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# ICMTE

## The 11<sup>th</sup> International Conference of Manufacturing Technology Engineers 2024

Collaborated with SIMTOS 2024

2(Tue.)~3(Wed.) April 2024

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
- AI Carbon Neutral Manufacturing
- 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
- Vibration and Control

A Big Step Towards Autonomous Manufacturing



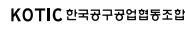
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**KSMTTE**  
Korean Society of Manufacturing Technology Engineer



www.imcc1983.org

Chinese Production Engineering Institute, CMES (CPEI)



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## Welcome Message

### International Conference of Manufacturing Technology Engineers

## Welcome Message

On behalf of the Organizing Committee, I am honored to announce that the 2024 International Conference of Manufacturing Technology Engineers (ICMTE 2024) will be held at KINTEX in Goyang, Korea.

ICMTE 2024 aims to facilitate interactions among engineers and manufacturers in the fields of mechanical design, computer-aided engineering (CAE), traditional manufacturing, robotics, and automation. It also extends their connections to micro- and nano-technology, sustainable manufacturing, and other cutting-edge areas of manufacturing.

After the Fourth Industrial Revolution, digital transformation has accelerated globally, and the industrial structure is being reorganized based on hyper-connectivity and super-intelligence. In the post-COVID era, metaverse platforms are experiencing rapid growth, and the demand for innovative manufacturing technologies, such as autonomous manufacturing, is more vital than ever. In response to these emerging global trends and demands, our manufacturing community is on a significant mission to actively lead innovation in the production and manufacturing sector. To achieve this goal, we believe it is essential to strengthen and expand the core functions of academic research activities and scholarly exchanges, fulfilling our inherent role. Furthermore, building on this foundation, enhancing international collaboration among academia, industry, and research institutions is also deemed necessary to foster continued growth and progress in our community.

Jointly organized with the 20th Seoul International Manufacturing Technology Show (SIMTOS 2024), Korea's largest production and manufacturing technology exhibition, ICMTE 2024 is expected to provide the perfect venue for promoting mutual cooperation and learning about cutting-edge manufacturing technologies, including autonomous manufacturing.

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

Thank you very much.

#### General Chair



Sungchul Jee  
President of the KSMTE  
Professor of Mechanical Engineering, Dankook University

## ICMTE 2024 Program

### International Conference of Manufacturing Technology Engineers

2-April (Tue)		3-April (Wed)	
12:00-	Registration	08:30-	Registration
13:00 - 13:30	Opening Ceremony Welcome Speech	09:00 - 09:40	Poster Session
13:30 - 14:20	Plenary Speech 1	09:40 - 10:00	Break
14:20 - 14:40	Break	10:00 - 10:50	Plenary Speech 2
14:40 - 15:40	Invited Speech - 1, 2	10:50 - 12:20	Invited Speech - 3, 4, 5
15:40 - 16:00	Break	12:20 - 13:30	Lunch
16:00 - 17:30	Oral Session : Manufacturing Technologies 1	13:30 - 14:30	Oral Session : Manufacturing Technologies 2
17:30 - 18:00	To Banquet Place	14:30 - 14:50	Break
18:00 -	Banquet @ Sono Calm Goyang Hotel	14:50 - 15:50	Oral Session : Manufacturing Technologies 3
		15:50 -	Closing Ceremony

## Place

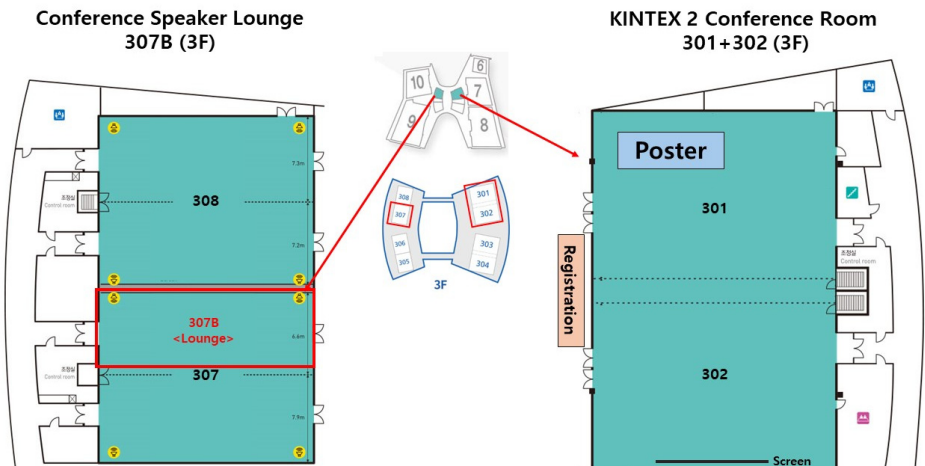
Place		
Registration	2-April (Tue)	KINTEX 2 HALL 8 Conference Room B (1F)
	3-April (Wed)	KINTEX 2 Conference Room 301+302 (3F) Lobby
Plenary Speech 1		KINTEX 2 HALL 8 Conference Room B (1F)
Plenary Speech 2		KINTEX 2 Conference Room 301+302 (3F)
Invited Speech 1, 2		KINTEX 2 HALL 8 Conference Room B (1F)
Invited Speech 3, 4, 5		KINTEX 2 Conference Room 301+302 (3F)
Oral Session : Manufacturing Technologies 1		KINTEX 2 HALL 8 Conference Room B (1F)
Oral Session : Manufacturing Technologies 2, 3		KINTEX 2 Conference Room 301+302 (3F)
Poster Session		KINTEX 2 Conference Room 301+302 (3F)
Banquet [Conference Dinner, 2-April(Tue)]		Sono Calm Goyang - West Tower Crystal Ballroom (2F)
Lunch [3-April (Wed)]		KINTEX 2 "F&B Area" (1F)
Conference Speaker Lounge	2-April (Tue)	KINTEX 2 HALL 7A (1F)
	3-April (Wed)	KINTEX 2 Conference Room 307B (3F)

## Floor plan

### ■ 2-April (Tue)



### ■ 3-April (Wed)



## Registration Information

- Registration Date : 2-April (Tue), 12:00 ~
- Registration Fee

Category		Regular	Student
On-Site Registration	KRW	600,000	300,000
	USD	500	250

- Shuttle Bus Schedule (KINTEX 2 ↔ Sono Calm Goyang)

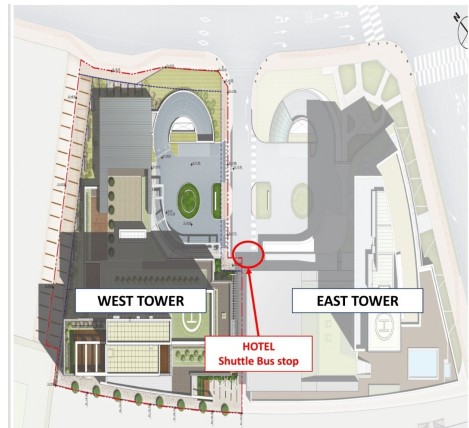
Sono Calm Goyang → KINTEX 2	KINTEX 2 → Sono Calm Goyang
Operating every 10 minutes from 8:30 AM to 10:00 AM	Operating every 10 minutes from 05:00 PM to 06:30 PM

- Shuttle Bus Stop

<KINTEX 2 : 8 Hall loading dock>



<Sono Calm Goyang Hotel : Lobby entrance>



- 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)

**Plenary Speech 1**

Speech title : Smart Manufacturing with a Decentralized and Distributed Regime  
Speaker : Prof. Xun Xu (University of Auckland, New Zealand)  
Place : 8 Hall, Conference Room B  
Date : 2-April (Tue), 13:30-14:20

Chairman: Dr. Jongyoup Shim (Korea Institute of Machinery & Materials)

**Invited Speech 1** **TB1-1**

Speech title : Novel evaluation method for motion trajectory of machine tool feed drives based on human visual sensitivity  
Speaker : Prof. Ryuta Sato (Nagoya University, Japan)  
Place : 8 Hall, Conference Room B  
Date : 2-April (Tue), 14:40-15:10

**Invited Speech 2** **TB1-2**

Speech title : AI-based autonomous Factory solutions & Use Case  
Speaker : Mr. Jason Park (INTERX Co., Ltd., Korea)  
Place : 8 Hall, Conference Room B  
Date : 2-April (Tue), 15:10-15:40

## ◎ Special Session 2

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

### Plenary Speech 2

Speech title : Autonomous Machine Tools - Vision or Soon Reality?

Speaker : Prof. Dr.-Ing. Berend Denkena (Leibniz University Hannover, Germany)

Place : Conference Room 301+302

Date : 3-April (Wed), 10:00-10:50

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

### Invited Speech 3 **WA2-1**

Speech title : Research activities in the Industrial Cyber-Physical Systems Research Center,  
AIST for human-centric digital manufacturing

Speaker : Dr. Hitoshi Komoto  
(National Institute of Advanced Industrial Science and Technology (AIST), Japan)

Place : Conference Room 301+302

Date : 3-April (Wed), 10:50-11:20

### Invited Speech 4 **WA2-2**

Speech title : The digital twin brings the machine to the office

Speaker : Mr. Dongyul Ahn (HEIDENHAIN Korea Ltd., Korea)

Place : Conference Room 301+302

Date : 3-April (Wed), 11:20-11:50

### Invited Speech 5 **WA2-3**

Speech title : Additive Manufacturing as the enabler of digital transformation in sustainable  
production

Speaker : Mr. Brian Moon (Stratasys Korea, Korea)

Place : Conference Room 301+302

Date : 3-April (Wed), 11:50-12:20

**2-April (Tue)**

⦿ **Oral Session : Manufacturing Technologies 1**

Chairman: Dr. Jongyoup Shim (Korea Institute of Machinery & Materials)

**Conference Room B**

16:00-16:15 **TC1-1** Design and analysis of mobile platforms for measurement

Design and  
Engineering for  
Manufacturing

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

16:15-16:30 **TC1-2** Rheological equivalent circuit model using electrochemical impedance analysis

Polymer  
Processing

Hwan Woo Choi\*, Young Seok Song, Seoung Jai Bai (Dankook University)

16:30-16:45 **TC1-3** Learning-based thermal control of MIMO system

Robots and  
Automation

Chang-Hyeon Lee, Sung-Gyun Chun, Sun Kyoung Kim\*  
(Seoul National University of Science and Technology)

16:45-17:00 **TC1-4** Enhanced electrochemical performance of laser-induced graphene porous electrodes for hydrogen evolution reaction

Carbon  
Convergence

Mohammad Ali Asgar\* (Jatiya Kabi Kazi Nazrul Islam University),  
Seok-min Kim (Chung-Ang University)

17:00-17:15 **TC1-5** Micromanufacturing enables High-performance flat optics

Ultra-precision  
Nanomachining

Hocheol Lee\*, Truong Van Vu, Hien Nguyen (Hanbat National University)

17:15-17:30 **TC1-6** Design of multimodal powder mixture feedstock for non-melting based metal 3D printing

3D Printing

Joon Phil Choi\*, Pil-Ho Lee, Min-Kyo Jung, Dongwoon Shin, Yongrae Kim,  
Changwoo Lee, Taeho Ha, Segon Heo (Korea Institute of Machinery & Materials)

3-April (Wed)

○ Oral Session : Manufacturing Technologies 2

Chairman: Moon Gu Lee (Ajou University)

Conference Room 301+302

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- 13:30-13:45 **WB2-1** Fabrication of wafer scale vitreous carbon mold for precision glass molding  
Ultra-precision Nanomachining  
Muhammad Refatul Haq\* (Paul Scherrer Institute(PSI)),  
Muzahir Ali, Young Kyu Kim, Seok-min Kim (Chung-Ang University)
- 
- 13:45-14:00 **WB2-2** Compressive residual stress generation at crack tip in bulk metal using acoustic cavitation  
Design and Engineering for Manufacturing  
Prabhu Murugesan\*, Sunghwan Jung (Dankook University),  
Hyungyil Lee (Sogang University)
- 
- 14:00-14:15 **WB2-3** Monitoring device for machining center spindle preload using strain sensors  
Advanced Machine Tools  
Dung Minh Nguyen\* (University of Science and Technology)  
Jooho Hwang, Jongyoun Shim (Korea Institute of Machinery & Materials)
- 
- 14:15-14:30 **WB2-4** Multiport fast charging stations based on solid-state transformer  
Green Manufacturing Systems  
Dongho Choi\*, Hyeon-Woo Oh, June-Seok Lee (Dankook University)
-

## ◉ Oral Session : Manufacturing Technologies 3

Chairman: Jong G. Ok (Seoul National University of Science and Technology)

### Conference Room 301+302

- 
- 14:50-15:05 **WB2-5** Investigation on chatter suppression effect with spindle speed variation  
Advanced Machine Tools  
Soohyun Nam\*, Hyein Kim, Jaehyun Lee, Sung-Ho Nam,  
Kyung-Hee Park (Korea Institute of Industrial Technology)
- 
- 15:05-15:20 **WB2-6** Improving the precision of a five-axis CNC interpolator via geometric form error prediction on machined surfaces  
Advanced Machine Tools  
Jeongmo Kang\*, Dayoung Kim, Jaehyun Park, Sungchul Jee (Dankook University)
- 
- 15:20-15:35 **WB2-7** Research on the AI-based defect monitoring system in robotic CFRP machining processes  
Smart Manufacturing  
DongChan Kim\*, JaeGyeong Choi, Miyoung Chung,  
Sunghoon Lim, YunSeok Kang, HyungWook Park (UNIST)
- 
- 15:35-15:50 **WB2-8** Plasmonic nanoantenna dot array-enhanced fluorescence substrate for simultaneous detection of multiple biomarkers  
Medical/Bio Engineering  
Xun Lu\* (Yanbian University),  
TASADDUQ HUSSAIN, Seongmin Lee (Chung-Ang University),  
Naseem Abbas (Sejong University, Korea), Seok-min Kim (Chung-Ang University)
-

**3D Printing**

- WPS2-1** Finite element analysis of impact test for human protection wearable product design  
SeokHwan Jung\*, Sung-Han Rhim (Dankook University)
- WPS2-2** VP printer monitoring using PVDF-based AE sensor  
Jaehyeon Nam\* (Hanyang University), Heehwan Lee (Daeyoung Power Pump Co., Ltd.),  
Hyojeong Kim (Hanyang University), Kyunghee Song (Daeyoung Power Pump Co., Ltd.),  
Seonghwan Lee (Hanyang University)
- WPS2-3** Multi-objective parametric optimization for manufacturing structures with gradients in additive manufacturing  
Hyungjin Park\*, Hyojeong Kim (Hanyang University), Heehwan Lee,  
Kyunghee Song (Daeyoung Power Pump Co., Ltd.), Seonghwan Lee (Hanyang University)

**Advanced Machine Tools**

- WPS2-4** Analysis of tool point dynamics of an ATC type aerostatic spindle based on receptance coupling substructure analysis  
Jooho Hwang\*, Jongyoup Shim (Korea Institute of Machinery & Materials),  
Cong Chi Dang (ASPL Ltd)
- WPS2-5** On vibration suppression with gyroscopic moment for flexible machine milling  
Jongyoup Shim\*, Jooho Hwang, Seung-Kook Ro (Korea Institute of Machinery & Materials)
- WPS2-6** A feedrate profiling method for reducing machining time by decreasing feedrate fluctuations in five-axis CNC machine tools  
Dayoung Kim\*, Jeongmo Kang, Myeongyeon Kim, Jihyeon Kim, Sungchul Jee (Dankook University)
- WPS2-7** Automatic workpiece changer control under cross-heterogeneous CNC communication  
Soonhwan Kwon\*, Byeonghee Kim, Intae Hwang, Beomsu Kim,  
Yong-Jai Park (Kangwon National University)
- WPS2-8** Enhanced CNC system centralized control with cyclic synchronous torque mode  
Jinseop Shin\*, Byunghee Kim, Jaewoo Park, Jeongwan Lee (Kangwon National University),  
Inhue Choi (CSCAM), Yong-Jai Park, Youngho Seo (Kangwon National University)
- WPS2-9** Development of energy consumption monitoring system for machine tools aligned with ISO14955  
Jaehak Lee\* (Korea Institute of Industrial Technology),  
Jeong Seok Oh, Gyungho Khim (Korea Institute of Machinery & Materials)
- WPS2-10** A study on AEE-clustering based anomaly detection for monitoring the tool condition monitoring using feature of induction motor  
Pyeong An Kim\*, Sung Ho Nam (Korea Institute of Industrial Technology),  
Jehoon Oh (Hanyang University)

## Carbon Convergence

- WPS2-11** Polymeric emulsion process for designing monodisperse spherical hard carbon nanoparticle anode materials  
Seong Ung Hong\*, Byoung-Sun Lee (Dankook University)
- WPS2-12** Manufacture of activated carbon pellets for automotive canister with controlled pore structure by activation and pelletizing process  
Byeonghun Lee\*, Hyemin Lee (Korea Carbon Industry Promotion Agency)
- WPS2-13** Manufacture of high-purity carbon molecular sieve for high-purity gas separation with controlled pore structure through pelletization process  
Byeonghun Lee\*, Hyemin lee (Korea Carbon Industry Promotion Agency)

## Design and CAE

- WPS2-14** Design of a syringe pump for medical devices  
Moon Gu Lee, Se Eun Kim\*, Yong Ho Jeon (Ajou University)
- WPS2-15** Piezoelectric strain sensor for multi-verification security device  
Yujun Song\*, Hyeongjin Jo, Ji-Hyeon Song (Dankook University)

## Design and Engineering for Manufacturing

- WPS2-16** Study on manufacturing highly processible, high power thick electrode via porosity regulated solvent-free process  
Yeonwook Park\*, Jiwoong Bae (Hanyang University)

## Green Manufacturing Systems

- WPS2-17** Feedback control system for dimensional precision improvement in electrochemical machining  
SeongUng Kwak, UkSu Kim\*, JeongWoo Park (Chosun University)
- WPS2-18** Analysis of the effect of dry electrochemical polishing (electropolishing) through surface processing at the particle level with pulse application  
SeongUng Kwak\*, UkSu Kim, JeongWoo Park (Chosun University)
- WPS2-19** Experimental analysis of microholes on ceramic material drilled by a focused electron beam  
Hyunmin Park\*, Yun Seok Kang, Hyung Wook Park (Ulsan National Institute of Science and Technology)

**WPS2-20** Performance evaluation of PEMFCs in marine environments

Ye Rim Kwon\*, Gu Young Cho, Ho Jun Yoo,  
Byung Gyu Kang, Ki Won Hong, Sun Ki Kwon (Dankook University)

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**WPS2-21** Combustion-assisted sintering for tunable densification of manganese cobalt oxide layers

Yonghwan Cho\*, Wonjoon Choi, Taewon Kim, Kyungmin Kim (Korea University)

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### Medical/Bio Engineering

**WPS2-22** Fabrication of enhanced fluorescence substrate with plasmonic nanodots on micropost array substrate

TASADDUQ HUSSAIN\*, Muzahir Ali, Seok-min Kim (Chung-Ang University)

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**WPS2-23** Highly sensitive breath-biosensor with carbon nanowalls

Hyung Jin Kim\* (Ulsan College)

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### Nano/Micro Systems

**WPS2-24** Practical manufacturing protocols for nanoporous Ag thin films on various substrates for functional electronics and photonics

Kwangjun Kim\*, Minwook Kim, Yong Tae Kim, Rahul S. Ingole, Hyunbin Park,  
June Suk Lee, Jong G. Ok (Seoul National University of Science and Technology)

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**WPS2-25** Thermal optimizing of reduced graphene oxide for enhanced performance in semiconductor based biosensors

Teajong Hwang\*, Seong Chan Jun, TIANCI LIU (Yonsei University)

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**WPS2-26** Neural network model for identifying complex gas molecules in a high humidity environment

Yun Ji Hwang\*, TIANCI LIU, Seong Chan Jun (Yonsei University)

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### Polymer Processing

**WPS2-27** Sealing of plastic microfluidic chips via automated UV-curable adhesive dispensing with a contouring machine

Yeong-eun Yoo (Korea Institute of Machinery & Materials),  
Jae-Ho Jin\*, Da-in Kwon (Neo Nanotech, Ltd),  
Jae-sung Yoon, Kwan-Oh Kim, Do-hyun Kang (Korea Institute of Machinery & Materials)

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## Printable Electronics

**WPS2-28** High-performance flexible transparent heaters practically producible by soft contact printing of ionic Ag ink

Minwook Kim\*, Kwangjun Kim, Yong Tae Kim, Rahul S. Ingole,  
Jeong Min Park, Jong G. Ok (Seoul National University of Science and Technology)

**WPS2-29** Experimental characterization of flexible printed circuit board lamination process by roll-to-roll approach with peel strength analysis

Chan-Woo Lee, Eun-Ji Gwak, Doo-Sun Choi,  
Tae-Jin Je, Jun Sae Han\* (Korea Institute of Machinery & Materials)

## Robots and Automation

**WPS2-30** Optimized path generation algorithm for collision avoidance in fiber optic positioner systems for multi-object spectroscopy

Hyunho Lim\*, Young-Man Choi (Ajou University)

**WPS2-31** Design and construction of multi-axis integrated robot machining system

JongWoo Han\*, ChangHyeon Mun, HyungWook Park  
(Ulsan National Institute of Science and Technology)

**WPS2-32** LiDAR-less AMR system based on real-time object recognition and game mechanics

SuVin Lee\*, ByeongHee Kim, YoungHo Seo,  
Min Jeong, InSik Choi (Kangwon National University)

## Smart Manufacturing

**WPS2-33** Adaptive control for improving enamel stripping performance of hairpin stator manufacturing equipment

Sung-Jin Choi\*, Wonkyun Lee (Chungnam National University)

**WPS2-34** Development of digital twin technology for robotic manufacturing systems based on cutting force physics models

JuHyung Ha\*, YongJae Lee (Korea Institute of Industrial Technology),  
JoonHyeok Choe (Kyungpook National University),  
DongMin Kim (Korea Institute of Industrial Technology)

## Wearable Sensors

**WPS2-35** Inspection of foreign materials in the steam generator with PEC probe

Mingeon Ku\* (DHNTEC)

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## The 11<sup>th</sup> International Conference of Manufacturing Technology Engineers 2024

Publication April 2(Tue) 2024

Publisher Sungchul Jee

Editor Seok-min Kim

Publishing office Korean Society of Manufacturing Technology Engineers  
A - 1206 Centreville Asterium Seoul, 372, Hangang-daero,  
Yongsan-gu, Seoul 04323, Korea

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Homepage <https://www.ksmte.kr>

Tel +82-2-501-9172

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ISSN 2287-1411 (ICMTE 2024 Proceedings)

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