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ICMTE

The 10th International Conference of Manufacturing Technology Engineers 2022

Collaborated with SIMTOS 2022

25(Wed.)~26(Thu.) May 2022

KINTEX, KOREA

Scope and Topics

- Advanced Machine Tools
- Smart Machine Tools
- Tool and Die Design
- Robots and Automation
- Ultra-precision Nanomachining
- Integrated Manufacturing
- Green Manufacturing Systems
- Smart Manufacturing
- Polymer Processing
- 3D Printing
- Vibration and Control
- Medical/Bio Engineering
- Nano/Micro Systems
- Applied Optical Energy
- Carbon Convergence
- Wearable Sensors
- Printable Electronics
- Design and CAE
- Design and Engineering for Manufacturing
- Smart Factory FOMs
- Etc.

Gateway to Digital Manufacturing

www.ksmte.kr

KSMTE
Korean Society of Manufacturing Technology Engineer

www.imcc1983.org
Chinese Production Engineering Institute, CMES (CPEI)

Sponsered By GOYANG CVB Convention & Visitors Bureau · Gyeonggi Tourism Organization 경기관광공사

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International Conference of Manufacturing Technology Engineers

Welcome Message

On behalf of the organizing committee, I am honored to announce that the 2022 International Conference of Manufacturing Technology Engineers (ICMTE 2022) will be held at KINTEX in Goyang, South Korea.

The ICMTE 2022 aims to facilitate interaction between engineers in mechanical design, computer-aided engineering (CAE), manufacturing, robotics, and automation, with their wide linkage to nanotechnology, sustainable manufacturing, and other cutting-edge areas.

Industry 4.0 transformed the overall manufacturing paradigm. The demand for innovative manufacturing technologies is more vital than ever in line with emerging fields of technology, including metaverse and self-driving vehicles. Breakthroughs have been made in all areas of manufacturing, such as smart manufacturing, digital machining, robotics, smart sensors, 3D printing, and digital twins, and we have indeed witnessed that such key technologies can improve the competitive edge of the manufacturing industry. To deliver continued growth and progress in our community, it is essential to disseminate the knowledge and experience and, more importantly, to foster the younger generation of manufacturing engineers. Jointly organized with the Seoul International Manufacturing Technology Show (SIMTOS) for the first time, we believe the ICMTE 2022 will offer the perfect venue to network and to learn about cutting-edge technologies and be a gateway to digital manufacturing.

Located 20 minutes north of Seoul, the capital of South Korea, Goyang is one of Seoul's largest satellite cities. It is best known for the annual international flower festival and has Asia's biggest artificial lake park. With the national representative broadcasting station and beautiful neighborhoods presented in famous TV shows and movies, the city may have attractions for those interested in Korean pop culture and entertainment. We hope you will have a great time in Goyang.

Thank you.

Conference Chair

Shinill Kang
President of the KSMTE
Professor of Mechanical Engineering, Yonsei University

ICMTE 2022 Program

International Conference of Manufacturing Technology Engineers

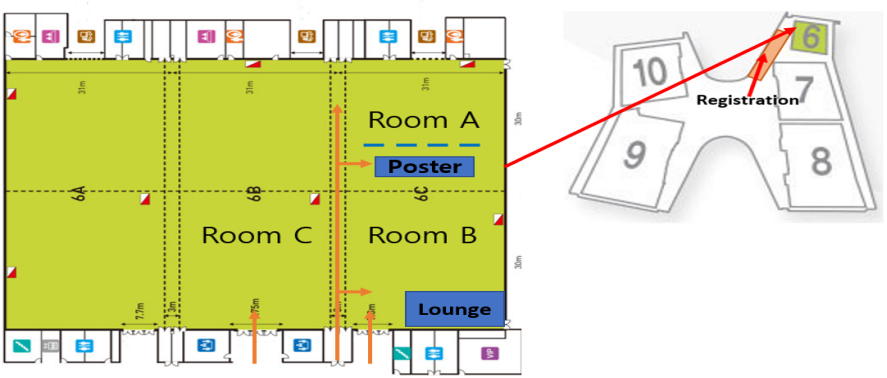
25-May (Wed)		26-May (Thu)	
09:00-	Registration	9:00	Registration
09:30 - 10:00	Opening Ceremony	10:00 - 11:00	Keynote Speech 3
10:00 - 11:00	Keynote Speech 1	11:00 - 12:30	Manufacturing Forum
11:00 - 12:00	Keynote Speech 2	12:30 - 14:00	Lunch
12:00 - 13:30	Lunch	14:00 - 15:00	Oral Session Sessions 5
13:30 - 14:30	Invited Speech - 1, 2, 3, 4	14:00 - 14:30	Invited Speech 9
14:30 - 15:00	Oral Session Sessions 1, 2	14:30 - 15:15	Oral Session Sessions 6
15:00 - 15:40	Poster Session 1	15:15 - 15:55	Poster Session 2
15:40 - 16:00	Coffee Break	15:55-	Closing Committee Meeting
16:00 - 17:00	Invited Speech 5, 6, 7, 8		
17:00 - 17:30	Oral Session Sessions 3, 4		
17:30 - 18:00	To Banquet Place		
18:00 -	Banquet @ Sono Calm Goyang Hotel		

Place

Place	
Registration 25-May (Wed)	Lobby - 1 Floor (KINTEX 2 HALL 6)
Keynote Speech and Forum	Room C - 1 Floor (KINTEX 2 HALL 6)
Session [1, 3, 5]	Room A - 1 Floor (KINTEX 2 HALL 6)
Session [2, 4, 6]	Room B - 1 Floor (KINTEX 2 HALL 6)
Poster Session	Room A - 1 Floor (KINTEX 2 HALL 6)
Banquet (Conference Dinner)	Sono Calm Goyang - East Tower 2 Floor
Lunch	"F&B Area" - 1 Floor (KINTEX 2 HALL 6)
Lounge	Room B Lounge - 1 Floor (KINTEX 2 HALL 6)
Closing Committee Meeting	Room B Lounge - 1 Floor (KINTEX 2 HALL 6)

Floor plan

KINTEX 2 HALL 6



Registration Information

- **Registration Information**
- **Registration Date : 25-May (Wed),** 09:00 ~
- **Registration Fee**

Category		Regular		Student	
		Local Participant	International Participant (Online Only)	Local Participant	International Participant (Online Only)
On-Site Registration	KRW	500,000		250,000	
	USD	500	300	250	150

- **Shuttle bus Timetable**

Wed. May 25	
Departure	Itinerary
17:10 17:40	KINTEX 2 → Sono Calm Goyang (for Gala dinner)
19:30	Sono Calm → KINTEX By K-Tree Hotel → Daehwa Stn. (Subway line No.3) → Haengsin Stn. (KTX)

Thu. May 26	
Departure	Itinerary
09:00	Sono Calm Goyang → KINTEX 2
16:00	KINTEX 2 → Daehwa Stn. → Haengsin Stn.

- **Bus Stop**

KINTEX 2 : 8 Hall loading dock / Sono Calm Goyang : East Tower 1 Floor

- **Precautions**

Due to traffic, the shuttle bus will not stay at the bus stop for more than five minutes.
It will be on standby at the bus stop 5 minutes before departure.
For those who arrive at the bus stop earlier,
please wait for the bus and get on it at the scheduled time above.

◉ Special Session 1

Chairman: Prof. Seong Chan Jun (Yonsei University)

Keynote Speech 1
Speech title : First-and-Every-Print-Correct Metal Additive Manufacturing
Speaker : Prof. Steven Y. Liang (Georgia Institute of Technology, USA)
Place : Room C
Date : 25-May (Wed), 10:00-11:00

Keynote Speech 2
Speech title : Reconfigurable Assembly Systems and The Transition to Electric Vehicles
Speaker : Dr. J. Patrick Spicer (General Motors, USA)
Place : Room C
Date : 25-May (Wed), 11:00-12:00

◉ General Session 1

Chairman: Dr. Sungcheul Lee (Korea Institute of Machinery & Materials)

Invited Speech 1 WB1-1
Speech title : Toward Next Generation of Machine Tools: Perspectives on Smart Machine Tools and Artificial Intelligence
Speaker : Prof. Simon Park (University of Calgary, Canada)
Place : Room A
Date : 25-May (Wed), 13:30-14:00

Invited Speech 2 WB1-2
Speech title : Overview and Case Studies of Smart Manufacturing in the Metal Industries of Taiwan
Speaker : Dr. Chorng-Tyan Lin (Metal Industries R&D Centre, Taiwan)
Place : Room A
Date : 25-May (Wed), 14:00-14:30

Chairman: Prof. Yongho Jeon (Ajou University)

Invited Speech 3 WB2-1
Speech title : Coated Bio-based Polymers
Speaker : Prof. Dumitru Nedelcu (“Gheorghe Asachi” Technical University of Iasi, Romania)
Place : Room B
Date : 25-May (Wed), 13:30-14:00

Invited Speech 4 WB2-2
Speech title : Applications of Artificial Intelligence in Manufacturing
Speaker : Prof. Sachin Salunkhe (Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, India)
Place : Room B
Date : 25-May (Wed), 14:00-14:30

Chairman: Dr. Seung-Kook Ro (Korea Institute of Machinery & Materials)

Invited Speech 5 WC1-1
Speech title : Challenge of System Development for Condition Monitoring in Intelligent Manufacturing
Speaker : Prof. Ming-Chyuan Lu (National Chung Hsing University, Taiwan)
Place : Room A
Date : 25-May (Wed), 16:00-16:30

Invited Speech 6 WC1-2
Speech title : Practice of Smart Manufacturing Implementation on Traditional Manufacturing Industry
Speaker : Prof. Shih-Ming Wang (National Chung Hsing University, Taiwan)
Place : Room A
Date : 25-May (Wed), 16:30-17:00

Chairman: Prof. Bo Hyun Kim (Soongsil University)

Invited Speech 7 WC2-1
Speech title : A Development of Sustainable Digital 3D Laser Micro Additive Manufacturing
Speaker : Prof. Ming-Tsang Lee (National Tsing Hua University, Taiwan)
Place : Room B
Date : 25-May (Wed), 16:00-16:30

Invited Speech 8 WC2-2
Speech title : Manufacturing Process Innovation through Digital Transformation based on Additive Manufacturing and its Applications
Speaker : Dr. Kuk-Hyun Han (Samyoung Machinery Co., Ltd., South Korea)
Place : Room B
Date : 25-May (Wed), 16:30-17:00

◉ Special Session 2

Chairman: Prof. Hyung Wook Park (Ulsan National Institute of Science and Technology)

Keynote Speech 3
Speech title : Off-Line and On-Line Volumetric Error Compensation of Machine Tools and Industrial Robots
Speaker : Prof. Robert G. Landers (University of Notre Dame, USA)
Place : Room C
Date : 26-May (Thu), 10:00-11:00

Manufacturing Forum
Forum title : "Gateway to Digital Manufacturing"
Place : Room C
Date : 26-May (Thu), 11:00-12:30

◉ General Session 2

Chairman: Dr. Yeong-Eun Yoo (Korea Institute of Machinery & Materials)

Invited Speech 9 TB2-1
Speech title : Hybrid Tertiary Bio-based Composites for High Performance Applications
Speaker : Prof. Chung-Hae Park (IMT Nord Europe, France)
Place : Room B
Date : 26-May (Thu), 14:00-14:30

◉ Special Session 3

Job Fair
Speech title : Job Competitiveness in Science and Engineering Postgraduate Student
Speaker : Mr. Chi Sung Kim (Zenics, South Korea)
Place : Online Conference Homepage
Date : 25(Wed)-26(Thu), May

Manufacturing Forum

Manufacturing Forum on 'Gateway to Digital Manufacturing'

The ICMTE 2022 organizing committee is pleased to announce that the 'Manufacturing Forum' will take place in KINTEX, South Korea from 11:00 AM to 12:30 PM on May 26th (local time in Korea), 2022.
Under the topic of 'Gateway to Digital Manufacturing', distinguished researchers from Academy, Institutes and Industries will talk and share valuable insights for the future manufacturing innovation.

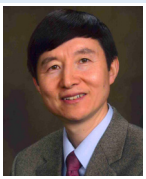
Please join the forum and share your valuable insights for the future manufacturing innovation.

Moderator and Panelists

Moderator

Pres. Dongyoung Jang
Korea Electronics-Machinery Convergence Technology Institute
(South Korea)

Panelists



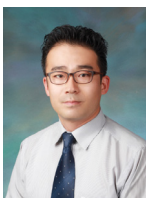
Prof. Jun Ni
University of Michigan
(USA)

Prof. Robert G. Landers
University of Notre Dame
(USA)

Pres. Eungki Lee
Chungnam Techno Park
(South Korea)

Dr. Kangjae Lee
Doosan machine tools Co. Ltd.
(South Korea)

Dr. Chang Ju Kim
Korea Institute of Machinery & Materials
(South Korea)



Dr. Hye Jin Lee
Korea Institute of Industrial Technology
(South Korea)

25-May (Wed)

⊙ Oral Session 1

Chairman: Dr. Sungcheul Lee (Korea Institute of Machinery & Materials)

Machine Tools Room A

Invited Speech

13:30-14:00 WB1-1 Toward Next Generation of Machine Tools: Perspectives on Smart Machine Tools and Artificial Intelligence

Simon Park* (University of Calgary)

Invited Speech

14:00-14:30 WB1-2 Overview and Case Studies of Smart Manufacturing in the Metal Industries of Taiwan

Chorng-Tyan Lin*, Chia-Ming Jan, Pin-Jyun Chen, Antony H. C. Lee (Metal Industries R&D Centre)

14:30-14:45 WB1-3 Studying removal behavior of single-crystal sapphire during orthogonal ultra-precision machining based on slip/fracture activation model

Suk Bum Kwon*, Sangkee Min (University of Wisconsin-Madison)

14:45-15:00 WB1-4 Real-time tool orientation linearization and global tool path smooth interpolation to improve the surface quality in 5-Axis CNC machining

Jeongmo Kang*, Dayoung Kim, Geunyeol Park, Sungyoun Jung, Sungchul Jee (Dankook University)

⊙ Oral Session 3

Chairman: Dr. Seung-Kook Ro (Korea Institute of Machinery & Materials)

Advanced Machine Tools Room A

Invited Speech

16:00-16:30 WC1-1 Challenge of System Development for Condition Monitoring in Intelligent Manufacturing

Ming-Chyuan Lu* (National Chung Hsing University)

Invited Speech

16:30-17:00 WC1-2 Practice of Smart Manufacturing Implementation on Traditional Manufacturing Industry

Shih-Ming Wang* (National Chung Hsing University)

17:00-17:15 WC1-3 Enhancement of tool point FRF estimation on multipurpose aerostatic spindle by compensation of contact parameter

Dang Chi Cong*, Jooho Hwang, Jongyoup Shim (Korea Institute of Machinery & Materials)

⊙ Oral Session 2

Chairman: Prof. Yongho Jeon (Ajou University)

Robotics & Automation Room B

Invited Speech

13:30-14:00 WB2-1 Coated Bio-based Polymers

Alina Marguta, Justina Georgiana Motas, Simona-Nicoleta Mazurchevici, Ramona-Iuliana Popa, Constantin Carausu, Dumitru Nedelcu*
("Gheorghe Asachi" Technical University of Iasi)

Invited Speech

14:00-14:30 WB2-2 Applications of Artificial Intelligence in Manufacturing

Sachin Salunkhe*, Ragavanantham Shanmugam, Vishal Naranje, H. M. A. Hussein
(Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology)

14:30-14:45 WB2-3 Design of a three-fingered robotic gripper with high dexterity

Myoung-Su Choi*, Bureum Jun, Dong-Hyuk Lee, Jae-Han Park, Ji-Hun Bae
(Korea Institute of Industrial Technology)

⊙ Oral Session 4

Chairman: Prof. Bo Hyun Kim (Soongsil University)

3D Printing Room B

Invited Speech

16:00-16:30 WC2-1 A Development of Sustainable Digital 3D Laser Micro Additive Manufacturing

Ming-Tsang Lee* (National Tsing Hua University)

Invited Speech

16:30-17:00 WC2-2 Manufacturing Process Innovation through Digital Transformation based on Additive Manufacturing and its Applications

Kuk-Hyun Han* (Samyoung Machinery Co., Ltd.)

17:00-17:15 WC2-3 A new system for predicting deformation of 3D printed part

Hongseok Park*, Bowen Qi (University of Ulsan)

17:15-17:30 WC2-4 Appropriate defect monitoring method for the fused deposition modeling using a deep transfer learning approach

Hyungjung Kim*, Hyunsu Lee, Sung-Hoon Ahn (Seoul National University)

26-May (Thu)

⊙ Oral Session 5

Chairman: Prof. Moon G. Lee (Ajou University)

Medical/Bio Engineering — Room A

14:00-14:15 TB1-1 Effect of viscoelasticity on cell viability in bioprinting using the lattice boltzmann method

Heemin Lee*, Joon Sang Lee (Yonsei University)

14:15-14:30 TB1-2 Anatomic knowledge-based hybrid method for segmenting coronary arteries and ascending aorta

Junhong Kim*, Joon Sang Lee (Yonsei University)

14:30-14:45 TB1-3 Optimization of artificial intelligence algorithms for FFR prediction in gray zone

Hyeong Jun Lee*, Junhong Kim, Joon Sang Lee (Yonsei University)

14:45-15:00 TB1-4 Real-time cell viability prediction through artificial neural network for drop-on-demand bio-inkjet printing

Soonwook Kwon*, Joon Sang Lee (Yonsei University)

26-May (Thu)

⊙ Oral Session 6

Chairman: Dr. Yeong-Eun Yoo (Korea Institute of Machinery & Materials)

Polymer Processing Room B

Invited Speech

14:00-14:30 TB2-1 Hybrid Tertiary Bio-based Composites for High Performance Applications

Chung-Hae Park*, Anurag Pisupati (IMT Nord Europe), Thomas Laurent, Mathilde Leroy (CETI)

14:30-14:45 TB2-2 A study on the hybrid material development and property evaluation to secure high-strength properties using FRP materials

Myeong Han Yoo, Ho Hyung Kuk, Na Ru Kang, Min Seok Moon* (Korea Carbon Industry Promotion Agency)

14:45-15:00 TB2-3 Hierarchical porous carbon electrode derived from organic resin for efficient hydrogen evolution reaction

Md. Ali Asgar*, Jun Kim, Seok-min Kim (Chung-Ang University)

15:00-15:15 TB2-4 Modelling of surface fusion mark during laser transmission welding of flax fiber reinforced polymer composites.

Rowshni Jabeen*, Benoît Cosson, André Chateau Akue Asseko, Chung Hae Park (IMT Nord Europe)

25-May (Wed) 15:00-15:40 Poster Session 1

3D Printing

WPS1-1 Study on layering direction for SLA 3D printing of micro-fluidic device

Jae-Ho Jin*, Da-in Kwon (Neo Nanotech), Do-Hyun Kang, Kwanoh Kim, Jae-Sung Yoon, Yeong Eun Yoo (Korea Institute of Machinery & Materials)

Advanced Machine Tools

WPS1-2 Residual vibration analysis for 3D semiconductor packaging inspection equipment

Sanghwa Min*, Moon G. Lee, Yongho Jeon (Ajou University)

WPS1-3 Enhanced tool life of a tungsten carbide cutting tools via the surface modification using a large pulsed electron beam in machining of Ti alloys

Joon-Hyeok Choe (Kyungpook National University), Sang Min Yang, Hyung Wook Park (Ulsan National Institute of Science and Technology), Jisoo Kim* (Kyungpook National University), Do Young Kim (Kyungnam University)

WPS1-4 Feed drive identification of gantry type machine tool system by using LinuxCNC

Hyunsu Jang*, Yoosu Kang, Soonhwan Kwon, Woongki Jang, Junho Hwang, Young Ho Seo, Byeong Hee Kim (Kangwon National University)

WPS1-5 A study on the thermal properties of spindles for multi-tasking machines during cutting

Sechan Kang*, Jisang Hwang, Sungjae Kim (Donga University), Chelhoon Sung (Sungsan amdeco)

WPS1-6 Micro mechanical machining of cemented carbide using EDMed micro tools

Dae Bo Sim*, Chan Young Yang, Min Ki Kim, Bo Hyun Kim (Soongsil University)

Carbon Convergence

WPS1-7 A study on the change of mechanical strength according to the mixing conditions of recycled carbon fiber

Myeong Han Yoo*, Chang Soo Kang, Na Ru Kang, Min Seok Moon (Korea Carbon Industry Promotion Agency)

WPS1-8 Fiber orientation characteristics in the injection/compression molding process of short fiber-reinforced composite materials

Geung-Hyeon Lee*, Da-Young Jang, Dae-hyeon Na, Ye-Jin Choi, Jang-Woo Han (Kumoh National Institute of Technology)

WPS1-9 Thermal characteristics of carbon fiber polyimide-coated by electrophoretic deposition

Jae Jin Kim* (Korea Institute of Industrial Technology), Jong Woong Kim (Jeonbuk National University), Kwang Seok Kim (Korea Institute of Industrial Technology)

Design and CAE

WPS1-10 Analysis of cerebral aneurysm occlusion effect of 'Heart' flow disruptor through structural and flow analysis

Byungkwan Jeong*, Hye Jin Lee, Chanhee Won (Korea Institute of Industrial Technology)

WPS1-11 Shape prediction of high efficiency (IE4) induction motor using DNN

Sung jun Jeon*, Seog young Han (Hanyang University)

WPS1-12 CAE analysis study of the 2-step glass molding press to improve the bending angle above 90° of 3D curved glass for mobile display

Jeong-Yeon Park* (Korea Institute of Industrial Technology), Sung-Ho Jang (Gaon-solutec co.,), Dong-Won Lee (Korea Institute of Industrial Technology/Inha University), Hyeon-Hwa Lee, Jong-Su Kim (Korea Institute of Industrial Technology)

WPS1-13 A study on the design improvement of coolant pump for ultra-precision machine tools applying CFD technique

Sang-Yu Kim*, Jae-Yeol Kim, Chan-Woo Lee, Seo-Han Lee, Jeong-Min Ko (Chosun University)

WPS1-14 Flow analysis for fan-in/fan-out wafer level package coating process

Junsoo Shin*, Joo-Pyo Hong, Seungmo Kim (Korea University of Technology and Education)

WPS1-15 Analysis of combustion characteristics of mixed swirl combustion furnace

Young Hwan Han*, Hyun Ik Yang, Tae Sung Shin, Jae Hyuk Lee (Hanyang University)

Design and Engineering for Manufacturing

WPS1-16 3D-printed part design and CFD analysis in spindle drawbar for cryogenic liquid jet

Jungsoo Nam, Da Eun Ko* (Korea Institute of Industrial Technology), Song Hyeon Ju (Chung-Ang University), Tae-Gon Kim (Korea Institute of Industrial Technology)

WPS1-17 A study on the fiber orientation and deformation characteristics of fiber reinforced plastic for automotive transmission side cover

Euichul Jeong* (Dankook University, Korea Institute of Industrial Technology), Yongdae Kim, Eongyeong Yun, Sunghee Lee (Korea Institute of Industrial Technology)

WPS1-18 Microstructure and low-temperature toughness of 9% Ni steel FCAW weld joint using Hastelloy weld metals

Ji Yong Hwang*, Kwangsu Choi, Hyo Yun Jung (Korea Institute of Industrial Technology)

WPS1-19 Wheel design for mobile machine

Sungcheul Lee*, Yongjin Kim, Byung-Sub Kim, Hyun-Su KIM, Dong-Hoon Kim, Seung-Kook Ro (Korea Institute of Machinery & Materials)

WPS1-20 A study on the characteristics of 45,000rpm ball bearing spindle for machine tools according to driving time

Jiwan Kang*, Heeyoung Maeng (Seoul National University of Science and Technology)

WPS1-21 A study on injection analysis of pump cap parts to increase production quality

Seung Yub Baek, Eun Chan Wi*, Min Sung Ko, Yi Seob Yun (Induk University), Joong Bae Lee, Min Su Kim (ILLUPACK Co., Ltd)

Green Manufacturing Systems

WPS1-22 Simulation for prediction of material removal characteristics in electrochemical machining

UkSu Kim*, Seong Ung Kwak, Kang Hyun Lee, Jeong Woo Park (Chosun University)

WPS1-23 Slurry reduction using composite polishing tool

Dong-Ryul Kim*, Sung-Hoon Ahn (Seoul National University)

Etc.

WPS1-24 Recycling of worn bobbin probe for eddy current test

Sangmo KU* (Hojin Industrial Co., Ltd)

WPS1-25 Indication signal distortion by nearby test coil in eddy current test

Sangmo KU* (Hojin Industrial Co., Ltd)

WPS1-26 Tackling the cyber-attack problem in industrial control systems

Jungsoo Nam, Youngjoon Lee* (Korea Institute of Industrial Technology)

WPS1-27 Soft thermo-pneumatic actuator based on phase transition

Yeosang Yoon*, Huijae Park (Seoul National University), Jinwoo Lee (Georgia Institute of Technology), Seung Hwan Ko (Seoul National University)

WPS1-28 Stretchable thermoelectric skin for underwater power generation and thermoregulation

Yeongju Jung*, Junhwa Choi (Seoul National University), Jinwoo Lee (Georgia institute of technology), Seung Hwan Ko (Seoul National University)

WPS1-29 A study on the investment strategy for the establishment of autonomous mobility ecosystem
Kwang Hoon Kim* (Korea Institute of Science and Technology Information)

WPS1-30 Adaptive respiratory protection by dynamic modulation of stretchable air filter
Seongmin Jeong*, Seung Hwan Ko (Seoul National University)

WPS1-31 Web-based technology valuation system
Jongtaik Lee* (Korea Institute of Science and Technology Information)

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TPS1-1 Gait analysis system based on machine learning using 6-axis accelerometer

Sangwoo Ham*, Chang-Young Yoo, Jae-Youn Jung, Woong Ki Jang, Byeong Hee Kim, Seong-Wook Choi, Suk-Jin Ha, Hojin Ha (Kangwon National University)

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TPS1-3 Development of red blood cell abnormality detection algorithm using YOLOv5

Jingu Kim, Jihun Kang, Kyoungcheol Choi, Woong Ki Jang, Soonhwan Kwon*, Hojin Ha, Kwangsuk Lim, Byeong Hee Kim, Yongjai Park (Kangwon National University)

Nano/Micro Systems

TPS1-4 Size-tailored fabrication of metal micro/nanoporous structure by direct laser patterning

Jong-Eun Park* (State University of New York Korea), June Sik Hwang (Korea Advanced Institute of Science and Technology), Srinivasan Arthanari (Chungnam National University), Sanha Kim (Korea Advanced Institute of Science and Technology), Huseung Lee (Chungnam National University), Minyang Yang(State University of New York Korea)

TPS1-5 Acoustophoretic microfluidic device with inertial prefocusing channel for efficient particle and blood cell separation

Uihwan Kim* (Seoul National University of Science & Technology), Sang Wook Lee (PCL Inc.), Younghak Cho (Seoul National University of Science & Technology)

TPS1-6 Development of confocal imaging system using optical probe array module with expanded working distance

DongHyun Kim*, Runjia Han, Eunjoo Chae, Shinill Kang (Yonsei University)

TPS1-7 Characteristics of Al_2O_3 thin films grown by using atomic layer deposition at low temperature

Suyeon Kim*, Seung-Hun Lee, In Ho Jo (Hanbat National University), Yeong-Eun Yoo (Korea Institute of Machinery and Materials), Jeong Hwan Kim (Hanbat National University)

TPS1-8 Development of large-scale parallel direct writing of nanoapertures

Jongeun Oh*, Qi Zhou, Ika Suryani, Shinill Kang (Yonsei University)

TPS1-9 Development of biomimetic metal surface with nano-features in curved micro-features

Jeehyeon Lee*, Nahyun Won, Sunmok Kwon, Shinill Kang (Yonsei University)

Polymer Processing

TPS1-10 A study on the realization of thin artificial nails through injection molding for each type of thermoplastic plastics

Jeong-Yeon Park*, Jung-Eon Son, Jong-Su Kim (Korea Institute of Industrial Technology)

TPS1-11 Effects of atmospheric exposure of Ru-based catalyst on the mechanical properties of glass fiber/polydicyclopentadiene composites

Hyeong-Min Yoo*, Dong-Jun Kwon (Korea University of Technology and Education)

TPS1-12 A study on ultra-sonic welding process for plastic micro-fluidic device

Sang-Won Woo* (Woo Young Solution), Ki-woon Kim (S & S Med), Jae-Ho Jin (Neo Nanotech), Jae-Sung Yoon, Yeong Eun Yoo (Korea Institute of Machinery & Materials)

Printable Electronics

TPS1-13 Strong thermal oxidation resistant copper electrodes using large pulsed electron beam sintering

Yunjae Hwang* (Ulsan National Institute of Science and Technology), Jisoo Kim, Changyong Yim (Kyungpook National University), Hyung Wook Park (Ulsan National Institute of Science and Technology)

TPS1-14 Improvement of anti-plasma etching property by the formation of dense coating layer containing yttrium via laser-induced hydrothermal one-step synthesis

Jaeho Park*, Sangmin Song, Jaehong Lee, Kyungwoo Lee, Yu-Chan Kim, Myoung-Ryul Ok, Hyung-Seop Han (Korea Institute of Science and Technology), Jeong-Yun Sun (Seoul National University), Hojeong Jeon (Korea Institute of Science and Technology)

TPS1-15 Femtosecond laser induced hydroxyapatite synthesis and nano coating on Ti alloy

Jaehong Lee (Korea Institute of Science and Technology), Dae-Hyeok Kwon* (KU-KIST Graduate School of Converging Science and Technology), Seung-Hoon Um, Min Young Na, Jaeho Park, Hye Jung Chang, Hojeong Jeon, Yu-Chan Kim (Korea Institute of Science and Technology)

TPS1-16 Fabrication of low-temperature sintered silver paste for flexible electronics

Sun Hong Yoon* (Korea Electronics Technology Institute)

Robots and Automation

TPS1-17 Estimating the stiffness of robots in various postures using artificial neural network

Chang Hyeon Mun* (Ulsan National Institute of Science and Technology), Jihyun Lee (University of Calgary), Hyung Wook Park, DongChan Kim (Ulsan National Institute of Science and Technology)

TPS1-18 Analysis of investment trends for national R&D projects in the field of service robots

Kwang Hoon Kim* (Korea Institute of Science and Technology Information)

Smart Machine Tools

TPS1-19 A study on the 5-Axis NC data modification through geometric form error prediction based on CL points

Geunyeol Park*, Jeongmo Kang, Eunbyeol An, Jaehyun Park, Sungchul Jee (Dankook University)

TPS1-20 Machine tool monitoring system based on unified CNC interface

Dong Yoon Lee*, Eunseok Nam, Sung Ho Nam (Korea Institute of Industrial Technology)

Smart Manufacturing

TPS1-21 Analysis of YOLOv5 results based on detection speed and precision

Iksu Kim*, Moon G. Lee, Yongho Jeon (Ajou University)

TPS1-22 Development of feasibility testing module for evaluating smart sensors in hot forging and extrusion during transferring heated steel billet

Chanhee Won*, Hye Jin Lee, Byung-Kwan Jeong, Jin-Myeong Lee (Korea Institute of Industrial Technology)

TPS1-23 Reconstruction on digital twin model of billet heating and conveying equipment for analysis at the system-of-systems level

Bong Gu Kang*, Chan-Hee Won, Jung Min Yun, Hye Jin Lee (Korea Institute of Industrial Technology), Jae Cheon Kim (INGKLE)

TPS1-24 Development of modular rotational precision measurement system for multi-channel expansion based on ring-type encoder

Intae Hwang*, Sang Woo Lee, Insik Choi, Kyeng Ho Jin, Young Ho Seo, Byeong Hee Kim (Kangwon National University)

TPS1-25 Real-time defect inspection system for teflon tube using object detection

Chun Muk Jo*, SeHyong Lee, Byeong Hee Kim, Young Ho Seo (Kangwon National University), HoTaek Kwak (CAE Technology), Woong Ki Jang, Yong Jai Park (Kangwon National University)

TPS1-26 Appropriate defect inspection module for the industrial sewing machine

Semin Ahn*, Hyunsu Lee, Hyungjung Kim (Seoul National University), Woo-Kyun Jung (MFAFA Coperation), Jae-Won Lee (Hojeon Coperation), Sung-Hoon Ahn (Seoul National University)

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TPS1-27 The development fabrication process of thin-film thermocouple (TFTC) applicable to the machining process

Dongmin Kim* (Korea Institute of Industrial Technology), JunYoung Kim (Gyeongsang National University)

Ultra-precision Nanomachining

TPS1-28 A study on the temperature control method that predicts and responds to changes in outside air temperature

Jong Won Yun, Seung Kook Ro* (Korea Institute of Machinery & Materials)

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TPS1-29 Development of fault detection and diagnosis system for rotating machine using deep learning

Seong Un Choi*, Byeong Hee Kim, Jae Hyun Kim, Sang Hu Jeon, Woong Ki Jang, Seock Hyun Kim, Young Ho Seo (Kangwon National University), Young Hun Yang (SPM Instrument Korea)

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Truong Vu*, Hocheol Lee, Han-Kil Yeon (Hanbat National University), Young-Sub Song, Young-Ju Kim (Reform Tech Company)

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TPS1-31 Comparative study of acoustic reflection detection using PVDF sensor

Hyo-Jeong Kim, Seoung-Hwan Lee*, Sin-Yeop Lee, Ju-Heon Lee (Hanyang University), Hyung-Jin Park (Hanyang University ERICA), Hee-Hwan Lee (Hanyang University)

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TPS1-32 Analysis of the surface roughness of magnesium alloy as biological material in microplate processing

Hyung Gon Shin*, Sang Don Mun, Hwi Joong Kim, Sieb Chanchamnan, Hong Cheol Im (Jeounbuk National University)

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Travel information

Il San Lake Park

This is an eco-friendly park where you can enjoy beautiful sceneries all around the year, the best of its kind in whole metropolitan areas for rest and sightseeing. With the lake positioned in the center, bike paths and walkways lined with dawn red wood or metasequoia are provided. Various other facilities such as lawn ground, outdoor stage, singing fountain, place for ecological lessons and exhibition hall are also made available for use by citizens. The park is also the venue for colorful festivals like International Horticulture, Goyang.

Starfield Goyang

Starfield Goyang is located in a gateway that connects Seoul and the Northwestern Gyeonggi-do. The beautiful natural environment of Bukhan Mountain and Korean architecture motifs such as castles, towering doors, and watchtowers are reinterpreted in a modern way and incorporated into architectural design. Especially The classic Euro-style Indoor Market Hall, Beer Tab House, Trendy&Steady Restaurant, Asian Market Food Court and Family&Dining Restaurant will provide you with the experience of one step higher eating and drinking facilities.

Moreover You can enjoy various shopping and leisure culture comfortably and pleasantly in one space from trendy fashion beauty special hall to reasonably priced warehouse type hypermarket, upgraded market. Including Aqua Field with hot spring water for four seasons, state-of-the-art cinema, complex playground for children and various specialized services, it will be a hot place for the entire family to make precious memories.

Hyundai Motorstudio Goyang

Hyundai Motorstudio Goyang is the largest automobile theme park in Korea, offering fun and excitement for visitors as they learn about how cars are manufactured and how they function. There are many facilities visitors can enjoy, including Kitchen, a large area replete with tempting delicacies, our cozy Cafe, and the Shop, which offers special collections and souvenirs. Embark on a new kind of automotive journey with us, seeing, hearing, and touching cars.

Haengjusanseong Fortress

Haengju Sanseong is a mountain fortification built with earthen walls along the ridge of 70~100 meters in elevation with the summit of Mt. Deokyang at Haengjunae-dong, Deokyang-gu, Goyang, which is 124.8 meters above sea level being the center. Whole length of the wall is about 1Km. In the south, the fortification borders Han River. In the southwest, Changreung-cheon river flows around the fortification and into Han River making a natural moat. Very steep slopes in the southwest and south form a natural protective wall. The fortification consists of the inner castle surrounding the peak of a hill close to the river and the outer castle surrounding a small ravine opening to the north. It is unknown exactly when the fortification was built. But the construction method utilizing steep riverside cliffs and shape of the site encompassing wide plains in the northeast resemble the fortifications constructed in early days of the 3 Kingdom Era. Especially, this fortification is well known for the victory won by General Kweon Yul in 1593 during the reign of King Seonjo against invading Japanese forces. The victory is one of the 3 major victories won by the country during the Japanese Invasion.

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