



PRESM 2019

Da Nang, Vietnam

International Symposium on
PRecision **E**ngineering and **S**ustainable **M**anufacturing

Date

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Korean Society for Precision Engineering
KSPE, Korea



Hanoi University of Science and Technology
HUST, Vietnam

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Program & Proceedings

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Welcome to PRESM 2019

On behalf of all the committee members of PRESM 2019, we would like to welcome you to PRESM 2019 which will be held from July 10 to 13, 2019 in Da Nang, Vietnam.

The International Symposium on **P**recision **E**ngineering and **S**ustainable **M**anufacturing (PRESM) is an international symposium that covers a wide range of topics related to precision engineering and sustainable manufacturing. Since 2018, PRESM has been the new name of International Symposium on Green Manufacturing and Applications (ISGMA). Since its first symposium in 2011, ISGMA has been highly successful in bringing together researchers in precision engineering and manufacturing from all over the world to share the latest knowledge in these fields. The reputation and excellence of ISGMA continues with PRESM which is dedicated to the development of precision engineering and sustainable manufacturing for the benefit of the global society.

We would like to take this opportunity to express our gratitude to all the committee members, sponsors and attendees for their precious contributions to PRESM 2019. We are confident that this symposium will be enjoyable and fruitful to all the participants. We hope that all of you will come and join us in this exciting symposium.

We are looking forward to seeing you in Da Nang, Vietnam in July 2019. Thank you.

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Chair of PRESM 2019

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Pusan National University (Korea)



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Plenary and Invited Talks

Plenary Speakers

Paper No.	Name	Title	Date / Time	Place
PL001	Hideki Aoyama Keio University (Japan)	Automatic Utilization System of Turning-Milling Machine Tool with Three Turrets	July 11(Thu) 13:10-13:50	Nguyet Que 3F
PL002	Seung-Woo Kim KAIST (Korea)	Ultrashort Lasers towards Ultraprecision in Instrumentation and Microfabrication	July 12(Fri) 13:00-13:40	Nguyet Que 3F

Invited Speakers

Paper No.	Name	Title	Date / Time	Place
IT001	Matthias Brockmann RWTH Aachen University (Germany)	Internet of Production – Research Roadmap “Production Technology” at RWTH Aachen	July 11(Thu) 10:30-11:00	Son Tra 2 2F
IT002	Seung Ki Moon Nanyang Technological University (Singapore)	A Data-Driven Approach to Develop Customized Sensors using Additive Manufacturing Technologies	July 12(Fri) 10:30-11:00	My Khe 2F
IT003	ChaBum Lee Texas A&M University (USA)	On-Machine Dimensional Measurement Technology for Health Monitoring for Precision Manufacturing Systems and Processes	July 12(Fri) 10:30-11:00	My Son 3F
IT004	Yunn-Shiuan Liao National Taiwan University (Taiwan)	Design and Development of an Ultrasonic Spindle Module for Grinding Machines and its Applications	July 11(Thu) 14:00-14:30	Nguyet Que 3F
IT005	Quoc Hung Nguyen Vietnamese-German University (Vietnam)	Development of Force Feedback Systems Featuring Magnetorheological Fluid	July 11(Thu) 16:00-16:30	My Son 3F
IT006	Le Hoang Sinh Duy Tan University (Vietnam)	Graphene-Based Flexible and Wearable Supercapacitors: From Material Design to Device Processing	July 12(Fri) 10:30-11:00	Pho Hoi 3F
IT007	Pei-Chen Su Nanyang Technological University (Singapore)	Fast 4D Printing of Shape Memory Polymers using Stereolithography (SLA)	July 11(Thu) 10:30-11:00	Pho Hoi 3F
IT008	Kazuto Yamauchi Osaka University (Japan)	Precision Measurement, Fabrication and Related Technologies for X-ray Mirror Optics	July 12(Fri) 10:30-11:00	Nguyet Que 3F
IT009	Chunhua Zheng Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences (China)	Energy Management Strategies of Hybrid Electric Vehicles	July 12(Fri) 10:30-11:00	Son Tra 2 2F
IT010	Low Hong Yee Singapore University of Technology and Design (Singapore)	Scalable High-Resolution Functional Surfaces on Free-Form 3D Objects	July 11(Thu) 14:00-14:30	My Son 3F

Plenary Speech 1

Title



July 11 (Thu)
13:10-13:50

Room 1
Nguyet Que (3F)

Session Chair :
Haedo Jeong
(Pusan National University)

Automatic Utilization System of Turning-Milling Machine Tool with Three Turrets

Hideki Aoyama

Professor

Department of System Design Engineering
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E-mail: haoyama@sd.keio.ac.jp

A system to easily and safely utilize a turning-milling machine tool with three turrets was developed by integrating an automatic optimum process planning system, an automatic identification system of the shape parameters of cutting tools and workpieces, and an automatic NC program generation system. In this talk, the following three issues are introduced.

(1) Development of optimum process planning system

A removal shape CAD data is constructed by making the difference between a workpiece shape CAD data and a required (product) shape CAD data. The removal shape is recognized as an aggregate of element shapes (hexahedron, sphere, cylinder, etc.) by dividing the removal shape by extending planes constructing a removal shape. Element shapes are recognized as machining features based on relationships between element planes and product planes. Process plan is derived as an order of machining features and the order of machining features which generates the minimum machining time is determined as the optimum process plan.

(2) Development of collision avoidance technology

The unexpected collision between a cutting tool and the machine tool is avoided by inputting the shape parameters of a cutting tool and a workpiece. In order to identify the parameters, an optical measurement device was developed. The measurement device obtains high density point cloud data. The parameters to avoid a collision are derived by processing the cloud data.

(3) Development of automatic generation system of the NC program

A system to automatically generate the NC program to execute the optimum process plan by using the attribute data of machining features based on the optimum process plan.

Plenary Speech 2

Title



July 12 (Fri)
13:00-13:40

Room 1
Nguyet Que (3F)

Session Chair :
Seung-Han Yang
(Kyungpook National University)

Ultrashort Lasers towards Ultraprecision in Instrumentation and Microfabrication

Seung-Woo Kim

Professor

Department of Mechanical Engineering
KAIST (Korea)
Email: swk@kaist.ac.kr

Ultrashort lasers draw attention as a new light source for precision engineering to break the technological limits of conventional lasers on instrumentation and microfabrication. As illustrated in Fig.1, ultrashort lasers are able to provide extremely short pulses down to the femtosecond regime, thereby permitting ultrafast instrumentation in observing diverse physical phenomena. The peak power concentrated over the short pulse duration builds up to be strong enough to induce highly nonlinear light-matter interactions for frequency up/down-conversion over the entire optical electromagnetic regime. This remarkable time-domain feature of ultrashort lasers facilitates non-thermal materials processing for microfabrication of glasses, dielectrics and metals. Furthermore, the optical spectrum of ultrashort lasers, referred to as the frequency comb, acts as the frequency ruler that allows ultra-stable wavelengths to be produced with stabilization to the atomic clock. This spectral-domain uniqueness of ultrashort lasers helps advance many metrological techniques, based on interferometric or time-of-flight principles, towards ultraprecision beyond the capabilities of existing continuous-wave or pulse light sources. Conclusively, ultrashort lasers are greatly anticipated to lay the foundation for ultraprecision as demanded in the next generation of precision engineering particularly in precision instrumentation and microfabrication.

Invited Talks



Matthias Brockmann

Managing Director

The Cluster of Excellence
'Integrative Production
Technology'

Chief Engineer

Laboratory for Machine Tools
and Production Engineering
RWTH Aachen University
(Germany)

Internet of Production – Research Roadmap “Production Technology” at RWTH Aachen

The vision of the “Internet of Production” describes the common research roadmap of RWTH Aachen University concerning Industrie 4.0. Within a large-scale interdisciplinary team, researchers from engineering, computer science and social science are shaping the future of production technology. This presentation will provide an overview of actual research topics, as well as potentials and risks for producing industries in the context of the Internet of Production. Core concepts like the Digital Shadow, a new reference infrastructure and approaches for a new level of cross-domain collaboration will be explained. Practical examples will be presented from different fields of production technology.”



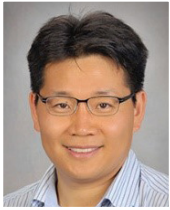
Seung Ki Moon

Assistant Professor

School of Mechanical and
Aerospace Engineering
Nanyang Technological
University (Singapore)

A Data-Driven Approach to Develop Customized Sensors using Additive Manufacturing Technologies

Additive manufacturing (AM) technologies have been penetrating deeper and wider into various industries, due to its free-form, free-tooling capabilities, mature processes and decline in printing costs. Aerosol jet printing (AJP) technology is ideal for producing customized electronic components due to its high design flexibility and fine feature deposition. Despite the capability of fine feature deposition, the printed sensor quality can be influenced by the complicated relationship between main process parameters, such as carrier gas, sheath gas, and printing speed as shown in Fig. 1. The objective of this research is to propose a data-driven approach for determining optimal operating process parameters in customized sensor development using AJP and control the printed line morphology for improving the line uniformity of cross-sectional area. The proposed data-driven approach is applied to fabricate continuous lines with better edge definition and less overspray by integrating data mining methods, and a learning approach. Different from experiment-based approaches to determine optimal process parameters in AM technologies, the proposed approach is utilized the principles of data mining and knowledge discovery. Therefore, the proposed approach can be extended the knowledge of determining optimal process parameters into improving the quality of various additive manufactured products.



ChaBum Lee

Assistant Professor

Department of Mechanical
Engineering
Texas A&M University (USA)

On-Machine Dimensional Measurement Technology for Health Monitoring for Precision Manufacturing Systems and Processes

Metrology, or the science of measurement, is essential in manufacturing. The phrase “if it can’t be measured, it can’t be manufactured” may be overused, but it remains true. Once a workpiece is machined, its dimensions need to be inspected for quality control. There is a critical need for on-machine dimensional metrology technology in precision manufacturing. In particular, integration of metrology in manufacturing processes is becoming increasingly important. Currently, optical and tactile measuring systems are the most advanced methods in process metrology. Investigator Lee has extensively researched a variety of precision optical metrology systems, and has used theoretical approaches of optical sensors and instrumentation, surface topography characterization and precision machine design including empirical verification. Investigator Lee aims to seek the possibilities of transformative methods by elaborating on integration of metrology in manufacturing processes. In this presentation, novel dimensional measurement techniques that can be used for on-machine measurement in real manufacturing processes will be introduced: 1) on-machine cutting tool wear monitoring, 2) curved-edge displacement sensors for spindle health monitoring, and 3) machined freeform surface measurement. This research addresses the metrology needs of industries and national science initiatives for the manufacture and application of on-machine measurement instrumentation for advanced manufacturing.



Yunn-Shiuan Liao

Professor

Department of Mechanical
Engineering
National Taiwan University
(Taiwan)

Design and Development of an Ultrasonic Spindle Module for Grinding Machines and its Applications

The assistance of ultrasonic vibration acting on the workpiece has been proved very effective in grinding process. But it is rarely implemented on the grinding machines and applied in practice so far due to its workpiece vibration arrangement and wiring. In this study, an “ultrasonic spindle module” was designed and developed. The FEM was taken for stress analysis, mode shape optimization, and modification of the surface grinder’s spindle. The design enables the vibration to transform from axial direction to radial direction. In addition, the vibration can be transmitted from spindle to grinding wheel directly without the assistance of external devices. Experimental result shows that in grinding of brittle materials such as tungsten carbide by this module, the depth of grind can be increased to 40 μm as compared to 10 μm in conventional grinding. The average grinding force is decreased. The wear of grinding wheel and the machined surface roughness (S_a) are reduced by 20% and 30%, respectively. The surface defects due to brittle fractures are also reduced substantially. When the module is used to grind SUS304, a kind of ductile materials, chip adhesion can be reduced greatly, and the dressing cycle of the grinding wheel can be extended by 2.4 times.



Quoc Hung Nguyen

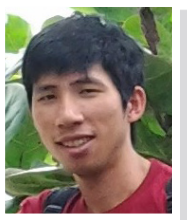
Associate Professor

Dean of Engineering Faculty,
Senior Lecturer in Structural
Dynamics & Mechatronics
Vietnamese-German University
(Vietnam)

Development of Force Feedback Systems Featuring Magnetorheological Fluid

Magnetorheological fluids (MRF) are suspensions of particles, which can be magnetized, and exhibit fast, strong, and reversible changes in their rheological properties when a magnetic field is applied. Therefore, MRF holds great potential in many applications that require an electromechanical interface such as clutch, brakes, valves, dampers and robotics. There have been a large number of researches on development and application of MRF based devices in various fields of engineering. Recently, there have been a number of researches on development of force feedback systems featuring MRF (MRF based force feedback system). Figure 1 shows an example of the 3-DOF joystick featuring two bi-directional MR actuators (BMRAs) and a linear MR brake (LMRB).

The purposes of this research is to review state-of-the-art of the MRF based force feedback systems to feature out advantages and disadvantages of each configuration and mechanisms and possibilities to implement these in haptic systems. In addition, based on the advantages and disadvantages of the review results, some new configurations for MRF based force feedback system are proposed to improved performance characteristics of force feedback systems.



Le Hoang Sinh

Director

Center for Advanced Chemistry

Vice-Director

Institute of Research and
Development
Duy Tan University (Vietnam)

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

The electronic devices have been becoming thinner, flexible and wearable to satisfy complex requirements of modern life of human. Flexible supercapacitors (SCs) have attracted widespread interest in developing lightweight, and flexible energy storage devices. Since invented in 2004 by Geim and Novoselov, Graphene is a promising material for application in flexible supercapacitors thank to its outstanding properties, i.e., excellent flexibility, high specific surface area (up to $2675 \text{ m}^2 \text{ g}^{-1}$), high electrical conductivity, good chemical stability, and high mechanical strength ($\sim 1 \text{ TPa}$). For electrochemical performance, the theoretical specific capacitance of single-layer-graphene is $\sim 21 \text{ } \mu\text{F cm}^{-2}$ and corresponding specific capacitance is $\sim 550 \text{ F g}^{-1}$ when entire surface area is fully utilized. In this presentation, many strategies on developing hybrid nanomaterials for supercapacitor electrodes will be discussed. The fabrication methods for paper-based and fiber-based supercapacitors will also be included.



Pei-Chen Su

Associate Professor

School of Mechanical and
Aerospace Engineering
Nanyang Technological
University (Singapore)

Fast 4D Printing of Shape Memory Polymers using Stereolithography (SLA)

Current 3D printers are limited by time-consuming printing processes, but there can be tremendous potentials in using these additive manufacturing (AM) technologies for mass manufacturing if their print speeds increase by at least an order of magnitude. Most of the technological improvements have been geared towards improving machine capabilities, but the speed issue can also be addressed through material modulations. To solve this time-bottle neck issue in AM, this work presents a novel development to accelerate the printing speed of photopolymerization-based process by improving resin curability with nanosilica fillers. The nanosilica particles are revealed as “superior catalysts” that altered the light scattering characteristics of the resin and facilitated remarkably fast curing rates due to enhanced nucleation activities. The curing time for each layer of printing was greatly reduced to 0.7 s. The addition of nanosilica into shape memory polymers (SMPs) resins has also invoked new development of SMP composites (SMPCs) as reinforced 4D printing materials. The printed SMPCs exhibited at least 4 times improvement in tensile strength and elongation as compared to their neat SMPs. This work demonstrates that the mechanics of nanosilica plays a critical role in developing high speed 3D printing technology and opens up new high-performance material.



Kazuto Yamauchi

Professor

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Osaka University (Japan)

Precision Measurement, Fabrication and Related Technologies for X-ray Mirror Optics

Science and technology researches based on Synchrotron radiation X-rays are rapidly expanding with new sources such as upgraded 3rd generation SR sources and X-ray free electron laser sources now being constructed world widely. The X-rays emitted from these sources are getting better natures in their brilliance. In this status, optics for focusing and imaging are playing indispensable roles and being demanded to be more precise and feasible.

We have developed precision X-ray optics with diffraction-limited performances both in focusing and imaging devices to be applied at synchrotron radiation facilities. We will talk about fabrication and metrology methods for manufacturing the precision optics together with introducing new X-ray optics designed by us to be more applicable and feasible using free form concepts.



Chunhua Zheng

Associate Professor

Automotive Electronics
Research Center
Shenzhen Institutes of
Advanced Technology,
Chinese Academy of Sciences
(China)



Low Hong Yee

Associate Professor

Engineering Product
Development Pillar
Singapore University of
Technology and Design

Director

Digital Manufacturing and Design
(DmanD) Center (Singapore)

Energy Management Strategies of Hybrid Electric Vehicles

There are two or more power sources in a hybrid vehicle, thus an energy management strategy has a significant influence on the fuel economy, since it determines the operating status and efficiency of the power sources during driving. There are several types of energy management strategies developed for hybrid vehicles up to now. Typical energy management strategies are introduced and compared in this paper, including the heuristic concept-based, the optimal control theory-based, and the learning-based energy management strategies. The rule-based energy management strategy is introduced as an example of the first type, while the Pontryagin's Minimum Principle (PMP)-based energy management strategy and the Deep Reinforcement Learning (DRL)-based energy management strategy are presented as the example of the second and the third types. The verification of the energy management strategies using the Rapid Control Prototype (RCP) scheme is also discussed in this paper.

Scalable High-Resolution Functional Surfaces on Free-Form 3D Objects

Micro and nano-scale textured surfaces are important to many engineering applications such as electronics, biomedical and consumer devices where surface functions such as wettability, friction and optical control are often part of vital product performance. Traditionally, micro and nano-scale surface topography with controllable geometry and resolutions are achieved via lithographic techniques which are inherently limited to 2-dimensional (2D) planar substrates. Many engineering applications requires scalable fabrication techniques for free-form 3-dimensional (3D) objects; one ubiquitous mass manufacturing process for products in the above-mentioned applications is injection molding. However, there has been limited success in advancing the resolution of injection molding process.

The hurdles to achieve high resolution injection molding are multiples: 1 lack of a rapid prototyping process for mold insert fabrication 2. lack of predictive modeling in melt flow in confined cavities, 3. lack of design formula that account for both micro, nanoscale surface texture and macroscopic curvature on surface functionalities. In this talk I will share our recent results that cover the above three aspects of research. Through a hybrid fabrication of 3D printing and nanoimprinting, mold inserts with controllable macroscopic curvature can be rapidly fabricated with surface resolution as high as 200 nm over a wide range of curvature¹. An analytical model was developed to simulate the degree of filling in confined cavities, through which key process parameters that control the fidelity of replication were identified². With the advent of a rapid prototyping technique for high resolution fabrication of free-form object, the co-current design of surface texture and macroscopic curvature can be simulated and optimized. Superhydrophobic effect was achieved on injection molded polypropylene with 250 nm surface texture and an anti-sweat concept on wearable product is demonstrated with saline water contact angle > 150°. In this work, we have achieved a workflow for surface texture design, process simulation and manufacture of high-resolution functional surfaces on free form object.

Program at a Glance

July 10 (Wed)

10:00-12:00	Committee Meeting (Only PRESM 2019 Committee Members)
14:00-17:30	Registration Open Lobby (2F), Nalod Da Nang Hotel
16:00-17:30	Welcome Reception Lobby (2F), Nalod Da Nang Hotel
18:00-21:00	Welcome Dinner (Only Invitees & PRESM 2019 Committee Members) Ca Chia Voi (4AF), Nalod Da Nang Hotel

July 11 (Thu)

Time	Room	Room#1 Nguyet Que (3F)	Room#2 Pho Hoi (3F)	Room#3 My Son (3F)	Room#4 My Khe (2F)	Room#5 Son Tra 2 (2F)
08:30		Registration Open - Lobby (2F), Nalod Da Nang Hotel				
09:00-10:15	ORAL 1	Manufacturing Processes 1 (Additive Processes)	Organized Session 1 Additive Manufacturing-1	Micro/Nano Technology 1 (Micro/Nano Materials)	Materials & Design 1 (Smart Materials, Composites)	Organized Session 2 Korea-Germany Intelligent Manufacturing Systems-1
10:15-10:30		Coffee Break				
10:30-12:00	ORAL 2	Manufacturing Processes 2 (Welding, Joining, Embossing)	Invited Talk Pei-Chen Su Organized Session 1 Additive Manufacturing-2	Micro/Nano Technology 2 (Micro/Nano Fabrication /Manufacturing)	Materials & Design 2 (Tribology, Surface Engineering)	Invited Talk Matthias Brockmann Organized Session 2 Korea-Germany Intelligent Manufacturing Systems-2
12:00-13:00		Conference Lunch - Cat Dang (1F), Nalod Da Nang Hotel				
12:00-13:00		IJPEM/IJPEM-GT Editorial Board Meeting - Ca Chia Voi (4AF), Nalod Da Nang Hotel				
13:00-13:10		Opening Ceremony - Nguyet Que (3F), Nalod Da Nang Hotel				
13:10-13:50		Plenary Speech 1 Hideki Aoyama (Keio University) Room 1- Nguyet Que (3F), Nalod Da Nang Hotel				
13:50-14:00		Break				
14:00-15:45	ORAL 3	Invited Talk Yunn-Shiuan Liao Manufacturing Processes 3 (Grinding, Ablation)	Organized Session 1 Additive Manufacturing-3 Organized Session 8 Singapore-Korea Joint Session-1	Invited Talk Low Hong Yee Micro/Nano Technology 3 (Micro/Nano Device and Applications)	Materials & Design 3 (Design of System and Components-1)	Automation, Measurement & Control 1 (Measurement Systems)
15:45-16:00		Coffee Break				
16:00-17:30	ORAL 4	Manufacturing Processes 4 (Machining)	Organized Session 8 Singapore-Korea Joint Session-2	Invited Talk Quoc Hung Nguyen Organized Session 6 System Engineering using Computational Mechanics	Materials & Design 4 (Design of System and Components-2)	Automation, Measurement & Control 2 (Automation)

July 12 (Fri)

08:30		Registration Open - Lobby (2F), Nalod Da Nang Hotel				
09:00-10:15	ORAL 5	Manufacturing Processes 5 (CMP, Metal Forming)	Sustainable Technology 1 (Energy Monitoring and Management)	Machine Tools & Systems 1 (Advanced Machine Tools)	Materials & Design 5 (Design for Manufacturing)	Automation, Measurement & Control 3 (System Control)
10:15-10:30		Coffee Break				
10:30-12:00	ORAL 6	Invited Talk Kazuto Yamauchi Manufacturing Processes 6 (Manufacturing)	Invited Talk Le Hoang Sinh Sustainable Technology 2 (Manufacturing Technology)	Invited Talk ChaBum Lee Machine Tools & Systems 2 (Smart Factory)	Invited Talk Seung Ki Moon Organized Session 7 Precision Machinery and Related Materials	Invited Talk Chunhua Zheng New and Renewable Energy 1 (Battery / Fuel cell / Solar cell)
12:00-13:00		Conference Lunch - Cat Dang (1F), Nalod Da Nang Hotel				
13:00-13:40		Plenary Speech 2 Seung-Woo Kim (KAIST) Room 1- Nguyet Que (3F), Nalod Da Nang Hotel				
13:40-13:45		Break				
13:45-14:45		Poster Presentation 1 - Lobby (2F & 3F), Nalod Da Nang Hotel				
14:45-16:15	ORAL 7	Organized Session 4 Development of Freeform Optics Manufacturing Process and Measurement System	Organized Session 5 Innovative Forming	Machine Tools & Systems 3 (Machinery)	Materials & Design 6 (Ecofriendly and Advanced Materials)	New and Renewable Energy 2 (Wind / Hydro and Other Energy)
16:15-16:30		Coffee Break				
16:30-17:30		Poster Presentation 2 - Lobby (2F & 3F), Nalod Da Nang Hotel				
17:30-17:50		Closing Ceremony (Awards, PRESM 2020 Announcements and Closing Remark by Conference Chair)				
18:30-21:30		Banquet - Four Point by Sheraton Da Nang, The Eatery Restaurant (3F), Regular Participants and Banquet Ticket Holders Only				

July 13 (Sat)

09:30-12:00	Technical Tour - Duy Tan University (Quang Trung Campus & South Hoa Khanh Campus)
16:00-17:30	Korea-Vietnam Workshop (Only PRESM Committee & Invitees) My Son (3F), Nalod Da Nang Hotel

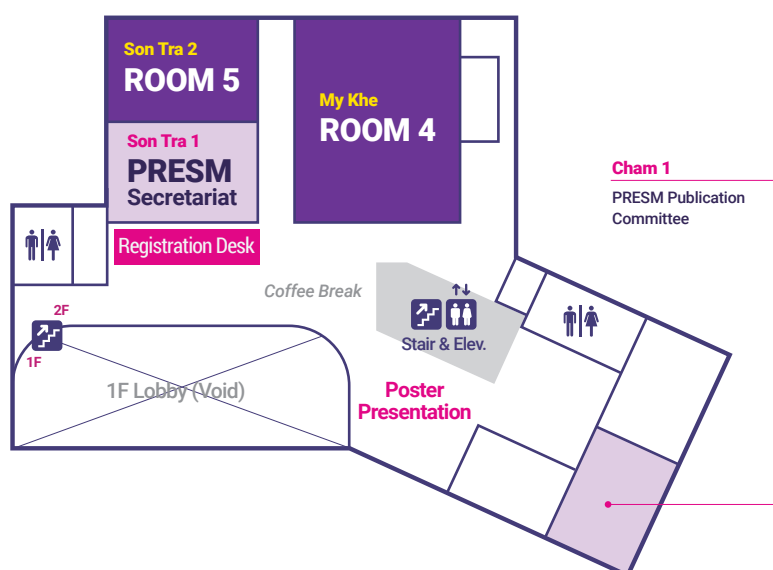
Venue / Floor Plan

Nalod Da Nang Hotel

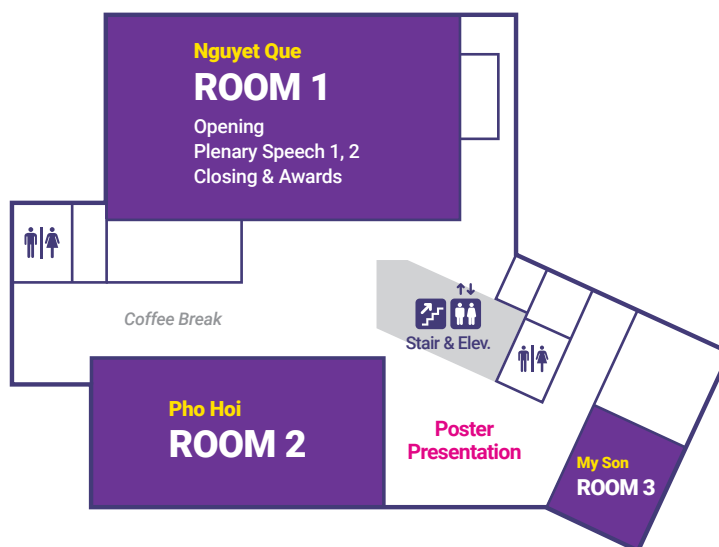
- 1 192 Vo Nguyen Giap Str., Son Tra, Da Nang City
Center of Coastline of My Khe Beach
- 2 Registration Desk – Lobby (2F)
- 3 Free Wi-Fi ; Nalod Da Nang.



2F

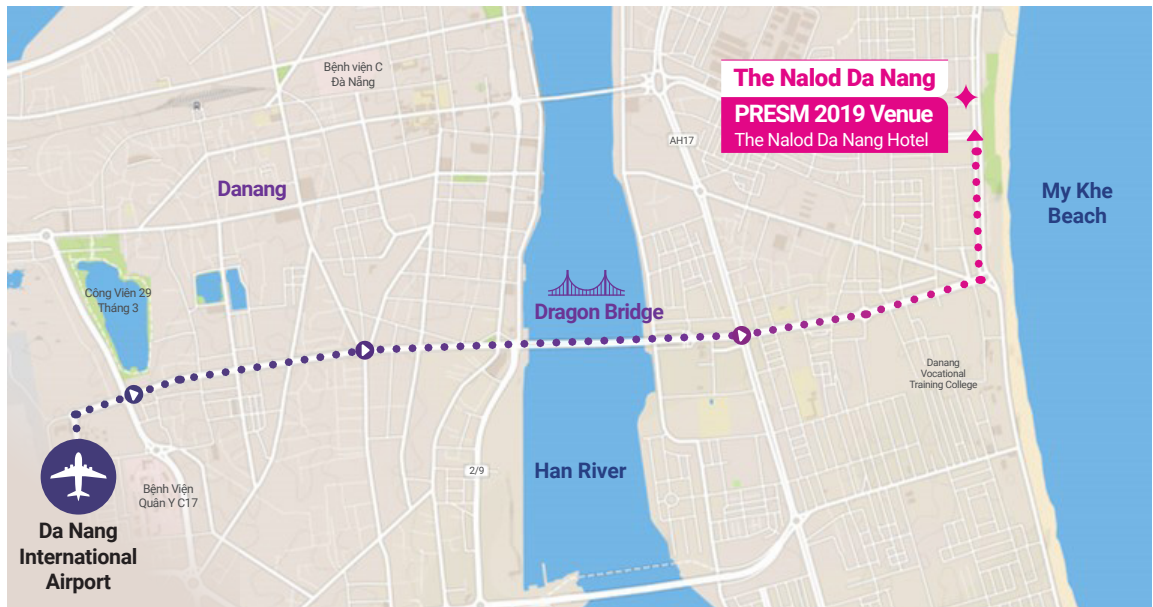


3F



The Nalod Da Nang Hotel

The Nalod Hotel is 8km away from the Da Nang International Airport and it takes about 20 mins. by taxi.



Registration / Information

Registration

Registration desk is located at the 2nd floor.

Category	Early Registration	On-Site Registration
Date	By May 15, 2019	from May 16 to July 12, 2019
Regular	600USD / 650,000KRW	700USD / 750,000KRW
Student	300USD / 350,000KRW	350USD / 400,000KRW
Banquet	50USD / 50,000KRW	

- 1 Please check your registration with the participants name at the Registration Desk (2F).
- 2 The registered participants can receive the Proceeding Kit : name tag, program book, e-proceedings (USB), Lunch coupons and eco-bag.
- 3 Banquet coupon is provided to Regular participants and to the person who purchased the banquet coupon.
- 4 On-site registration is available ONLY by Cash (USD, KRW) and ONLY for general participants. Presenter should complete the Early-Registration.

Meetings

Meetings	Date	Time	Place
Welcome Reception *All Participants	July 10 (Wed)	16:00-17:30	The Nalod Da Nang Hotel Lobby (2F)
Welcome Dinner *Only Invitees & Committee	July 10 (Wed)	18:00-21:00	The Nalod Da Nang Hotel Ca Chia Voi (4AF)
IJPEM/IJPEM-GT Editorial Board Meeting *Editors and Members of the Editorial Board of IJPEM and IJPEM-GT	July 11 (Thu)	12:00-13:00	The Nalod Da Nang Hotel Ca Chia Voi (4AF)
Korea-Vietnam Workshop *Only Invitees	July 13 (Sat)	16:00-17:30	The Nalod Da Nang Hotel My Son (3F)

Oral / Poster Presentation Guideline

Oral

- Presentation time: Total 15mins (Presentation 12mins / Q&A 3mins)
- *1st timer alert: 2 mins remaining (10 mins after start)
- *2nd timer alert: 12 mins after start (end of time)
- Presentation materials: Please bring your PPT material on a USB memory stick.
; no specific format required
- Please upload your presentation material on the computer in the conference room by 10 mins before the session.
- Please wear your name tag and follow the instructions of the session chair.
- You can ask for help from our staff in blue vest.

Poster

- Poster size: A0 (841 mm×1189 mm)
- All presenters should print and bring their posters and no specific format required
- The poster Paper Number is attached on the top of the board.
- Items needed to attach the posters will be provided by the PRESM secretariat.
- Please wear your name tag and be prepared to answer questions from poster session chair.
- Please make sure that your poster is presented properly to avoid being listed as a no-show poster.

Category	Poster Posting & Presentation Time	Date & Location
Poster Session 1	Poster Posting Time: 11:00-13:00 Presentation Time: 13:45-14:45	July 12 (Fri) Lobby (2F & 3F)
Poster Session 2	Poster Posting Time: 15:30-16:30 Presentation Time: 16:30-17:30	

Lunch / Awards / Banquet

Lunch

Date / Time	Place
July 11 (Thu) 12:00-13:00	Cat Dang (1F), The Nalod Hotel
July 12 (Fri) 12:00-13:00	Cat Dang (1F), The Nalod Hotel

- Please *submit the coupon for Lunch* to staff when you enter the Restaurant.

Awards

Best Paper Awards and Young Researcher Awards will be announced at the Closing Ceremony in Room 1 (3F).

Banquet

Date / Time	Place
July 12 (Fri) 18:30-21:00	<ul style="list-style-type: none">• Four Point by Sheraton Da Nang, The Eatery Restaurant (3F)• Banquet coupon is required to enter the the Banquet Hall.• Additional purchase is available at the registration desk only by cash.



Technical Tour / Journal Publication

Technical Tour

Technical Tour of PRESM 2019 is planned to visit to **Duy Tan University** in Da Nang.

Date / Time	Program
July 13 (Sat) 09:00-12:30	09:30 – Departure to Duy Tan University 10:00 – Duy Tan University (Quang Trung Campus) Duy Tan University (South Hoa Khanh Campus) 11:30 – Departure to the Nalod Hotel 12:30 – Arrival at the Nalod Hotel



How to participate

Please apply at the Conference VENUE (The Nalod Hotel) at registration desk (Lobby, 2F).
The application is available from 9:00 on July 11 to 17:00 on July 12.
There is a limit of 40 people and the cost is for free.

Journal Publication

Selected papers will be published in journals below after passing through peer review.

- International Journal of Precision Engineering and Manufacturing (SCIE, IF 1.779(2017))
- International Journal of Precision Engineering and Manufacturing-Green Technology (SCIE, IF 4.561(2017))
- Journal of the Korean Society for Precision Engineering (SCOPUS)



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)

Manufacturing Processes 2 (Welding, Joining, Embossing)	Room 1 (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)

Manufacturing Processes 3 (Grinding, Ablation)				Room 1 (Nguyet Que, 3F)
Session Chair: Hyunseop Lee (Tongmyong University)				14:00-15:45
Invited Speech 4				
14:00-14:30			Design and Development of an Ultrasonic Spindle Module for Grinding Machines and its Applications	
			Yunn-Shiuan Liao (National Taiwan University)	
14:30-14:45	OP010	432	A Defect-Free Surface Modification Process based on Hybrid Irradiations Using High Power Diode Laser and Large Pulsed Electron Beam	
			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	Design and Development of PCD Tool for Micro-Grinding of Tungsten Carbide	
			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	Effect of Electron-Lattice Coupling on Selective Ablation of Metal Thin Film by Using Ultrashort Pulse Laser	
			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	Modeling of Grinding Chip Thickness Distribution for Brittle Materials by Material Removal Mode	
			Chongjun Wu (Donghua University), Beizhi Li (Donghua University), Jun Hu (Donghua University)	
15:30-15:45	OP014	546	Study on Reactive Electrophoretic Diamond Wire Sawing Process of Silicon Substrates for Solar Cell Application	
			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)	

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

- 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)

Organized Session 1 (Additive Manufacturing 1)			Room 2 (Pho Hoi, 3F)
Session Chair: Young-Jin KIM (Nanyang Technological University)			09:00-10:15
09:00-09:15	OS001	459	Criteria for the Orientation of Additive Manufacturing Parts in Powder Bed Fusion: An Industry Practice 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	OS002	024	Effects of the Surface Alloying in Joining of Titanium Composite Powders with Heterogeneous Titanium Substrates Using Selective Laser Melting 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	OS003	539	Surface Modification of Metallic Porous Structure Fabricated by Additive Manufacturing Technology 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	OS004	499	Design Rules for Support Structures in Electron Beam Melting Frederic Vignat (The Univ. Grenoble Alpes), Christelle Grandvallet (The Univ. Grenoble Alpes), Maxime Limousin (The Univ. Grenoble Alpes)
10:10-10:15	OS005	376	Conformal Additive Manufacturing Process Faez Alkadi (The University of Akron), Jae-Won Choi (The University of Akron)

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

Organized Session 1 (Additive Manufacturing 3)			Room 2 (Pho Hoi, 3F)
Session Chair: In Hwan Lee (Chungbuk National University)			14:00-14:45
14:00-14:15	OS010	283	Development of Multi Material Food 3D Printer In Hwan Lee (Chungbuk National University), Ju Ho Park (Chungbuk National University)
14:15-14:30	OS011	517	A Method to Investigate Mechanical Properties of Lattice Structures for Additive Manufacturing Dinh Son Nguyen (Danang University of Science and Technology), Thien An Nguyen-Van (Danang University of Science and Technology)
14:30-14:45	OS012	006	Influence of Process Parameters on Mechanical Strength of Fabricated Parts Using the Fused Deposition Modelling Method 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)

Organized Session 8 (Singapore-Korea Joint Session 1)	Room 2 (Pho Hoi, 3F)
Session Chair: Dong-Gyu Ahn (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)

Organized Session 8 (Singapore-Korea Joint Session 2)			Room 2 (Pho Hoi, 3F)
Session Chair: Seung Ki Moon (Nanyang Technological University)			16:15-17:15
16:15-16:30	OS101	584	Ultrafast Photonics for Ultra-Precision: Precision Metrology and Direct-Laser-Writing Young-Jin Kim (Nanyang Technological University)
16:30-16:45	OS102	599	Methodologies of the Development of Advanced Dies with the Improved Wear Characteristics Using a Directed Energy Deposition Process Dong-Gyu Ahn (Chosun University)
16:45-17:00	OS103	585	Fuel Cell and Hydrogen Technologies Research and Development in NTU Pei-Chen Su (Nanyang Technological University)
17:00-17:15	OS104	615	Exploration of Shape Memory Alloy (SMA) Actuators: Fast Actuation and Soft Robotic Applications 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)

Micro/Nano Technology 1 (Micro/Nano Materials)	Room 3 (My Son, 3F)
Session Chair: Moonkyu Kwak (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)

Micro/Nano Technology 2 (Micro/Nano Fabrication/Manufacturing)				Room 3 (My Son, 3F)	
Session Chair: Won Seok Chang (Korea Institute of Machinery & Materials)				10:30-11:45	
10:30-10:45	OP097	333	Mechanical Characterization of Polymeric Thin Film Using Nano Cutting Theory JeongHeon Lee (Chosun University), Jae B. Kwak (Chosun University), HyoSeong Lee (Chosun University)		
10:45-11:00	OP098	147	Investigation on Layered Elliptical Vibration-Assisted Cutting of Micro Groove 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	OP099	365	Nanomanufacturing and Nanofluidics of Atomically Thin Orifices of Porous Graphene Hyung Gyu Park (Pohang University of Science and Technology)		
11:15-11:30	OP100	083	Fabrication of Salvinia Inspired Functional Surfaces and Its Application 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	OP101	230	Nanomechanical Properties Measurements of Polymers Using AFM Probes with Different Shapes 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

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|-------------|--------------|-----|--|
| 14:00-14:30 | | | Scalable High-Resolution Functional Surfaces on Free-form 3D Objects
Low Hong Yee (Singapore University of Technology and Design) |
| <hr/> | | | |
| 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 H₂/H₂O 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) |

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

Organized Session 6 (System Engineering using Computational Mechanics)	Room 3 (My Son, 3F)
Session Chair: Jung Woo Sohn (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 Al₃Ni 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)

Materials & Design 2 (Tribology, Surface Engineering)				Room 4 (My Khe, 2F)
Session Chair: Sung-Tae Hong (University of Ulsan)				10:30-12:00
10:30-10:45	OP063	510	Effects of Surface Roughness to Adhesion of Cr₃C₂ Coating Fabricated on 16Mn Alloy Steel by a Thermal Spray Technique 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	OP064	445	Prediction of Thermal Fatigue Life in Thermal Barrier Coatings on Single Crystal Superalloy 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	OP065	411	Effect of Artificial Thermal Aging on High Temperature Fatigue Lifetime in Austenitic Stainless Steel Jaegu Choi (Sungkyunkwan University), Chang-Sung Seok (Sungkyunkwan University), Keekeun Kim (Sungkyunkwan University), Ki-Bum Park (Sungkyunkwan University)	
11:15-11:30	OP066	405	Prediction of Thermal Barrier Performance According to Thickness and Thermal Conductivity of Thermal Barrier Coating 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	OP067	183	Investigation of Multilayer Coatings for Wear Reduction Mahdi Khadem (Yonsei University), Dae-Eun Kim (Yonsei University)	
11:45-12:00	OP068	072	Post-Additive Manufacturing Surface Modification Technology for Controlling Microstructure, Mechanical and Tribological Properties of Ti-6Al-4V Alloy Auezhan Amanov (Sunmoon University), Young-Sik Pyun (Sunmoon University)	

Materials & Design 3 (Design of System and Components 1)	Room 4 (My Khe, 2F)
Session Chair: Hyung Wook Park (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)

Materials & Design 4 (Design of System and Components 2)			Room 4 (My Khe, 2F)
Session Chairs: Jihye Lee (Korea Institute of Machinery and Materials) Nguyen Hay (Nong Lam University)			16:00-17:30
16:00-16:15	OP075 295	Investigation on Hysteretic Characteristics of STS304 Stainless Steel Slit Damper BoKyung Hwang (Hanbat National University), TaeSoo Kim (Hanbat National University), YoungJu Kim (Pusan National University), JinWon Kim (POSCO)	
16:15-16:30	OP076 332	Design of Seal Structure for HFCV Cylinder Valve Considering Low Temperature Jaeseong Choi (Pusan National University), Hwayoung Kim (Pusan National University)	
16:30-16:45	OP077 455	Reliability Design of Submersible Multistage Coolant Pump by Comparison of Flow Simulation and Experiment 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	Design of Pressure Control System Using Fuzzy Algorithm for Surgical Stapler 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	An Investigation on Pressure Drop and Transport Time Through the Pipe Hole Network in Aspirating Smoke Detection System Ha Thien Khieu (Chung-Ang University), Hong Sun Ryou (Chung-Ang University), Young Man Lee (Chung-Ang University)	
17:15-17:30	OP080 476	Effect of Technological and Geometrical Parameters on Formation of Radius Region at Cylindrical Product Bottom in Hydrostatic Forming 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) Matthias Brockmann (RWTH Aachen University)	09:00-10:15

- 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**
Daenyong 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)	
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.)	

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

- 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)

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

Manufacturing Processes 5 (CMP, Metal Forming)	Room 1 (Nguyet Que, 3F)
Session Chair: Pham Duc Cuong (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)

Manufacturing Processes 6 (Manufacturing)			Room 1 (Nguyet Que, 3F)
Session Chair: Shihyoung Ryu (Chonbuk National University)			10:30-12:00
Invited Speech 8		Session Chair: Yong Sup Choi (National Fusion Research Institute)	
10:30-11:00		Precision Measurement, Fabrication and Related Technologies for X-ray Mirror Optics Kazuto Yamauchi (Osaka University)	
11:00-11:15	OP024 281	Development of Electrically Assisted Rapid Stress Relief Annealing for Helical Automotive Springs 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	OP025 020	Estimation of Process Damping Coefficient Using Dynamic Cutting Force Model Minh-Quang Tran (National Taiwan University of Science and Technology), Chunhui Chung (National Cheng Kung University)	
11:30-11:45	OP026 463	Recent Developments in Manufacturing of Marine Propellers: A Literature Review Eric Dimla (RMIT University), Minh Tran Quang (RMIT University)	
11:45-12:00	OP027 036	A Study on Cluster-Wise Regression Model for Welding Quality in the Robotic Arc Welding 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)

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

Organized Session 5 (Innovative Forming)			Room 2 (Pho Hoi, 3F)
Session Chair: Tae-Wan Ku (Pusan National University)			13:45-16:00
13:45-14:00	OS050 063	Application of SPH Numerical Method to Jointing Sheet Materials Kihwan Park (Pusan National University), Jeong Kim (Pusan National University)	
14:00-14:15	OS051 074	Spring-Back Compensation of AHSS Parts by Robust Error Correction 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	OS052 410	Parametric Study on Blank Support Structure for Thick Plate Forming of Hollow-Partitioned Turbine Stator Mi-Rae Lim (Pusan National University), Tae-Wan Ku (Pusan National University), Beom-Soo Kang (Pusan National University)	
14:30-14:45	OS053 077	Process Design of Continuous Two Stage Roll Die Forming to Improve Dimensional Accuracy 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	OS054 341	A Study on Die Design for Manufacturing Pinch Yoke of Automotive Steering System 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	BREAK		

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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)

Machine Tools & Systems 1 (Advanced Machine Tools)			Room 3 (My Son, 3F)
Session Chairs: Jayil Jeong (Kookmin University) Dong Min Kim (Korea Institute of Industrial Technology)			09:15-10:15
09:15-09:30	OP028 262	Development of Edge Control Technology for Side Shape Implementation of FCP Ki Hyuk Kim (Hanbat National University), Donghoon Lee (Hanbat National University), Kiyoungh Son (University of Ulsan), Taihui Kim (Mokpo National University)	
09:30-09:45	OP029 132	Proposal of Ultrasonic Multi-Mode Vibration Cutting for High-Efficiency Surface Texturing 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	OP030 069	Development of a Tabletop Wire-EDM Machine for Fabricating Micro Cutting Tools 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	OP031 543	Multiple Defects Detection Model Using a Convolutional Network for Injection Molding Products Hwaseop Lee (Pusan National University), Kwangyeol Ryu (Pusan National University), Siku Kim (Pusan National University), Yeeyeng Liao (Pusan National University)	

Machine Tools & Systems 2 (Smart Factory)	Room 3 (My Son, 3F)
Session Chairs: 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-Orientation 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)

Machine Tools & Systems 3 (Machinery)			Room 3 (My Son, 3F)
Session Chairs: Young Hun Jeong (Kyungpook National University) Tae-Gon Kim (Korea Institute of Industrial Technology)			15:00-16:00
15:00-15:15	OP036 170	Generating Continuous Tool Motions in 5-Axis CNC Flank Milling for Improving Machining Quality Chih-Hsing Chu (National Tsing Hua University), Hsiang-Yun Chen (National Tsing Hua University)	
15:15-15:30	OP037 474	Industrial Internet of Service Platform for Ecosystem of Manufacturing Quality Management 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	OP038 537	An Integrated Decision Making Model for Configuration Selection in Reconfigurable Manufacturing System Kezia Amanda Kurniadi (Pusan National University), Kwangyeol Ryu (Pusan National University), Sangil Lee (Pusan National University)	
15:45-16:00	OP039 286	Designing an OPC UA Companion Model for Predictive Model Markup Language 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),
 Eunwoo 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)	
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 Binh 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**
Jinja 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)

Automation, Measurement & Control 3 (System Control)			Room 5 (Son Tra 2, 2F)
Session Chairs: 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)

New and Renewable Energy 2 (Wind / Hydro and Other Energy)			Room 5 (Son Tra 2, 2F)
Session Chair: Chunhua Zhang (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences)			15:00-16:15
15:00-15:15	OP110	416	Aerodynamic Shape Optimization of Small Size Wind Turbine Blades Using DAKOTA – Genetic Algorithm 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	The Design, Simulation and Testing of an Omni-Direction Deflector for Vertical Axis Wind Turbine 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	Experimental Investigation of the Influence of the Relatively Humidity on Water Film Evaporative Cooling Thermoelectric Device 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	Empirical Correlation Development of EEV Mass Flow Rate in a Refrigeration System 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	Effects of Stochastic Soil Variability on the Dynamic Behavior of Offshore Wind Turbines Woochul Nam (Chung-Ang University), Ki-yong Oh (Chung-Ang University)

Poster Presentation 1

July 12 (Friday) 13:45-14:45

1. Manufacturing Processes

Lobby (3F)

PP001 224 Fabrication of Micro Pin Array of Graphite Carbon

Ui Seok Lee (Soongsil University), Bo Hyun Kim (Soongsil University), Yung Na (Soongsil University),
Pyeong An Lee (Soongsil University)

PP002 249 Prediction of Forming Forces in Incremental Sheet Forming with a Tool Dynamometer

Chai Hwan Kim (Kyungnam University), Jae Gwan Kang (Kyungnam University),
Kyung Hee Koh (Kyungnam University)

PP003 068 A Study on the Austenite Formation and Oxidation Resistance of AGI According to Aluminum Content

Dong Hyuk Kim (Korea Institute of Industrial Technology), Jong Hyoung Kim (Korea Institute of Industrial
Technology), Si Geun Choi (Korea Institute of Industrial Technology), Jae Il Jeong (Korea Institute of Industrial
Technology), Jae Won Kim (Korea Institute of Industrial Technology), Bok Seong Choe (Korea Institute of
Industrial Technology), Jin Young Park (Korea Institute of Industrial Technology)

PP004 242 Study of Durability of Superhydrophobic Coating on Polypropylene

Oyunchimeg Erdene-Ochir (University of Ulsan), Doo-Man Chun (University of Ulsan)

**PP005 071 Effects of Substrate Preheating for Suppressing Crack Formation in Repairs Using Direct Energy
Deposition (DED)**

Wook Jin Oh (Korea Maritime and Ocean University), Do Sik Shim (Korea Maritime and Ocean University),
Min Seob Kim (Korea Maritime and Ocean University), Yee Un Jeong (Korea Maritime and Ocean University),
Ki Yong Lee (Korea Institute of Industrial Technology)

**PP006 182 The Study of Soldering-Resistance Characteristics of IN718 Manufactured by Direct Energy
Deposition Process in Aluminum Melt**

Gwang Yong Shin (Korea Institute of Industrial Technology), Ki Yong Lee (Korea Institute of Industrial
Technology), Do Sik Shim (Korea Maritime and Ocean University), Young Chan Kim (Korea Institute of Industrial
Technology), Se Weon Choi (Korea Institute of Industrial Technology), Yu Mi Kim (Korea Institute of Industrial
Technology)

PP007 167 Picosecond Laser Direct Fabrication of Micro Channel on Fused Silica

Hong Shen (Shanghai Jiao Tong University), Han Wang (Shanghai Jiao Tong University)

PP008 296 The Effects of Magnetic Abrasive Finishing on Slot and Optimization Using Grey Relational Analysis

Jung-Hee Lee (Pukyong National University), Jae-Seob Kwak (Pukyong National University),
Chul-Bae Son (Hanguk Precision Co., Ltd.)

PP009 010 Study on AI Welding as Material of Cryogenic Fuel Propulsion Tank for Ship

Jaewoong Kim (Korea Institute of Industrial Technology), In-Ju Kim (Korea Institute of Industrial Technology),
Jisun Kim (Korea Institute of Industrial Technology), Sungwook Kang (Korea Institute of Industrial Technology)

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- PP010** 165 **Development of Hot Press Forming via Resistance Heating System to Improve Energy Efficiency by 80%**
 Jeongsik Lim (SHIN YOUNG Co., Ltd.), Jaedong Cho (SHIN YOUNG Co., Ltd.),
 Jongdock Seo (SHIN YOUNG Co., Ltd.), Seunghun Cha (Gyeongbuk Technopark)
- PP011** 322 **Bending Strength Dependency on Powder Particle Size in Binder Jetting Type Additive Manufacturing Process**
 Jongyoul Lee (Korea Electronics Technology Institute), Kyoung Il Lee (Korea Electronics Technology Institute),
 Jinkoog Shin (Korea Electronics Technology Institute), Sunghwak Park (Korea Electronics Technology Institute),
 Jongsuk Won (Korea Electronics Technology Institute), Youngjun Ji (Korea Electronics Technology Institute)
- PP012** 493 **Development of Aluminium Thin Sheet Forming Process for Battery Cell Cover of Electric Vehicle**
 Seongwon Lee (Korea Institute of Industrial Technology),
 Jungmin Lee (Korea Institute of Industrial Technology), Gyuman Kim (CENTRAL)
- PP013** 008 **Investigation on Natural Convection Effects of Inert Gas Flow in Glass Fiber Drawing of Optical Fiber Manufacturing System**
 Gia Ginelle Carandang (Kumoh National Institute of Technology),
 Kyoungjin Kim (Kumoh National Institute of Technology)
- PP014** 234 **Tool Fracture Mechanism in Wet Milling of Ti-6Al-4V Alloy and LN2 Cryogenic Machining**
 Kyung-Hee Park (Korea Institute of Industrial Technology), Gi-Dong Yang (Korea Institute of Industrial Technology),
 Dong Yoon Lee (Korea Institute of Industrial Technology), Patrick Kwon (Michigan State University)
- PP015** 274 **Application of Convolutional Neural Network for Effective Process Monitoring in Selective Laser Melting**
 Ohjung Kwon (Korea Institute of Industrial Technology), Kangil Kim (Gwangju Institute of Science and Technology),
 Hyung Giun Kim (Korea Institute of Industrial Technology), Min Ji Ham (Korea Institute of Industrial Technology),
 Wonrae Kim (Korea Institute of Industrial Technology), Gun-Hee Kim (Korea Institute of Industrial Technology)
- PP016** 513 **Ultrasonic Powder Removal System for Parts Built with Electron Beam Melting Technology**
 Pierre-Thomas Dautre (The Univ. Grenoble Alpes), Xinyu Wang (The Univ. Grenoble Alpes),
 Matthieu Museau (The Univ. Grenoble Alpes), Frederic Vignat (The Univ. Grenoble Alpes)
- PP017** 490 **Ball-Burnishing and UNSM Treatment for Ultrahigh Wearproof Characteristics of SUS316**
 Young Uk Gil (Pusan National University), Sang Hu Park (Pusan National University),
 Yeong Kwan Jo (Pusan National University), Jae Hyun Yu (Pusan National University),
 Do Sik Shim (Korea Maritime and Ocean University), Young Sik Pyun (Sunmoon University)

- PP018** 453 **Tool Wear Analysis of CFRP Routing Tool Using Vision Based On-machine Measurement System**
Tae-Gon Kim (Korea Institute of Industrial Technology), Kangwoo Shin (Korea Institute of Industrial Technology), Jung-Soo Nam (Korea Institute of Industrial Technology), Hyo-Young Kim (Korea Institute of Industrial Technology), Seok-Woo Lee (Korea Institute of Industrial Technology)
- PP019** 568 **A Study on the Processing Characteristics Following the Focus Alignment for Improving the Machinability of High Power Density Electron Beam**
Seung-Yub Baek (Induk University), Seong-Hyun Kim (Induk University), Hyun-Jeong Kim (Induk University), Eun-Chan Wi (Induk University), Sung-Taek Jung (Induk University), Sung-Chul Kim (AM Technology Co., Ltd.)
- PP020** 374 **3D Hole Drilling by Pulsed Electrochemical Machining through Magnetic Position Control of Sphere Electrode**
Yifan Tang (Chonbuk National University), Shihyoung Ryu (Chonbuk National University)
- PP021** 279 **Development of IE4 Class 2.2kW Induction Motor**
Myeong Jin Ko (Korea Institute of Industrial Technology), Soon Sub Park (Korea Institute of Industrial Technology), Hyoun-Seon Shim (Korea Institute of Industrial Technology)
- PP022** 587 **An Experimental Investigation of Pre-Cryogenic Treated Titanium Alloys in Ultra-Precision Machining**
Wai Sze Yip (The Hong Kong Polytechnic University), Suet To (The Hong Kong Polytechnic University)
- PP023** 324 **Numerical Analysis of Welding Residual Stress Evolution During CTOD Specimen Preparation by Reverses Bending**
Sung Min Joo (Chosun University), Young Gon Kim (Korea Institute of Industrial Technology), Young Hyun Kim (Chosun University)
- PP024** 236 **A Study on Improvement of Heater Design by Heat Transfer Simulation of Press Tempering Mold**
Yonghan Yoon (Gyeongbuk Technopark), Jaesool Shim (Yeungnam University), Man-Ho Choi (CHUNG HO Heat Treatment)
- PP025** 144 **Evaluation of Tensile Shear Strength by Salt Spray Test on Dissimilar Welds of Aluminum Alloy and Galvannealed Steel**
Young Gon Kim (Korea Institute of Industrial Technology), Sung Min Joo (Chosun University), Young Hyun Kim (Korea Institute of Industrial Technology), Min Suk Oh (Chonbuk National University)
- PP026** 518 **Determination of the Stress-Strain Relation in Plain Strain Tensile Testing Using High-Speed Photography and Infra-Red (IR) Thermography**
Byoungjin Choi (Seoul National University of Science and Technology), Jihong Hwang (Seoul National University of Science and Technology)

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- PP027** 456 **Warpage and Shrinkage of PA6/GF Composites by Microcellular Foam Injection Molding Process**
 Chang-Seok Yun (Yonsei University), Sung Woon Cha (Yonsei University), Joo Seong Sohn (Yonsei University),
 Youngjae Ryu (Yonsei University), Kun Zhu (Yonsei University), Soo-hyun Cho (Yonsei University),
 Byeongkoo Park (JINWON Inc.)
- PP028** 252 **A Study on in-Mold Temperature Measurement Using Thermocouples Array**
 Channyong Yun (Korea Electronics-Machinery Convergence Technology Institute),
 Dongyoung Jang (Seoul National University of Science and Technology),
 Changwoo Ban (Korea Electronics-Machinery Convergence Technology Institute),
 Ohsung Kwon (Korea Electronics-Machinery Convergence Technology Institute),
 Sanghun Ok (Korea Electronics-Machinery Convergence Technology Institute),
 Seungpil Lee (Korea Electronics-Machinery Convergence Technology Institute)
- PP029** 470 **Study on CMP Pad Profile Deformation According to Diamond Arrangement of Conditioning Discs**
 Donghwan Lee (Pusan National University), Haedo Jeong (Pusan National University),
 Dasol Lee (Pusan National University), Seonho Jeong (Pusan National University),
 Hyoungjae Kim (Pusan National University), Hanchul Cho (Korea Institute of Industrial Technology)
- PP030** 563 **Evaluation of Tool Wear During Turning for Inconel 713C Using TiAlN Coated Insert Tool**
 Geon Cheol Park (Yeungnam University), Tae Jo Ko (Yeungnam University), Rendi Kurniawan (Yeungnam University),
 KiMoon Park (Yeungnam University), MinChael Kim (Yeungnam University), Yeln Kwak (Yeungnam University),
 JongMin Lee (Yeungnam University), Zhen Yu (Yeungnam University), Chong Sung Park (Mirae Metal Tech Co.,
 Ltd. Korea)
- PP031** 159 **Optimal Design Considering Rib Thickness of Supported Structure for Inner Race Track Grinding Machine**
 Hye-Won Han (Dong-A University), Seung-Ho Han (Dong-A University), Hyung-Jun Park (Dong-A University),
 Hyo-Rim Kang (Dong-A University), Ga-Eun Kim (Dong-A University)
- PP032** 533 **Electrochemical Oxidation Assisted Machining Using Conductive Tool**
 Hyunho Jo (Yonsei University), Byung-Kwon Min (Yonsei University), Eunseok Nam (Korea Institute of Industrial
 Technology), Jaesang Park (Yonsei University), Myeong Gu Gang (Yonsei University), Gyuho Kim (Yonsei University)
- PP033** 208 **Cross-Section Morphology and Surface Roughness of Material Extrusion Type 3D Printing
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Sang San Lee (LJ TECH Co., Ltd.)
- PP246** 313 **Finite Element Analysis of Suture Anchor Design and Primary Fixation Strength**
Soo-Won Chae (Korea University),
Ju-Yong Kang (Korea University),
Soung-Yon Kim (Korea University)

Organized Session 7 (Precision Machinery and Related Materials)

Lobby (2F)

- OS086 312 Comparative Analysis of Laser Cladding Using White Metal**
 Chan Kyu Kim (Changwon National University),
 Young Tae Cho (Changwon National University),
 Won Pyo Kim (Changwon National University),
 Do Yeong Moon (Changwon National University)
- OS087 478 Effects of Processing Path on Mechanical Properties in Ultrasonic Nanocrystal Surface Modification Technology**
 Chanjin Kim (Korea Maritime and Ocean University),
 Dosik Shim (Korea Maritime and Ocean University),
 Minseob Kim (Korea Maritime and Ocean University),
 Yeongkwan Jo (Pusan National University),
 Sanghu Park (Pusan National University)
- OS088 454 Applications of Nano Imprint Process for Smart Window Panel**
 Do Hyeog Kim (Changwon National University),
 Young Tae Cho (Changwon National University),
 Ki Beom Park (Changwon National University)
- OS089 496 Application of Contact Arc Metal Cutting Process for Underwater Manufacturing**
 Do Yeong Mun (Changwon National University),
 Young Tae Cho (Changwon National University),
 Ill-woo Moon (Hanto Cutting System)
- OS090 116 A Study on the Structural Analysis of the Special Chuck for Ball Screw Nut Grinding Machining**
 Ho-In Jeong (Changwon National University),
 Choon-Man Lee (Changwon National University)
- OS091 212 A Basic Study on the Thermal Analysis of a Spindle of Hybrid Machine Tool Based on 3D Printing**
 Kangwook Kim (Changwon National University),
 Choon-Man Lee (Changwon National University)
- OS092 213 A Basic Study on the Thermal Deformation of a Plasma Torch for Plasma Assisted Machining**
 Seong-Gyu Kim (Changwon National University),
 Choon-Man Lee (Changwon National University),
 In-Jae Lee (Changwon National University)

- OS093 451 Comparison of Oleophobicity between Re-entrant and Pillar Structure**
Su Hyun Choi (Changwon National University),
Young Tae Cho (Changwon National University),
Seon Jun Kim (Changwon National University),
Woo Young Kim (Changwon National University),
Youn Hee Park (Changwon National University)
- OS094 494 Numerical Studies of Fluidic Flow and Thermal Response of 3D Lattice Structures for Efficient Catalytic Substrates**
Wonpyo Kim (Changwon National University),
Young Tae Cho (Changwon National University),
Seok Kim (Massachusetts Institute of Technology),
Nicholas Xuanlai Fang (Massachusetts Institute of Technology)
- OS095 486 Shape Morphing by Partial Curing with Composition Control of Dye and HDDA**
Woo Young Kim (Changwon National University),
Young Tae Cho (Changwon National University),
Seon Jun Kim (Changwon National University),
Su Hyun Choi (Changwon National University)
- OS096 102 A Basic Study on the Copper Pipe Forming Analysis According to Center Position of a Joint Mandrel**
Yea Jin Yang (Changwon National University),
Choon-man Lee (Changwon National University)

Poster Presentation 2

July 12 (Friday) **16:30-17:30**

4. Materials & Design-2

Lobby (3F)

- PP135** 190 **Characteristics of Geopolymer-Polyurethane Sponge Composite**
Sang-Jin Lee (Mokpo National University)
- PP136** 117 **Analysis of Wettability and Surface Free Energy of Engine Oils**
Sangmin Lee (Donggeui University), Unyoung Ko (Donggeui University), In-Woong Lyo (Hyundai Motor Group), Jeong-Uk An (Hyundai Motor Group), Hongwook Lee (Hyundai Motor Group)
- PP137** 611 **Optimum Sound Absorption Design of Composite Structure Nonwoven for Fender-liner in Vehicle Exterior Parts**
Seong Jin Cho (Korea Textile Machinery Convergence Research Institute), In-Sung Lee (Korea Textile Machinery Convergence Research Institute), Jun Hyeok Heo (Korea Textile Machinery Convergence Research Institute), Tae Hyeon Oh (Korea Textile Machinery Convergence Research Institute), Un-Hwan Park (Korea Textile Machinery Convergence Research Institute), Chang Seok Park (Wonpung Mulsan Co., Ltd.)
- PP138** 261 **Design Optimization of Rear Floor Assembly with CFRP to Meet Stiffness and Strength**
Seunghoon Cha (Gyeongbuk Technopark), Bumsik So (Gyeongbuk Technopark), Joonghee Kim (Gyeongbuk Technopark)
- PP139** 136 **Light-Weight Design of Automotive Shock Tower Mounting Bracket by Using Computer Aided Engineering**
Si Tae Won (Seoul National University of Science and Technology), Kee Joo Kim (Tongmyong University)
- PP140** 564 **Enhancement of Mechanical Properties and Extrudability of Magnesium Alloys Using Artificial Cooling System**
Sung Hyuk Park (Kyungpook National University), Sang-Hoon Kim (Kyungpook National University), Ha Sik Kim (Korea Institute of Materials Science)
- PP141** 607 **The Gearbox Design for High Precision Thread Whirling Head**
Kim Dong Seon (Gyeongsang National University), Jeon Min Hyong (Gyeongsang National University), Qin Zhen (Gyeongsang National University), Cho Jae Ung (Kongju National University), Jeon Namsul (Guemhwa Tech LDT)
- PP142** 358 **Determination of Specimen Shape for Accurate Measurement of Tensile Properties Using SHTB Apparatus**
Yo-Han Yoo (Agency for Defense Development), Jong-Bong Kim (Seoul National University of Science and Technology), Khac-Ha Nguyen (Seoul National University of Science and Technology), Hyeon Jun Jung (Seoul National University of Science and Technology), Taek Jin Jang (Seoul National University of Science and Technology), Chang-Whan Lee (Seoul National University of Science and Technology), Hyunho Shin (Gangneung-Wonju National University)

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- PP143** 033 **Pressure Deviation Analysis of Pressurized Roller System for Superhydrophobic Surface Fabrication**
Yousung Kang (Ajou University), Yongho Jeon (Ajou University), Changho Jung (Ajou University), Moon G. Lee (Ajou University), Seung-Jun Lee (Seowon University)
- PP144** 175 **A Study on Design of the Reduction for Small Electric Vehicle Due to the Change of Gear Module**
Beom Seop Gwak (Gyeongsang National University), Chul Ki Song (Gyeongsang National University), Seong Hoon Kim (Gyeongsang National University), Jae Gu Lee (SEONGHWA Co., Ltd.), Jae Bok Yoo (REO Co., Ltd.)
- PP145** 120 **Robust Design of Flame for Battery Exchange Typed Electric Motorcycle**
Dahae Yu (Hansung University), Sang-Hyun Kim (Hansung University), Jungwoo Park (Hansung University), Nadan Cho (Hansung University), Gaeun Kim (Hansung University), Jimin Lee (Hansung University), Dayul Na (Hansung University), Kwanghyun Rho (Hansung University), Jaesang Lee (JAESANG Electronic Co. Ltd)
- PP146** 058 **True Stress-Strain Curve of Pure Silver over a Large Strain Range**
Doo Hyun Cho (Korea University), Kwon-Hee Kim (Korea University), Jung-Hoon Kim (Korea University), Hyo Chan Kwon (Korea University)
- PP147** 590 **Structural Stability of High-temperature Butterfly Valve Using Interaction Analysis**
Eunah Jeong (Donggeui University), Insoo Son (Donggeui University), Sangpill Lee (Donggeui University)
- PP148** 258 **Pressure Assisted Solid State Sintering Process of Tungsten Materials and Their Characterization**
Hui-seong Hong (Donggeui University), Sang-pill Lee (Donggeui University), Jin-Kyoung Lee (Donggeui University), In-soo Son (Donggeui University), Moon-hee Lee (Donggeui Institute of Technology), Jong-ho Lee (Donggeui Institute of Technology)
- PP149** 155 **Highly Sensitive and Flexible Ionic Thermocouple Array Based on Ionic Seebeck Effect**
Jei Gyeong Jeon (Inha University), Tae June Kang (Inha University), Hyeongjun Kim (Inha University), Ju Hyeon Kim (Inha University), Ju Hwan Lee (Inha University)
- PP150** 181 **Structural Analysis of Hat-Type Structures with Different Composites for Lightweight Materials**
Jiheon Kang (Korea Institute of Industrial Technology), Jaewook Lee (Korea Institute of Industrial Technology), Kunwoo Kim (Korea Institute of Industrial Technology), Jinseok Jang (Korea Institute of Industrial Technology), Jiwook Kim (Korea Institute of Industrial Technology), Minseok Yang (Korea Institute of Industrial Technology)
- PP151** 095 **3D Printed Fluidic Channel for Rapid and Uniform Cooling of Injection Molding**
Ju Yeon Park (Chonnam National University), Hyun Wook Kang (Chonnam National University), Na Kyong Kim (Chonnam National University), Dong Hee Kang (Chonnam National University)
- PP152** 051 **Energy Absorption of Rectangular Tubes with Perforations in Dynamic Axial Crush**
Jung-Hoon Kim (Korea University), Kwon-Hee Kim (Korea University), Chang-Hee Cho (Gyeonggi College of Science and Technology), Seon-Ung Choi (Korea University)

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- PP153** 105 **Research on Result of Sapphire CMP After Lap-Grinding Process**
 Junyoung Seo (Tongmyong University), Hyunseop Lee (Tongmyong University),
 Taekyoung Kim (Tongmyong University), Jungyu Son (Tongmyong University)
- PP154** 245 **Effect of Counter Material on Tribological Characteristics of Cobalt-Chromium-Molybdenum Alloy**
 Ngoc-Phat Huynh (University of Ulsan), Koo-Hyun Chung (University of Ulsan), Mi Na Jeong (University of Ulsan)
- PP155** 326 **Fabrication of In-Site TiC Particles Dispersed Ti Matrix Composite**
 Ning Wang (Hiroshima University), Yongbun Choi (Hiroshima University), Siran Chen (Hiroshima University),
 Kentaro Ohe (Hiroshima University), Kazuhiro Matsugi (Hiroshima University), Xingang Liu (Yanshan University)
- PP156** 081 **A Study on Indented Crash Box for Enhanced Energy Absorption or Weight Reduction for Automobiles**
 Seon-Ung Choi (Korea University), Kwon-Hee Kim (Korea University), Jung-Hoon Kim (Korea University)
- PP157** 316 **A Study on the Weight Reduction of Floor Panel for Automobile Bodies**
 Seon-Ung Choi (Korea University), Kwon-Hee Kim (Korea University), Jung-Hoon Kim (Korea University)
- PP158** 323 **Buckling Strength on Duplex Stainless Steel Tubular Column under Axial Compression**
 Sungsoo Kim (Hanbat National University), TaeSoo Kim (Hanbat National University),
 Bokyung Hwang (Hanbat National University), JeongYeon Kim (Hanbat National University)
- PP159** 501 **Effect of Metal-Support Interaction on Catalytic Performance of Co-Based Catalysts for Production of High-Calorific Synthetic Natural Gas**
 Tae Young Kim (Kyungpook National University), Jae Chang Kim (Kyungpook National University), Seong Bin Jo
 (Kyungpook National University), Chul Ho Lee (Kyungpook National University), Suk-Hwan Kang (Institute for
 Advanced Engineering), Joon Woo Kim (Research Institute of Industrial Science & Technology),
 Moon Jeong (Construction Engineering Service Co.), Soo Chool Lee (Kyungpook National University)
- PP160** 137 **Design of Foot Part Damping Structure for the Riding Comfort of Lightweight Electric-Kickboards**
 Tae Han Park (Seoul National University of Science and Technology), Si Tae Won (Seoul National University of
 Science and Technology), HanSu Kim (Seoul National University of Science and Technology)
- PP161** 247 **Efficiency Analysis of Mechanical Component Friction**
 Tae-Hyeong Kim (Yonsei University), Dae-Eun Kim (Yonsei University)
- PP162** 104 **Effect of Hydrogen Peroxide on Machining Results in Abrasive Fluidized CMP**
 Taekyoung Kim (Tongmyong University), Hyunseop Lee (Tongmyong University),
 Junyoung Seo (Tongmyong University), Jungyu Son (Tongmyong University)
- PP163** 424 **Static Analysis of Low Frequency Isolation Model Using Pneumatic Cylinder with Auxiliary Chamber**
 Ngoc Yen Phuong Vo (University of Technology and Education Ho Chi Minh City),
 Thanh Danh LE (Industrial University of Ho Chi Minh City)

- PP164** 268 **Study of Fabrication Process for Superhydrophobic Glass Surface**
The Hung Dinh (University of Ulsan), Doo-Man Chun (University of Ulsan)
- PP165** 259 **Characteristics of the Tribological Properties of Carbon-based Films**
YouJin Min (Yonsei University), Dae-Eun Kim (Yonsei University), Oleksiy V. Penkov (Yonsei University)
- PP166** 616 **A Study on Vibration Analysis for Air Guide in Vehicles**
Tae-Jong Yun (Mokpo National University), Ill-Soo Kim (Mokpo National University), Bo-Ram Lee (Mokpo National University), Won-Bin Oh (Mokpo National University), Byeol Lim (Mokpo National University)
- PP167** 097 **A Study of Fracture Characteristic Due to the Generation of Notch Hole Near the Adhesive Interface**
Jae-Won Kim (Kongju National University), Jae-Ung Cho (Kongju National University), Sung-Ki Lyu (Gyeongsang National University), Seong S. Cheon (Kongju National University)
- PP168** 098 **A Study on Fracture Behavior of the Tapered Double Cantilever Beam of Nonhomogeneous Material Bonded with Adhesive**
Jung-Ho Lee (Kongju National University), Jae-Ung Cho (Kongju National University), Sung-Ki Lyu (Gyeongsang National University), Seong S. Cheon (Kongju National University)
- PP169** 443 **Numerical and Experimental Study on the Dynamic Characteristics of Polymer Materials**
Bong-Jo Ryu (Hanbat National University), Youngshik Kim (Hanbat National University), Buhyun Shin (Hanbat National University), Jeahun Jung (Hanbat National University)
- PP170** 206 **Characterization of Functional Film Coated on the Glass Substrate for PV Module According to the Thickness**
Wonseok Choi (Hanbat National University), Ma Minh Trang (Hanbat National University), Chiwon Choi (Hanbat National University), Seung Cheol Yoo (Hanbat National University), Youngdal Kim (Hanbat National University)
- PP171** 619 **Determining Ideal Strength and Electronic Properties of Ge/Si Core-shell Nanowires**
Thanh Vuong Van (Ha Noi University of Science and Technology), Hung Nguyen Tuan (Tohoku University), Quang Tran The (Ha Noi University of Science and Technology), Truong Do Van (Ha Noi University of Science and Technology)
- PP172** 627 **Study on Forging Process for Weight Reduction of Wheel Bearing HUB with Dissimilar Materials**
Heechan Shim (ILJIN GLOBAL Co.), Seonho Lee (ILJIN GLOBAL Co.), Inha Lee (ILJIN GLOBAL Co.)

5. Micro/Nano Technology

Lobby (3F)

- PP173 600 Handheld, Flexible and User-Friendly Van de Graaff-based Miniature Tribo-Electrospinning Device**
Dohee Lee (Chonbuk National University), Cheolsang Kim (Chonbuk National University), Serim Jang (Chonbuk National University)
- PP174 437 Simulation and Experimental Study on Shear Thickening Polishing of Gear Surfaces**
Duc Nam Nguyen (Industrial University of Ho Chi Minh City)
- PP175 596 Plasmonics-based Nanopatterning Technology and Its Application in Optoelectronics**
Eung-Sug Lee (Korea Institute of Machinery and Materials), Jun-Hyuk Choi (Korea Institute of Machinery and Materials), Jihye Lee (Korea Institute of Machinery and Materials), Dae-Guen Choi (Korea Institute of Machinery and Materials), Junho Jeong (Korea Institute of Machinery and Materials)
- PP176 299 Jet-Circulating Electrodeposition Using Micro Electrode Nozzle**
Haan Kim (Dongyang Mirae University), Chong Nam Chu (Seoul National University)
- PP177 508 Deep Electrochemical Etching Using a Laser-Patterned Copper Layer**
Hong Shik Shin (Korea National University of Transportation)
- PP178 091 Method of Fabrication of an Array of DOEs by Using a Direct Laser Lithographic System**
Hyug-Gyo Rhee (Korea Research Institute of Standards and Science), Young-Sik Ghim (Korea Research Institute of Standards and Science), Young-Gwang Kim (Korea Research Institute of Standards and Science)
- PP179 199 Roll-to-Roll Nanoimprinting of Ultrafine Patterns on Al Foil Using Femtosecond Laser Nanostructured Stainless Steel Stampers**
Seokkwan Hong (Korea Institute of Industrial Technology), Jeongjin Kang (Korea Institute of Industrial Technology), Taek Yong Hwang (Korea Institute of Industrial Technology), Moonwoo La (Korea Institute of Industrial Technology), Jeongho Hwang (Korea Institute of Industrial Technology)
- PP180 483 Fabrication of the Vertical Array of WO₃ Nanorods with Design-Based Ordering for Photochemical Water Splitting**
Jihye Lee (Korea Institute of Machinery and Materials), Ho Young Lee (Korea Institute of Machinery & Materials), Joo-Yun Jung (Korea Institute of Machinery & Materials), Jun-Hyuk Choi (Korea Institute of Machinery & Materials)
- PP181 384 UV Nanosecond Laser Processing of Soda-Lime Glass**
Joonghan Shin (Kongju National University), Kimoon Nam (Kongju National University), SeungGu Kang (Kongju National University), Dongkyoung Lee (Kongju National University)

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- PP182** 226 **Plasmon-Enhanced Infrared Spectroscopy Based on Metamaterial Absorber with Vertical Nanogap**
 Joo-Yun Jung (Korea Institute of Machinery and Materials),
 Jun-Hyuk Choi (Korea Institute of Machinery & Materials),
 Jihye Lee (Korea Institute of Machinery & Materials),
 Jun-Ho Jeong (Korea Institute of Machinery & Materials)
- PP183** 143 **Robust Detector of Multiple-Lane Patterns on Printed Devices for Laser Ablation**
 Jun Young Hwang (Korea Institute of Industrial Technology), HyungTae Kim (Korea Institute of Industrial Technology),
 Yoon Jae Moon (Korea Institute of Industrial Technology), Heuiseok Kang (Korea Institute of Industrial Technology)
- PP184** 444 **Fabrication and Evaluation of a Drag-Force Type Flowmeter for Wide Range Measurement**
 Sang Hoon Lee (Seoul National University of Science and Technology),
 Ju Ho Cha (Seoul National University of Science and Technology),
 Kyung Ju Kim (Seoul National University of Science and Technology),
 Yong U Lim (Seoul National University of Science and Technology)
- PP185** 219 **Development and Investigation of Cu-Ag composite by Planetary Milling**
 Sangwoo Kim (Korea Institute of Industrial Technology), Myung Sik Choi (Hanyang University)
- PP186** 238 **Development of a Portable Electrospinning System for Biomedical Applications**
 Seong J. Cho (Chungnam National University)
- PP187** 037 **Fabrication of Magnetic Microneedles (MMNs) Array Containing Iron Oxide Nanoparticles (IONs) Through Micropatterned Mold**
 Seung-Jun Lee (Seowon University), Jin-Chul Kim (Kangwon National University)
- PP188** 141 **Conductive Pattern Fabrication on Heat-sensitive Substrate**
 Won Seok Chang (Korea Institute of Machinery and Materials),
 Seok Young Ji (Korea Institute of Machinery and Materials)
- PP189** 118 **High-Precision Continuous Nanopatterning Based on Uniaxial Piezo Actuator Vibration**
 Dong Kyo Oh (Seoul National University of Science and Technology), Jong G. Ok (Seoul National University of Science and Technology), Seungjo Lee (Seoul National University of Science and Technology), Nayeong Lee (Seoul National University of Science and Technology), Haneul Jeong (Seoul National University of Science and Technology), Wonseok Lee (Seoul National University of Science and Technology), Gyubeom Yeon (Seoul National University of Science and Technology), Hyunsoo Chun (Seoul National University of Science and Technology), Hyunsik Choi (Seoul National University of Science and Technology)
- PP190** 222 **Mechanically Robust Three-dimensional Nanostructure of Aramid Nanofibers via Covalent Crosslinking**
 Guk-Hwan Lee (Chonnam National University), Wonoh Lee (Chonnam National University),
 Hoang Luan Van (Chonnam National University)

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- PP191** 348 **The Flexibility and Electrical Properties of Carbon Nanowall Transferred on Plasma-Treated Porous Polyimide Substrate**
Hiep Tran Van (Hanbat National University), Hyunil Kang (Hanbat National University),
Seokhun Kwon (Hanbat National University), Hyeokjoo Choi (Hanbat National University)
- PP192** 277 **Preparation of Chitosan Microparticles Based on Microfluidic Device**
Hye Jin Choi (Kyungpook National University), Gyu Man Kim (Kyungpook National University),
Bao Ngoc Tran (Kyungpook National University)
- PP193** 251 **Characteristics of Carbon Nanowall According to ITO Interlayer Thickness**
Hyeokjoo Choi (Hanbat National University), Wonseok Choi (Hanbat National University),
Seok Hun Kwon (Hanbat National University), Soekwon Lee (Hanbat National University)
- PP194** 162 **Highly Sensitive and Flexible Ionic Thermocouple Based on Ionic Seebeck Effect**
Hyeongjun Kim (Inha University), Tae June Kang (Inha University), Jei Gyeong Jeon (Inha University),
Ju Hyeon Kim (Inha University), Ju Hwan Lee (Inha University)
- PP195** 073 **Development of Transparent 3D Touch Via Laser Induced Micro-Structure Engineering**
Inho Ha (Seoul National University), Seung Hwan Ko (Seoul National University),
Kyun Kyu Kim (Seoul National University)
- PP196** 210 **Development and Analysis of a Flexible Surface Electromyography (sEMG) Sensor**
Hwayeong Jeong (Korea Advanced Institute of Science and Technology),
Jung Kim (Korea Advanced Institute of Science and Technology),
Jirou Feng (Korea Advanced Institute of Science and Technology)
- PP197** 329 **Catalyst-decorated CNT Heater System for VOCs Decomposition**
Kibeom Kwon (Korea Institute of Industrial Technology),
Hyeonjin Eom (Korea Institute of Industrial Technology),
Hyun Wook Kang (Chonnam National University)
- PP198** 246 **Nanostructuring of Steel Tool Surface for Injection Molding by Spin-on Glass Material Coating and Nanoimprinting**
Kyoung Chan Min (Korea Polytechnic University), Wook-Bae Kim (Korea Polytechnic University),
Yeaji Lee (Korea Polytechnic University), Seonghee Ryu (Korea Polytechnic University)
- PP199** 603 **Fabrication of Liquid Crystal Device with Layer-by-Layer Assembled Carbon Nanotube Thin Films**
Soyoung Han (Myongji University), Yong Tae Park (Myongji University),
Hyun A Cho (Myongji University), Dongseob Kim (Korea Institute of Industrial Technology)

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- PP200** 548 **Moth-Eye Pattern based on Six Beam Laser Interference Lithography Using the Prism and Application of Optical Devices**
Sung Jae Lee (Pusan National University), Bo Sung Shin (Pusan National University),
Jun Han Park (Pusan National University)
- PP201** 221 **High-quality Graphene Sheets by Biased DC-switching Exfoliation of Expanded Graphite**
Sungmook Lim (Chonnam National University), Wonoh Lee (Chonnam National University),
Jea Uk Lee (Korea Research Institute of Chemical Technology)
- PP202** 362 **Fabrication of Microfiber Bundles Using Far Field Electrohydrodynamic Direct Printing for Tissue Engineering Applications**
Sunhee Cho (Chonbuk National University), Chanhee Park (Chonbuk National University),
Cheol Sang Kim (Chonbuk National University), Dohee Lee (Chonbuk National University)
- PP203** 425 **Design of Polynomial Window Function for Measurement of Silicon Wafer Using Wavelength Tuning Interferometry**
Yangjin Kim (Pusan National University), Mamoru Mitsuishi (The University of Tokyo)
- PP204** 621 **Fabrication of Glass Plasmonic Nanostructure by Glass Nanoimprinting with Vitreous Carbon Stamp**
Seok-min Kim (Chung-Ang University), Mohsin Ali Badshah (Chung-Ang University),
Jonghyun Ju (Chung-Ang University)

6. New and Renewable Energy

Lobby (3F)

- PP205** 547 **A Verification on the Similarity of Torque Response Between MW Wind Turbine and Small-Scale Simulator**
Chae Wook Lim (Hanbat National University)
- PP206** 436 **Annealing Effect on Electrochemical Performance of Al-Air Battery**
Zhize Deng (Wonkwang University), Ikwhang Chang (Wonkwang University), Jong Dae Baek (Yeungnam University)
- PP207** 583 **A Roller-Bearing Structured Self-Powered Angle Measurement Sensor Based on Triboelectric Nanogenerator**
Jungho Choe (Korea University), Jaehwa Jeong (Korea University), Seong Gu Kang (Korea University), Young-Man Choi (Ajou University)
- PP208** 480 **Energy Storage System with BSPC Converter and Low Voltage Battery**
Jungmin Kwon (Hanbat National University)
- PP209** 450 **Development of a Group of Single Axis Solar Trackers for Solar Power Plant**
Kyuwon Jeong (Chungbuk National University), Hyojin Kang (Chungbuk National University)
- PP210** 556 **Utilization of Energy Storage System for Frequency Regulation Considering Power System Condition**
Minhan Yoon (Tongmyong University), Sungchul Hwang (Korea University), Jaehyeong Lee (Korea University), Sungyoon Song (Korea University), Yeontae Yoo (Korea University), Seungmin Jung (Hanbat National University)
- PP211** 150 **Thickness Determination of a Solid Oxide Fuel Cell Blocking Layer Deposited by Atomic Layer Deposition Considering the Non-Uniform Surface Geometry of Porous Substrate**
Sanghoon Ji (Korea Institute of Civil Engineering and Building Technology), Wonjong Yu (Seoul National University), Yuseung Kim (Seoul National University), Suk Won Cha (Seoul National University)
- PP212** 434 **Rational Design of Cost-Effective Pt Thin-Film Cathode Capped by Atomic Layer Deposition of Alumina for Low-Temperature Solid Oxide Fuel Cells**
Sanghoon Ji (Korea Institute of Civil Engineering and Building Technology), Jongsu Seo (Korea Advanced Institute of Science and Technology), Han Gil Seo (Korea Advanced Institute of Science and Technology), WooChul Jung (Korea Advanced Institute of Science and Technology), Jeong Hwan Kim (Korea Institute of Machinery & Materials)
- PP213** 386 **Membrane-Electrode Assembly with Ultra-Low Pt by Sputtering for Passive Direct Methanol Fuel Cells**
Taehyun Park (Soongsil University), Wonyeop Jeong (Seoul National University), Suk Won Cha (Seoul National University)

- PP214** 202 **Cellular Instabilities in Spherically Propagating Hydrogen-Air Flames**
Wookyung Kim (Hiroshima University), Tomoyuki Johzaki (Hiroshima University),
Takuma Endo (Hiroshima University)
- PP215** 128 **High Versatility of Non-Conducting Polymer/Carbonaceous Composite Thermoelectric Thin Films Fabricated by Layer-by-Layer Technique**
Wonjun Jang (Myongji University), Yong Tae Park (Myongji University), Soyoung Han (Myongji University),
Kyungwho Choi (Korea Railroad Research Institute), Dongseob Kim (Korea Institute of Industrial Technology),
Dahoon Ahn (Kongju National University)
- PP216** 205 **The Thickness Effect on the Functional Coating for the Anti-Pollution PV Module**
Changyeon Lee (Hanbat National University), Wonseok Choi (Hanbat National University),
Kyumin Lee (Hanbat National University), Seung Cheol Yoo (Hanbat National University)
- PP217** 233 **Analysis of Solar Power Generation with Various PV Surface Temperature Algorithms Used for Building Applications**
Dong Eun Jung (Hanbat National University), Sung Lok Do (Hanbat National University),
Gyuhwan Yeom (Hanbat National University)
- PP218** 241 **Reflection Coefficients of a Model for Gas Turbine Combustor Burning Synthetic Natural Gas**
Gyuseong Youn (Hanbat National University), Sunglok Do (Hanbat National University),
Dongjin Cha (Hanbat National University)
- PP219** 129 **Enhanced Triboelectric Performance of Porous Graphene-PDMS Nanocomposite Multilayers**
Habtamu Gebeyehu Menge (Myongji University), Yong Tae Park (Myongji University),
Jin Ok Kim (Myongji University), Dukhyun Choi (Kyung Hee University),
Dongseob Kim (Korea Institute of Industrial Technology)
- PP220** 516 **A Case Study on Annual Energy Balance of Plus Energy House Based on Operational Data**
Minjoo Choi (Hanbat National University), Jongho Yoon (Hanbat National University),
Hyomun Lee (Hanbat National University), Eunho Kang (Hanbat National University),
Jeongyun Heo (Hanbat National University)
- PP221** 160 **Liquid-Cooled Type Cooling System of 6.2MW Class Hybrid Direct-Drive Generator for Wind Turbine**
Hyung-Jun Park (Dong-A University), Seung-Ho Han (Dong-A University),
Hye-Won Han (Dong-A University), Hyo-Rim Kang (Dong-A University),
Ga-Eun Kim (Dong-A University), Hae-Seong Hwang (Dong-A University)
- PP222** 158 **Stretchable and Flip-Flop Designed Thermo-Electrochemical Array Cells for the Use of Wearable Body Heat Harvester**
Jae Yun Baek (Inha University), Tae June Kang (Inha University),
Ju Hyeon Kim (Inha University), Ju Hwan Lee (Inha University)

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- PP223** 187 **Predictive Utilization of Energy Storage with Voltage Expectation for PV Systems**
Jung-Hwan Kim (Hanbat National University), Seungmin Jung (Hanbat National University),
Minhan Yoon (Tongmyong University), Iseul Nam (Hanbat National University)
- PP224** 156 **Transparent Thermo-Electrochemical Cells for the Use of Energy Harvesting Window**
Ju Hwan Lee (Inha University), Tae June Kang (Inha University), Ju Hyeon Kim (Inha University),
Jae Yun Baek (Inha University)
- PP225** 164 **Hybrid Thermo-Electrochemical Cells Inserting Piezoelectric Cantilever**
Jun Ho Lee (Inha University), Tae June Kang (Inha University), Ju Hwan Lee (Inha University),
Ju Hyeon Kim (Inha University), Jae Yun Baek (Inha University)
- PP226** 163 **Paper Based Thermo-Electrochemical Cell for Changeable Output Voltage and Power with Origami**
Kil Yong Shin (Inha University), Tae June Kang (Inha University), Jei Gyeong Jeon (Inha University),
Ju Hyeon Kim (Inha University), Ju Hwan Lee (Inha University)
- PP227** 114 **Development of Perovskite Solar Cell by Using Spin Coating Technology**
Kyeongmi Kim (Hanbat National University), Dongsoo Kim (Hanbat National University),
Chanyong Lee (Konkuk University), Hyunah Lee (Hanbat National University),
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Jeong, Seonho	OP022 / 439	July 12	09:45-10:00	Room 1

Jeong, Wootae	OS037 / 124	July 12	16:30-17:30	Lobby (2F)
Jeong, Young Hun	OP017 / 503	July 11	16:30-16:45	Room 1
Jeoung, Seoung Pil	OS080 / 407	July 11	17:15-17:45	Room 3
Ji, Sanghoon	PP211 / 150	July 12	16:30-17:30	Lobby (3F)
Ji, Sanghoon	PP212 / 434	July 12	16:30-17:30	Lobby (3F)
Jin, Kyung-Chan	OP056 / 256	July 12	09:45-10:00	Room 5
Jo, A Ra	OS054 / 341	July 12	14:45-15:00	Room 2
Jo, Byoung-Wook	PP072 / 305	July 12	13:45-14:45	Lobby (3F)
Jo, Deoksang	OS057 / 189	July 12	15:45-16:00	Room 2
Jo, Hyunho	PP032 / 533	July 12	13:45-14:45	Lobby (3F)
Joo, Ki-Nam	OP042 / 398	July 11	14:45-15:00	Room 5
Joo, Sung Min	PP023 / 324	July 12	13:45-14:45	Lobby (3F)
Jung, Dong Eun	PP217 / 233	July 12	16:30-17:30	Lobby (3F)
Jung, Hongjin	OP029 / 132	July 12	09:30-09:45	Room 3
Jung, Im Doo	OP004 / 244	July 11	10:10-10:15	Room 1
Jung, Joo-Yun	PP182 / 226	July 12	16:30-17:30	Lobby (3F)
Jung, Kyuseok	OP021 / 500	July 12	09:30-09:45	Room 1
Jung, Soonmoon	OP078 / 487	July 11	16:45-17:00	Room 4
Jung, Yong-Hun	OS055 / 076	July 12	15:15-15:30	Room 2
K				
Kang, Dong Hee	OP096 / 223	July 11	10:10-10:15	Room 3
Kang, Hyun-Wook	OS015 / 030	July 12	16:30-17:30	Lobby (2F)
Kang, Jaeyoung	OS065 / 491	July 11	16:15-16:30	Room 3
Kang, Jiheon	PP150 / 181	July 12	16:30-17:30	Lobby (3F)
Kang, Kyeong-Hee	OP102 / 387	July 11	14:30-14:45	Room 3
Kang, Munjin	PP054 / 370	July 12	13:45-14:45	Lobby (3F)
Kang, MyungChang	OP008 / 560	July 11	11:15-11:30	Room 1
Kang, Yoosu	PP119 / 203	July 12	13:45-14:45	Lobby (3F)
Kang, Yousung	PP143 / 033	July 12	16:30-17:30	Lobby (3F)
Khadem, Mahdi	OP067 / 183	July 11	11:30-11:45	Room 4
Kim, BoHung	OP095 / 255	July 11	09:45-10:00	Room 3
Kim, Byongsung	PP102 / 328	July 12	13:45-14:45	Lobby (3F)
Kim, Byunggi	OP012 / 293	July 11	15:00-15:15	Room 1
Kim, Chai Hwan	PP002 / 249	July 12	13:45-14:45	Lobby (3F)
Kim, Chan Kyu	OS086 / 312	July 12	13:45-14:45	Lobby (2F)
Kim, Chang-Lae	OP058 / 067	July 11	09:00-09:15	Room 4

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Kim, Chanjin	OS087 / 478	July 12	13:45-14:45	Lobby (2F)
Kim, Cheol	OP107 / 021	July 12	11:00-11:15	Room 5
Kim, Chul	PP069 / 315	July 12	13:45-14:45	Lobby (3F)
Kim, Dae Wook	OS039 / 111	July 12	15:00-15:15	Room 1
Kim, Daenyoung	OS026 / 379	July 11	09:30-09:45	Room 5
Kim, Damhyun	OP064 / 445	July 11	10:45-11:00	Room 4
Kim, Do Hyeog	OS088 / 454	July 12	13:45-14:45	Lobby (2F)
Kim, Dong Hyuk	PP003 / 068	July 12	13:45-14:45	Lobby (3F)
Kim, Dong Wook	PP103 / 207	July 12	13:45-14:45	Lobby (3F)
Kim, Dongjoo	OS070 / 594	July 11	17:15-17:45	Room 3
Kim, Dongyun	PP104 / 042	July 12	13:45-14:45	Lobby (3F)
Kim, Eun Ho	PP087 / 209	July 12	13:45-14:45	Lobby (3F)
Kim, EunJung	OS082 / 101	July 12	11:00-11:15	Room 4
Kim, Geon Hee	OS043 / 395	July 12	16:30-17:30	Lobby (2F)
Kim, Haan	PP176 / 299	July 12	16:30-17:30	Lobby (3F)
Kim, Hansoul	PP239 / 127	July 12	16:30-17:30	Lobby (3F)
Kim, Heung Soo	OS064 / 139	July 11	16:00-16:15	Room 3
Kim, Hyein	PP083 / 485	July 12	13:45-14:45	Lobby (3F)
Kim, Hyeongjun	PP194 / 162	July 12	16:30-17:30	Lobby (3F)
Kim, Hyun-Soo	PP128 / 429	July 12	13:45-14:45	Lobby (3F)
Kim, Ill-Soo	OP027 / 036	July 12	11:45-12:00	Room 1
Kim, Jaehong	OS061 / 052	July 12	16:30-17:30	Lobby (3F)
Kim, Jaemin	OP072 / 473	July 11	15:00-15:15	Room 4
Kim, Jae-Won	PP167 / 097	July 12	16:30-17:30	Lobby (3F)
Kim, Jaewoong	PP009 / 010	July 12	13:45-14:45	Lobby (3F)
Kim, Jangwoo	OS044 / 215	July 12	16:30-17:30	Lobby (2F)
Kim, Jeong-Hun	OS062 / 086	July 12	16:30-17:30	Lobby (3F)
Kim, Ji Wook	PP077 / 334	July 12	13:45-14:45	Lobby (3F)
Kim, Jihun	OP051 / 275	July 11	17:15-17:30	Room 5
Kim, Jinjae	OP088 / 507	July 12	15:15-15:30	Room 4
Kim, Jisoo	OP010 / 432	July 11	14:30-14:45	Room 1
Kim, Jongryeol	PP232 / 110	July 12	16:30-17:30	Lobby (3F)
Kim, Ju Hyeon	PP243 / 157	July 12	16:30-17:30	Lobby (3F)
Kim, Jung Sub	PP037 / 464	July 12	13:45-14:45	Lobby (3F)
Kim, Jung-Hoon	PP152 / 051	July 12	16:30-17:30	Lobby (3F)
Kim, Jung-Hwan	PP223 / 187	July 12	16:30-17:30	Lobby (3F)

Kim, Kangwook	OS091 / 212	July 12	13:45-14:45	Lobby (2F)
Kim, Keekeun	OP091 / 426	July 12	16:00-16:15	Room 4
Kim, Ki Hyuk	OP028 / 262	July 12	09:15-09:30	Room 3
Kim, Kunwoo	PP131 / 270	July 12	13:45-14:45	Lobby (3F)
Kim, Kwang Joon	PP040 / 061	July 12	13:45-14:45	Lobby (3F)
Kim, Kwonse	PP091 / 078	July 12	13:45-14:45	Lobby (3F)
Kim, Kyeongmi	PP227 / 114	July 12	16:30-17:30	Lobby (3F)
Kim, Kyong	PP234 / 059	July 12	16:30-17:30	Lobby (3F)
Kim, Kyoung Hoon	OS071 / 070	July 11	17:15-17:45	Room 3
Kim, Kyunghyun	OP049 / 357	July 11	16:45-17:00	Room 5
Kim, Min Ji	PP110 / 382	July 12	13:45-14:45	Lobby (3F)
Kim, Minseob	OS023 / 119	July 12	16:30-17:30	Lobby (2F)
Kim, Minsu	OP100 / 083	July 11	11:15-11:30	Room 3
Kim, Na Kyong	OP106 / 088	July 11	15:30-15:45	Room 3
Kim, Sangjoon	PP106 / 196	July 12	13:45-14:45	Lobby (3F)
Kim, Sangwoo	PP185 / 219	July 12	16:30-17:30	Lobby (3F)
Kim, Sangyu	OP077 / 455	July 11	16:30-16:45	Room 4
Kim, Seok-min	PP204 / 621	July 12	16:30-17:30	Lobby (3F)
Kim, Seolha	OS079 / 302	July 11	17:15-17:45	Room 3
Kim, Seong Hyeon	PP082 / 529	July 12	13:45-14:45	Lobby (3F)
Kim, Seong-Gyu	OS092 / 213	July 12	13:45-14:45	Lobby (2F)
Kim, Seung Gi	OP082 / 512	July 12	09:15-09:30	Room 4
Kim, Seung-Hun	PP094 / 197	July 12	13:45-14:45	Lobby (3F)
kim, Sungsoo	PP158 / 323	July 12	16:30-17:30	Lobby (3F)
Kim, Tae Young	PP159 / 501	July 12	16:30-17:30	Lobby (3F)
Kim, Tae-Gon	PP018 / 453	July 12	13:45-14:45	Lobby (3F)
Kim, Tae-Hyeong	PP161 / 247	July 12	16:30-17:30	Lobby (3F)
Kim, Taekyoung	PP162 / 104	July 12	16:30-17:30	Lobby (3F)
Kim, Uksu	PP051 / 612	July 12	13:45-14:45	Lobby (3F)
Kim, Wonpyo	OS094 / 494	July 12	13:45-14:45	Lobby (2F)
Kim, Woo Young	OS095 / 486	July 12	13:45-14:45	Lobby (2F)
Kim, Wookyoung	PP214 / 202	July 12	16:30-17:30	Lobby (3F)
Kim, Yangjin	OS098 / 606	July 11	15:15-15:30	Room 2
Kim, Yangjin	PP203 / 425	July 12	16:30-17:30	Lobby (3F)
Kim, Young Gon	PP025 / 144	July 12	13:45-14:45	Lobby (3F)
Kim, Younggwan	PP052 / 060	July 12	13:45-14:45	Lobby (3F)

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Kim, Young-Jin	OS101 / 584	July 11	16:15-16:30	Room 2
Kim, Youngshik	PP099 / 353	July 12	13:45-14:45	Lobby (3F)
Kim, Youngsik	OS042 / 351	July 12	15:45-16:00	Room 1
Kim, Yunhan	OS030 / 240	July 11	11:00-11:15	Room 5
Kim, Yunjoo	PP120 / 344	July 12	13:45-14:45	Lobby (3F)
Ko, Myeong Jin	PP021 / 279	July 12	13:45-14:45	Lobby (3F)
Koh, Daegwon	PP095 / 409	July 12	13:45-14:45	Lobby (3F)
Kuo, Chunliang	OS002 / 024	July 11	09:15-09:30	Room 2
Kurniadi, Kezia Amanda	OP038 / 537	July 12	15:30-15:45	Room 3
Kurniawan, Rendi	PP090 / 113	July 12	13:45-14:45	Lobby (3F)
Kwak, Tae-Soo	PP238 / 229	July 12	16:30-17:30	Lobby (3F)
Kwak, Yein	PP070 / 593	July 12	13:45-14:45	Lobby (3F)
Kwon, Byeong-chan	OP016 / 381	July 11	16:15-16:30	Room 1
Kwon, Hyo-chan	PP088 / 054	July 12	13:45-14:45	Lobby (3F)
Kwon, Jungmin	PP208 / 480	July 12	16:30-17:30	Lobby (3F)
Kwon, Kibeom	PP197 / 329	July 12	16:30-17:30	Lobby (3F)
Kwon, Ohjung	PP015 / 274	July 12	13:45-14:45	Lobby (3F)
Kwon, Patrick	OP018 / 528	July 11	16:45-17:00	Room 1
Kwon, Seok-Jin	OS036 / 430	July 12	16:30-17:30	Lobby (2F)
Kwon, Yongseop	OP043 / 400	July 11	15:00-15:15	Room 5
Kyeong, Seulki	PP113 / 218	July 12	13:45-14:45	Lobby (3F)
L				
Le, Quang-Dung	PP061 / 626	July 12	13:45-14:45	Lobby (3F)
Lee, Bong Gu	PP084 / 605	July 12	13:45-14:45	Lobby (3F)
Lee, Bo-Ram	PP055 / 040	July 12	13:45-14:45	Lobby (3F)
Lee, Chang-hyuk	PP064 / 360	July 12	13:45-14:45	Lobby (3F)
Lee, Chang-Whan	PP124 / 468	July 12	13:45-14:45	Lobby (3F)
Lee, Changyeon	PP216 / 205	July 12	16:30-17:30	Lobby (3F)
Lee, Chanwoo	OS034 / 542	July 12	16:30-17:30	Lobby (2F)
Lee, Chan-Young	PP073 / 532	July 12	13:45-14:45	Lobby (3F)
Lee, Dasol	OP023 / 417	July 12	10:10-10:15	Room 1
Lee, Daun	OS076 / 321	July 11	17:15-17:45	Room 3
Lee, Dohee	PP173 / 600	July 12	16:30-17:30	Lobby (3F)
Lee, Donghwan	PP029 / 470	July 12	13:45-14:45	Lobby (3F)
Lee, Dongkyoung	PP066 / 318	July 12	13:45-14:45	Lobby (3F)

Lee, Dong-Mok	OS013 / 317	July 12	16:30-17:30	Lobby (2F)
Lee, Eung-Sug	PP175 / 596	July 12	16:30-17:30	Lobby (3F)
Lee, Guk-Hwan	PP190 / 222	July 12	16:30-17:30	Lobby (3F)
Lee, Gyeong Hak	OP057 / 050	July 12	10:10-10:15	Room 5
Lee, Ho Seong	OP055 / 014	July 12	09:30-09:45	Room 5
Lee, Hoon-Hee	PP076 / 361	July 12	13:45-14:45	Lobby (3F)
Lee, Hwaseop	OP031 / 543	July 12	10:10-10:15	Room 3
Lee, Hyesung	OS028 / 327	July 11	10:10-10:15	Room 5
Lee, Hyomun	PP229 / 151	July 12	16:30-17:30	Lobby (3F)
Lee, Hyunah	PP228 / 099	July 12	16:30-17:30	Lobby (3F)
Lee, Hyunsu	OS029 / 123	July 11	10:10-10:15	Room 5
Lee, In Hwan	OS010 / 283	July 11	14:00-14:15	Room 2
Lee, Jae Yong	PP067 / 300	July 12	13:45-14:45	Lobby (3F)
Lee, Jae-chul	OP040 / 604	July 11	14:15-14:30	Room 5
Lee, JeongHeon	OP097 / 333	July 11	10:30-10:45	Room 3
Lee, Jihye	PP180 / 483	July 12	16:30-17:30	Lobby (3F)
Lee, Jiwoong	PP078 / 571	July 12	13:45-14:45	Lobby (3F)
Lee, Jong Man	OP116 / 488	July 12	09:45-10:00	Room 2
Lee, Jongyoul	PP011 / 322	July 12	13:45-14:45	Lobby (3F)
Lee, Ju Hwan	PP224 / 156	July 12	16:30-17:30	Lobby (3F)
Lee, Jun Ho	PP225 / 164	July 12	16:30-17:30	Lobby (3F)
Lee, JungGil	PP233 / 176	July 12	16:30-17:30	Lobby (3F)
Lee, Jung-Hee	PP008 / 296	July 12	13:45-14:45	Lobby (3F)
Lee, Jung-Ho	PP168 / 098	July 12	16:30-17:30	Lobby (3F)
Lee, Jungsub	OP119 / 520	July 12	11:15-11:30	Room 2
Lee, Kang Il	OS048 / 090	July 12	16:30-17:30	Lobby (2F)
Lee, Kihun	PP038 / 418	July 12	13:45-14:45	Lobby (3F)
Lee, Kyung-min	OP045 / 306	July 11	15:30-15:45	Room 5
Lee, Sang Hoon	PP184 / 444	July 12	16:30-17:30	Lobby (3F)
Lee, Sangil	OP034 / 536	July 12	11:30-11:45	Room 3
Lee, Sang-Jin	PP135 / 190	July 12	16:30-17:30	Lobby (3F)
Lee, Sang-Kon	OS059 / 325	July 12	16:30-17:30	Lobby (3F)
Lee, Sangmin	PP136 / 117	July 12	16:30-17:30	Lobby (3F)
Lee, Sangwoong	OS069 / 301	July 11	17:15-17:45	Room 3
Lee, Seok Woo	OS099 / 589	July 11	15:30-15:45	Room 2
Lee, Seongwon	PP012 / 493	July 12	13:45-14:45	Lobby (3F)

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Lee, Seongwon	PP046 / 337	July 12	13:45-14:45	Lobby (3F)
Lee, Seung-Jun	PP187 / 037	July 12	16:30-17:30	Lobby (3F)
Lee, Soo Yeol	OP002 / 250	July 11	09:30-09:45	Room 1
Lee, Sung Jae	PP200 / 548	July 12	16:30-17:30	Lobby (3F)
Lee, Tae Hun	OS025 / 403	July 11	09:00-09:15	Room 5
Lee, Taekyeong	OP120 / 477	July 12	11:30-11:45	Room 2
Lee, Ui Seok	PP001 / 224	July 12	13:45-14:45	Lobby (3F)
Lee, Wonkyun	OS049 / 172	July 12	16:30-17:30	Lobby (2F)
Lee, Yeonho	PP097 / 228	July 12	13:45-14:45	Lobby (3F)
Lee, Yoon Sun	OS017 / 280	July 12	16:30-17:30	Lobby (2F)
Lee, Youngseon	OP083 / 415	July 12	09:30-09:45	Room 4
Letzig, Dietmar	OP074 / 545	July 11	15:30-15:45	Room 4
Lim, Chae Wook	PP205 / 547	July 12	16:30-17:30	Lobby (3F)
Lim, Hong Sik	PP075 / 319	July 12	13:45-14:45	Lobby (3F)
Lim, Jeongsik	PP010 / 165	July 12	13:45-14:45	Lobby (3F)
Lim, Jung Hwan	PP107 / 345	July 12	13:45-14:45	Lobby (3F)
Lim, Mi-Rae	OS052 / 410	July 12	14:15-14:30	Room 2
Lim, Sungmook	PP201 / 221	July 12	16:30-17:30	Lobby (3F)
Luong Quoc, Viet	PP118 / 018	July 12	13:45-14:45	Lobby (3F)
Luyen, The Thanh	PP085 / 623	July 12	13:45-14:45	Lobby (3F)
Lyu, Jaehee	OS067 / 200	July 11	16:45-17:00	Room 3
M				
Mac, Thi-Bich	PP060 / 625	July 12	13:45-14:45	Lobby (3F)
Maeng, Sangjin	OP050 / 595	July 11	17:00-17:15	Room 5
Mbow, Mouhamadou Mansour	PP043 / 458	July 12	13:45-14:45	Lobby (3F)
Menge, Habtamu Gebeyehu	PP219 / 129	July 12	16:30-17:30	Lobby (3F)
Min, Kyoung Chan	PP198 / 246	July 12	16:30-17:30	Lobby (3F)
Min, Sangkee	OP011 / 112	July 11	14:45-15:00	Room 1
Min, Soo-Hong	OS032 / 023	July 11	11:30-11:45	Room 5
Min, YouJin	PP165 / 259	July 12	16:30-17:30	Lobby (3F)
Mondal, Mounarik	PP044 / 390	July 12	13:45-14:45	Lobby (3F)
Moon, Byungwoo	OP084 / 399	July 12	09:45-10:00	Room 4
Moon, Seung Ki	OS097 / 602	July 11	15:00-15:15	Room 2
Mun, Do Yeong	OS089 / 496	July 12	13:45-14:45	Lobby (2F)
N				
Nam, Jinsu	OS078 / 201	July 11	17:15-17:45	Room 3

Nam, Woochul	OP114 / 586	July 12	16:00-16:15	Room 5
Nguyen Thi, Thu	OP080 / 476	July 11	17:15-17:30	Room 4
Nguyen Van, Tuan	PP117 / 272	July 12	13:45-14:45	Lobby (3F)
Nguyen, Dinh Son	OS011 / 517	July 11	14:15-14:30	Room 2
Nguyen, Duc Nam	PP174 / 437	July 12	16:30-17:30	Lobby (3F)
Nguyen, Duong Nam	OP069 / 457	July 11	14:15-14:30	Room 4
Nguyen, Lich	OP118 / 462	July 12	11:00-11:15	Room 2
Nguyen, Quang Dang	OP101 / 230	July 11	11:30-11:45	Room 3
Nguyen, Thi Anh Nguyet	OP005 / 288	July 11	10:30-10:45	Room 1
Nguyen, Trung	OP019 / 527	July 11	17:00-17:15	Room 1
O				
Oh, Dong Kyo	PP189 / 118	July 12	16:30-17:30	Lobby (3F)
Oh, Won-jung	OS085 / 138	July 12	11:45-12:00	Room 4
Oh, Wook Jin	PP005 / 071	July 12	13:45-14:45	Lobby (3F)
Oktaviana, Laily	OS068 / 057	July 11	17:00-17:15	Room 3
P				
Palem, Ramasubba Reddy	OP061 / 011	July 11	09:45-10:00	Room 4
Park, Eunju	OS003 / 539	July 11	09:30-09:45	Room 2
Park, Eu-Tteum	OS060 / 103	July 12	16:30-17:30	Lobby (3F)
Park, Geon Cheol	PP030 / 563	July 12	13:45-14:45	Lobby (3F)
Park, Hong-Seok	OP032 / 538	July 12	11:00-11:15	Room 3
Park, Hyeong-gyu	OS056 / 372	July 12	15:30-15:45	Room 2
Park, Hyung Gyu	OP099 / 365	July 11	11:00-11:15	Room 3
Park, Hyung-Jun	PP221 / 160	July 12	16:30-17:30	Lobby (3F)
Park, Il-Ha	OP033 / 482	July 12	11:15-11:30	Room 3
Park, Jeong-hun	PP034 / 561	July 12	13:45-14:45	Lobby (3F)
Park, Ju Yeon	PP151 / 095	July 12	16:30-17:30	Lobby (3F)
Park, Jung-Hwan	OS022 / 489	July 12	16:30-17:30	Lobby (2F)
Park, Keontae	OS083 / 447	July 12	11:15-11:30	Room 4
Park, Kibum	OP085 / 433	July 12	10:10-10:15	Room 4
Park, Kihwan	OS050 / 063	July 12	13:45-14:00	Room 2
Park, Kwi Young	PP134 / 340	July 12	13:45-14:45	Lobby (3F)
Park, Kye-Jeong	OS051 / 074	July 12	14:00-14:15	Room 2
Park, Kyung-Hee	PP014 / 234	July 12	13:45-14:45	Lobby (3F)
Park, Kyungseo	PP111 / 198	July 12	13:45-14:45	Lobby (3F)
Park, Minkyong	OP117 / 472	July 12	10:10-10:15	Room 2

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Park, Sung Hawk	PP050 / 330	July 12	13:45-14:45	Lobby (3F)
Park, Sung Hyuk	PP140 / 564	July 12	16:30-17:30	Lobby (3F)
Park, Sung-Cheol	OS058 / 438	July 12	16:30-17:30	Lobby (3F)
Park, Sungjin	OS016 / 446	July 12	16:30-17:30	Lobby (2F)
Park, Sungyun	PP237 / 297	July 12	16:30-17:30	Lobby (3F)
Park, Tae Han	PP160 / 137	July 12	16:30-17:30	Lobby (3F)
Park, Taehyun	OS100 / 601	July 11	15:45-16:00	Room 2
Park, Taehyun	PP213 / 386	July 12	16:30-17:30	Lobby (3F)
Pham Thi Hong, Nga	PP133 / 435	July 12	13:45-14:45	Lobby (3F)
Pham, Van Lam	OP110 / 416	July 12	15:00-15:15	Room 5
Phan, Loc	PP121 / 269	July 12	13:45-14:45	Lobby (3F)
Q				
Quach, Hung	OP020 / 567	July 12	09:15-09:30	Room 1
Quan, Yingjun	OS027 / 253	July 11	09:45-10:00	Room 5
R				
Rhee, Hyug-Gyo	PP178 / 091	July 12	16:30-17:30	Lobby (3F)
Rhee, Kyehan	PP132 / 045	July 12	13:45-14:45	Lobby (3F)
Ryu, Bong-Jo	PP169 / 443	July 12	16:30-17:30	Lobby (3F)
Ryu, Hye-Yeon	PP105 / 195	July 12	13:45-14:45	Lobby (3F)
Ryu, Jae-Chang	OS053 / 077	July 12	14:30-14:45	Room 2
Ryu, Seonghee	PP045 / 149	July 12	13:45-14:45	Lobby (3F)
Ryu, Youngjae	PP053 / 265	July 12	13:45-14:45	Lobby (3F)
S				
Sasaki, Gen	OP062 / 320	July 11	10:10-10:15	Room 4
Seo, Jungwon	OS035 / 177	July 12	16:30-17:30	Lobby (2F)
Seo, Junyoung	PP153 / 105	July 12	16:30-17:30	Lobby (3F)
Seok, Dong Chan	OS047 / 032	July 12	16:30-17:30	Lobby (2F)
Shanmugasundaram, Arunkumar	OP093 / 497	July 11	09:15-09:30	Room 3
Shen, Hong	PP007 / 167	July 12	13:45-14:45	Lobby (3F)
Shim, Heechan	PP172 / 627	July 12	16:30-17:30	Lobby (3F)
Shin, Dong-Youn	OP109 / 027	July 12	11:30-11:45	Room 5
Shin, Gwang Yong	PP006 / 182	July 12	13:45-14:45	Lobby (3F)
Shin, Hong Shik	PP177 / 508	July 12	16:30-17:30	Lobby (3F)
Shin, Joonghan	PP181 / 384	July 12	16:30-17:30	Lobby (3F)
Shin, Ki-Hoon	PP056 / 028	July 12	13:45-14:45	Lobby (3F)

Shin, Kil Yong	PP226 / 163	July 12	16:30-17:30	Lobby (3F)
Shin, Mi Yeon	PP123 / 314	July 12	13:45-14:45	Lobby (3F)
Shin, Mi Yeon	PP244 / 580	July 12	16:30-17:30	Lobby (3F)
Shin, Seung-Jun	OP039 / 286	July 12	15:45-16:00	Room 3
Shin, Somin	PP048 / 421	July 12	13:45-14:45	Lobby (3F)
Sim, Kyuho	PP109 / 066	July 12	13:45-14:45	Lobby (3F)
Sohn, Joo Seong	PP036 / 179	July 12	13:45-14:45	Lobby (3F)
Son, Jongyoun	PP035 / 056	July 12	13:45-14:45	Lobby (3F)
Son, Jungyu	PP049 / 502	July 12	13:45-14:45	Lobby (3F)
Song, Cheon-Ho	PP074 / 570	July 12	13:45-14:45	Lobby (3F)
Song, Hyunseok	PP127 / 133	July 12	13:45-14:45	Lobby (3F)
Song, Kyu	PP041 / 041	July 12	13:45-14:45	Lobby (3F)
Su, Pei-Chen	OS103 / 585	July 11	16:45-17:00	Room 2
Sugio, Kenjiro	OP073 / 385	July 11	15:15-15:30	Room 4
T				
Tae, Byeong Hee	PP101 / 204	July 12	13:45-14:45	Lobby (3F)
Tang, Yifan	PP020 / 374	July 12	13:45-14:45	Lobby (3F)
Thanh Hoang, Vo	OP001 / 525	July 11	09:15-09:30	Room 1
Thien Khieu, Ha	OP079 / 263	July 11	17:00-17:15	Room 4
Tran Van, Hiep	PP191 / 348	July 12	16:30-17:30	Lobby (3F)
Tran, Minh-Quang	OP025 / 020	July 12	11:15-11:30	Room 1
Tran, Ngoc-Hien	OS006 / 428	July 11	11:00-11:15	Room 2
Tran, Thanh T.	OS012 / 006	July 11	14:30-14:45	Room 2
Tran, Van Loi	OP024 / 281	July 12	11:00-11:15	Room 1
Trinh, XuanLong	PP230 / 237	July 12	16:30-17:30	Lobby (3F)
V				
Vignat, Frederic	OS004 / 499	July 11	09:45-10:00	Room 2
Vo, Ngoc Yen Phuong	PP163 / 424	July 12	16:30-17:30	Lobby (3F)
Vu, Tiendung	PP116 / 541	July 12	13:45-14:45	Lobby (3F)
Vuong Van, Thanh	PP171 / 619	July 12	16:30-17:30	Lobby (3F)
W				
Wang, Ning	PP155 / 326	July 12	16:30-17:30	Lobby (3F)
Won, Si Tae	PP139 / 136	July 12	16:30-17:30	Lobby (3F)
Woo, In Young	PP033 / 208	July 12	13:45-14:45	Lobby (3F)
Woo, Wan-Sik	OS084 / 092	July 12	11:30-11:45	Room 4
Wu, Chongjun	OP013 / 217	July 11	15:15-15:30	Room 1

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Yan, Mu-Tian	OP030 / 069	July 12	09:45-10:00	Room 3
Yang, Minseok	PP080 / 371	July 12	13:45-14:45	Lobby (3F)
Yang, Seung Weon	PP047 / 354	July 12	13:45-14:45	Lobby (3F)
Yang, Yea Jin	OS096 / 102	July 12	13:45-14:45	Lobby (2F)
Yeom, Gyuhan	PP240 / 168	July 12	16:30-17:30	Lobby (3F)
Yeom, Junghoon	OP003 / 526	July 11	09:45-10:00	Room 1
Yeom, Sung Woo	OS081 / 406	July 11	17:15-17:45	Room 3
Yip, Wai Sze	PP022 / 587	July 12	13:45-14:45	Lobby (3F)
Yoo, Yo-Han	PP142 / 358	July 12	16:30-17:30	Lobby (3F)
Yoon, Jonghun	PP130 / 573	July 12	13:45-14:45	Lobby (3F)
Yoon, Minhan	PP210 / 556	July 12	16:30-17:30	Lobby (3F)
Yoon, Yonghan	PP024 / 236	July 12	13:45-14:45	Lobby (3F)
You, Jeonghee	OS020 / 465	July 12	16:30-17:30	Lobby (2F)
Youn, Gyuseong	PP218 / 241	July 12	16:30-17:30	Lobby (3F)
Yu, Dahae	PP145 / 120	July 12	16:30-17:30	Lobby (3F)
Yu, JaeHyeong	OP090 / 414	July 12	15:45-16:00	Room 4
Yu, Jong-Hyeok	PP079 / 535	July 12	13:45-14:45	Lobby (3F)
Yu, Min Sook	PP058 / 005	July 12	13:45-14:45	Lobby (3F)
Yuh, Minjong	PP042 / 449	July 12	13:45-14:45	Lobby (3F)
Yuk, Dogyeong	OS066 / 349	July 11	16:30-16:45	Room 3
Yun, Chang-Seok	PP027 / 456	July 12	13:45-14:45	Lobby (3F)
Yun, Channyong	PP028 / 252	July 12	13:45-14:45	Lobby (3F)
Yun, Dae Jhoong	OP048 / 126	July 11	16:30-16:45	Room 5
Yun, Haeyong	OS014 / 043	July 12	16:30-17:30	Lobby (2F)
Yun, Junghan	OP066 / 405	July 11	11:15-11:30	Room 4
Yun, Tae-Jong	PP166 / 616	July 12	16:30-17:30	Lobby (3F)

Z

Zhang, Chen	OP098 / 147	July 11	10:45-11:00	Room 3
Zhang, Shengwei	OP006 / 292	July 11	10:45-11:00	Room 1
Zhang, Yongjie	OS008 / 121	July 11	11:30-11:45	Room 2
Zhang, Zhe-Hao	PP231 / 342	July 12	16:30-17:30	Lobby (3F)
Zheng, Liang Jun	OP112 / 080	July 12	15:30-15:45	Room 5
Zhou, Yuansheng	OP015 / 392	July 11	16:00-16:15	Room 1
Zhu, Kun	PP039 / 298	July 12	13:45-14:45	Lobby (3F)