

# Oral Presentation

July 11 (Thursday)

**Manufacturing Processes 1** (Additive Processes)

**Room 1** (Nguyet Que, 3F)

Session Chair: **Le Hoang Sinh** (Duy Tan University)

09:15-10:15

- 09:15-09:30 **OP001** 525 **Geometric Defect of the Overhang Part Produced by Additive Manufacturing**  
Vo Thanh Hoang (The Univ. Grenoble Alpes),  
Soukaina Ghaoui (Univ. of Bordeaux),  
Alex Ballu (Univ. of Bordeaux),  
Yann Ledoux (Univ. of Bordeaux),  
Frederic Vignat (The Univ. Grenoble Alpes),  
Matthieu Museau (The Univ. Grenoble Alpes),  
François Villeneuve (The Univ. Grenoble Alpes)
- 09:30-09:45 **OP002** 250 **Microstructure and Mechanical Anisotropy of Additive Manufactured Stainless Steel**  
Soo Yeol Lee (Chungnam National University),  
Hobyung Chae (Chungnam National University),  
E-Wen Huang (National Chiao Tung University),  
Stefanus Harjo (Japan Atomic Energy Agency)
- 09:45-10:00 **OP003** 526 **Sintering Additives as Joining Agents for Additively Manufactured Parts**  
Junghoon Yeom (Michigan State University),  
Truong Do (Michigan State University),  
Tyler Bauder (Michigan State University),  
Aryan Mehboudi (Michigan State University),  
Xiaolu Huang (Michigan State University),  
Hawke Suen (Michigan State University),  
Patrick Kwon (Michigan State University)
- 10:10-10:15 **OP004** 244 **Tensile Deformation and Fracture Behaviors of Metal 3D Printed H13 Tool Steel Under Varying Conditions**  
Im Doo Jung (Korea Institute of Materials Science),  
Hyokyung Sung (Gyeongsang National University),  
Seung Ki Moon (Nanyang Technological University),  
Ji-Hun Yu (Korea Institute of Materials Science)

<b>Manufacturing Processes 2</b> (Welding, Joining, Embossing)	<b>Room 1</b> (Nguyet Que, 3F)
Session Chair: Sangkee Min (University of Wisconsin-Madison)	10:30-11:45

- 10:30-10:45 **OP005** 288 **Electrically Assisted Pressure Joining of Steel Bolt and Plate**  
 Thi Anh Nguyet Nguyen (University of Ulsan),  
 Sung-Tae Hong (University of Ulsan),  
 Viet Tien Luu (University of Ulsan),  
 Thi Tu Anh Bui (University of Ulsan),  
 Ho-Wook Choi (Seoul National University),  
 Heung Nam Han (Seoul National University)
- 10:45-11:00 **OP006** 292 **Electrically Assisted Solid State Joining of Steel and Aluminum Alloys**  
 Shengwei Zhang (University of Ulsan),  
 Sung-Tae Hong (University of Ulsan),  
 Kun Gao (University of Ulsan),  
 Mi Na Jeong (University of Ulsan),  
 Ju-Won Park (Seoul National University),  
 Heung Nam Han (Seoul National University)
- 11:00-11:15 **OP007** 498 **Minimization of Surface Deflection in Rectangular Embossing Using Response Surface Analysis and Artificial Neural Network**  
 Sungmin Cho (Seoul National University of Science and Technology),  
 Wanjin Chung (Seoul National University of Science and Technology),
- 11:15-11:30 **OP008** 560 **Torque Characteristics of Friction Stir Welding for Dissimilar Pipe Parts of Cast Aluminum Alloy and High Strength Steel using Rotational Jig**  
 MyungChang Kang (Pusan National University),  
 SeongHwan Park (Pusan National University),  
 YoungHwan Joo (Pusan National University),  
 SooHyeong Park (Pusan National University),  
 JeongHun Park (Pusan National University),  
 CheolGyu Woo (Chasys Corporation)
- 11:30-11:45 **OP009** 291 **Friction Stir Spot Welding of Steel and Precipitation Hardening Aluminum Alloys**  
 Kun Gao (University of Ulsan),  
 Sung-Tae Hong (University of Ulsan),  
 Mounarik Mondal (University of Ulsan),  
 Hrishikesh Das (University of Ulsan),  
 Mi Na Jeong (University of Ulsan)

<b>Manufacturing Processes 3</b> (Grinding, Ablation)		<b>Room 1</b> (Nguyet Que, 3F)
<b>Session Chair: Hyunseop Lee</b> (Tongmyong University)		14:00-15:45
<b>Invited Speech 4</b>		
14:00-14:30		<b>Design and Development of an Ultrasonic Spindle Module for Grinding Machines and its Applications</b> Yunn-Shiuan Liao (National Taiwan University)
14:30-14:45	OP010 432	<b>A Defect-Free Surface Modification Process based on Hybrid Irradiations Using High Power Diode Laser and Large Pulsed Electron Beam</b> Jisoo Kim (Ulsan National Institute of Science and Technology), Hyung Wook Park (Ulsan National Institute of Science and Technology), Jaewoo Seo (Ulsan National Institute of Science and Technology)
14:45-15:00	OP011 112	<b>Design and Development of PCD Tool for Micro-Grinding of Tungsten Carbide</b> Sangkee Min (University of Wisconsin-Madison), Sangjin Maeng (University of Wisconsin-Madison), Pyeong An Lee (Soongsil University), Bo Hyun Kim (Soongsil University)
15:00-15:15	OP012 293	<b>Effect of Electron-Lattice Coupling on Selective Ablation of Metal Thin Film by Using Ultrashort Pulse Laser</b> Byunggi Kim (Korea Advanced Institute of Science and Technology), Seung-Woo Kim (Korea Advanced Institute of Science and Technology), Shotaro Watanabe (Tokyo Institute of Technology), Han Ku Nam (Korea Advanced Institute of Science and Technology), Kazuyoshi Fushinobu (Tokyo Institute of Technology),
15:15-15:30	OP013 217	<b>Modeling of Grinding Chip Thickness Distribution for Brittle Materials by Material Removal Mode</b> Chongjun Wu (Donghua University), Beizhi Li (Donghua University), Jun Hu (Donghua University)
15:30-15:45	OP014 546	<b>Study on Reactive Electrophoretic Diamond Wire Sawing Process of Silicon Substrates for Solar Cell Application</b> Ajay Gupta (National Taiwan University of Science and Technology), Chao-Chang Arthur Chen (National Taiwan University of Science and Technology), Guan-Lin Chen (National Taiwan University of Science and Technology)

<b>Manufacturing Processes 4 (Machining)</b>	<b>Room 1 (Nguyet Que, 3F)</b>
<b>Session Chair: Wonkyun Lee</b> (Chungnam National University)	<b>16:00-17:15</b>

- 16:00-16:15 **OP015** 392 **An Adaptive Geometric Envelope Approach to the Simulation of CNC Machining**  
 Yuansheng Zhou (Central South University),  
 Xianghuan Liu (Central South University),  
 Jinyuan Tang (Central South University),  
 Defu Liu (Central South University)
- 16:15-16:30 **OP016** 381 **Analysis of the Relation Between Interlaminar Delamination, Thrust Force of Step Drill and CFRP Adhesion Force Measured by DCB Test**  
 Byeong-chan Kwon (Konkuk University),  
 Sung Lim Ko (Konkuk University),  
 Eun Soo Cheon (Konkuk University),  
 Duong Mai (Konkuk University)
- 16:30-16:45 **OP017** 503 **Improvement of Tool Wear Estimation in CFRP Drilling**  
 Young Hun Jeong (Kyungpook National University),  
 Chengwen Han (Kyungpook National University)
- 16:45-17:00 **OP018** 528 **Layer Formations when Turning FGI and CGI Bars and Their Impact in Machinability**  
 Patrick Kwon (Michigan State University),  
 Dinh Nguyen (Michigan State University),  
 Ryan Khawarizmi (Michigan State University),  
 Kyung-Hee Park (Korea Institute of Industrial Technology)
- 17:00-17:15 **OP019** 527 **Minimum Quantity Lubrication (MQL) and MQL with Exfoliated Graphite Nanoplatelets in Machining Titanium Alloy**  
 Trung Nguyen (Hanoi University of Science and Technology),  
 Patrick Kwon (Michigan State University),  
 Kyung-Hee Park (Korea Institute of Industrial Technology),  
 Dinh Nguyen (Michigan State University),  
 Ryan Khawarizmi (Michigan State University)

<b>Organized Session 1</b> (Additive Manufacturing 1)		<b>Room 2</b> (Pho Hoi, 3F)
Session Chair: Young-Jin KIM (Nanyang Technological University)		09:00-10:15
09:00-09:15	<b>OS001</b> 459	<b>Criteria for the Orientation of Additive Manufacturing Parts in Powder Bed Fusion: An Industry Practice</b> Christelle Grandvallet (The Univ. Grenoble Alpes), Trent Mainwaring (Zenith Technica), Mouhamadou Mansour Mbow (The Univ. Grenoble Alpes), Frédéric Vignat (The Univ. Grenoble Alpes), Franck Pourroy (The Univ. Grenoble Alpes)
09:15-09:30	<b>OS002</b> 024	<b>Effects of the Surface Alloying in Joining of Titanium Composite Powders with Heterogeneous Titanium Substrates Using Selective Laser Melting</b> Chunliang Kuo (National Taiwan University of Science and Technology), Tsung-Hsieh Yeh (National Taiwan University of Science and Technology), Pinxian Ye (National Taiwan University of Science and Technology)
09:30-09:45	<b>OS003</b> 539	<b>Surface Modification of Metallic Porous Structure Fabricated by Additive Manufacturing Technology</b> Eunju Park (Ulsan National Institute of Science and Technology), Namhun Kim (Ulsan National Institute of Science and Technology), Jisoo Kim (Ulsan National Institute of Science and Technology), Hyung Wook Park (Ulsan National Institute of Science and Technology)
09:45-10:00	<b>OS004</b> 499	<b>Design Rules for Support Structures in Electron Beam Melting</b> Frederic Vignat (The Univ. Grenoble Alpes), Christelle Grandvallet (The Univ. Grenoble Alpes), Maxime Limousin (The Univ. Grenoble Alpes)
10:10-10:15	<b>OS005</b> 376	<b>Conformal Additive Manufacturing Process</b> Faez Alkadi (The University of Akron), Jae-Won Choi (The University of Akron)

<b>Organized Session 1</b> (Additive Manufacturing 2)		<b>Room 2</b> (Pho Hoi, 3F)
<b>Session Chair: Hochan Kim</b> (Andong National University)		10:30-12:00
<b>Invited Speech 7</b>	<b>Session Chair: Dong-Gyu Ahn</b> (Chosun University)	
10:30-11:00	<b>Fast 4D Printing of Shape Memory Polymers using Stereolithography (SLA)</b> Pei-Chen Su (Nanyang Technological University)	
11:00-11:15	<b>OS006</b> 428	<b>An Experimental Investigation of the Deformation of the Printed Parts</b> Ngoc-Hien Tran (University of Transport and Communications), Hong-Seok Park (University of Ulsan), Huu-Hoang Nguyen (University of Transport and Communications)
11:15-11:30	<b>OS007</b> 278	<b>Development of Element Activation Algorithm for Thermal Stress Analysis of Metal Additive Manufacturing Using Directed Energy Deposition Process</b> Bih Lii Chua (Chosun University), Dong Gyu Ahn (Chosun University)
11:30-11:45	<b>OS008</b> 121	<b>Investigation on the Effect of Annealing on Additive Manufactured ULTEM™ 9085 Mechanical Properties</b> Yongjie Zhang (Nanyang Technological University), Seung Ki Moon (Nanyang Technological University)
11:45-12:00	<b>OS009</b> 013	<b>Laser Induced Graphene Electronics</b> Young-Jin Kim (Nanyang Technological University)

<b>Organized Session 1</b> (Additive Manufacturing 3)		<b>Room 2</b> (Pho Hoi, 3F)
Session Chair: In Hwan Lee (Chungbuk National University)		14:00-14:45
14:00-14:15	<b>OS010</b> 283	<b>Development of Multi Material Food 3D Printer</b> In Hwan Lee (Chungbuk National University), Ju Ho Park (Chungbuk National University)
14:15-14:30	<b>OS011</b> 517	<b>A Method to Investigate Mechanical Properties of Lattice Structures for Additive Manufacturing</b> Dinh Son Nguyen (Danang University of Science and Technology), Thien An Nguyen-Van (Danang University of Science and Technology)
14:30-14:45	<b>OS012</b> 006	<b>Influence of Process Parameters on Mechanical Strength of Fabricated Parts Using the Fused Deposition Modelling Method</b> Thanh T. Tran (Vietnamese-German University), Lan T. P. Huynh (Vietnamese-German University), Huy A. Nguyen (Vietnamese-German University), Huy Q. Nguyen (Vietnamese-German University), Loc H. K. Phan (Vietnamese-German University)

<b>Organized Session 8</b> (Singapore-Korea Joint Session 1)	<b>Room 2</b> (Pho Hoi, 3F)
<b>Session Chair: Dong-Gyu Ahn</b> (Chosun University)	15:00-16:00

- 15:00-15:15 **OS097** 602 **The 4th Industrial Revolution: 3D Printing and Smart Factory**  
Seung Ki Moon (Nanyang Technological University)
- 15:15-15:30 **OS098** 606 **Wavelength Tuned Phase Shifting Interferometry – Development of Phase Shifting Algorithm**  
Yangjin Kim (Pusan National University)
- 15:30-15:45 **OS099** 589 **Highly Efficient Electrochemical Energy Farvesting from a Mechanical Perspective**  
Seok Woo Lee (Nanyang Technological University)
- 15:45-16:00 **OS100** 601 **Improvement in Performance and Stability of Thin Film Solid Oxide Fuel Cells through Combination of Multiple Deposition Processes**  
Taehyun Park (Soongsil University),  
Suk Won Cha (Seoul National University),  
Sanghoon Lee (Seoul National University)



<b>Organized Session 8</b> (Singapore-Korea Joint Session 2)		<b>Room 2</b> (Pho Hoi, 3F)
<b>Session Chair: Seung Ki Moon</b> (Nanyang Technological University)		<b>16:15-17:15</b>
16:15-16:30	<b>OS101</b> 584	<b>Ultrafast Photonics for Ultra-Precision: Precision Metrology and Direct-Laser-Writing</b> Young-Jin Kim (Nanyang Technological University)
16:30-16:45	<b>OS102</b> 599	<b>Methodologies of the Development of Advanced Dies with the Improved Wear Characteristics Using a Directed Energy Deposition Process</b> Dong-Gyu Ahn (Chosun University)
16:45-17:00	<b>OS103</b> 585	<b>Fuel Cell and Hydrogen Technologies Research and Development in NTU</b> Pei-Chen Su (Nanyang Technological University)
17:00-17:15	<b>OS104</b> 615	<b>Exploration of Shape Memory Alloy (SMA) Actuators: Fast Actuation and Soft Robotic Applications</b> Sung-Hoon Ahn (Seoul National University), Sung-Hyuk Song (Korea Institute of Machinery & Materials), Hyun-Taek Lee (Imperial College London), Min-Soo Kim (Seoul National University), Ki-Hwan Jang (Seoul National University), Woo-Kyun Jung (Seoul National University), Hye-Sung Lee (Seoul National University), Alan Yu (Seoul National University), Jong Hyuk Im (Seoul National University)

<b>Micro/Nano Technology 1</b> (Micro/Nano Materials)	<b>Room 3</b> (My Son, 3F)
Session Chair: <b>Moonkyu Kwak</b> (Kyungpook National University)	09:15-10:15

- 09:15-09:30 **OP093** 497 **Hierarchical Nanohybrids of ZnO Hollow Spheres and Nitrogen Doped Graphitic Carbon Nitride: An Excellent Material for Hydrogen Sensing**  
 Arunkumar Shanmugasundaram (Chonnam National University),  
 Dong Weon Lee (Chonnam National University)
  
- 09:30-09:45 **OP094** 404 **Continuous Laser Induced Fast Synthesis of ZnO Nanostructures For Self-Powered Piezoresistive Sensors**  
 Biplab Kr Deka (Ulsan National Institute of Science and Technology),  
 Hyung Wook Park (Ulsan National Institute of Science and Technology),  
 Ankita Hazarika (Ulsan National Institute of Science and Technology),  
 Young-Bin Park (Ulsan National Institute of Science and Technology)
  
- 09:45-10:00 **OP095** 255 **Nanoscale Thermal Resistance at the Dissimilar Material Interface for the Additive Manufacturing**  
 BoHung Kim (University of Ulsan),  
 Mohammad Rashedul Hasan (University of Ulsan)
  
- 10:10-10:15 **OP096** 223 **Enhanced Performance of Photo-Induced Electrons from Zinc Oxide on the Electrospun Fiber Based Composite Structure**  
 Dong Hee Kang (Chonnam National University),  
 Hyun Wook Kang (Chonnam National University),  
 Na Kyong Kim (Chonnam National University)

<b>Micro/Nano Technology 2 (Micro/Nano Fabrication/Manufacturing)</b>		<b>Room 3 (My Son, 3F)</b>
<b>Session Chair: Won Seok Chang (Korea Institute of Machinery &amp; Materials)</b>		<b>10:30-11:45</b>
10:30-10:45	<b>OP097</b> 333	<b>Mechanical Characterization of Polymeric Thin Film Using Nano Cutting Theory</b> JeongHeon Lee (Chosun University), Jae B. Kwak (Chosun University), HyoSeong Lee (Chosun University)
10:45-11:00	<b>OP098</b> 147	<b>Investigation on Layered Elliptical Vibration-Assisted Cutting of Micro Groove</b> Chen Zhang (Nanjing University of Aeronautics and Astronautics), Lei Hou (Nanjing University of Aeronautics and Astronautics), Xiaoming Gan (Nanjing University of Aeronautics and Astronautics)
11:00-11:15	<b>OP099</b> 365	<b>Nanomanufacturing and Nanofluidics of Atomically Thin Orifices of Porous Graphene</b> Hyung Gyu Park (Pohang University of Science and Technology)
11:15-11:30	<b>OP100</b> 083	<b>Fabrication of Salvinia Inspired Functional Surfaces and Its Application</b> Minsu Kim (Kyungpook National University), Moon Kyu Kwak (Kyungpook National University), Jihoon Lee (Kyungpook National University), Sungho Lee (Kyungpook National University), Bongsu Kang (Kyungpook National University), Juheon Lee (Kyungpook National University), Hyunwoo Song (Kyungpook National University)
11:30-11:45	<b>OP101</b> 230	<b>Nanomechanical Properties Measurements of Polymers Using AFM Probes with Different Shapes</b> Quang Dang Nguyen (University of Ulsan), Koo-Hyun Chung (University of Ulsan)

**Micro/Nano Technology 3 (Micro/Nano Device and Applications) Room 3 (My Son, 3F)**

**Session Chair: Chen Zhang** (Nanjing University of Aeronautics and Astronautics) 14:00-15:45

**Invited Speech 10**

- 14:00-14:30 **Scalable High-Resolution Functional Surfaces on Free-form 3D Objects**  
Low Hong Yee (Singapore University of Technology and Design)
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- 14:30-14:45 **OP102** 387 **Micro-Wear Characteristics of Thin Layered Coatings**  
Kyeong-Hee Kang (Yonsei University),  
Dae-Eun Kim (Yonsei University),
- 14:45-15:00 **OP103** 452 **Proposal of a MEMS-based Cooling System Using an ECF Micropump**  
Huy Hoang Huynh (Tokyo Institute of Technology),  
Joon-Wan Kim (Tokyo Institute of Technology),  
Kazuhiro Yoshida (Tokyo Institute of Technology)
- 15:00-15:15 **OP104** 084 **Anodized Aluminum Oxide-based Rechargeable Thin-Film Fe-Air Battery with H<sub>2</sub>/H<sub>2</sub>O Redox Mediator**  
In Won Choi (Seoul National University),  
Suk Won Cha (Seoul National University),  
Ikwhang Chang (Wonkwang University)
- 15:15-15:30 **OP105** 412 **Optimal Design of a New Flexure Hinge Embedded into Compliant XY Positioning Platform for Nanoindentation Tester Using Two-Phases Optimization Approach**  
Minh Phung Dang (University of Technology and Education Ho Chi Minh City),  
Thanh-Phong Dao (Ton Duc Thang University),  
Hieu Giang Le (University of Technology and Education Ho Chi Minh City)
- 15:30-15:45 **OP106** 088 **Biomimetic Water Collection System by Electrospun PVDF Nanofiber and Zinc-Oxide Hierarchical Nanostructures**  
Na Kyong Kim (Chonnam National University),  
Hyun Wook Kang (Chonnam National University),  
Dong Hee Kang (Chonnam National University)

<b>Organized Session 6</b> (System Engineering using Computational Mechanics)		<b>Room 3</b> (My Son, 3F)
<b>Session Chair: Jung Woo Sohn</b> (Kumoh National Institute of Technology)		16:00-17:45
<b>Invited Speech 5</b>		
16:00-16:30		<b>Development of Force Feedback Systems Featuring Magnetorheological Fluid</b> Quoc Hung Nguyen (Vietnamese-German University)
16:30-16:45	<b>OS064</b> 139	<b>Damage Identification of Smart Composite Laminates Using Convolution Neural Network</b> Heung Soo Kim (Dongguk University), Asif Khan (Dongguk University)
16:45-17:00	<b>OS065</b> 491	<b>Moving Mode Shape Function Approach to Asymmetric Rotating Disk Applications Under Static Loading</b> Jaeyoung Kang (Inha University)
17:00-17:15	<b>OS066</b> 349	<b>Robot Arm Manipulation Using Electromyogram Sensors and Inertia Measurement Unit</b> Dogyeong Yuk (Kumoh National Institute of Technology), Jung Woo Sohn (Kumoh National Institute of Technology)
17:15-17:30	<b>OS067</b> 200	<b>Simulation of Sweeping Motion with BPM and Analysis of Residual Sand by Discrete Element Method</b> Jaehee Lyu (Kumoh National Institute of Technology), Junyoung Park (Kumoh National Institute of Technology), Jinsu Nam (Kumoh National Institute of Technology)
17:30-17:45	<b>OS068</b> 057	<b>Investigation of Ball Skidding Condition in Angular Contact Ball Bearings</b> Laily Oktaviana (Kumoh National Institute of Technology), Seong Wook Hong (Kumoh National Institute of Technology), Van Cahn Tong (Korea Institute of Machinery & Materials)

<b>Organized Session 6</b> (System Engineering using Computational Mechanics)	<b>Room 3</b> (My Son, 3F)
<b>Session Chair: Jung Woo Sohn</b> (Kumoh National Institute of Technology)	17:45-18:15

- OS069** 301 **An IMU Sensor Based Leveling Platform for the Stable Takeoff and Landing of the UAV**  
 Sangwoong Lee (Kumoh National Institute of Technology),  
 Baeksuk Chu (Kumoh National Institute of Technology),  
 Hwanhee Kang (Kumoh National Institute of Technology),  
 Junyoung Kwak (Kumoh National Institute of Technology)
- OS070** 594 **Simulation of Particle Deposition in Circular Cylinder Wake Considering Particle Interception and Sticking Probability**  
 Dongjoo Kim (Kumoh National Institute of Technology),  
 Seokmin Jeong (Kumoh National Institute of Technology)
- OS071** 070 **Increased Power Production with Organic Flash Cycle Driven by Renewable Energy**  
 Kyoung Hoon Kim (Kumoh National Institute of Technology)
- OS072** 145 **A Study on Dynamic Reduction Method for Strongly Coupled Fluid Structure Interaction**  
 Seongmin Chang (Kumoh National Institute of Technology),  
 Kang-Heon Lee (Korea Atomic Energy Research Institute)
- OS073** 294 **A Study on the Analytical Prediction of Sliding Friction Torque in Angular Contact Ball Bearings**  
 Seong-Wook Hong (Kumoh National Institute of Technology),  
 Laily Oktaviana (Kumoh National Institute of Technology),  
 Van-Canh Tong (Korea Institute of Machinery & Materials),  
 Hyun-Soo Kim (Korea Institute of Machinery & Materials)
- OS074** 188 **Highly Active Layered Perovskite Cathode on Proton Conducting Solid Oxide Fuel Cells**  
 Sihyuk Choi (Kumoh National Institute of Technology)
- OS075** 216 **A Study on the Optimization of the Number of Coupling Bolts in Rock Crusher Using FEM**  
 Wonyoung Jeon (Kumoh National Institute of Technology),  
 Youngjin Seo (Kumoh National Institute of Technology)
- OS076** 321 **Robot Arm Manipulation Using Wearable Motion Recognition Device**  
 Daun Lee (Kumoh National Institute of Technology),  
 Jung Woo Sohn (Kumoh National Institute of Technology)

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- OS077** 408 **Design of Electromyogram Signal-Based Prosthetic Arm**  
Ho Myoung Jang (Kumoh National Institute of Technology),  
Jung Woo Sohn (Kumoh National Institute of Technology)
- OS078** 201 **Computational Analysis Based on the Discrete Element Method for the Dynamic Behavior of Soft Particles According to the Rotating Speed and the Amount of Particle in Rotating Horizontal Drum**  
Jinsu Nam (Kumoh National Institute of Technology),  
Junyoung Park (Kumoh National Institute of Technology),  
Jaehee Lyu (Kumoh National Institute of Technology)
- OS079** 302 **Optimization of a Mist Spraying Machine Operation for the Effective Dust Suppression in Construction Sites**  
Seolha Kim (Kumoh National Institute of Technology),  
Baeksuk Chu (Kumoh National Institute of Technology)
- OS080** 407 **Comparison of Sensor Characteristics for Walking Intent Recognition**  
Seoung Pil Jeoung (Kumoh National Institute of Technology),  
Jung Woo Sohn (Kumoh National Institute of Technology)
- OS081** 406 **Modeling for Prediction of Shear Modulus Change of Magnetorheological Elastomer**  
Sung Woo Yeom (Kumoh National Institute of Technology),  
Jung Woo Sohn (Kumoh National Institute of Technology)

**Materials & Design 1** (Smart Materials, Composites)

**Room 4** (My Khe, 2F)

Session Chair: **Chang-Lae Kim** (Chosun University)

09:00-10:15

- 09:00-09:15 **OP058** 067 **Thermal and Mechanical Durability of Conductive Fabrics**  
 Chang-Lae Kim (Chosun University),  
 Dae-Eun Kim (Yonsei University)
- 09:15-09:30 **OP059** 307 **In-site synthesis of Al Matrix Composite Reinforce with Dispersed Al<sub>3</sub>Ni Using Porous Nickel**  
 Yongbum Choi (Hiroshima University),  
 Kazuhiro Matsugi (Hiroshima University),  
 Gen Sasaki (Hiroshima University),  
 Kenjiro Sugio (Hiroshima University)
- 09:30-09:45 **OP060** 125 **Fabrication of Woven Kevlar Fiber Composite for Personal Thermal Management**  
 Ankita Hazarika (Ulsan National Institute of Science and Technology),  
 Hyung Wook Park (Ulsan National Institute of Science and Technology),  
 Biplab Deka (Ulsan National Institute of Science and Technology),  
 Do Young Kim (Ulsan National Institute of Science and Technology),  
 Young-Bin Park (Ulsan National Institute of Science and Technology)
- 09:45-10:00 **OP061** 011 **A Self-Healable and pH-Sensitive Guar Gum Based Silver Nanocomposite Hydrogels for Wound Dressing Applications**  
 Ramasubba Reddy Palem (Inha University),  
 Tae June Kang (Inha University),  
 Jei Gyeong Jeon (Inha University)
- 10:10-10:15 **OP062** 320 **Characterization of Short Carbon Fiber Dispersed Flame-Resistant Magnesium Alloy Composites for Practical Use**  
 Gen Sasaki (Hiroshima University),  
 Kentaro Tashiro (Hiroshima University),  
 Yongbum Choi (Hiroshima University),  
 Kazuhiro Matsugi (Hiroshima University),  
 Kenjiro Sugio (Hiroshima University)



<b>Materials &amp; Design 2</b> (Tribology, Surface Engineering)		<b>Room 4</b> (My Khe, 2F)
Session Chair: <b>Sung-Tae Hong</b> (University of Ulsan)		10:30-12:00
10:30-10:45	<b>OP063</b> 510	<b>Effects of Surface Roughness to Adhesion of Cr<sub>3</sub>C<sub>2</sub> Coating Fabricated on 16Mn Alloy Steel by a Thermal Spray Technique</b> Xuan Thao Dang (Hanoi University of Industry), Duc Cuong Pham (Hanoi University of Industry), Van Got Hoang (National Research Institute of Mechanical Engineering)
10:45-11:00	<b>OP064</b> 445	<b>Prediction of Thermal Fatigue Life in Thermal Barrier Coatings on Single Crystal Superalloy</b> Damhyun Kim (Sungkyunkwan University), Chang-Sung Seok (Sungkyunkwan University), Sunguk Wee (Sungkyunkwan University), Keekeun Kim (Sungkyunkwan University), Kibum Park (Sungkyunkwan University), Jaemean Koo (Sungkyunkwan University), Sungho Yang (Sungkyunkwan University)
11:00-11:15	<b>OP065</b> 411	<b>Effect of Artificial Thermal Aging on High Temperature Fatigue Lifetime in Austenitic Stainless Steel</b> Jaegu Choi (Sungkyunkwan University), Chang-Sung Seok (Sungkyunkwan University), Keekeun Kim (Sungkyunkwan University), Ki-Bum Park (Sungkyunkwan University)
11:15-11:30	<b>OP066</b> 405	<b>Prediction of Thermal Barrier Performance According to Thickness and Thermal Conductivity of Thermal Barrier Coating</b> Junghan Yun (Sungkyunkwan University), Chang-Sung Seok (Sungkyunkwan University), Sunguk Wee (Sungkyunkwan University), Hyunwoo Song (Sungkyunkwan University), Jeong-min Lee (Sungkyunkwan University), Soo Park (Sungkyunkwan University)
11:30-11:45	<b>OP067</b> 183	<b>Investigation of Multilayer Coatings for Wear Reduction</b> Mahdi Khadem (Yonsei University), Dae-Eun Kim (Yonsei University)
11:45-12:00	<b>OP068</b> 072	<b>Post-Additive Manufacturing Surface Modification Technology for Controlling Microstructure, Mechanical and Tribological Properties of Ti-6Al-4V Alloy</b> Auezhan Amanov (Sunmoon University), Young-Sik Pyun (Sunmoon University)

<b>Materials &amp; Design 3</b> (Design of System and Components 1)	<b>Room 4</b> (My Khe, 2F)
<b>Session Chair: Hyung Wook Park</b> (Ulsan National Institute of Science and Technology)	14:15-15:45

- 14:15-14:30 **OP069** 457 **Influence of the Deformation Process on the Microstructure and Mechanical Properties of Low Carbon Alloy Steel which Heat Treatment by TBF**  
 Duong Nam Nguyen (Vietnam Maritime University),  
 Phap Dong Tran (Vietnam Maritime University),  
 The Nam Tran (Vietnam Maritime University),  
 Hong Hai Nguyen (Ha Noi University of Science and Technology),  
 Mai Khanh Pham (Ha Noi University of Science and Technology)
  
- 14:30-14:45 **OP070** 282 **A Study on Relative Stability for Poppet Type Relief Valve with Flow Force**  
 Hwang Hun Jeong (Korea Construction Equipment Technology Institute),  
 Jong Il Yoon (Korea Construction Equipment Technology Institute)
  
- 14:45-15:00 **OP071** 576 **Long Life Design of Pitch Bearing for Wind Turbine**  
 SuJin Heo (Jungwon University),  
 JongHun Kang (Jungwon University),  
 JaeHong Yu (Jungwon University),  
 SungWon Choi (CS Bearing),  
 YongChul Kwon (Korea Conformity Laboratories)
  
- 15:00-15:15 **OP072** 473 **Design, Fabrication and Experimental Evaluation of Trocar Valves Under the Condition of Laparoscopic Surgery**  
 Jaemin Kim (Korea University),  
 Junghwa Hong (Korea University),  
 Taekyeong Lee (Korea University),  
 Hunhee Kim (Korea University),  
 Soonmoon Jung (Korea University),  
 Youngho Lee (Korea University)
  
- 15:15-15:30 **OP073** 385 **Development of a Software to Quantify the Microstructures of Metals and Metal Matrix Composites**  
 Kenjiro Sugio (Hiroshima University),  
 Yongbum Choi (Hiroshima University),  
 Gen Sasaki (Hiroshima University)
  
- 15:30-15:45 **OP074** 545 **Development of Innovative Magnesium Sheet via Twin Roll Casting**  
 Dietmar Letzig (Helmholtz-Zentrum Geesthacht),  
 Jose Victoria-Hernandez (Helmholtz-Zentrum Geesthacht),  
 Gerrit Kurz (Helmholtz-Zentrum Geesthacht),  
 Sangbong Yi (Helmholtz-Zentrum Geesthacht)

<b>Materials &amp; Design 4</b> (Design of System and Components 2)		<b>Room 4</b> (My Khe, 2F)
<b>Session Chairs:</b> Jihye Lee (Korea Institute of Machinery and Materials) Nguyen Hay (Nong Lam University)		16:00-17:30
16:00-16:15	OP075 295	<b>Investigation on Hysteretic Characteristics of STS304 Stainless Steel Slit Damper</b> BoKyung Hwang (Hanbat National University), TaeSoo Kim (Hanbat National University), YoungJu Kim (Pusan National University), JinWon Kim (POSCO)
16:15-16:30	OP076 332	<b>Design of Seal Structure for HFCV Cylinder Valve Considering Low Temperature</b> Jaeseong Choi (Pusan National University), Hwayoung Kim (Pusan National University)
16:30-16:45	OP077 455	<b>Reliability Design of Submersible Multistage Coolant Pump by Comparison of Flow Simulation and Experiment</b> Sangyu Kim (Chosun University), Jaeyeol Kim (Chosun University), Jaebok Kwak (Chosun University), Gyungil Lee (Chosun University), Yoonsoo Jung (Chosun University)
16:45-17:00	OP078 487	<b>Design of Pressure Control System Using Fuzzy Algorithm for Surgical Stapler</b> Soonmoon Jung (Korea University), Junghwa Hong (Korea University), Taekyeong Lee (Korea University), Jaemin Kim (Korea University), Youngho Lee (Korea University), Hunhee Kim (Korea University)
17:00-17:15	OP079 263	<b>An Investigation on Pressure Drop and Transport Time Through the Pipe Hole Network in Aspirating Smoke Detection System</b> Ha Thien Khieu (Chung-Ang University), Hong Sun Ryou (Chung-Ang University), Young Man Lee (Chung-Ang University)
17:15-17:30	OP080 476	<b>Effect of Technological and Geometrical Parameters on Formation of Radius Region at Cylindrical Product Bottom in Hydrostatic Forming</b> Thu Nguyen Thi (Hanoi University of Science and Technology), Trung Nguyen Dac (Hanoi University of Science and Technology)

**Organized Session 2** (Korea-Germany Intelligent Manufacturing Systems 1) **Room 5** (Son Tra 2, 2F)  
**Session Chairs: Sung-Hoon Ahn** (Seoul National University) **09:00-10:15**  
**Matthias Brockmann** (RWTH Aachen University)

- 09:00-09:15 **OS025** 403 **Evaluation of Industry 4.0 Data Formats for Digital Twins of Optical Components**  
 Tae Hun Lee (Fraunhofer Institute for Production Technology IPT),  
 Arno Schmetz (Fraunhofer Institute for Production Technology IPT),  
 Maximilian Hoeren (Fraunhofer Institute for Production Technology IPT),  
 Christian Brecher (RWTH Aachen University)
  
- 09:15-09:30 **OS026** 379 **Effect of Kerosene Supply Condition on Machining Performance in Micro-EDM of AlN**  
 Daeyoung Kim (Seoul National University),  
 Chong Nam Chu (Seoul National University),  
 Yooseok Kim (Seoul National University)
  
- 09:30-09:45 **OS027** 253 **Large Stretchable Structural Color Based Strain Sensor Using Nanoimprinting with Focused Ion Beam Nanopatterning Process**  
 Yingjun Quan (Seoul National University),  
 Sung-Hoon Ahn (Seoul National University),  
 Min-Soo Kim (Seoul National University),  
 Younggyun Kim (Seoul National University)
  
- 09:45-10:00 **OS028** 327 **Microscale Shape Memory Alloy Actuators with Meta-surfaces of Diffraction Grating**  
 Hyesung Lee (Seoul National University),  
 Sung-Hoon Ahn (Seoul National University),  
 Min-Soo Kim (Seoul National University),  
 Ying-Jun Quan (Seoul National University)
  
- 10:00-10:15 **OS029** 123 **Failure Detection for FDM Process Using Webcam and Machine Learning**  
 Hyunsu Lee (Seoul National University),  
 Sung-Hoon Ahn (Seoul National University),  
 Hyunjung Kim (Seoul National University)

**Organized Session 2** (Korea-Germany Intelligent Manufacturing Systems 2)

**Room 5** (Son Tra 2, 2F)

**Session Chairs:** Sung-Hoon Ahn (Seoul National University)  
Matthias Brockmann (RWTH Aachen University)

10:30-12:00

### Invited Speech 1

10:30-11:00 **Internet of Production - Research Roadmap "Production Technology" at RWTH Aachen**  
Matthias Brockmann (RWTH Aachen University)

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- 11:00-11:15 **OS030** 240 **Vibration-Based Fault Detection of a Gearbox in an Industrial Robot Using Improved Time Domain Averaging**  
Yunhan Kim (Seoul National University),  
Byeng Dong Youn (Seoul National University),  
Jungho Park (Seoul National University),  
Kyumin Na (Seoul National University),  
Hao Yuan (Seoul National University)
- 11:15-11:30 **OS031** 100 **Integrated Safety-Network in the Internet of Production**  
Melanie Buchsbaum (RWTH Aachen University),  
Christian Brecher (RWTH Aachen University),  
Simon Storms (RWTH Aachen University)
- 11:30-11:45 **OS032** 023 **Highly Sensitive and Stretchable Strain Sensors Printing using Aerodynamically Focused Nanomaterials (AFN) Printer**  
Soo-Hong Min (Seoul National University),  
Sung-Hoon Ahn (Seoul National University),  
Gil-Yong Lee (Kumoh National Institute of Technology)
- 11:45-12:00 **OS033** 331 **Data Augmentation of Sewing Machine Data for Task Recognition Using Convolutional Neural Network**  
Sangmin Bang (Seoul National University),  
Sung-Hoon Ahn (Seoul National University),  
Hyungjung Kim (Seoul National University),  
Hyunsu Lee (Seoul National University),  
Woo-Kyun Jung (Seoul National University),  
Jae Won Lee (Hojeon Ltd.),  
Young Chul Park (Hojeon Ltd.)

<b>Automation, Measurement &amp; Control 1 (Measurement Systems)</b>	<b>Room 5 (Son Tra 2, 2F)</b>
<b>Session Chair: Ki-Nam Joo (Chosun University)</b>	<b>14:15-15:45</b>

- 14:15-14:30 **OP040** 604 **Development of the Quality Control System – Equipment for Dimensional Measurement with Using Mixed Reality Technique**  
 Jae-chul Lee (Gyeongsang National University),  
 Sung-chul Shin (Pusan National University),  
 Hyun-soo Kim (BHI Co., Ltd.),  
 Hwan-seok Gim (BSSNK Co., Ltd.),  
 Jong-hoon Park (ITS-I Inc.),  
 Soon-Sub Lee (Gyeongsang National University)
  
- 14:30-14:45 **OP041** 614 **Developments of Laser Range Sensors to Improve Precision of High Speed, Continuous Motion Manufacturing Systems**  
 Eric Dimla (RMIT University),  
 Ilya Kavalchuk (RMIT University),  
 Sachintha Ravidu (RMIT University)
  
- 14:45-15:00 **OP042** 398 **Direct Instantaneous 2-D Imaging for Photoacoustic Waves by Ultrashort Single Pulse Interferometry**  
 Ki-Nam Joo (Chosun University),  
 Seung-Woo Kim (Korea Advanced Institute of Science and Technology),  
 Daehee Kim (Chosun University)
  
- 15:00-15:15 **OP043** 400 **Development of Integrated Embedded System of In-Pipe Robot and Sensor System for Precise Diagnosis by Non-Destruction of Large-Water Supply Pipe**  
 Yongseop Kwon (Korea Insititue of Robot and Convergence),  
 Goobong Chung (Korea Institute of Robot and Convergence),  
 Jaekyu An (Korea Institute of Robot And Convergence)
  
- 15:15-15:30 **OP044** 026 **Volumetric Error Modelling and Compensation for Batch of Vertical Machining Centers Based on Sensitivity Analysis**  
 Zhengchun Du (Shanghai Jiao Tong University),  
 Yun Yang (Shanghai Jiao Tong University),  
 Mengrui Zhu (Shanghai Jiao Tong University),  
 Huimin Li (Shanghai Jiao Tong University),  
 Jianguo Yang (Shanghai Jiao Tong University)
  
- 15:30-15:45 **OP045** 306 **Real Time Error Compensation of a Dual Absolute Encoder System for Improved Accuracy and Extended Measuring Range**  
 Kyung-min Lee (Chungnam National University),  
 Young-bong Bang (Advanced Institute of Convergence Technology),  
 Taehyeong Gu (University of Texas Health Science Center at Houston)

<b>Automation, Measurement &amp; Control 2 (Automation)</b>		<b>Room 5 (Son Tra 2, 2F)</b>
<b>Session Chair: Baeksuk Chu (Kumoh National Institute of Technology)</b>		<b>16:00-17:45</b>
16:00-16:15	<b>OP046</b> 460	<b>Motordrive Design for Sustainable Automated Warehouse System</b> Eric Dimla (RMIT University), Ilya Kavalchuk (RMIT University), Chuong Nguyen Hoang Khanh (RMIT University)
16:15-16:30	<b>OP047</b> 131	<b>Automated Solid Model Generation by Integrating Computer Vision and CAD</b> Binayak Bhandari (Woosong University), Yong Tae Cho (Woosong University), Gi Jun Park (Woosong University), Tuhel Ahmed (Woosong University)
16:30-16:45	<b>OP048</b> 126	<b>Study on Compensation and Temperature Characteristic of Pressure Sensor Using Diaphragm</b> Dae Jhoong Yun (Pusan National University), Jung Hwan Ahn (Pusan National University), Gil Seung Lee (Novasen Co., Ltd.)
16:45-17:00	<b>OP049</b> 357	<b>Energy-Efficient Vehicle Driving on Urban Road with Traffic Signal Information</b> Kyunghyun Kim (Seoul National University), Sukwon Cha (Seoul National University), Changbeom Kang (Seoul National University)
17:00-17:15	<b>OP050</b> 595	<b>Work Coordinate Setup Using Electrical Breakdown in Ultra-Precision Machining</b> Sangjin Maeng (University of Wisconsin-Madison), Sangkee Min (University of Wisconsin-Madison)
17:15-17:30	<b>OP051</b> 275	<b>Quantitative Analysis on Upper Limb Spasticity of Children with Cerebral Palsy Using a Dual-mode Cycling Robot</b> Jihun Kim (Handong University), Jaehyo Kim (Handong University), Seung Yeon Cho (Handong University), Seong Won Seo (Handong University), Sung Gyung Kim (Korea Institute of Motor Development)
17:30-17:45	<b>OP052</b> 440	<b>Deep Regression for Precise Geometric Dimension Measurement</b> Thang Duong Nhat (NAL Vietnam JSC), Binh Nguyen Duc (Hanoi University of Science and Technology), Phuong Le Khac (Hanoi University of Science and Technology), Mai Nguyen Thi Phuong (Hanoi University of Science and Technology)

**July 12** (Friday)

<b>Manufacturing Processes 5</b> (CMP, Metal Forming)	<b>Room 1</b> (Nguyet Que, 3F)
<b>Session Chair: Pham Duc Cuong</b> (Hanoi University of Industry)	09:15-10:15

- 09:15-09:30 **OP020** 567 **A New Ductile Fracture Criterion for Prediction of Sheet Metal Forming**  
 Hung Quach (Kyungpook National University),  
 Young-Suk Kim (Kyungpook National University),  
 Seok-Hwan Oh (Kyungpook National University),  
 Duc-Toan Nguyen (Hanoi University of Science and Technology)
  
- 09:30-09:45 **OP021** 500 **A Study on the Cross-Sectional Shape Discrepancy of Incremental Sheet Metal Forming**  
 Kyuseok Jung (Seoul National University of Science and Technology),  
 Changwhan Lee (Seoul National University of Science and Technology),  
 Wanjin Chung (Seoul National University of Science and Technology)
  
- 09:45-10:00 **OP022** 439 **Process Time Modeling for Endpoint Detection on Package Substrate CMP**  
 Seonho Jeong (Pusan National University),  
 Haedo Jeong (Pusan National University),  
 Dasol Lee (Pusan National University),  
 Donghwan Lee (Pusan National University),  
 Somin Shin (Pusan National University)
  
- 10:10-10:15 **OP023** 417 **Development of Slurry Supply System with Oxygen Atomization for Green CMP**  
 Dasol Lee (Pusan National University),  
 Haedo Jeong (Pusan National University),  
 Donghwan Lee (Pusan National University),  
 Kihun Lee (Pusan National University),  
 Somin Shin (Pusan National University)

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<b>Manufacturing Processes 6</b> (Manufacturing)		<b>Room 1</b> (Nguyet Que, 3F)
<b>Session Chair: Shihyoung Ryu</b> (Chonbuk National University)		10:30-12:00
<b>Invited Speech 8</b>	<b>Session Chair: Yong Sup Choi</b> (National Fusion Research Institute)	
10:30-11:00	<b>Precision Measurement, Fabrication and Related Technologies for X-ray Mirror Optics</b> Kazuto Yamauchi (Osaka University)	
11:00-11:15	<b>OP024</b> 281	<b>Development of Electrically Assisted Rapid Stress Relief Annealing for Helical Automotive Springs</b> Van Loi Tran (Korea Institute of Industrial Technology), Sung-Tae Hong (University of Ulsan), Viet Tien Luu (University of Ulsan), Ji Ye Hong (Daewon Kang Up Co.)
11:15-11:30	<b>OP025</b> 020	<b>Estimation of Process Damping Coefficient Using Dynamic Cutting Force Model</b> Minh-Quang Tran (National Taiwan University of Science and Technology), Chunhui Chung (National Cheng Kung University)
11:30-11:45	<b>OP026</b> 463	<b>Recent Developments in Manufacturing of Marine Propellers: A Literature Review</b> Eric Dimla (RMIT University), Minh Tran Quang (RMIT University)
11:45-12:00	<b>OP027</b> 036	<b>A Study on Cluster-Wise Regression Model for Welding Quality in the Robotic Arc Welding</b> Ill-Soo Kim (Mokpo National University), Tae-Jong Yun (Mokpo National University)

**Organized Session 4**

(Development of Freeform Optics Manufacturing Process and Measurement System)

**Room 1** (Nguyet Que, 3F)

**Session Chair: Sangwon Hyun** (Korea Basic Science Institute)

15:00-16:00

**15:00-15:15 OS039 111 Full Spectrum Big Data Analysis for Dynamic Freeform Optics Manufacturing**

Dae Wook Kim (The University of Arizona),  
 Geon-Hee Kim (Korea Basic Science Institute),  
 Xiangyu Guo (Texas A&M University),  
 Logan Graves (The University of Arizona),  
 Isaac Trumper (The University of Arizona),  
 Yong Shu (Air Force Engineering University),  
 Maham Aftab (The University of Arizona),  
 Heejoo Choi (The University of Arizona)

**15:15-15:30 OS040 534 Design and Development of a SiC Mirror for High Precision Optical Systems**

Myung Cho (National Optical Astronomy Observatory),  
 Geon-Hee Kim (Korea Basic Science Institute),  
 Sangwon Hyun (Korea Basic Science Institute),  
 Jeong-Yeol Han (Korea Astronomy and Space Science Institute)

**15:30-15:45 OS041 271 Development of the Plasma Polishing Systems for Silicon Carbide**

Yong Sup Choi (National Fusion Research Institute),  
 Kang-il Lee (National Fusion Research Institute),  
 Dong Chan Seok (National Fusion Research Institute),  
 Soo Ouk Jang (National Fusion Research Institute)

**15:45-16:00 OS042 351 Wide-Field Freeform Projection Lens/Module for Augmented Reality**

Youngsik Kim (The University of Arizona),  
 Sungchul Shin (LG Electronics),  
 Seungyong Shin (LG Electronics),  
 Changkyu Hwang (LG Electronics),  
 Hyukmo Kang (The University of Arizona),  
 Daewook Kim (The University of Arizona)

<b>Sustainable Technology 1</b> (Energy Monitoring & Management)		<b>Room 2</b> (Pho Hoi, 3F)
<b>Session Chair: Sanghoon Ji</b> (Korea Institute of Civil Engineering and Building Technology)		<b>09:30-10:15</b>
09:30-09:45	<b>OP115</b> 617 <b>Rejuvenation in Product Evolution</b> Eric Dimla (RMIT University)	
09:45-10:00	<b>OP116</b> 488 <b>Heating and Cooling Energy Efficiency of Standing Column Well Geothermal Heat Pump System Assisted with Heat Storage Tank</b> Jong Man Lee (Hanbat National University), Kwang Ho Lee (Korea University), Da Young Lee (Hanbat National University)	
10:10-10:15	<b>OP117</b> 472 <b>Cooling Energy Performance of AHU DAT Reset Strategy based on Outdoor Air Temperature in VAV System</b> Minkyong Park (Hanbat National University), Kwang Ho Lee (Korea University), Wonhee Kang (Hanbat National University), Sunghyup Hong (Hanbat National University)	

**Sustainable Technology 2 (Manufacturing Technology)**

**Room 2 (Pho Hoi, 3F)**

Session Chair: **Ikwhang Chang** (Wonkwang University)

10:30-11:45

**Invited Speech 6**

10:30-11:00

**Graphene-Based Flexible and Wearable Supercapacitors: From Material Design to Device Processing**

Le Hoang Sinh (Duy Tan University)

11:00-11:15 **OP118** 462 **An Investigation into the Effect of Spacer on Freshwater Production in Direct Contact Membrane Distillation**

Lich Nguyen (University of Agriculture and Forestry - Hue University),  
 Linh Ve (University of Agriculture and Forestry - Hue University),  
 Abhijit Date (RMIT University),  
 Aliakbar Akbarzadeh (RMIT University),  
 Cuong Do (University of Agriculture and Forestry - Hue University)

11:15-11:30 **OP119** 520 **Fatigue Life Assessment of Aluminum Alloy for Scroll Compressor using Rotary Bending Fatigue Test**

Jungsub Lee (Korea University),  
 Byoung-Ho Choi (Korea University),  
 Sang Youn Park (Korea University)

11:30-11:45 **OP120** 477 **A Design of Fluid Type Balloon Nucleus Pulposus Replacement for Human Lumbar Spine Discs Restoration**

Taekyeong Lee (Korea University),  
 Junghwa Hong (Korea University),  
 Soonmoon Jung (Korea University),  
 Jaemin Kim (Korea University),  
 Youngho Lee (Korea University),  
 Hunhee Kim (Korea University)

<b>Organized Session 5</b> (Innovative Forming)		<b>Room 2</b> (Pho Hoi, 3F)
<b>Session Chair: Tae-Wan Ku</b> (Pusan National University)		<b>13:45-16:00</b>
13:45-14:00	<b>OS050</b> 063	<b>Application of SPH Numerical Method to Jointing Sheet Materials</b> Kihwan Park (Pusan National University), Jeong Kim (Pusan National University)
14:00-14:15	<b>OS051</b> 074	<b>Spring-Back Compensation of AHSS Parts by Robust Error Correction</b> Kye-Jeong Park (Pusan National University), Byung-Min Kim (Pusan National University), Jae-Hong Kim (Pusan National University), In-Bo Shim (KSM Co., Ltd.), Jun-Hyeong Park (KSM Co., Ltd.), Hyun-Seop Song (KSM Co., Ltd.)
14:15-14:30	<b>OS052</b> 410	<b>Parametric Study on Blank Support Structure for Thick Plate Forming of Hollow-Partitioned Turbine Stator</b> Mi-Rae Lim (Pusan National University), Tae-Wan Ku (Pusan National University), Beom-Soo Kang (Pusan National University)
14:30-14:45	<b>OS053</b> 077	<b>Process Design of Continuous Two Stage Roll Die Forming to Improve Dimensional Accuracy</b> Jae-Chang Ryu (Pusan National University), Dae-Cheol Ko (Pusan National University), Hynn-Seok Lee (NARA Mold & Die Co., Ltd.), Joon-Hong Park (Dong-A University), Byung-Min Kim (Pusan National University)
14:45-15:00	<b>OS054</b> 341	<b>A Study on Die Design for Manufacturing Pinch Yoke of Automotive Steering System</b> A Ra Jo (Korea Institute of Industrial Technology), Sun Kwang Hwang (Korea Institute of Industrial Technology), Myeong Sik Jeong (Korea Institute of Industrial Technology), Sang Kon Lee (Korea Institute of Industrial Technology), In Kyu Lee (Korea Institute of Industrial Technology), Sung Yun Lee (Korea Institute of Industrial Technology), Yong Jin Choi (Korea Institute of Industrial Technology), Jea Seob An (Korea Institute of Industrial Technology), Sun Hyung Kim (Korea Institute of Industrial Technology)
15:00-15:15		<b>BREAK</b>

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- 15:15-15:30 **OS055** 076 **Application of Cohesive Zone Model to Prediction of Fracture at Interface in Hybrid Composite Part**  
Yong-Hun Jung (Pusan National University),  
Dae-Cheol Ko (Pusan National University),  
Jeong-Min Lee (Pusan National University),  
Chan-Joo Lee (Korea Institute of Industrial Technology),  
Dong-Hwan Kim (International University of Korea),  
Byung-Min Kim (Pusan National University)
- 15:30-15:45 **OS056** 372 **Experimental Study on Relationship Between Microstructure Change and Flow Stress Drop of DP980 by Electro-Plastic Effect**  
Hyeong-gyu Park (Pusan National University),  
Jeong Kim (Pusan National University)
- 15:45-16:00 **OS057** 189 **Temperature Prediction in Friction Stir Spot Welding Using Upper Bound Analysis**  
Deoksang Jo (Pusan National University),  
Byung Min Kim (Pusan National University)

<b>Machine Tools &amp; Systems 1</b> (Advanced Machine Tools)		<b>Room 3</b> (My Son, 3F)
<b>Session Chairs:</b> Jayil Jeong (Kookmin University) Dong Min Kim (Korea Institute of Industrial Technology)		09:15-10:15
09:15-09:30	<b>OP028</b> 262 <b>Development of Edge Control Technology for Side Shape Implementation of FCP</b> Ki Hyuk Kim (Hanbat National University), Donghoon Lee (Hanbat National University), Kiyoung Son (University of Ulsan), Taihui Kim (Mokpo National University)	
09:30-09:45	<b>OP029</b> 132 <b>Proposal of Ultrasonic Multi-Mode Vibration Cutting for High-Efficiency Surface Texturing</b> Hongjin Jung (Nagoya University), Kyungki Lee (Nagoya University), Takehiro Hayasaka (Nagoya University), Eiji Shamoto (Nagoya University), Hiroaki Ishii (Taga Electric Co., Ltd.), Takashi Ueyama (Taga Electric Co., Ltd.), Seiji Hamada (Taga Electric Co., Ltd.)	
09:45-10:00	<b>OP030</b> 069 <b>Development of a Tabletop Wire-EDM Machine for Fabricating Micro Cutting Tools</b> Mu-Tian Yan (National Chin-Yi University of Technology), Yu-Hsiang Lin (Huafan University), Kuo-Yi Huang (National Chung Hsing University), Feng-Yi Liao (National Chung Hsing University), Pi-Wen Wang (Huafan University)	
10:10-10:15	<b>OP031</b> 543 <b>Multiple Defects Detection Model Using a Convolutional Network for Injection Molding Products</b> Hwaseop Lee (Pusan National University), Kwangyeol Ryu (Pusan National University), Siku Kim (Pusan National University), Yeeyeng Liao (Pusan National University)	

<b>Machine Tools &amp; Systems 2</b> (Smart Factory)	<b>Room 3</b> (My Son, 3F)
<b>Session Chairs:</b> Sang Won Lee (Sungkyunkwan University) Kyung-Hee Park (Korea Institute of Industrial Technology)	10:30-12:00

**Invited Speech 3**

10:30-11:00                      **On-Machine Dimensional Measurement Technology for Health Monitoring for Precision Manufacturing Systems and Processes**  
 ChaBum Lee (Texas A&M University)

11:00-11:15    **OP032**    538    **A Virtual Machining System for Tool Deflection Compensation**  
 Hong-Seok Park (University of Ulsan),  
 Bowen Qi (University of Ulsan)

11:15-11:30    **OP033**    482    **Design of System Architecture Based on Big Data Framework for Manufacturing Data Processing**  
 Il-Ha Park (Korea Institute of Industrial Technology),  
 Joo-Sung Yoon (Korea Institute of Industrial Technology)

11:30-11:45    **OP034**    536    **Goal Model for Developing Goal-Oriented Mechanism in Self-Reconfigurable Manufacturing Systems**  
 Sangil Lee (Pusan National University),  
 Kwangyeol Ryu (Pusan National University),  
 Kezia Amanda Kurniadi (Pusan National University),  
 Moonsoo Shin (Hanbat National University)

11:45-12:00    **OP035**    375    **Design of Production Systems for Scheduling in Smart Factory**  
 Ping Chong Chua (Nanyang Technological University),  
 Seung Ki Moon (Nanyang Technological University),  
 Byung Jun Joo (Singapore Institute of Manufacturing Technology)

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<b>Machine Tools &amp; Systems 3 (Machinery)</b>		<b>Room 3 (My Son, 3F)</b>
<b>Session Chairs: Young Hun Jeong</b> (Kyungpook National University) <b>Tae-Gon Kim</b> (Korea Institute of Industrial Technology)		<b>15:00-16:00</b>
15:00-15:15	<b>OP036</b> 170 <b>Generating Continuous Tool Motions in 5-Axis CNC Flank Milling for Improving Machining Quality</b> Chih-Hsing Chu (National Tsing Hua University), Hsiang-Yun Chen (National Tsing Hua University)	
15:15-15:30	<b>OP037</b> 474 <b>Industrial Internet of Service Platform for Ecosystem of Manufacturing Quality Management</b> Hye Min Choe (Korea Institute of Industrial Technology), Yong Ju Cho (Korea Institute of Industrial Technology), Se Hwan Ahn (Korea Institute of Industrial Technology)	
15:30-15:45	<b>OP038</b> 537 <b>An Integrated Decision Making Model for Configuration Selection in Reconfigurable Manufacturing System</b> Kezia Amanda Kurniadi (Pusan National University), Kwangyeol Ryu (Pusan National University), Sangil Lee (Pusan National University)	
15:45-16:00	<b>OP039</b> 286 <b>Designing an OPC UA Companion Model for Predictive Model Markup Language</b> Seung-Jun Shin (Hanyang University), Prita Meilanitasari (Hanyang University), Wonchul Seo (Pukyong National University)	

**Materials & Design 5** (Design for Manufacturing)

**Room 4** (My Khe, 2F)

Session Chair: **Youngseon Lee** (Korea Institute of Materials Science)

09:00-10:15

- 09:00-09:15 **OP081** 107 **Design and Testing of a Shear-Mode Self-Power MR Damper Featuring Permanent Magnet for Washing Machine**  
 Quoc Duy Bui (Industrial University of Ho Chi Minh City),  
 Quoc Hung Nguyen (Vietnamese German University)
- 09:15-09:30 **OP082** 512 **A Study on the Design of Tuned Mass Damper Holder for Inconel 718 Machining**  
 Seung Gi Kim (Korea Institute of Industrial Technology),  
 Dong Yoon Lee (Korea Institute of Industrial Technology),  
 Gi Dong Yang (Korea Institute of Industrial Technology),  
 Kyung Hee Park (Korea Institute of Industrial Technology)
- 09:30-09:45 **OP083** 415 **Innovative Process of Automotive Parts Applied with the Yield-Ratio-Control-Steel**  
 Youngseon Lee (Korea Institute of Materials Science),  
 Sungjun Bae (Korea Institute of Materials Science),  
 Kihan Kim (Korea Institute of Materials Science),  
 Eunyoo Yoon (Korea Institute of Materials Science)
- 09:45-10:00 **OP084** 399 **Life Behavior of Aged Tire Sidewall Using Non-Linear Arrhenius Equation**  
 Byungwoo Moon (Sungkyunkwan University),  
 Chang-Sung Seok (Sungkyunkwan University),  
 Keekeun Kim (Sungkyunkwan University),  
 Soo Park (Sungkyunkwan University)
- 10:10-10:15 **OP085** 433 **A Study on Fatigue Characteristics of Hollow Valves for Automobile Engine through Simulation Fatigue Test and Finite Element Analysis**  
 Kibum Park (Sungkyunkwan University),  
 Chang-Sung Seok (Sungkyunkwan University),  
 Namgyu Jun (Sungkyunkwan University),  
 Keekeun Kim (Sungkyunkwan University),  
 Damhyun Kim (Sungkyunkwan University),  
 Jaegu Choi (Sungkyunkwan University)

**Organized Session 7** (Precision Machinery and Related Materials)

**Room 4** (My Khe, 2F)

**Session Chair:** Won-Shik Chu (Gyeongsang National University)

10:30-12:00

**Invited Speech 2**

- 10:30-11:00      **A Data-Driven Approach to Develop Customized Sensors using Additive Manufacturing Technologies**  
Seung Ki Moon (Nanyang Technological University)
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- 11:00-11:15    **OS082**    101    **A Comparative Study on the Energy Consumption Analysis of Laser and Induction Assisted Machining**  
EunJung Kim (Changwon National University),  
Choon-Man Lee (Changwon National University)
- 11:15-11:30    **OS083**    447    **A Study on the Specimen Shape Simulating the Plastic Zone of the Real Pipe**  
Keontae Park (Sungkyunkwan University),  
Chang-Sung Seok (Sungkyunkwan University),  
Soo Park (Sungkyunkwan University),  
Jae Mean Koo (Sungkyunkwan University)
- 11:30-11:45    **OS084**    092    **A Fundamental Study on the Rough Machining and Finishing of Turbine Blade in Conventional and Laser Assisted Machining**  
Wan-Sik Woo (Changwon National University),  
Choon-Man Lee (Changwon National University)
- 11:45-12:00    **OS085**    138    **A Study on the Laser Power and Specific Cutting Energy in Laser Assisted Machining**  
Won-Jung Oh (Changwon National University),  
Choon-Man Lee (Changwon National University)

**Materials & Design 6** (Ecofriendly and Advanced Materials)

**Room 4** (My Khe, 2F)

Session Chair: **Yongho Jeon** (Ajou University)

14:45-16:30

- 14:45-15:00 **OP086** 531 **A New Flexible Solid 3D Model Reconstruction System for Mechanical CAD / CAM Systems**  
 Long Hoang (Hanoi University of Science and Technology),  
 Long Banh Tien (Hanoi University of Science and Technology)
- 15:00-15:15 **OP087** 441 **Effect of Deformation and Dual Phase Treatment on Mechanical Properties of a Low Carbon Steel**  
 Hien Dinh (Institute of Technology - General Department of Defense Industry, Academy of Military Science and Technology, Le Quy Don Technical University)
- 15:15-15:30 **OP088** 507 **Prediction of Hole-Expansion Test for DP980 Based on a Non-Associated Flow Rule**  
 Jinjae Kim (Kyungpook National University),  
 Youngsuk Kim (Kyungpook National University),  
 Quoctuan Pham (Kyungpook National University)
- 15:30-15:45 **OP089** 289 **The Effect of Pre-Strain and Subsequent Electrically Assisted Annealing on the Mechanical Behavior of Aluminum Alloy**  
 Kieu-Anh Dinh (University of Ulsan),  
 Sung-Tae Hong (University of Ulsan),  
 Moon-Jo Kim (Korea Institute of Industrial Technology),  
 Heung-Nam Han (Seoul National University)
- 15:45-16:00 **OP090** 414 **Analysis of Creep Behavior of Magnesium Alloy Sheet(AZ31b) in Warm Tensile Test**  
 JaeHyeong Yu (Seoul National University of Science and Technology),  
 ChangWhan Lee (Seoul National University of Science and Technology)
- 16:00-16:15 **OP091** 426 **Study on the Change of Mechanical Properties of Suspension Porcelain Insulator Due to Field Aging**  
 Keekeun Kim (Sungkyunkwan University), Chang-Sung Seok (Sungkyunkwan University),  
 Byungwoo Moon (Sungkyunkwan University), Kibum Park (Sungkyunkwan University),  
 Damhyun Kim (Sungkyunkwan University), Jaehyung Park (Sungkyunkwan University),  
 Soo Park (Sungkyunkwan University), In Hyuck Choi (Korea Electric Power Research Institute),  
 Juam Son (Korea Electric Power Research Institute)
- 16:15-16:30 **OP092** 038 **Properties of Nanocellulose/Micro-Nanochitosan Green Composites for Food Packaging Application**  
 Le Van Hai (Inha University), Jaehwan Kim (Inha University), Ruth M. Muthoka (Inha University),  
 Swarup Roy (Inha University), Qin Yu Zhu (Inha University)

<b>Automation, Measurement &amp; Control 3</b> (System Control)	<b>Room 5</b> (Son Tra 2, 2F)
<b>Session Chairs:</b> Jung Kim (KAIST) Quoc Hung Nguyen (Vietnamese-German University)	09:00-10:15

- 09:00-09:15 **OP053** 025 **Invariant-Based Method for Axis Motion Accuracy Evaluation of CNC Machine Tools**  
Ming Deng (Shanghai Jiao Tong University),  
Zhengchun Du (Shanghai Jiao Tong University),  
Huimin Li (Shanghai Jiao Tong University),  
Peng Zhang (Shanghai Jiao Tong University),  
Sitong Xiang (Ningbo University),  
Jianguo Yang (Shanghai Jiao Tong University)
- 09:15-09:30 **OP054** 549 **A Transportation Optimization Model for Solving the Single Delivery Truck Routing Problem with the Alldifferent Constraint in MS Excel**  
Hai Dung Dinh (Vietnamese German University)
- 09:30-09:45 **OP055** 014 **Advances in Servo Track Writing Technologies**  
Ho Seong Lee (Gyeongsang National University)
- 09:45-10:00 **OP056** 256 **Cleaning Map Implementation Using Inference Engine in Floor Cleaning Robot**  
Kyung-Chan Jin (Korea Institute of Industrial Technology),  
Sang-Wook Lee (Korea Institute of Industrial Technology),  
Ji-Ho Kim (Danhui Co.),  
Tae-Sung Park (Danhui Co.)
- 10:10-10:15 **OP057** 050 **Design of Fuzzy Speed Controller for BLDC Motor : A Guaranteed Cost Control Approach**  
Gyeong Hak Lee (Hanbat National University),  
Do Wan Kim (Hanbat National University)

**New and Renewable Energy 1** (Battery / Fuel cell / Solar cell)

**Room 5** (Son Tra 2, 2F)

Session Chair: **Taehyun Park** (Soongsil University)

10:30-11:45

**Invited Speech 9**

10:30-11:00

**Energy Management Strategies of Hybrid Electric Vehicles**

Chunhua Zheng (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences)

11:00-11:15 **OP107** 021

**Development of a Analytical Model to Predict the Effective Modulus of a Si Electrode in Li-ion Batteries**

Cheol Kim (Kyungpook National University),  
Junghoon Lee (Kyungpook National University)

11:15-11:30 **OP108** 009

**Liquid Water Transport Simulation in a GDL of PEMFC Using LBM**

Dong Hyup Jeon (Dongguk University)

11:30-11:45 **OP109** 027

**Fabrication of Solar Modules by Direct Layup Process of Solar Cells**

Dong-Youn Shin (Pukyong National University),  
Jong Rok Lim (Korea Institute of Energy Research),  
Yong-Seong Kim (Korea Institute of Energy Research),  
Sungeun Park (Korea Institute of Energy Research),  
Jeong In Lee (Korea Institute of Energy Research),  
Min Gu Kang (Korea Institute of Energy Research),  
Hee-eun Song (Korea Institute of Energy Research),  
Gi-Hwan Kang (Korea Institute of Energy Research)

<b>New and Renewable Energy 2</b> (Wind / Hydro and Other Energy)		<b>Room 5</b> (Son Tra 2, 2F)
<b>Session Chair: Chunhua Zhang</b> (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences )		15:00-16:15
15:00-15:15	OP110 416	<b>Aerodynamic Shape Optimization of Small Size Wind Turbine Blades Using DAKOTA – Genetic Algorithm</b> Van Lam Pham (Ho Chi Minh City University of Technology), Khanh Hieu Ngo (Ho Chi Minh City University of Technology)
15:15-15:30	OP111 394	<b>The Design, Simulation and Testing of an Omni-Direction Deflector for Vertical Axis Wind Turbine</b> Wen Tong Chong (University of Malaya), Kok Hoe Wong (University of Malaya), Xianbo Xiang (Huazhong University of Science and Technology), Keen Kuan Kong (University of Malaya)
15:30-15:45	OP112 080	<b>Experimental Investigation of the Influence of the Relatively Humidity on Water Film Evaporative Cooling Thermoelectric Device</b> Liang Jun Zheng (Chonnam National University), Hyun Wook Kang (Chonnam National University), Dong Hee Kang (Chonnam National University), Na Kyong Kim (Chonnam National University)
15:45-16:00	OP113 178	<b>Empirical Correlation Development of EEV Mass Flow Rate in a Refrigeration System</b> Ting Chen (University of Science and Technology), Ohkyung Kwon (Korea Institute of Industrial Technology), Kyungjin Bae (Korea Institute of Industrial Technology)
16:00-16:15	OP114 586	<b>Effects of Stochastic Soil Variability on the Dynamic Behavior of Offshore Wind Turbines</b> Woochul Nam (Chung-Ang University), Ki-yong Oh (Chung-Ang University)