechanical Properties of a Honeycomb Sandwich Panel**
Sung-il Seo, Jeong-Seok Kim (KRRI, Korea), Se-Hyun Cho (Hankuk Fiber Glass, Korea), and Seong-Chul Kim (KRRI, Korea)
- P6 Microstructural Evolution and the Joining Tensile Strength of Brazed Ni-based Superalloys**
Kyeong Ho Kim, Gwang Ho Kim, Ho Jin Lee, and Whung Whoo Kim (KAERI, Korea)
- P7 Effect of Joint Configuration Design on the Butt Welding Characteristics of Double Wall PE Pipes**
Hyung-Kook Jin, Jae-Seong Kim, Dae-Hwan An, Bo-Young Lee, and Sang-Yul Lee (Hankuk Aviation Univ., Korea)
- P8 Determination of Optimum Welding Process Specification and Distortion Forces in the Lattice Beam Structures**
Yusuf Ozcatalbas and Halil Ibrahim Vural (Gazi Univ., Turkey)
- P9 Development of Visual Monitoring System for Deformation Measuring of Welded Members and Its Application**
J. G. Han, K. H. Chang, G. C. Jang, K. K. Hong (Chung-ang Univ., Korea), S. D. Cho, Y. S. Kim (KICT, Korea), J. M. Kim, Y.E.Shin (Chung-ang Univ., Korea)
- P10 Different Material Welding by Laser Diode**
Yutaka Mitooka, Makoto Hino, Kazuya Nagata (Industrial Tech. Research Inst. of Okayama Prefectural Government, Japan) and Kazuto Urakami (HAYAKAWA RUBBER CO., LTD., Japan)
- P11 Brazing with Microwave Energy**
Adem Kurt (Gazi Univ., Turkey), Ilyas Uygur (Duzce Univ., Turkey), and Hakan Ates (Gazi Univ., Turkey)
- P12 Rotary Friction Welding of Copper Couples**
Hakan Ates, Adem Kurt (Gazi Univ., Turkey), and Ilyas Uygur (Duzce Univ., Turkey)
- P13 Effect of Probe Thread on Friction Spot Joint Strength of AZ31 Mg Alloy**
Kazuhiro Nakata, Hirohisa Ikegami, and Takuya Tsumura (Osaka Univ., Japan)
- P14 Determination of Optimum Welding Process Specification in Welded I Beams**
Yusuf Ozcatalbas and Yavuz Aktas (Gazi Univ., Turkey)
- P15 Microstructural Evolution and Weldability of AISI 4042 Steel**
Behcet Gulenc, Ismail Bayram (Gazi univ., Turkey), Ilyas Uygur (Duzce Univ., Turkey), and Ahmet Turgutlu (Gazi Univ., Turkey)
- P16 Effect of Heating Element Orientation on Failure Strength Evaluation of Resistance Welded Joints**
Han-Ju Park (Korea Polytechnic V College, Korea), Ho-Chel Yoon, Chul-In Kim, and Jae-Kyoo Lim (Chonbuk Nat' l Univ., Korea)
- P17 The Failure Strength Evaluation on Resistance Welding Mixed Adhesive Bonding**
Han-Ju Park (Korea Polytechnic V College, Korea), Ho-Chel Yoon, Ji-Man Chang, and Jae-Kyoo Lim (Chonbuk Nat' l Univ., Korea)
- P18 Residual Stress Relief and Redistribution of Welded Metals by Vibratory Stress Relaxation**
Bong-Joon Kim, Hae-Woo Lee, Jeong-Soo Lee, Young-Rak Son, and Woo-Hyun Choe (Hanjin Heavy Industries & Construction CO., LTD., Korea)
- P19 A Comparative Evaluation of Friction-Welded and Brazed Ti and AISI 321 Stainless Steel Joints**
Seung-Wook Baek (Sungkyunkwan Univ., Korea), Won-Bae Lee (POSCO, Korea), Ja-Myeong Koo, Chang-Yong Lee, and Seung-Boo Jung (Sungkyunkwan Univ., Korea)
- P20 Computer Simulation of Residual Stresses in Welding Process with Finite Element Method**
Shouju Li, Yingxi Liu (Dalian Univ. of Tech., China) and Zichang Shangguan (Dalian Fishery Univ., China)
- P21 Rate-Dependent Hysteresis Model for the Structural Steel(SM490) Considering the Coupled Effect of Strain Rate Hardening and Temperature Rise**
Gab Chul Jang, Kyong Ho Chang (Chung-Ang Univ., Korea), Chin Hyung Lee (Korea Railroad Research Inst., Korea), and Young Eui Shin (Chung-Ang Univ., Korea)
- P22 Fatigue Crack Growth Characteristics in Dissimilar Weld Metal Joint**
H. Ki, C.S. Kim, Y.C. Jeon, and S.I. Kwun (Korea Univ., Korea)
- P23 Strain-Induced Martensitic Phase Transformation by Low-Cycle Fatigue in AISI 316L Stainless Steel**
Y.C. Jeon, C.S. Kim, H. Ki, and S.I. Kwun (Korea Univ., Korea)
- P24 Development of Computational Modeling to Predict the Welding Deformation during Ship's Small Component Fabrications**
J. U. Park (Chosun Univ., Korea) and M. S. Han (DSME, Korea)
- P25 Optimization of a Helicopter Rotor Blade Considering Fatigue Life**
Jong-Bin Im, Man-Seok Oh, Soo-Yong Lee, and Jungsun Park (Hankuk Aviation Univ., Korea)
- P26 Optional Correlation Function Method in Kriging for Stochastic Optimal Design**
Jong-Bin Im, Young-Hee Ro, Soo-Yong Lee, and Jung-Sun Park (Hankuk Aviation Univ., Korea)
- P27 Analysis of Fatigue Life of SPR(self-piercing riveting) Jointed Various Specimens Using FEM**
Duckwhan Kim (Pusan Nat'l. Univ., Korea), Bokkyu Lim (Automotive Parts Innovation Center, Korea), Jeongsuk Kim, Donghee Kwon (Pusan Nat'l. Univ., Korea), Mingun Kim, Junggak Hwang, Myoungchan Kim (Kangwon Nat'l. Univ., Korea), and Jaewon Lee (Ulsan Univ., Korea)
- P28 A Study on the Development of Mach Peening for Prolonging Fatigue Life of Machine Structural Alloy Steel**
Bokkyu Lim (Automotive Parts Innovation Center, Korea)
- P29 Assessment of Fatigue Life by FEMFAT on the Weld Configuration of Spot Welding**
Duckwhan Kim (Pusan Nat'l. Univ., Korea), Bokkyu Lim (Automotive Parts Innovation Center, Korea), Jeongsuk Kim (Pusan Nat'l. Univ., Korea), Mingun Kim, Jaekyun Park, Kuhyun Chung, Dongyool Kim (Kangwon Nat'l Univ., Korea), and Junyong Han (Korea Polytechnic 6 Colleges)

- P30 Hybrid Integration of Optical Components on Planar Lightwave Circuit (PLC) with a Coated WDM Filter Using Passive Alignment Technique**
Jung Woon Lim, Sung Hwan Hwang (KOPTI, Korea), Myung Yong Jeong (Pusan Nat'l Univ., Korea), and Byung Sup Rho (KOPTI, Korea)
- P31 High-Accuracy Optical Subassembly for High Speed Data Transmission above 10 Gb/s/ch**
Sung Hwan Hwang, Jung Woon Lim (KOPTI, Korea), Hyo-Hoon Park (Information and Communications Univ., Korea), Myung Yong Jeong (Pusan Nat'l Univ., Korea), and Byung Sup Rho (KOPTI, Korea)
- P32 Characteristic of Electrochemical Migration on Surface Finish with Pb-free Alloy**
Bo-In Noh, Jong-Bum Lee (Sungkyunkwan Univ., Korea), Bo-Young Lee (Hankuk Aviation Univ., Korea), and Seung-Boo Jung (Sungkyunkwan Univ., Korea)
- P33 Impact Testing of Adhesive-bonded Joint by Hopkinson Bar and Its Numerical Simulation**
Xiao Ma, Haiyan Zhao, Zhipeng Cai, Li Lu (Tsinghua Univ., China), and Pei-Chung Wang (GM R&D, U.S.A)
- P34 Diffusion Bonded Ag/Cu Ingots for Mokumegane Jewelry**
Ohsung Song and Jongryul Kim (Univ. of Seoul, Korea)
- P35 Bending Fatigue Characteristic of Sn-3.5Ag solder bump on Ni-UBM**
K.I. Kang (MKE, Korea), J.P. Jung (Univ of Seoul, Korea), W.H.Bang (Seoul Nat'l Univ., Korea) K.H.Oh (Seoul Nat'l Univ, Korea), J.H.Park (RIST), and K.H.Oh (Seoul Nat'l Univ., Korea)
- P36 Reproducing the Direct Bonded Shilla's Granulation Process**
Ohsung Song and Jongryul Kim (Univ. of Seoul, Korea)
- P37 Measurement of Hazardous Air Pollutants in MIG/MAG and Manuel Metal Arc Welding**
Adem Kurt (Gazi Univ., Turkey), Ilyas Uygur (Duzce Univ., Turkey), Hakan Ates, and Muslum Koc (Gazi Univ., Turkey)
- P38 Reliability of Sn-8Zn-3Bi Solder Joint and Low Melting Point Phase**
Y. W. Lee, S. J. Hong, K. J. Lee, and J. P. Jung (Univ. of Seoul, Korea)
- P39 Effect of Oxygen Concentration on Wetting Property between Sn-8Zn-3Bi Solder Paste and MLCC Component**
Ja-Myeong Koo and Seung-Boo Jung (Sungkyunkwan Univ., Korea)
- P40 Coalescence Characteristics of Fusible Particles in Solderable Isotropic Conductive Adhesives (ICAs)**
Seong Hyuk Lee (Chung-Ang Univ., Korea), Junghee Lee (Function Bay Inc., Korea), Jin Woon Lee, and Jong-Min Kim (Chung-Ang Univ., Korea)
- P41 An Investigation on Wetting Characteristics of Solder Particle for Solderable Electrically Conductive Adhesives (ECAs)**
K.C. Yang, J. M. Kim, S.H.Lee, Y. E. Shin, K. H. Chang, J. G. Han (Chung-Ang Univ, Korea), Y. S. Eom (ETRI, Korea), J. T. Moon (ETRI, Korea), J. W. Baek and J. D. Nam (Sungkyunkwan Univ., Korea)
- P42 Reliability Evaluation of QFP Solder Joint Using Sn-8Zn-3Bi Solder Paste during the Thermal Shock Test**
S. W. Han, K. H. Chang, J. G. Han, I. J. Cho, J. M. Kim, M.G. Choi, Y. T. Kim, and Y. E. Shin (Chung-Ang Univ., Korea)
- P43 Ultrasonic Bonding of FPCB and Rigid PCB at Ambient Temperature**
K.S. Kim, K.J. Lee, S.J. Hong, and J.P. Jung (Univ. of Seoul, Korea)
- P44 Friction Stir Welding of Oxygen Free Copper and 60% Cu-40%Zn Copper Alloy**
Hwa Soon Park, Byung Woo Lee (Pukyong Nat'l Univ., Korea), Taichi Murakami, Kazuhiro Nakata, and Masao Ushio (Osaka Univ., Japan)
- P45 Effect of Particle Size Distribution of the Feedstock Powder on the Microstructure of Bulk Metallic Glass Sprayed Coating by HVOF on Al Alloy Substrate**
Hyun-guen Kim, Kazuhiro Nakata, Takuya Tsumura (Osaka Univ., Japan), Masaharu Sugiyama, Takanori Igarashi (TOPY Industries, Ltd., Japan), and Masahiro Fukumoto (Toyohashi Univ., Japan)
- P46 Effect of Plasma Spraying Parameters on Anisotropic Feature of Mechanical Property of Plasma Sprayed Al₂O₃ Coating**
Shinichiro Adachi (Tech. Research Inst. of Osaka Prefecture, Japan) and Kazuhiro Nakata (Osaka Univ., Japan)
- P47 Numerical Analysis of Distortion of a Laser Welded Thin Metal Structure**
Jae-Woong Kim and Choong-Gi Kim (Yeungnam Univ., Korea)
- P48 Fiber Laser Welding of Noncombustible Magnesium Alloy**
Yuji Sakai (Osaka Univ., Japan), Kazuhiro Nakata, Takuya Tsumura (JWRI, Osaka Univ., Japan), Mitsuji Ueda (KS Technos, CO., Ltd., Japan), Tomoyuki Ueyama (Daihen, CO., Ltd., Japan), and Kastuya Akamatsu (Kansai Univ., Japan)
- P49 Surface Transformation Hardening for Rod-shaped Carbon Steel by Laser Heat Source**
Jong-Do Kim, Jin-Seok Oh, and Woon-Ju Kang (Korea Maritime Univ., Korea)
- P50 Formation Mechanisms of Weld Defects and Dynamic Behavior of Keyhole in Galvanized Steel Welding by CO₂ Laser**
Jong-Do Kim, Seo-Jeong Park, and Hyun-Joon Park (Korea Maritime Univ., Korea)
- P51 Welding Characteristic of Super Alloys for Nd: YAG Laser**
Sang Hyun Ryu, Jae Hoon Lee, Jeong Suh, Jeng O Kim, and Ji Whan Noh (KIMM, Korea)
- P52 Laser Welding of Dissimilar Sheath Metals**
Soo-sung Kim, Geun-il Park (KAERI, Korea), and Jin-hyun Koh (Korea Univ. of Tech. & Education, Korea)
- P53 Corrosion Monitoring Characteristics of Plasma RF Sputtered Mg Thin Films under Cyclic Wet-Dry Conditions**
Myeong-Hoon Lee, Jong-Do Kim, and Il-Yong Bae (Korea Maritime Univ., Korea)
- P54 Laser-based Fe-36%Ni (Invar®) Alloy Processing with Deep Microgrooves in Aqueous Solutions**
Kwang H. Oh, and S. H. Jeong (GIST, Korea)
- P55 Development of New LASER Welding Apparatus and Method of Inner-strap Welding of a Spacer Grid Assembly for PWR Fuel Assembly**
Kee-nam Song, and Soo-sung Kim (KAERI, Korea)
- P56 Optimization of Welding Conditions for Sealing of Lithium-ion Battery by Pulsed Nd:YAG Laser**
Jong-Do Kim (Korea Maritime Univ., Korea), Seung-Jo Yoo (MS AUTOTECH CO.,LTD., Korea), and Jang-Soo Kim (Korea Maritime Univ., Korea)
- P57 Improvement of Electrochemical and Mechanical Properties by Solution Heat Treatment of Al-Mg Alloy**
Seong-Jong Kim, Jae-Yong Ko, and Jeong-Il Kim (Mokpo Nat'l Maritime Univ., Korea)
- P58 The Electrochemical Investigation on Corrosion Protection Potential in Anodic and Cathodic Protection Application of Al-Mg Alloy**
Seong-Jong Kim and Jae-Yong Ko (Mokpo Nat'l Maritime Univ., Korea)
- P59 Analysis on Thermal Strain of AC7A Aluminum Alloy Casting Mold for Automobile Tire by Finite Element Method**
Yool Kwon Oh, Ho Dong Yang, and Yong Bum Kim (Chosun Univ., Korea)

- P60 Effect of Repair Welding on Residual Stresses of Dissimilar Welds in Nuclear Components**
Jong-Sung Kim, Tae-Eun Jin (KOPEC, Korea), Nam-Young Hur (KHNP, Korea), and Han-Seop Chung (KEPRI, Korea)
- P61 Fatigue Life Improvement using Mechanical Post Treatment for Weldment**
Seung Ho Han, Jeong Woo Han, and Yong Yun Nam (KIMM, Korea)
- P62 The Study of Field Application of Digital Radiography Test for the Maintenance of Quality Welded Structure in Power Plants**
Sang-Ki Park, Yeon-Sik Ahn, Doo-Song Gil, Byung-Chul Park (KEPRI, Korea), and Myungsup Kim (ITM, Korea)
- P63 Application of Air-coupled Ultrasonic Techniques Using Carbon/Carbon Composites**
In-Young Yang, UK Heo (Chosun Univ., Korea), Jun-Woo Jeong, Young-Hun Kim (Mokpo Nat'l Univ., Korea), Je-Woong Park (Chosun Univ., Korea), David K. Hsu (Iowa State Univ., USA), and Kwang-Hee Im (Woosuk Univ., Korea)
- P64 On-line Weld Quality and Fault Inspection Based on Measured Indentation in Resistance Spot Welding**
Yansong Zhang (Shanghai Jiaotong Univ., China), P. C. Wang (General Motors Research and Development Center, USA), Xiaoyun Zhang, and Guanlong Chen (Shanghai Jiaotong Univ., China)
- P65 Pattern Recognition of Ultrasonic Inspection Defects of Spot Welding based on BP Neural Network**
Changming Qian, Yansong Zhang, and Guanlong Chen (Shanghai Jiao Tong Univ., China)
- P66 Investigation on Annealing Treatment Affecting Electrochemical Characteristics of Al-Mg Alloy**
Seong-Jong Kim and Jae-Yong Ko (Mokpo Nat'l Maritime Univ., Korea)
- P67 The Variations of Quality Characteristics according to Environmental Factors of High Tension Bolt, Nut and Washer Set**
H. G. Suk, D. S. Kim (Kangwon Nat'l Univ., Korea), and I. S. Cho (Korea Parts & Fasteners Co., Ltd., Korea)
- P68 The Influence on the Axial Force by the Size Scattering of High Tension Bolt, Nut and Washer Set**
H. G. Suk (Kangwon Nat'l Univ., Korea), I. S. Cho (Korea Parts & Fasteners Co., Ltd., Korea), and J. U. Park (Chosun Univ., Korea)
- P69 Effects of Fatigue Characteristics of Automotive SCM420H Gear Steel by Investigating the Optimum-peening Intensity**
Tae-hyung Kim (Sogang Univ., Korea) and Seong-kyun Cheong (Seoul Nat'l Univ. of Tech., Korea)
- P70 Design of a Control System for Welding Robot with Image Simulation**
Jin-Seok Oh, Jong-Do Kim, and Jun-Ho Kwak (Korea Maritime Univ., Korea)
- P71 A Study on Crack Propagation of Pipe under Thermo-Mechanical Fatigue Loading**
Gyubeom Lee, Jaeseong Kim, Boyoung Lee, and Jocho Choi (Hankook Aviation Univ., Korea)
- P72 Micromechanical Responses of Sn-3.5Ag-xCo Lead-free Solders by Nanoindentation**
Feng Gao, Hiroshi Nishikawa and Tadashi Takemoto (Osaka Univ., Japan)
- P73 Characteristics of Deformation and Residual Stress of Steel Piles with a Welded Joint under Dynamic Loading**
Kyong Ho Chang and Gab Chul Jang (Chung-ang Univ., Korea)
- P74 Optimal Design of Welding Current and Voltage Waveforms to Reduce Spatter in Short Circuit Transfer Mode of Gas Metal Arc Welding**
Hyoung Jin Park (Hanyang Univ., Korea), In Sung Hwang, Mun Jin Kang, Bong Yong Kang (Korea Inst. of Industrial Tech., Korea), and Sehun Rhee (Hanyang Univ., Korea)
- P75 Weldability Studies of the Replacement Repair Welded Joints of a Damaged Steel Bridge**
K. H. Chang, H. C. Park (Chung-Ang Univ., Korea), C. H. Lee (Korea Railroad Research Inst., Korea), E. H. Choi, G. C. Jang, and J. H. Lee (Chung-Ang Univ., Korea)
- P76 Effects of Heat Treatment on Cathodic Corrosion Protection Application of Steel for Ship Structure**
Seong-Jong Kim, Seok-Ki Jang, and Min-Su Han (Mokpo Nat'l Maritime Univ., Korea)

May 11, 2007 (Friday)

May 11 (Friday) 08:30-09:10

Room 311

PL. Plenary Session

Chair Boyoung Lee - Hankuk Aviation Univ., Korea

08:30-09:10 PL3 **Packaging Technology for Today and Future**
J. I. Kim (Amkor Tech. Korea, Korea)

May 11 (Friday) 09:20-10:50

Room B (311B+C)

FB1. Spot Joining Processes

Chairs Yun-Mo Yeon - Suwon Science College, Korea
Hiroyuki Kokawa - Tohoku Univ., Japan

09:20-09:50 FB1-1 **[Invited]Mechanical and Microstructural Properties of Friction Spot Joined 5052 and 6111 Al Alloys**
Woong-Seong Chang, Chang-Keun Chun, Heung-Ju Kim, Hyeon-Jin Cho, and Teuk-Ki Kim (RIST, Korea)

09:50-10:10 FB1-2 **Liquid Penetration Induced Cracking in Mg-alloy Spot Welds**
M. Yamamoto (Hiroshima Univ., Japan), A. Gerlich, T.H. North (Univ. of Toronto, Canada), and K. Shinozaki (Hiroshima Univ., Japan)

10:10-10:30 FB1-3 **Friction Stir Spot Welding of AZ31 Mg Alloy**
Chang-Yong Lee, Jae-Hong Lee, Don-Hyun Choi (Sungkyunkwan Univ., Korea), Yun-Mo Yeon (Suwon Science College, Korea), Hwan-Jin Sung, Woong-Seong Chang (RIST, Korea), and Saung-Boo Jung (Sungkyunkwan Univ., Korea)

10:30-10:50 FB1-4 **Mechanical and Microstructural Properties of Dissimilar Friction Spot Welded Aluminum Alloy**
Chang-Keun Chun, Heung-Ju Kim, Hyeon-Jin Cho, Teuk-ki Kim, and Woong-Seong Chang (RIST, Korea)

May 11 (Friday) 09:20-10:50

Room A (311A)

FA1. Fusion Welding-Carbon Steel I

Chair Hyun-Uk Hong - Posco, Korea
Kazuyoshi Saida - Osaka Univ., Japan

09:20-09:50 FA1-1 **[Invited]Hot Cracking in Stainless Steels and Nickel-base Alloys**
Kazutoshi Nishimoto (Osaka Univ., Japan)

09:50-10:10 FA1-2 **Effect of Hydrogen Concentration at Overlay / Base Metal Interface on Repair Weldability of Petroleum Pressure Vessel**
Hiroaki Mori, Kazutoshi Nishimoto (Osaka Univ., Japan), and Rinzo Kayano (The Japan Steel Works, Ltd., Japan)

10:10-10:30 FA1-3 **Effect of Weld Metal Microstructure on Cold Crack Susceptibility of High Strength Weld**
Hee Jin Kim, Jae Hak Kim, Ka Hee Kim, Jun Seok Seo (KITECH, Korea), Jin Hyun Koh (KUT, Korea), Hoi Soo Ryoo (KITECH, Korea), and Moo Young Huh (Korea Univ., Korea)

10:30-10:50 FA1-4 **Analysis of Weld Defects in Offshore Structural H Beams**
Heekeun Lee, Jinyong Kim, and Inhwan Hwang (Daewoo Shipbuilding & Marine Engineering, Korea)

May 11 (Friday) 09:20-11:00

Room C (310A)

FC1. Arc Welding Control

Chairs Il-soo Kim - Mokpo Nat'l Univ., Korea
Yoshinori Hirata - Osaka Univ., Japan

09:20-09:40 FC1-1 **Spatter Reduction of Steel Sheets Welding Using Controlled Bridge Transfer (CBT) GMA Process**
Tetsuo Era, Akihiro Ide, Toshio Uezono, and Tomoyuki Ueyama (Daihen Corp., Japan)

09:40-10:00 FC1-2 **Real-time Detection and Control of Torch-height in Waveform Controlled Short-circuit CO₂ Arc Welding**
Zhiming Zhu (Tsinghua Univ., China)

10:00-10:20 FC1-3 **Short Circuit Severity Model for Pulse Gas Metal Arc Welding of Aluminum**
Prasad K. D. V. Yarlagadda (Queensland Univ. of Tech., Korea), M. J. Kang (Korea Institute of Industrial Technology, Korea), and S. Rhee (Hanyang Univ., Korea)

10:20-10:40 FC1-4 **Effects of Contact Tip Diameter on the Arc Stability in FCAW**
Yong-Su Chu (Pukyong Nat'l Univ., Korea), Geun-Young Kang (ESAB SeAH, Crop., Korea), and Sang-Myoung Cho (Pukyong Nat'l Univ., Korea)

10:40-11:00 FC1-5 **The CMT - Process - a Revolution in Welding Technology**
Juergen Bruckner and Heinz Hackl (Fronius Int' l GmbH, Austria)

May 11 (Friday) 09:20-10:30 Room D (310B+C)

FD1. Inspection

Chair **Yongsik Kim** - Korea Electric Power Research Institute, Korea

- 09:20-09:50 FD1-1 **[Invited]New Technology for NDT Weld Inspections- Phased Arrays and Diffraction Sizing**
Simon Labbe and Michael Moles (Olympus NDT, Canada)
- 09:50-10:10 FD1-2 **Investigation of Wall Thinning Measurement in Steel Plates by Electromagnetic Acoustic Resonance**
Kinya Mitani (Nichizo Tech Inc., Japan), Masahito Mochizuki, and Masao Toyoda (Osaka Univ., Japan)
- 10:10-10:30 FD1-3 **Material Evaluation Technique Using V(z) Curve of SAM**
Ik-Keun Park, Chul-Ku Lee, and Tae-Sung Park (Seoul Nat'l Univ., Korea)

May 11 (Friday) 09:20-11:10 Room F (304B)

FF1. Laser Application in Transportation Industry I

Chairs **Joohan Kim** - Seoul Nat'l Univ. of Tech., Korea
Roland Dierken - ERLAS - Erlanger Lasertechnik, Germany

- 09:20-09:50 FF1-1 **[Invited]State of the Art Laser Joining in the Transportation Industry**
Klaus Loeffler (TRUMPF Laser and Systems GmbH, Germany)
- 09:50-10:10 FF1-2 **Development of Remote Welding System using Fiber Laser**
K. S. Kim, C. H. Jung, and I. S. Chang (Hyundai Motor Company, Korea)
- 10:10-10:30 FF1-3 **The Impact of High Power Diode Lasers on Solid-State-Laser Technology and Applications**
Friedrich Bachmann(ROFIN-SINAR Laser GmbH, Germany) and Yong-Cheol Lim(ROFIN-Baasel Korea Co. Ltd., Korea)
- 10:30-10:50 FF1-4 **Characteristics of CO₂ Laser Welded AHSS TRIP Steels with a Tensile Strength of 600 to 1000MPa for Automotive**
Tae-Kyo Han, Gwang-Geun Chin (POSCO, Korea), and Chung-Yun Kang (Pusan Nat'l Univ., Korea)
- 10:50-11:10 FF1-5 **A Study on the Thermal Characteristics of Nd:YAG Laser Stitch Welding for Automotive High Strength Steel Sheet**
Jae-Seon Chu, Hee-Seon Bang, S. R. Rajesh, and Han-Sur Bang (Chosun Univ., Korea)

May 11 (Friday) 09:20-11:10 Room E (304A)

FE1. Wire Bonding

Chairs **Mock Soon Kim** - Inha Univ., Korea
Yasuo Takahashi - Osaka Univ., Japan

- 09:20-09:50 FE1-1 **[Invited]Resistance Microwelding of Fine Wires for Medical Applications**
J. M. Kim, M.L. Kuntz and Y. Zhou (Univ. of Waterloo, Canada)
- 09:50-10:10 FE1-2 **Bonding Interface Analysis of Au-Ag Bonding**
Eun Kyu Her, Hee Suk Chung, Suk Hoon Kang, Kyu Hwan Oh (Seoul Nat'l Univ., Korea), Jong Soo Cho, and Jeong Tak Moon (MK Electron, Korea)
- 10:10-10:30 FE1-3 **Fracture Study of Ultrasonic Aluminum Wire Wedge Bonding on Copper Substrate with Mechanical Peeling-off Method**
Heeseon Bang (Chosun Univ., Korea), Hongjun Ji, Ming-Yu Li, Chunqing Wang (Harbin Inst. of Tech., China), and Hansur Bang (Chosun Univ., Korea)
- 10:30-10:50 FE1-4 **Tail Breaking Force in Thermoasonic Wire Bonding with Novel Bonding Wires**
J. Lee, M. Mayer, Y. Zhou (Univ. of Waterloo, Canada), Sung-Jae Hong, and Sung-Mun Lee (MK Electron Co., Ltd., Korea)
- 10:50-11:10 FE1-5 **Small-scale Resistance Welding of Crossed NiTi Fine Wire**
Shinji Fukumoto, Shigeru Morikawa, and Atsushi Yamamoto (Univ. of Hyogo, Japan)

May 11 (Friday) 11:30-13:10 Room A (311A)

FA2. Fusion Welding-Carbon Steel II

Chairs **Kook-soo Bang** - Pukyong Nat'l Univ., Korea
M.Sc.(Eng) Winarto - Univ. of Indonesia, Indonesia

- 11:30-11:50 FA2-1 **Size Effect of M-A Constituent on the Toughness of Intercritical CGHAZ**
Yoonki Lee, Joonoh Moon (Hanyang Univ., Korea) Sungmin Joo, Woongseong Chang (RIST, Korea), and Changhee Lee (Hanyang Univ., Korea)
- 11:50-12:10 FA2-2 **Fracture Toughness of Thick Steel Plates for Shipbuilding**
Joon Sik Park, Bo Young Jung (POSCO, Korea), Hiroshi Yajima (Nagasaki Inst. of Applied Science, Japan), and Jong Bong Lee (POSCO, Korea)
- 12:10-12:30 FA2-3 **Effect of Welding Parameters on the Characteristics of Electric Resistance Welded Seam of API-X70 Steel**
Choong-Myeong Kim (POSCO, Korea) and Jung-Kyu Kim (Hanyang Univ., Korea)
- 12:30-12:50 FA2-4 **An Efficient Method to Control the HAZ Softening of Ultra Fine Grained Steel's FCA Weldment**
JoongGeun Youn and TaeDong Park (Hyundai Heavy Ind. Co., Ltd., Korea)
- 12:50-13:10 FA2-5 **The Effect of Process Variables on Strength and Fracture Modes of Resistance Spot Welded 600-MPa Dual-phase Steels**
Yansong Zhang, Xinmin Lai, and Guanlong Chen (Shanghai Jiaotong Univ., China)

May 11 (Friday) 11:30-13:10 Room B (311B+C)

FB2. Welding Process

Chair Han Sur Bang - Chosun Univ., Korea
Kiyokazu Yasuda - Osaka Univ., Japan

- 11:30-11:50 FB2-1 **Seam Tracking and Wireless Control System in Pipeline Welding Equipment with Pulse Welding Process**
Hyeong Soon Moon, Sung Hoon Ko, Jong Cheol Kim, Jong Joon Kim, and Yong Baek Kim (Hyundai Heavy Industries Co.,Ltd., Korea)
- 11:50-12:10 FB2-2 **Determination of Optimum LASER Welding Parameters and Development of LASER Welding Technique to Enhance the Lateral Impact Strength of a Spacer Grid Assembly for PWR Fuel Assembly**
Kee-nam Song, and Soo-sung Kim (KAERI, Korea)
- 12:10-12:30 FB2-3 **A Study on the Adhesive Joint for Pipe Support in Shipbuilding**
Hyun Soo Kim, Yong Shin So, and Seong Beom Yang (Hyundai Heavy Industries, Co., Ltd., Korea)
- 12:30-12:50 FB2-4 **Joining Technologies for Manufacturing Reliable Structures, Including Dissimilar-Metal Assemblies**
Manuel Marya, Rashmi Bhavsar (Schlumberger Tech. Corporation, USA), Xiaohong Gayden (General Motors R&D, USA), and Surendar Marya (Ecole Centrale Nantes, USA)
- 12:50-13:10 FB2-5 **Advances in Nickel Alloy Consumables and Welding Processes for the Fabrication of Nuclear Boiler Components**
Christopher E Thornton and Craig Cooper (Special Metals Welding Products Company, UK)

May 11 (Friday) 11:30-13:00 Room C (310A)

FC2. Process Optimization and Automation

Chairs Jae-Woong Kim - Yeungnam Univ., Korea
Zhiming Zhu - Tsinghua Univ., China

- 11:30-12:00 FC2-1 **[Invited]Cooperative Control of Robotic Welding System in One Side Backingless V Groove Welding**
Satoshi Yamane (Saitama Univ., Japan), Toru Nakajima, Hikaru Yamamoto (Hitachi Construction Machinery Co., Ltd., Japan), Yasuyoshi Kaneko, and Kenji Oshima (Saitama Univ., Japan)
- 12:00-12:20 FC2-2 **An Evaluation Approach for Prediction of Process Parameters with Genetic Algorithm**
D.T. Thao and I.S. Kim (Mokpo Nat'l Univ., Korea)
- 12:20-12:40 FC2-3 **Selection of the GTAW-flux Process Parameters on Type 310 Stainless Steel via a Taguchi-Neural Approach**
Hsuan-Liang Lin, Chang-Pin Chou, and Ming-Song Chen (Nat'l Chiao Tung Univ., Korea)
- 12:40-13:00 FC2-4 **Robot based Laser Welding Technology**
Hee-Shin Kang, Jeong Suh, Jae-Hoon Lee, Jeng-O Kim, Kyoung-Taik Park (KIMM, Korea) and Taik-Dong Cho (Chungnam Nat'l. Univ., Korea)

May 11 (Friday) 11:30-13:10 Room D (310B+C)

FD2. Welding Residual Stresses

Chairs Myung Hyun Kim - Pusan Nat'l Univ., Korea
Jeong Kyun Hong - Battelle, USA

- 11:30-11:50 FD2-1 **Experimental and Numerical Investigations of Residual Stress Distributions in the TIG Welding Process**
S. A. A. Akbari Mousavi, S. F. Kashani Bozorg, and R. Miresmaeili (Univ. of Tehran, Iran)
- 11:50-12:10 FD2-2 **Measurement of Through-Thickness Residual Stress in Primary Piping of Girth Welded Joint**
M. Mochizuki (Osaka Univ., Japan) and G.B. An (Samsung Heavy Industries Co., Ltd., Korea)
- 12:10-12:30 FD2-3 **Analysis of Welding Residual Stress of Steel Pipes**
Kwang Choi (RIST, Korea)
- 12:30-12:50 FD2-4 **Finite Element Analysis of the Effect of Residual Stress on Mechanical Behavior of Welded Plates**
B.C. Goo (KRRI, Korea) and S.Y. Yang (KUT, Korea)
- 12:50-13:10 FD2-5 **Geometrical and Welding Conditions on Through-Thickness Residual Stress in Primary Piping of Girth Welded Joints**
J. Katsuyama (Japan Atomic Energy Agency, Japan), M. Mochizuki (Osaka Univ., Japan), G. B. An (Samsung Heavy Industries Co. Ltd., Korea), and M. Toyoda (Osaka Univ., Japan)

May 11 (Friday) 11:30-13:10 Room E (304A)

FE2. Modelling and Simulation for Microjoining

Chairs Young Eui Shin - Chung-Ang Univ., Korea
Guisheng Zou - Tsinghua Univ., China

- 11:30-11:50 FE2-1 **Thermal Resistance Control of an Optical Module Packaging by a Heat Sink of High Thermal Conductivity**
Seung Hun Oh, Chang Seok Kim (Pusan Nat'l Univ., Korea), Byung Sup Rho (KOPTI, Korea), Seung Boo Jung (Sungkyunkwan Univ.), and Myung Yung Jeong (Pusan Nat'l Univ., Korea)
- 11:50-12:10 FE2-2 **Computer Simulation of Wetting and Flowing Behaviors of Filler Metal during Laser Brazing Process**
Kazuyoshi Saida, Woohyun Song, and Kazutoshi Nishimoto (Osaka Univ., Japan)
- 12:10-12:30 FE2-3 **Modeling and Simulation of Micro Bump Bonding**
Yasuo Takahashi and Takamasa Kameda (Osaka Univ., Japan)
- 12:30-12:50 FE2-4 **Characterization of Contact Formation Process for High Efficiency Solar Cell using Design of Experiment (DOE)**
Sung Joon Lee, Sewon Jung, Sei-young Moon, Sang Jeon Hong, and Seung Soo Han (Myongji Univ., Korea)
- 12:50-13:10 FE2-5 **Bonding Mechanism Maps for Solid-State Bonding of Titanium**
Yasuo Takahashi (Osaka Univ., Japan), Yoshihiro Asakura (Kobe City College of Tech., Japan), and Masakatsu Maeda (Osaka Univ., Japan)

May 11 (Friday) 11:30-13:10

Room F (304B)

FF2. Laser Application in Transportation Industry II

Chairs Ki-Young Park - Institute for Advanced Engineering, Korea
Friedrich Bachmann - ROFIN-SINAR Laser GmbH, Germany

- 11:30-11:50 FF2-1 **Advanced Laser Joining by Use of Process Optimizing System Technology**
Peter Hoffmann and Roland Dierken (Erlanger Lasertechnik GmbH, Germany)
- 11:50-12:10 FF2-2 **A Comparison of Weld Properties with or without Filler Wire on Laser Welding of Magnesium Alloy for Car Industry**
Mok-Young Lee, Woong-Seong Chang, and Sook-Hwan Kim (RIST, Korea)
- 12:10-12:30 FF2-3 **Stress Analysis of Stainless Steel Overlap Joining Panel by Laser Welding for Fatigue**
Kyoung Don Lee, Ki Young Park (IAE, Korea), and Kwang Il Ho (Suwon Univ., Korea)
- 12:30-12:50 FF2-4 **HAZ Softening of Dual Phase High Strength Sheet Steels in Laser Welding**
M. Xia, S. Lawson (Univ. of Waterloo, Canada), Z. Tian (Centrall Iron & Steel Research Inst., China) and Y. Zhou (Univ. of Waterloo, Canada)
- 12:50-13:10 FF2-5 **Change of the Tensile Load according to Shape of Fusion Zone using CO₂ Laser in 800Mpa High-tensile Steel Plate**
Mun Jong Song, Byung Hun Jung, and Mun Yong Lee (SUNGWOO HITECH, Korea)

May 11 (Friday) 14:30-16:20

Room A (311A)

FA3. Solid-State Joining

Chairs Kenji Shinozaki - Hiroshima Univ., Japan
Mitsuru Nakamura - Iwate Univ., Japan

- 14:30-15:00 FA3-1 **[Invited]Friction Stir Welding of Ultrafine Grained TWIP Steel**
Rintaro Ueji (Kagawa Univ., Japan), Hidetoshi Fujii (Osaka Univ., Japan), Kazutoshi Kunishige (Kagawa Univ., Japan), and Kiyoshi Nogi (Osaka Univ., Japan)
- 15:00-15:20 FA3-2 **Feasibility Study of a Newly Developed Solid-state Joining Technology for Endless Hot Rolling**
J. S. Lee, Y. H. Kang, S. H. Uhm, C. S. Won (POSCO, Korea), and K. Horii (Mitsubishi-Hitachi Metals Machinery Inc., Japan)
- 15:20-15:40 FA3-3 **Micro Flash Welding of Super Duplex Stainless Steel with Zr Metallic Glass Insert**
Toshio Kuroda, Kenji Ikeuchi, Masahiro Shimada (Osaka Univ., Japan), Akihisa Inoue, and Hisamichi Kimura (Tohoku Univ., Japan)
- 15:40-16:00 FA3-4 **Effect of Post Weld Heat Treatment on Interface Microstructure of Explosively Welded Titanium/Stainless Steel Composite**
Pezhman Farhadi Sartangi and S. A. A. Akbari Mousavi (Univ. of Tehran, Iran)
- 16:00-16:20 FA3-5 **Preheating Effects on the Crack and IMCs during Laser Cladding of Fe-based Alloy on Aluminum**
Namhyun Kang (Pusan Nat'l. Univ., Korea), Chang-Woo Lee, Cheol-Hee Kim, Jong-Hyun Lee, and Jeong-Han Kim (KITECH, Korea)

May 11 (Friday) 14:30-16:20

Room B (311B+C)

FB3. Modelling and Simulaiton

Chairs Seung-Boo Jung - Sungkyunkwan Univ., Korea
K. Nakata - Osaka Univ., Japan

- 14:30-15:00 FB3-1 **[Invited]Investigation of Residual Stresses in Friction Stir Welded AZ-31B Magnesium Alloy: A Combined Study of Neutron Diffraction and Contour Method**
Wan Chuck Woo, H. Choo (The Univ. of Tennessee, USA), Mike Prime, Donald Brown (Los Alamos Nat'l Lab., USA), and Zhili Feng (Oak Ridge Nat'l Lab., USA)
- 15:00-15:20 FB3-2 **Residual Stresses of Friction Stir Welded 2024-T4 Joints**
Ting Li, Qingyu Shi, Hongke Li, Wei Wang, and Zhipeng Cai (Tsinghua Univ., China)
- 15:20-15:40 FB3-3 **Finite Element Analysis of Hybrid Friction Welding and Effects of Pressure on Variations of Temperature and Strain Values**
M.H. Parsa, H. Davari, A.M. Hadian, and M. Nili Ahmadabadi (Univ. of Tehran, Iran)
- 15:40-16:00 FB3-4 **Thermal Distribution of Friction Stir Welded Al 6061 Alloy according to the Tool Pin Shape**
Heung-Ju Kim (RIST, Korea), Hee-Seon Bang, S.R. Rajesh (Chosun Univ., Korea), Chang-Keun Chun, and Woong-Seong Chang (RIST, Korea)
- 16:00-16:20 FB3-5 **Auto-adaptive Heat Source Model for Numerical Analysis of Friction Stir Welding**
Hongke Li, Qingyu Shi, Ting Li, and Wei Wang (Tsinghua Univ., China)

May 11 (Friday) 14:30-16:10

Room C (310A)

FC3. Sensing & Monitoring

Chairs Sehun Rhee - Hanyang Univ., Korea
Satoshi Yamane - Saitama Univ., Japan

- 14:30-14:50 FC3-1 **Monitoring of Backside Image of Molten Pool during Aluminum Pipe Welding Using Vision Sensor**
Ario Sunar Baskoro, Kabutomori Masashi, and Yasuo Suga (Keio Univ., Japan)
- 14:50-15:10 FC3-2 **In-process Monitoring of Micro Spot Weld Quality using Accelerometer**
Hee Seok Chang (Myongji Univ., Korea) and Hyo Chul Kwon (Hyosung Corp., Korea)
- 15:10-15:30 FC3-3 **Effect of Welding Position and Joint Geometry on the Arc Stability in CO₂ Arc Welding Process**
Jae-Seong Kim (Hankuk Aviation Univ., Korea), Yongjoon Cho (Hyundai Motor Co., Ltd., Korea), Moon-Soo Park (NGV Co., Ltd., Korea), In-Sung Chang (Hyundai Motor Co., Ltd., Korea), and Bo-Young Lee (Hankuk Aviation Univ., Korea)
- 15:30-15:50 FC3-4 **Real-Time Sensing and Monitoring in Robotic Gas Metal Arc Welding**
C.S. Wu, J.Q. Gao, and J.K. Hu (Shandong Univ., China)
- 15:50-16:10 FC3-5 **Statistical Process Monitoring System for SMT Industry using Automatic Optical Inspection System**
Hee Yeon Kim, Seung Soo Han (Myongji Univ., Korea), Sung Bok Hong (MirTec, Korea), and Sang Jeon Hong (Myongji Univ., Korea)

May 11 (Friday) 14:30-16:20 Room D (310B+C)

FD3. Evaluation

Chairs Chin-Hyung Lee - KRRI, Korea
Simon Labbe - Olympus NDT, Canada

- 14:30-15:00 FD3-1 **[Invited]Implementation Status of Performance Demonstration for Nuclear Power Plant Piping Weld Ultrasonic Examination in Korea**
Se-kyoung Kim, Hee-jong Lee, and Yong-sik Kim (KEPRI, Korea)
- 15:00-15:20 FD3-2 **A Study on Operational Characteristics of SMA Wire Segmented by Thermoelectric Module**
Sanghwa Jeong, Gwangho Kim, and Juhwan Kim (Chosun Univ., Korea)
- 15:20-15:40 FD3-3 **Development of Non-equilibrium Simulation Model of Gas Tungsten Arc**
Shinichi Tashiro (Osaka Univ., Japan), Toru Iwao (Musashi Inst. of Tech.), Tuginori Inaba (Chuo Univ., Japan), and Manabu Tanaka (Osaka Univ., Japan)
- 15:40-16:00 FD3-4 **Study of Weldability for Circularly Input Heat**
Hideaki Shirai (DENSO Corp., Japan), Masahito Mochizuki, and Masao Toyoda (Osaka Univ., Japan)
- 16:00-16:20 FD3-5 **Reconfigurable 3D Laser-stripe Sensor for Welding Processes**
Chang-Hyun Kim, Tae-Yong Choi, Ju-Jang Lee (KAIST, Korea), Jeong Suh, Kyoung-Taik Park, and Hee-Shin Kang (KIMM, Korea)

May 11 (Friday) 14:30-16:20 Room F (304B)

FF3. Hybrid Technology I

Chairs Sungho Jeong - GIST, Korea
Zhining Li - Tsinghua Univ., China

- 14:30-15:00 FF3-1 **[Invited]Understanding of Laser and Hybrid Welding Phenomena**
Seiji Katayama, Yousuke Kawahito, and Masami Mizutani (Osaka Univ., Japan)
- 15:00-15:20 FF3-2 **Equivalent GMAW Arc Power of 2 kW Nd:YAG Laser Powerin Welding of Steel and Al Alloy**
Shangyang Lin , Guoliang Qin, Xuyou Wang, Zhen Lei, and Wei Wang (Harbin Welding Inst., China)
- 15:20-15:40 FF3-3 **Hybrid Laser Welding of Polymers**
Frank Brunnecker, Ren Geiger, and Holger Aldebert (LPKF Laser & Electronics AG, Germany)
- 15:40-16:00 FF3-4 **Laser Roll Welding of Dissimilar Metal Joint of Titanium To Low Carbon Steel**
Hitoshi Ozaki, Reiji Ichioka, Takashi Matsuura and Muneharu Kutsuna (Nagoya Univ., Japan)
- 16:00-16:20 FF3-5 **Effect of Filler Wire for the Weld Characteristic in Nd:YAG Laser Welding of AA5182 Aluminum Alloy**
Young Whan Park, Sehun Rhee (Hanyang Univ., Korea), and Chulku Lee (Seoul Nat'l Univ. of Tech., Korea)

May 11 (Friday) 14:30-16:00 Room E (304A)

FE3. Pb-free Solder II

Chairs Nam Hyun Kang - Pusan Nat'l Univ., Korea
Shinji Fukumoto - Univ. of Hyogo, Japan

- 14:30-15:00 FE3-1 **[Invited]High Dissolution Rate of Solid Materials in Molten Lead-free Solders**
Tadashi Takemoto (Osaka Univ., Japan)
- 15:00-15:20 FE3-2 **Reaction Properties and Reliability for the Sn-Ag-Cu Solders with Different Ag Content**
Jong-Hyun Lee, A-Mi Yu, Jeong-Han Kim (KITECH, Korea), Nam-Hyun Kang (Pusan Nat'l. Univ., Korea), and Mock-Soon Kim (Inha Univ., Korea)
- 15:20-15:40 FE3-3 **Interfacial Reaction of Electroless Ni-P Plating with Sn-3.5Ag (-Co) Solder**
Hiroshi Nishikawa, Akira Komatsu, and Tadashi Takemoto (Osaka Univ., Japan)
- 15:40-16:00 FE3-4 **Effects of Isothermal Aging on the Microstructure and Tensile Behavior of Sn-3.0Ag-0.5Cu-0.2Co Solder**
Fangjie Cheng, Hiroshi Nishikawa, and Tadashi Takemoto (Osaka Univ., Japan)

May 11 (Friday) 16:40-18:00 Room A (311A)

FA4. Fusion Welding-Carbon Steel III

Chairs Joonggeun Yoon - Hyundai Heavy Ind. Co., Ltd., Korea
Hee Jin Kim - KITECH, Korea

- 16:40-17:00 FA4-1 **Influence of Heat Input on Mechanical Properties of Multipass Low-Alloy Steel Weld Metal**
Kook-soo Bang (Pukyung Nat'l Univ., Korea), Woong-seong Chang (RIST, Korea), Chul-gyu Park, and Woo-hyun Chung (KISWEL, Korea)
- 17:00-17:20 FA4-2 **Nd: YAG Laser Welding of 800MPa TRIP Steel for the Automotive Applications**
Byung-Hun Jung (Sungwoo HITEC, Korea), Min-Suk Kwon (Hyundai HYSCO, Korea), and Chung-Yun Kang (Pusan Nat'l. Univ., Korea)
- 17:20-17:40 FA4-3 **Effect of Chemical Composition in SAW Welding Wire on the Mechanical Properties of Low Temperature Material Welds**
Hee-Joon Sung, Yeon-Baeg Goo, Kyeong-Ju Kim, and Kee-Young Choi (Hyundai Heavy Ind. Co. Ltd., Korea)
- 17:40-18:00 FA4-4 **Weldability of Zinc Coated Steel Sheet by Plasma Arc Welding**
Winarto (Univ. of Indonesia, Indonesia)

May 11 (Friday) 16:40-18:30

Room C (310A)

FC4. Resistance Welding Physics & Control

Chairs Hee Seok Chang - Myungji Univ., Korea
Baohua Chang - Tsinghua Univ., China

- 16:40-17:10 FC4-1 **[Invited]Analysis of the Growth of the Nugget Using High Speed Camera and Process Parameters in Resistance Spot Welding**
Sehun Rhee, Taehyung Kim, Taegy Park (Hanyang Univ., Korea) and Yongjoon Cho (Hyundai Motor Co., Ltd., Korea)
- 17:10-17:30 FC4-2 **Advanced Resistance Spot Welding Technologies: New Machine, Adaptive Control and FEM Simulation**
Yongjoon Cho, In Sung Chang, and Heui Bom Lee (Hyundai Motor Com., Korea)
- 17:30-17:50 FC4-3 **Simulation and Optimization of Resistance Spot Welding**
Wenqi Zhang (SWANTEC, Denmark)
- 17:50-18:10 FC4-4 **Adaptive Control Algorithm for Expulsion Reduction in Inverter AC Resistance Spot Welding**
Mi Hye Gho (Pukyong Nat'l Univ., Korea), Jun Ik Son (Dong A Univ., Korea), and Sang Myung Cho (Pukyong Nat'l Univ., Korea)
- 18:10-18:30 FC4-5 **Research on Equivalent Heating Mechanism in Spot Welding**
Yunlong Chang, Bin Lin (Shenyang Univ. of Tech., China) and Chen Zhang (Shenyang Inst. of Engineering, China)

May 11 (Friday) 16:40-18:20

Room F (304B)

FF4. Hybrid Technology II

Chairs Jongwon Yoon - Dongeui Univ., Korea
F. Brunnecker - Erlangen Univ., Germany

- 16:40-17:00 FF4-1 **Laser Hybrid Welding for Industrial Applications**
H. Staufner (Fronius Int'l GmbH, Austria)
- 17:00-17:20 FF4-2 **The Effect of Shielding Gas Composition in Laser-GMA Hybrid Welding**
Cheolhee Kim (KITECH, Korea), Hyunbyung Chae (POSCO, Korea), Jeonghan Kim (KITECH, Korea), and Sehun Rhee (Hanyang Univ., Korea)
- 17:20-17:40 FF4-3 **Laser-TIG Hybrid Lap Welding of Galvanized Steel Sheets**
Cheolhee Kim (KITECH, Korea), Woongyong Choi (Samsung Electronics Co. Ltd., Korea), Jeonghan Kim (KITECH, Korea), and Sehun Rhee (Hanyang Univ., Korea)
- 17:40-18:00 FF4-4 **Finite Element Analysis of Laser Spot Lap-Joint Welding**
Zhiguo Gao, Jian Huang, and Yixiong Wu (Shanghai Jiao Tong Univ., China)
- 18:00-18:20 FF4-5 **Improved High Temperature Tensile Properties of Ti-6Al-4V Alloys by plasma spray coating**
Cui Li, Wei Qi (Beijing Univ., China) and Kutsuna Muneharu (Nagoya Univ., Japan)

May 11 (Friday) 16:40-17:50

Room D (310B+C)

FD4. Welding Distortion Analysis II

Chairs Kyong Ho Chang - Chung-Ang Univ., Korea
S.A.A. Akbari Mousavi - Univ. of Tehran, Iran

- 16:40-17:10 FD4-1 **[Invited]Forefront in High Accurate Prediction of Welding Distortion in Japan**
You-Chul Kim (Osaka Univ., Japan)
- 17:10-17:30 FD4-2 **Control Technique of Angular Distortion for the Multi-Pass Butt Weldment of 316LN**
Ha Geun Kim, Sang Beom Shin, and Dae Soon Kim (Hyundai Heavy Industries Co., Ltd., Korea)
- 17:30-17:50 FD4-3 **Numerical Study on the Effectiveness of Fixture and Pre-strain for Reduction of Welding Distortion**
Zhang Linjie, Zhang Jianxun (Xi'an Jiaotong Univ., China), Liang Wei, Serizawa Hisashi, and Murakawa Hidekazu (Osaka Univ., Japan)

May 12, 2007 (Saturday)

May 12 (Saturday) 08:30-09:30 Room A (311A)

SA1. Welding of Advanced Material

Chair Emmanuel Bauné - Air Liquide, France

- 08:30-08:50 SA1-1 **Laser Epitaxial Cladding of Ni-base Single Crystal Superalloy**
Yoshihiro Fujita, Kazuyoshi Saida, and Kazutoshi Nishimoto (Osaka Univ., Japan)
- 08:50-09:10 SA1-2 **The Microstructure and Properties Analysis of Fe-Cr-C-V Self-shielded Metal Cored-wire Hardfacing Alloy**
Yingjie Wang, Zhouxin Li, and Min Jiang (Beijing Univ., of Tech., China)
- 09:10-09:30 SA1-3 **Formation of Decobaltificated Layer on High Temperature Brazing between Cemented Carbides and Steels**
Mitsuru Nakamura, Daisuke Takesawa, Sang-Hak Lee (Iwate Univ., Japan), and Ha-Young Kim (Hanbat Nat'l Univ., Korea)

May 12 (Saturday) 08:30-09:50 Room B (311B+C)

SB1. Processes

Chairs Chang-Keun Chun - Research Inst. fo Industrial Science and Tech., Korea

- 08:30-08:50 SB1-1 **Hybrid Friction Stir Welding of Carbon Steel**
Hidetoshi Fujii, Takahiro Tatsuno, Takuya Tsumura, Manabu Tanaka, and Kazuhiro Nakata (Osaka Univ., Japan)
- 08:50-09:10 SB1-2 **Friction Stir Lap Joining of AC4C Cast Aluminum Alloy and Zinc-coated Steel**
Y.C. Chen (Osaka Univ., Japan), T. Komazaki (Ryobi Ltd., Japan), Y. G. Kim, T. Tsumura, and K. Nakata (Osaka Univ., Japan)
- 09:10-09:30 SB1-3 **Experimental and Numerical Studies of the Effects of Process Parameters in the Continuous Friction Welding Process**
S. A. A. Akbari Mousavi and A. Rahbar Kelishami (Univ. of Tehran, Iran)
- 09:30-09:50 SB1-4 **Effects of Different R Ratios on Fatigue Crack Growth in Laser Peened Friction Stir Welds**
Omar Hatamleh (NASA, USA) and Lloyd Hackel (Metal Improvement Company, USA)

May 12 (Saturday) 08:30-09:30

Room C (310A)

SC1. Resistance Welding Process

Chairs YongJoon Cho - Hyundai Motor Company, Korea
Wenqi Zhang - SWANTEC Software and Engineering ApS, Denmark

- 08:30-08:50 SC1-1 **Remote Resistance Welding of Zr-4 Endplate for a DUPIC Fuel Fabrication**
Soo-sung Kim, Dae-seo Koo, Geun-il Park (KAERI, Korea), and Jin-hyun Koh (Korea Univ. of Tech. and Education, Korea)
- 08:50-09:10 SC1-2 **Finite Element Analysis on the Formation Mechanism of Electrode Pitting in Resistance Spot Welding of an Aluminum Alloy**
Baohua Chang, Dong Du, and Y. Zhou (Tsinghua Univ., China)
- 09:10-09:30 SC1-3 **Analysis of Adhesive Bondedand Spot Welded Zone for Vehicle Crash**
Young Su Choi, Jong Gon Kim (Hanyang Univ., Korea), Hee Bum Lee, In Sung Jang, Yong Kyu Moon (Hyundai-motor, Korea), and Sehun Rhee (Hanyang Univ., Korea)

May 12 (Saturday) 08:30-10:00

Room D (310B+C)

SD1. Welding Design and Overlay

Chair Kwang Choi - RIST, Korea

- 08:30-09:00 SD1-1 **[Invited]The Design Provisions of the New AWS Structural Welding Code - Titanium**
William Mohr (EWI, USA)
- 09:00-09:20 SD1-2 **A Study on the Surface Modification of the Super Alloy by Plasma Transferred Arc Overlay Welding Method**
Young-sik Kim, Chang-hoon Lim, Won-seok Hwang (Korea Maritime Univ., Korea), and Young-gook Choi (Jonghap Entec, Korea)
- 09:20-09:40 SD1-3 **Evaluation of Fracture Toughness and Tensile Strength of Welded Joint with Weld HAZ Softening**
Gyu-Baek An, Seong-Kil Nam, and Tae-Won Jang (Samsung Heavy Industries Co., Ltd., Korea)
- 09:40-10:00 SD1-4 **Experimental Investigations on Explosive Cladding of cp-Titanium / AISI 304 Stainless Steel**
Pezhman Farhadi Sartangi and S. A. A. Akbari Mousavi (Univ. of Tehran, Iran)

May 12 (Saturday) 08:30-10:20 Room E (304A)

SE1. High Density Packaging

Chairs Jeong Han Kim - Korea Institute of Industrial Technology, Korea
Susumu Nanao - Univ. of Tokyo, Japan

- 08:30-09:00 SE1-1 **[Invited]Wafer Level Packaging Technology for Portable Wireless Telecommunications**
Sung Yi (Samsung Electro-Mechanics, Korea)
- 09:00-09:20 SE1-2 **Study on Thermal Characters of Induction Self Heating Reflow**
Hongbo Xu, Mingyu Li (Harbin Inst. of Tech., China), Jongmyung Kim, and Hongbae Kim (Jeonnam Provincial College, Korea)
- 09:20-09:40 SE1-3 **Reliability of Electroplated Sn-3.5Ag Solder Bumps during Multiple Reflows**
Ja-Myeong Koo, Yu-Na Kim, and Seung-Boo Jung (Sungkyunkwan Univ., Korea)
- 09:40-10:00 SE1-4 **Fabrication and Reliability Analysis of Sn-rich Sn-Au Solder Bump for Flip Chip Bonding**
Jeong-Won Yoon, Hyun-Suk Chun, and Seung-Boo Jung (Sungkyunkwan Univ., Korea)
- 10:00-10:20 SE1-5 **Failure Analysis of Chip on Flexible Printed Circuits with Non-Conductive Film Joints**
Jong-Woong Kim, Young-Chul Lee, and Seung-Boo Jung (Sungkyunkwan Univ., Korea)

May 12 (Saturday) 10:30-12:10 Room A (311A)

SA2. Weldability Testing and Modelling

Chairs P. C. Wang - R & D center General Motors Corporation, USA
Toshio Kuroda - Osaka Univ., Japan

- 10:30-10:50 SA2-1 **Grain Refinement of Titanium Weld by Heterogeneous Nucleation**
Hidenori Terasaki, Yu-ichi Komizo (Osaka Univ., Japan), Fumihiko Nishino, and Masahiko Ikeda (Kansai Univ., Japan)
- 10:50-11:10 SA2-2 **Comprehensive Analysis for Microstructure Formation in Welding**
Hidenori Terasaki, Yu-ichi Komizo (Osaka Univ., Japan), Mitsuharu Yonemura, and Takahiro Osuki (Sumitomo Metals, Japan)
- 11:10-11:30 SA2-3 **Observation of Nucleation and Growth of Acicular Ferrite in HSLA Steel Weld-metal**
Hidenori Terasaki, Tomonori Yamada, and Yu-ichi Komizo (Osaka Univ., Korea)
- 11:30-11:50 SA2-4 **Grain Growth in the Weld HAZ of Microalloyed Steel Containing (Ti, Nb)(C, N) Complex Particle**
Joonoh Moon, Sanghoon Kim (Hanyang Univ., Korea), Jongbong Lee (POSCO, Korea), and Changhee Lee (Hanyang Univ., Korea)
- 11:50-12:10 SA2-5 **Grades 92 and 23: Weldability Assessment and Long Term Performances for Power Generation Applications**
E. Baune, E. Galand, B. Leduey, G. Liberati (Air Liquid, France), G. Cumino, S. Caminada (Tenaris Dalmine., Italy), A. Di Gianfrancesco, and L. Cipolla (Centro Sviluppo Materiali, Italy)

May 12 (Saturday) 08:30-09:50 Room F (304B)

SF1. Hybrid Technology III

Chairs Cheolhee Kim - KITECH, Korea
Jian Huang - Shanghai Jiao Tong Univ., China

- 08:30-08:50 SF1-1 **Laser-arc Hybrid Welding Process of Galvanized Steel Plates**
Souta Matsusaka (Chiba Univ., Japan), Toshiro Uezono (Daihen Corp., Japan), Takuya Tsumura, Manabu Tanaka (Osaka Univ., Japan), and Takehiro Watanabe (Chiba Univ., Japan)
- 08:50-09:10 SF1-2 **Numerical Analysis on the Temperature Field in Laser-plasma Hybrid Welding of an Aluminum Alloy**
Zhining Li, Baohua Chang, Dong Du, and Hua Zhang (Tsinghua Univ., China)
- 09:10-09:30 SF1-3 **Three-dimensional Numerical Simulation on the Flow and Heat Transfer in the Welding Pool of Laser-plasma Hybrid Welding**
Zhining Li, Dong Du, Baohua Chang, and Li Wang (Tsinghua Univ., China)
- 09:30-09:50 SF1-4 **Effect of Dilution on Wear Performance of Plasma Transferred Arc Deposited Layers**
Byoung Hyun Yoon (RIST, Korea), Chang Hee Lee (Hanyang Univ., Korea), and Hyung Jun Kim (RIST, Korea)

May 12 (Saturday) 10:30-12:10 Room C (310A)

SC2. Special Welding Process

Chairs Hyun-seong Park- KIA Motors, Korea
Yunlong Chang- Shenyang Univ. of Technology, China

- 10:30-10:50 SC2-1 **Joining of Self-lubricating Bronze Bearings Used Hydraulic Pump Parts by Diffusion Welding**
Adem Kurt, Hakan Ates (Gazi Univ., Turkey), and Iyas Uygur (Duzce Univ., Turkey)
- 10:50-11:10 SC2-2 **Experimental Investigations of Explosive Welding of Three-Layer Cylinder Composites-Part 1**
S. A. A. Akbari Mousavi, A. Halvaei, and R. Khanzadeh (Univ. of Tehran, Iran)
- 11:10-11:30 SC2-3 **Numerical Studies of Explosive Welding of Three-Layer Cylinder Composites-Part 2**
S. A. A. Akbari Mousavi and G. R. Joodaki (Univ. of Tehran, Iran)
- 11:30-11:50 SC2-4 **Optimization of Electric Resistance Welding Conditions in Small Diameter X60 Pipes for HIC Resistance**
H. U. Hong and J. B. Lee (POSCO, Korea)
- 11:50-12:10 SC2-5 **Molten Metal Refilling Behavior during High-Frequency Electric Resistance Welding**
Choong-Myeong Kim (POSCO, Korea) and Jung-Kyu Kim (Hanyang Univ., Korea)

May 12 (Saturday) 10:30-11:30

Room D (310B+C)

SD2. Welding Repair and Metal Forming

Chairs Jae Myung Lee - Pusan Nat'l Univ., Korea
Yoo-Chul Kim - Osaka Univ., Japan

- 10:30-10:50 SD2-1 **Prediction of Longitudinal Welding Distortion and Mechanical Straightening Parameters of Welded T-section Built-up Beams**
Myoung Soo Han, Ick Seong Han, and Yong Seop Han (DSME Co. Ltd., Korea)
- 10:50-11:10 SD2-2 **Repair/Reinforcement by Welding for Steel Bridges in Service**
You-Chul Kim, Sang-Hyong Lee (Osaka Univ., Japan), and Yasuo Agano (Katayama Stratech Corp., Japan)
- 11:10-11:30 SD2-3 **A Study on the Factors Affecting the Workability of TMCP Steel for Curved Hull Plate**
Sang Beom Shin, Ha Geun Kim, Kyeong Gyu Kim, and Joong Geun Youn (Hyundai Heavy Industries Co., Ltd., Korea)

May 12 (Saturday) 10:30-12:10

Room F (304B)

SF2. Laser Materials Processing

Chairs Kyoung Don Lee - Institute for Advanced Engineering, Korea
Souta Matsusaka - Chiba Univ., Japan

- 10:30-10:50 SF2-1 **Effects of Process Parameters on Surface Characteristics in Cutting of Cold Rolled Steel Sheets Using a High-Power CW Nd:YAG Laser**
Dong-Gyu Ahn (Chosun Univ., Korea) Min-Su Kim (Doowon Heavy Industrial Co., Ltd., Korea) and Hyung-Jun Park (Chosun Univ., Korea)
- 10:50-11:10 SF2-2 **Micro Key Hole Welding of Mg Alloy - GA Steel by Single Mode Fiber Laser**
Seo-Jeong Park (RIST, Korea), Jong-Do Kim (Korea Maritime Univ., Korea), and Woong-Seong Chang (RIST, Korea)
- 11:10-11:30 SF2-3 **Heat Treatment Effects on the Microstructures and Fatigue Properties of CO₂ Laser Welded Inconel 718**
Jaekyun Hong, Jihong Park, Nhokwang Park (KIMM, Korea), Inseob Eom, and Chungyun Kang (Pusan Nat'l Univ., Korea)
- 11:30-11:50 SF2-4 **CW CO₂ Laser Welding of Al-Mg Alloys with Filler Wires**
J. W. Yoon (Donggwi Univ., Korea) and E. R. Wallach (Univ. of Cambridge, United Kingdom)
- 11:50-12:10 SF2-5 **A Study on the Effects of Lap and Butt Welding of the Nickel Coated Medium Carbon Steel Using CW Nd:YAG Laser**
Young Tae Yoo, Ho Jun Shin, Byung Heon Shin, and Dong-Gyu Ahn (Chosun Univ., Korea)

May 12 (Saturday) 10:30-11:50

Room E (304A)

SE2. Special Microjoining Processes

Chairs Jae Hyun Park - RIST, Korea
Ohsung Song - Univ. of Seoul, Korea

- 10:30-10:50 SE2-1 **Effect of Laser Parameter on the Bond Characteristics of Sn-3.5%Ag Solder Ball**
Jeng O Kim (KIMM, Korea), Jae Pil Jung (Univ. of Seoul, Korea), Jae Hoon Lee, Jeong Suh, and Hee Shin Kang (KIMM, Korea)
- 10:50-11:10 SE2-2 **Efficient Diffusion Bonding between BSCCO Superconducting Multifilamentary Tapes**
Guisheng Zou, Yanjun Wang, Aiping Wu, Hailin Bai, Najun Hu (Tsinghua Univ., China), Xiuhua Song, and Hanping Yi (Beijing Innova Tech. Co., Ltd., China)
- 11:10-11:30 SE2-3 **Characteristics of the Zn-Al-Cu Solder For Ultra High Temperature Application**
Namhyun Kang, Hye Sung Na, Seong Jun Kim, and Cheong Yun Kang (Pusan Nat'l Univ., Korea)
- 11:30-11:50 SE2-4 **Formation of Metal Electrode by Electroless Plating on BLU for LCD**
Seong Joon Hong (LG Electronics, Korea), Chu Seon Cheon (Danyang Soltec CO., Ltd., Korea), and Jae Pil Jung (Univ. of Seoul, Korea)