

ICEF2025

The 4th International Conference on Electrical
Facilities and information technologies 2025

New Intelligence Technology :
Past, Present and Future

August 18(MON) - 21(THU)

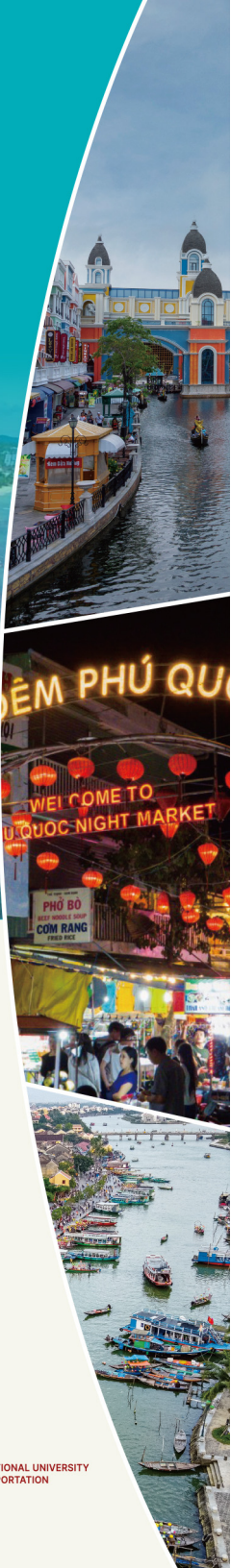
SEASHELLS Hotel & Spa Phú Quốc, Vietnam

Hosted by  THE KOREAN INSTITUTE OF
ELECTRICAL ENGINEERS

Organized by  THE KOREAN INSTITUTE OF
ELECTRICAL ENGINEERS

Co-Organized by   SINCE 1900
KOREA NATIONAL UNIVERSITY
OF TRANSPORTATION

Sponsored by  HANBAT NATIONAL UNIVERSITY  SINCE 1900
KOREA NATIONAL UNIVERSITY
OF TRANSPORTATION



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Welcome Message



Dear Attendees,

On behalf of the Korean Institute of Electrical Engineers (KIEE) and the ICEF2025 Organizing Committee, it is my great pleasure to welcome you to the 4th International Conference on Electrical Facilities and Information Technologies (ICEF2025), to be held from August 18 to 21, 2025, in the breathtaking island city of Phu Quoc, Vietnam.

With the theme “New Intelligence Technology: Past, Present and Future,” ICEF2025 will bring together academics, researchers, professionals, and students from around the world to share recent advances, challenges, and future visions in the fields of electrical facilities and information technologies.

This year’s conference is organized by KIEE – Electrical Facilities Society, and co-hosted by Ho Chi Minh City University of Technology (HCMUT) and Korea National University of Transportation (KNUT). This strong international collaboration reflects our shared commitment to fostering global dialogue and innovation across disciplines.

Phu Quoc, often referred to as “the pearl of Vietnam,” is a tropical paradise famed for its crystal-clear waters, white sandy beaches, and lush landscapes. The island’s serene setting, cultural richness, and modern hospitality will provide the perfect backdrop for productive academic exchange and memorable networking experiences.

ICEF2025 will feature an exciting program of keynote addresses from world-renowned experts, technical sessions, poster presentations, and interactive panel discussions. We have also planned informal “icebreaker sessions” to help build connections—especially among our international student participants—and to foster long-term research collaboration.

To complement the technical program, a warm and engaging social agenda has been prepared, beginning with a Welcome Reception and Registration Party on Monday evening, August 18, and culminating with a Gala Dinner on Wednesday, August 20.

We are sincerely grateful to the KIEE Electrical Facilities Society for organizing this important event, and extend special thanks to our co-host institutions, HCMUT and KNUT, for their valuable contributions and local support in making ICEF2025 a truly global and collaborative success.

I warmly invite you to take part in this meaningful international gathering—whether in person or online—and hope that your experience at ICEF2025 in Phu Quoc will be both professionally enriching and personally unforgettable.

Warmest regards,

Hyungchul Kim, Ph.D. / P.E.

*Chair, ICEF2025 Organizing Committee
Organized by KIEE – Electrical Facilities Society*



Committee

■ CONFERENCE HONORARY CHAIRMAN

Professor Mai Thanh Phong (HCMUT)

■ CONFERENCE CHAIR

Hyungchul Kim (President of KIEE EF (KRRI, Korea))

■ CONFERENCE CO-CHAIR

NHỞ NGUYỄN VĂN (HCMUT, Vietnam)

■ ORGANIZING CHAIR

Jeong-Won Kang (Korea National University of Transportation, Korea)

PHAM Tran Vu (HCMUT, Vietnam)

■ PROGRAM CHAIR

Juhee Choi (Sangmyung Univ. Korea)

Seungkwon Shin (Korea Railroad Research Institute, Korea)

Jeongju Kim (Hoseo University, Korea)

Wonseok Choi (Hanbat National University, Korea)

Lai Quoc Dat (HCMUT, Vietnam)

Pham Tan Thi (HCMUT, Vietnam)

■ INTERNATIONAL TECHNICAL AND SCIENTIFIC PROGRAM CHAIR

Prof. Aydogan Ozdemir (Kadir Has University, Istanbul-Turkey)

Prof. Assel Mukasheva (Kazakh-British Technical University, Kazakhstan)

Prof. Taehyung Kim (University of Michigan-Dearborn, USA)

■ FINANCIAL CHAIR

Jongnam Kim (YSFS Co., Ltd, Korea)

■ AWARD CHAIRS

Joonho Ahn (Seoul National Univ. SEPRI, Korea)

Kilmok SHONG (KESCO research institute, Korea)

■ PUBLICATION CHAIRS

Yongho Yoon (Gwangju University, Korea)

Hoseong Jeong (Korea Railroad Research Institute, Korea)

Jeonghwan Gwak (Korea National University of Transportation, Korea)



Conference Topics

■ Session 1 : Future Electric Facility Planning and Operations

- Power Distribution Network Modeling, Analysis and Control
- HVDC, MVDC & LVDC: Design, Control and Protection
- AC-DC Hybrid Grid Operation, Control and Protection
- Electrical Safety : Design, Control and Protection
- Electric Machinery and Drives
- Energy Storage Systems, Renewable Energy

■ Session 2 : Smart Electric Facility

- Smart Grids, Micro-grid, and Utility Applications
- Smart Energy Management for Home, Building and Factory
- Smart Materials and Devices, Media Facade and Large Format Display
- Illuminating Design and Light Installation
- Electrical Installation Design and Construction Technology
- Technical Specification for Electrical Install

■ Session 3 : Information Communication Technology

- Software System & Engineering
- Artificial Intelligence
- Communications and Networking
- Embedded System, IoT/Edge Computing
- VR/AR, Metaverse
- Data Science, Big Data, Database, Data Mining
- 3D Printing, Digital Twin

■ Session 4 : Intelligent Transportation Technology

- Railway System & Technology
- Intelligent Transportation System
- Smart Automobile Technology
- Road Operation Technology
- Aircraft System and Control Technology
- Mechatronics & Robotics
- Mechanical System

■ Session 5 : Material Science and Technology

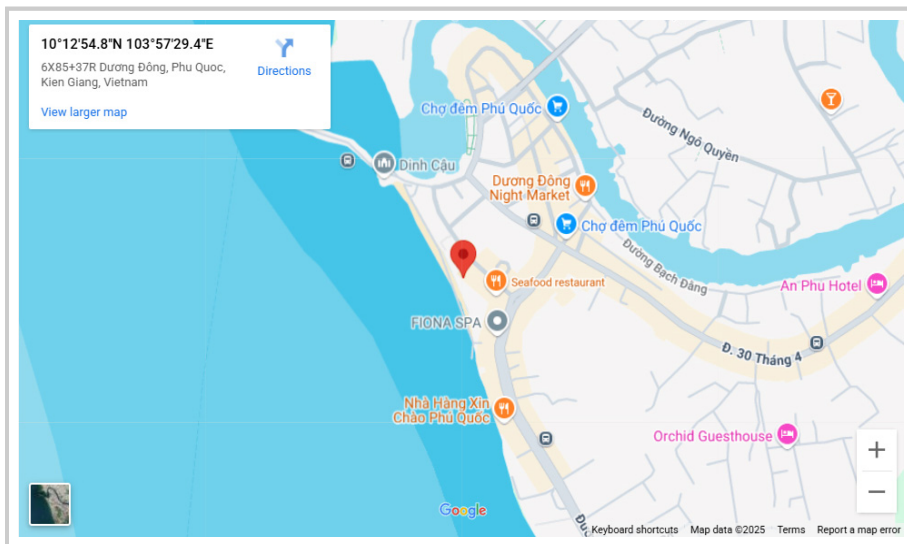
- Material Synthesis and Processing
- Smart Materials
- Semiconductor Devices
- 2D materials
- Solid State Physics
- Chemical Engineering

■ Session 6 : Building Integrated Photovoltaic System

- Solar cells & modules
- BIPV system design and construction
- Power conversion, optimization, simulation
- New and renewable energy grid connection
- Building Information Modeling (BIM)
- Sensors and monitoring systems
- PV system operation & maintenance

Seashells Phu Quoc Hotel & Spa

MAP



Address

01 Vo Thi Sau, Ward 2, Phu Quoc Special Zone, An Giang, 92500, Vietnam

Tel

Phone (+84) 297 7300 999 / Fax (+84) 297 7300 899

E-mail

reservation@seashellshotel.vn



Program at a Glance

1st Day

August 18 (Mon)

Time		Place : Seashells Phu Quoc Hotel	Organizer / Chair
		Room (Main Conference Hall)	
PM	13:00~	■ Registration	
	15:00~16:00	■ Preliminary Discussion for Special Session Organizer	
	16:00~18:00	■ KNUT 120th Anniversary – Railway Special Forum	
	18:00~20:00	Welcome Reception	

Place Information



Main Conference Hall (3F)



Registration Desk (3F)



Lunch Restaurant (1F)

* Main Conference Hall : Welcome Reception, Keynote, Opening, Banquet, Poster Session

[Oral Session 1]



Room 1 (1F)

[Oral Session 2]



Room 2 (2F)

[Oral Session 3]



Room 3 (3F)



Program at a Glance

2nd Day

August 19 (Tue)

Time		Place : Seashells Phu Quoc Hotel			Organizer / Chair
		Room (Main Conference Hall)			
AM	09:00~	■ Registration			
	09:00~09:30	■ Keynote Session 1 : Prof. Chatchawan Chaichana (Faculty of Engineering, Chiang Mai University, Thailand)			Prof. Dongsu Kim (Korea)
	09:30~10:00	■ Keynote Session 2 : Prof. Jeonghwan Gwak (Korea National University of Transportation, Korea)			Prof. Jeong Won Kang (Korea)
	10:00~10:30	■ Keynote Session 3 : Prof. Joondong Kim (Incheon National University, Korea)			Prof. Donggun Lim (Korea)
	10:30~11:00	■ Keynote Session 4 : Prof. Dongsu Kim (Hanbat National University, Korea)			Prof. Hyunjoong Kim (Korea)
	11:00~11:20	Coffee Break			
	11:20~12:30	■ Opening Ceremony - Opening Speech: Dr. Hyungchul Kim (KRRRI, Korea) - Welcome Speech: Prof. Dr. Pham Tran Vu (HCMUT, Vietnam)			
		■ Keynote Session 5 : Prof. Khai Phuc Nguyen (Ho Chi Minh City University of Technology, Vietnam)			Prof. Vo Ngoc Dieu (Vietnam)
		■ Keynote Session 6 : Prof. Young Park (Hanbat National University, Korea)			Prof. Jeong Won Kang (Korea)
12:30~13:30	Lunch (Individual)				
PM	Room	Room 1	Room 2	Room 3	
	13:30~15:00	■ Oral Session 1 KNUT Special Session 1	■ Oral Session 2 KNUT AI Session	■ HBNU-HCMUT Cooperation	
	15:00~15:30	Coffee Break			
	15:30~17:00	■ Oral Session 3 Future Electrics	■ Oral Session 4 Artificial Intelligence	■ Oral Session 5 HBNU Special Session 1	



Program at a Glance

3rd Day

August 20 (Wed)

Time		Place : Seashells Phu Quoc Hotel			Organizer / Chair
		Room (Main Conference Hall)			
AM	09:00~	■ Registration			
	09:00~09:30	■ Keynote Session 7 : Dr. Lee, Junwon <i>(Samsung SDS, Korea)</i>			Prof. Jeong Won Kang (Korea)
	09:30~10:00	■ Keynote Session 8 : Dr. DANG Bang Viet <i>(Vietnam Electricity (EVN), Vietnam)</i>			Prof. NHỖ NGUYỄN VĂN (Vietnam)
	10:00~10:30	■ Keynote Session 9 : Prof. SangYule Choi <i>(Induk University, Korea)</i>			Prof. Seung Kwon Shin (Korea)
	10:30~10:50	Coffee Break			
	10:50~11:20	■ Keynote Session 10 : Dr. Zhanna Suimenbayeva <i>(ALT University, Kazakhstan)</i>			Prof. Jeong Won Kang (Korea)
	11:20~11:50	■ Keynote Session 11 : Prof. Assel Mukasheva <i>(Kazakh-British Technical University, Kazakhstan)</i>			Prof. Seung Kwon Shin (Korea)
	11:50~12:20	■ Keynote Session 12 : Prof. Aydogan Ozdemir <i>(Kadir Has University, Turkey)</i>			Prof. Hyungchul Kim (Korea)
	12:20~13:30	Lunch (Individual)			
	PM	Room	Room 1	Room 2	Room 3
13:30~15:10		■ KIEE Workshop	■ Oral Session 6 KNUT Special Session 2	■ Oral Session 7 HBNU Special Session 2	
15:30~16:00		Coffee Break			
16:00~17:00		■ Poster Session 1 (Main Conference Hall)			
17:00~18:00		■ Poster Session 2 (Main Conference Hall)			
18:30~20:30		Banquet (Main Conference Hall)			



Program at a Glance

4th Day

August 21 (THU)

Time		Place : Seashells Phu Quoc Hotel
		Room (Main Conference Hall)
AM	09:00~10:00	■ Special Session (1): Electric Facility Workshop Korea-Vietnam Industrial Exchange Technical Forum (1)
	10:00~11:00	■ Special Session (2): Intelligent Railway & Transportation Workshop Korea-Vietnam Industrial Exchange Technical Forum (2)
	11:00~12:00	■ Special Session (3): Intelligent Science & Open Source Workshop Korea-Vietnam Industrial Exchange Technical Forum (3)
	12:00~14:00	Closing



Social Programs

Welcome Reception

August 18 (MON) 18:00~20:00

Main Conference Hall (3F)

On the first day of the conference, please join to know each other!

Opening Ceremony

August 19 (TUE) 11:20~11:30

Main Conference Hall (3F)

■ Opening Speech

- Dr. Hyungchul Kim (ICEF 2025 Chairman, Korea)

■ Welcome Speech

- Prof. Dr. PHAM TRAN VU (HCMUT, Vietnam)

Keynote session

August 19 (Tue) ~ August 20 (Wed)

Room (Main Conference Hall)

August 19 (Tue)	09:00~ 09:30	■ Keynote Session 1 Decarbonization in Building Sector Prof. Chatchawan Chaichana (<i>Faculty of Engineering, Chiang Mai University, Thailand</i>)
	09:30~ 10:00	■ Keynote Session 2 Sub One Shot Learning: Generalising When Data is Scarcer Than One Prof. Jeonghwan Gwak (<i>Korea National University of Transportation, Korea</i>)
	10:00~ 10:30	■ Keynote Session 3 Transparent Photovoltaics for Sustainable Ground and Water Energy Platform and Photonic Neuromorphic Devices for Intelligent Systems Prof. Joondong KIM (<i>Incheon National University, Korea</i>)
	10:30~ 11:00	■ Keynote Session 4 Performance Evaluation and Modeling of Net-Zero Energy Building Design with VRF System Prof. Dongsu Kim (<i>Hanbat National University, Korea</i>)
	11:30~ 12:00	■ Keynote Session 5 Application of Artificial Intelligence Models for Forecasting the Electricity Market Prof. Khai Phuc Nguyen (<i>Ho Chi Minh City University of Technology, Vietnam</i>)
	12:00~ 12:30	■ Keynote Session 6 Digitalization Technology for Overhead Contact Line Maintenance Prof. Young Park (<i>Hanbat National University, Korea</i>)
August 20 (Wed)	09:00~ 09:30	■ Keynote Session 7 Secure and Scalable IoT: An IoT Network Platform Based on Network Overlay and MAC Dr. Lee, Junwon (<i>Samsung SDS, Korea</i>)
	09:30~ 10:00	■ Keynote Session 8 Deputy Director of Science Technology & Digital Transformation Department Dr. DANG Bang Viet (<i>Vietnam Electricity (EVN), Vietnam</i>)
	10:00~ 10:30	■ Keynote Session 9 The Development of Weather Based Intelligent Demand Controller Prof. SangYule Choi (<i>Induk University, Korea</i>)
	10:50~ 11:20	■ Keynote Session 10 Rail Transport Energy in Kazakhstan: A Strategic Vector in the Era of Green Transformation Dr. Zhanna Suimenbayeva (<i>Mukhametzhan Tynyshpayev ALT University, Kazakhstan</i>)
	11:20~ 11:50	■ Keynote Session 11 Resilience of UNet-Based Models under Adversarial Conditions in Medical Image Segmentation Prof. Assel Mukasheva (<i>Kazakh-British Technical University, Kazakhstan</i>)
	11:50~ 12:20	■ Keynote Session 12 Resilient traction power supply systems in railways with interconnected microgrid Prof. Aydogan Ozdemir (<i>Kadir Has University, Turkey</i>)

Special session

August 19 (Tue) ~ August 21 (Thu)

August 19 (Tue)	13:30~ 15:00	■ HBNU-HCMUT Cooperation	Room 3
August 20 (Wed)	13:30~ 15:10	■ KIEE Workshop	Room 1
August 21 (Thu)	09:00~ 10:00	■ Special Session (1): Electric Facility Workshop Korea-Vietnam Industrial Exchange Technical Forum (1)	Main Conference Hall
	10:00~ 11:00	■ Special Session (2): Intelligent Railway & Transportation Workshop Korea-Vietnam Industrial Exchange Technical Forum (2)	Main Conference Hall
	11:00~ 12:00	■ Special Session (3): Intelligent Science & Open Source Workshop Korea-Vietnam Industrial Exchange Technical Forum (3)	Main Conference Hall

Oral Session

August 19 (Tue) ~ August 20 (Wed)

August 19 (Tue)	13:30~ 15:00	■ Oral Session 1 : KNUT Special Session 1 Topic 4: Intelligent Transportation Technology	Room 1
	13:30~ 15:00	■ Oral Session 2 : KNUT AI Session Topic 3: Information Communication Technology	Room 2
	15:30~ 17:00	■ Oral Session 3 : Future Electrics Topic 1: Future Electric Facility Planning and Operations Topic 6: Building Integrated Photovoltaic System	Room 1
	15:30~ 17:00	■ Oral Session 4 : Artificial Intelligence Topic 3: Information Communication Technology	Room 2
	15:30~ 17:00	■ Oral Session 5 : HBNU Special Session 1 Topic 6: Building Integrated Photovoltaic System	Room 3
August 20 (Wed)	13:30~ 15:10	■ Oral Session 6 : KNUT Special Session 2 Topic 4: Intelligent Transportation Technology	Room 2
	13:30~ 15:10	■ Oral Session 7 : HBNU Special Session 2 Topic 6: Building Integrated Photovoltaic System	Room 3

Poster Session

August 20 (Wed), 16:00~18:00
Room (Main Conference Hall)

DATE		Session	Conference Topics Session
August 20 (Wed)	16:00~ 17:00	Poster Session 1	<ul style="list-style-type: none"> ■ Topic 1: Future Electric Facility Planning and Operations ■ ETC ■ Topic 2: Smart Electric Facility ■ Topic 3: Information Communication Technology
	17:00~ 18:00	Poster Session 2	<ul style="list-style-type: none"> ■ Topic 1: Future Electric Facility Planning and Operations ■ Topic 3: Information Communication Technology ■ Topic 4: Intelligent Transportation Technology ■ Topic 6: Building Integrated Photovoltaic System



Online & Offline Assistance

■ Registration Desk | Lobby

- August 18 (MON) ~ August 20 (THU) 09:00~18:00
- Lobby, Main Conference Hall, 3rd floor

■ Registration Fee Covers [On-Site]

- [Early]
Regular USD 600 / KRW 800,000
Student USD 400 / KRW 500,000
- [Early-Virtual]
Regular USD 300 / KRW 400,000
Student USD 200 / KRW 240,000
- [On-Site]
Regular USD 800 / KRW 1,000,000
Student USD 500 / KRW 600,000
- [On-Site-Virtual]
Regular USD 400 / KRW 500,000
Student USD 300 / KRW 400,000
- [CIS countries & Developing countries]
Regular/Student Regular On-LINE Attendance USD 50

Keynote Sessions, Conference Kit

■ Personal Envelope

1. Name Badge
2. Program Book
3. Souvenir



■ Coffee Break

- August 19 (TUE) 11:00~11:20 / 15:00~15:30
- August 20 (WED) 10:30~10:50 / 15:30~16:00

Fresh coffee, tea and refreshments will be served during the break times.

■ DOWNLOAD MATERIALS

You can download your materials at my page or virtual website

■ How do I access the online session?

- Only participants who have completed
- Registration can access the ICEF 2025(www.icef2025.org)
- Virtual website. Please use the official
- Website login information (ID/PW).

■ What are the technical requirements needed to participate in the ICEF 2025

You need an Internet connection and web browser. For the best viewing experience, we recommend that you join the conference using a supported internet browser, which includes Google Chrome, Firefox and Safari.






Opening Ceremony, Keynote & Oral Session [on - site/online]

August 19 (Tue)		
Room	Live Sessions Access Link (Zoom Link)	QR code
Main Conference Hall AM 08:30~13:00	https://us06web.zoom.us/j/82587403861?pwd=DxG6ubD8x4SbzXx3KcFjfHdN3DGQ0x.1	 ID : 825 8740 3861 PW : 893685
Room 1 PM 13:00~17:30	https://us06web.zoom.us/j/88697560113?pwd=WfDqisn3FRuQixRDivbFZCccHwpYBg.1	 ID : 886 9756 0113 PW : 139175
Room 2 PM 13:00~17:30	https://us06web.zoom.us/j/86490631558?pwd=nN7dWuddFd3EsJa0hE2J0KpRHZBhar.1	 ID : 864 9063 1558 PW : 455228
Room 3 PM 13:00~17:30	https://us06web.zoom.us/j/82663506311?pwd=2Z6YBIMnNJBV0crkaZPMNXLMpuuSVr.1	 ID : 826 6350 6311 PW : 223943

■ Opening Ceremony, Keynote & Oral Session [on - site/online]

August 20 (Wed)		
Room	Live Sessions Access Link (Zoom Link)	QR code
Main Conference Hall AM 08:30~13:00	https://us06web.zoom.us/j/84585656424?pwd=pPpYEWEBdXdZqSgCMw8ZqA11ziaD4a.1	 ID : 845 8565 6424 PW : 791116
Room 1 PM 13:00~18:30	https://us06web.zoom.us/j/85163400506?pwd=UrsloollupOGbuXbtpfEVdEBarm7er.1	 ID : 851 6340 0506 PW : 873567
Room 2 PM 13:00~18:30	https://us06web.zoom.us/j/88161299575?pwd=y6erx8DZUgybva2sz72Q7aNvfHQaSu.1	 ID : 881 6129 9575 PW : 705621
Room 3 PM 13:00~18:30	https://us06web.zoom.us/j/82663506311?pwd=2Z6YBIMnNJBV0crkaZPMNXLmPuuSVr.1	 ID : 826 6350 6311 PW : 223943

■ Poster Session [on - site/online]

August 20 (Wed)		
Room	Live Sessions Access Link (Zoom Link)	QR code
Main Conference Hall	https://us06web.zoom.us/j/85163400506?pwd=UrsloollupOGbuXbtpfEVdEBarm7er.1	 ID : 851 6340 0506 PW : 873567
	https://us06web.zoom.us/j/88161299575?pwd=y6erx8DZUgybva2sz72Q7aNvfHQaSu.1	 ID : 881 6129 9575 PW : 705621
	https://us06web.zoom.us/j/82663506311?pwd=2Z6YBIMnNJBV0crkaZPMNXLmPuuSVr.1	 ID : 826 6350 6311 PW : 223943



How The Session Will Go

Oral Session

- Presentation time: 15 minutes Presentation + 5 minutes Live Q&A
- Make sure your presentation materials do not have compatibility issues beforehand.
- Given the Zoom live streaming, please arrive in the session room at least 15 minutes before the session.
- Submit your file to the staff of each presentation room before session starts.
- Presentations are to be done on - site

Poster Session

- Poster authors should print, bring and post the posters at the designated spot for on - site availability. [A0 Size or A1 Size]
- Please make sure to stand by your poster during your assigned presentation time.
- Q&As will be made live on - site and via virtual website with comments and email.
- All posters will be posted on both platforms (online/offline) simultaneously during the conference dates.



Keynote Session 1

09:00–09:30

Tue, August 19, 2025

Room : Conference Hall

Prof. Chatchawan Chaichana
(Faculty of Engineering, Chiang Mai University, Thailand)



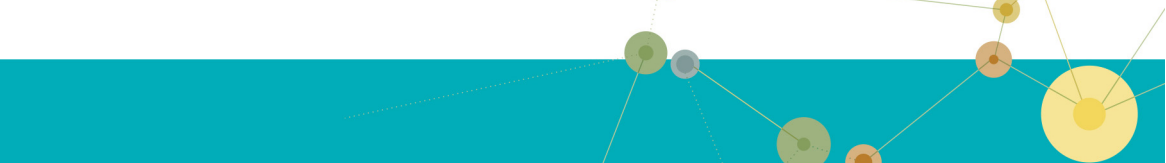
Decarbonization in Building Sector

Abstract

The building sector plays a crucial role in global decarbonization efforts, accounting for a significant share of energy consumption and carbon emissions. Decarbonization in this sector spans both pre-construction and post-construction phases. While pre-construction focuses on sustainable materials, design, and construction practices, the post-construction phase—the operational lifetime of buildings—presents the greatest opportunity for impactful and immediate carbon reduction through energy efficiency.

Buildings consume a substantial portion of total global energy, with electricity being the dominant form of energy used, especially in urban environments. The primary systems responsible for electricity consumption in buildings include air conditioning (approximately 40–50%), lighting (15–20%), and other electrical appliances and systems (30–40%), though this can vary by region and building type.

Improving energy efficiency in each of these systems can lead to significant reductions in energy use and associated emissions. For air conditioning, strategies such as high-efficiency HVAC equipment, smart thermostats, and building envelope improvements can cut energy use by up to 30–40%. In lighting, transitioning to LED technology and using daylighting strategies can reduce consumption by over 50%. Efficient appliances, load management, and the integration of smart control systems can also optimize overall building energy use.



When applied holistically, energy efficiency measures can reduce total building energy consumption by 20–40%, making it a cornerstone of decarbonization strategies. As buildings are expected to remain operational for decades, prioritizing energy efficiency in the post-construction phase is not only cost-effective but also essential for achieving long-term carbon neutrality goals in the built environment.

Biography

Prof. Chatchawan Chaichana is a distinguished expert in energy efficiency with a wealth of experience in both academic research and practical applications in the industrial sector. His work centers on improving the performance and reducing the energy consumption of key systems such as air conditioning and heat pumps—among the most energy-intensive equipment in buildings. He has provided technical expertise to both private enterprises and government agencies, helping them implement energy-saving strategies and reduce their environmental footprint.

Prof. Chatchawan has also been actively involved in international research collaborations. He has worked with The University of Melbourne and Kyoto University on projects related to smart energy systems and sustainable technologies. Notably, he has led a long-standing collaboration with Hanbat National University in South Korea, where he coordinates an international capstone project between students from Chiang Mai University and Hanbat National University. This program fosters cross-cultural teamwork and real-world problem solving, as students jointly design and develop innovative engineering solutions with a focus on energy and sustainability.

Currently, Prof. Chatchawan's research focuses on electricity load decomposition and solar energy electrification for remote and underserved areas, aligning with global efforts to expand access to clean, reliable power.



Keynote Session 2

09:30~10:00

Tue, August 19, 2025

Room : Conference Hall

Prof. Jeonghwan Gwak
(Korea National University of Transportation, Korea)



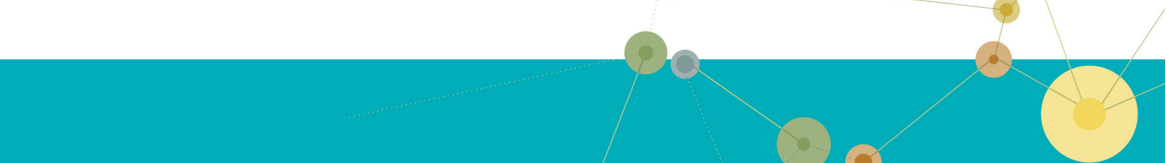
Sub One Shot Learning: Generalising When Data is Scarcer Than One

Abstract

My current line of research, entitled Sub One Shot Learning (SOSL), tackles the hitherto neglected situation in which the expected number of labelled examples per class (α) is strictly between zero and one. This problem formulation naturally occurs in ultra rare disease imaging, endangered language processing, military anomaly detection, and privacy sensitive on device personalisation—domains where even a single labelled instance can be prohibitively expensive or ethically constrained.

A rigorous PAC Bayesian analysis demonstrates that, as $\alpha \rightarrow 0$, empirical evidence vanishes while the KL divergence to a prior becomes the dominant term of the generalisation bound. Consequently, our first contribution is the construction of high fidelity priors distilled from state of the art vision language and medical foundation models. Building upon this theoretical footing, we propose a three layer SOSL pipeline:

1. Variational Bayesian Core — produces a calibrated posterior by jointly minimising task loss and KL divergence;
2. Ultra light Adaptation — adapter modules and prompt tuning inject task specific knowledge with only a few trainable parameters, thereby constraining the divergence term and enabling low power deployment;
3. Single Step Meta Learning — a degenerate MAML loop that adapts in one gradient step, or in the literal zero shot case, defers entirely to the prior.



To prevent synthetic bias when data are nearly absent, we restrict augmentation to group theoretic transformations that respect known symmetries without inducing distributional drift. Empirical studies confirm the merit of this design: on α constrained versions of mini ImageNet and Omniglot the method secures up to 18 % relative accuracy gains, while on a 14 slice MRI set for an ultra rare neoplasm it achieves a clinically actionable AUC 0.87 with tightly calibrated uncertainty.

Ongoing extensions include (i) Continual SOSL, which allows the model to transition smoothly from vacuum level data to moderate abundance without catastrophic forgetting, and (ii) Trustworthy SOSL, which emphasises Bayesian calibration for safety critical decisions. To foster community engagement, our group is releasing an open benchmark and leaderboard devoted to SOSL research.

I warmly invite collaborators who share the ambition of enabling reliable artificial intelligence precisely where data are scarcest.

Biography

Jeonghwan Gwak (Senior Member, IEEE) received the Ph.D. degree in machine learning and artificial intelligence from the Gwangju Institute of Science and Technology (GIST), Gwangju, South Korea, in 2014. From 2002 to 2007, he worked for several companies and research institutes as a researcher and the chief technician. From 2014 to 2016, he worked as a Postdoctoral Researcher with GIST, and from 2016 to 2017 as a Research Professor. From 2017 to 2019, he was a Research Professor with the Biomedical Research Institute and the Department of Radiology, Seoul National University Hospital, Seoul, South Korea. Since 2019, he has been with the Korea National University of Transportation as an Assistant Professor, where he has been an Associate Professor since 2021. He is the Director of the Algorithmic Machine Intelligence Laboratory. His current research interests include deep learning, computer vision, image and video processing, AIoT, fuzzy sets and systems, evolutionary algorithms, optimization, and relevant applications of medical and visual surveillance systems.

**Keynote Session 3**

10:00~10:30

Tue, August 19, 2025

Room : Conference Hall

Prof. Joondong KIM
(Incheon National University, Korea)

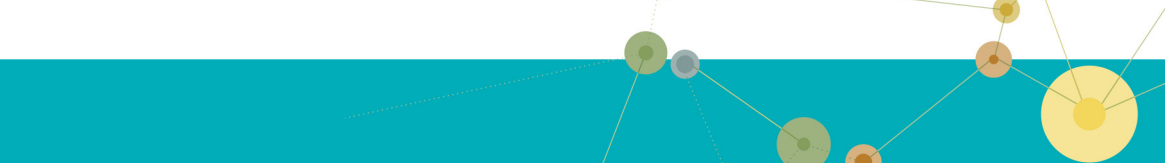


Transparent Photovoltaics for Sustainable Ground and Water Energy Platform and Photonic Neuromorphic Devices for Intelligent Systems

Abstract

The global transition toward renewable energy and intelligent computing is driving the development of multifunctional, environmentally integrated technologies. This study presents innovations in transparent photovoltaics and neuromorphic devices designed for both terrestrial and underwater applications. A highly efficient transparent photovoltaic (TPV) module was developed, comprising an FTO/n-ZnO/p-NiO/silver nanowires (AgNWs)/ZnO structure with a transparent p-n junction. By employing metal sputtering techniques to assemble module arrays, we significantly increased the voltage output per unit area, offering new opportunities for building-integrated transparent photovoltaics (BITPVs) that generate solar energy without obstructing visibility.

In parallel, we introduce a water-enhanced transparent photovoltaic system for underwater power generation, addressing critical needs in sensing, networking, and communication for ocean exploration. This wide-bandgap heterojunction device achieves an average visible transmittance of 41% and an underwater power conversion efficiency of 10.25% under monochromatic 470 nm light. The water medium not only focuses incident light but also improves light collection angles, while impedance spectroscopy reveals that a water-induced electric double layer enhances electron transport and photogeneration. Demonstrating its practicality, the system successfully



powered a 10 mW load underwater, establishing a pathway toward secure, energy-autonomous underwater environments.

Additionally, we report on a photonic neuromorphic device based on 2D layer (SnS) into the transparent heterojunction device, capable of performing basic logic operations (OR, NOT, AND) using light as a stimulus. This artificial synapse emulates neurotransmitter-like behavior, modulating signal processing for precise control of logic functions. Such a system promises significant advancements in neuromorphic computing, with potential applications in AI, humanoid robotics, and adaptive intelligent electronics.

Together, these developments represent a significant step toward seamlessly integrated energy-harvesting, intelligent computing, and environmentally adaptive systems for the future.

Biography

Professor Joondong Kim is a professor in the Department of Electrical Engineering and a director in Multidisciplinary Core Institute for Future Energies (MCIFE) at Incheon National University in Korea. He got his PhD in 2006 from State University of New York at Buffalo and MS in 2001 from Rensselaer Polytechnic Institute, NY, USA. He has research topics on energy devices (transparent photovoltaics and hydrogen generator), sensors, bioinspired electronics and functional designs. He published + 340 SCI papers and holds + 100 patents. - Commendation (Invention Award), Minister of Science and Technology Information and Communication (STIC) and +5 National Awards.



Keynote Session 4

10:30~11:00

Tue, August 19, 2025

Room : Conference Hall

Prof. Dongsu Kim
(Hanbat National University, Korea)



Performance Evaluation and Modeling of Net-Zero Energy Building Design with VRF System

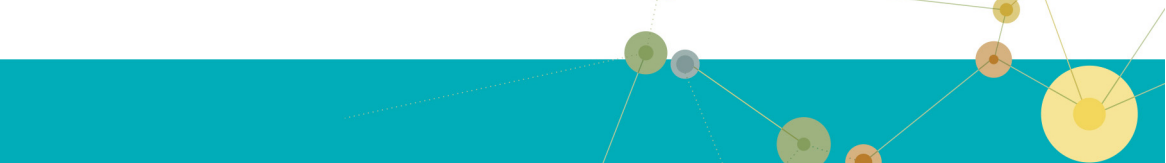
Abstract

This presentation discusses system design and modeling aspects of VRF systems when integrated into net-zero energy building (NZEB) designs. Various system configurations of VRF systems that can be used in NZEB designs and their influence on the NZEB energy performance will be illustrated. Modeling strategies of VRF systems for NZEB buildings will also be discussed in this presentation. Simulation-based case studies of an office prototype building model with a VRF based NZEB model will be presented to demonstrate potential economic and energetic benefits in various US climate locations.

Biography

Dongsu Kim received the B.S. and M.S. degrees in architectural engineering from Hanbat National University, Daejeon, Republic of Korea, in 2011 and 2013, respectively, and the Ph.D. degree in mechanical engineering from Mississippi State University, MS, USA, in 2019. His doctoral research contributed significantly to the field, particularly in the areas of HVAC systems and renewable energy applications.

Following his Ph.D., Dr. Kim joined the Department of Energy's Building Energy Codes Program as a postdoctoral associate researcher at the Pacific Northwest National



Laboratory (PNNL), USA. During his position at PNNL, he worked on various projects aimed at enhancing building energy efficiency and integrating innovative energy solutions.

Currently, Dr. Kim holds a position as an Assistant Professor at the Department of Architectural Engineering at Hanbat National University. In his academic role, he is dedicated to educating the next generation of engineers and advancing research in building energy system modeling and simulation, HVAC control and optimization, and the application of renewable energy technologies in building systems.



Keynote Session 5

11:30~12:00

Tue, August 19, 2025

Room : Conference Hall

Prof. Khai Phuc Nguyen
(Ho Chi Minh City University of Technology, Vietnam)



Application of Artificial Intelligence Models for Forecasting the Electricity Market

Abstract

This presentation summarizes our group's research on applying artificial intelligence models to forecast electricity loads and solar power generation systems. In Vietnam, electricity demand is growing rapidly, at approximately 10% per year. Our research team has proposed AI methods that utilize time series data for these forecasts. The results indicate that enhanced techniques derived from long short-term memory models yield promising outcomes. Furthermore, Vietnam leads among ASEAN countries in terms of installed solar power capacity. Based on the data collected from weather patterns, our research demonstrates that using artificial intelligence models produces highly accurate forecast results.

Biography

Khai Phuc Nguyen earned his Bachelor of Engineering (B.Eng.) and Master of Engineering (M.Eng.) degrees in electrical engineering from Ho Chi Minh City University of Technology, Vietnam, in 2010 and 2012, respectively. He obtained his PhD from Shibaura Institute of Technology in Japan in 2017. Since then, he has been a full-time lecturer at the Ho Chi Minh City University of Technology, where he specializes in renewable energy and electrical power systems. Additionally, he collaborates with GIZ Vietnam and other enterprises as a technical expert in solar energy in Vietnam. He has over 30 scientific articles on optimization and artificial intelligence in power systems.



Keynote Session 6

12:00~12:30

Tue, August 19, 2025

Room : Conference Hall



Prof. Young Park
(Hanbat National University, Korea)

Digitalization Technology for Overhead Contact Line Maintenance

Abstract

This presentation addresses the digitalization of overhead contact line maintenance for railway electrification through a novel management process utilizing 3D scanning and printing. The initiative aims to overcome the limitations of current 2D-based management and manual inspections by creating a 3D database of overhead line components. This approach seeks to enhance maintenance efficiency, improve component development, and support a digital twin framework for the railway industry. The process involves reverse engineering of components, creating precise 3D models with integrated metadata, and utilizing 3D printing for on-demand production and rapid prototyping. This methodology is positioned as a key technology for advancing railway infrastructure management and ensuring a more reliable and safer railway service.

Biography

Dr. & Prof. Young Park is a professor in the Department of Electrical System Engineering at Hanbat National University in Daejeon, South Korea. Prior to his position at Hanbat National University, he was a Principal Researcher at the Korea Railroad Research Institute for 15 years. His research focuses on electric railway systems, including overhead contact lines and the application of digital technologies like 3D scanning and printing for maintenance and manufacturing in the railway industry. He is actively involved in projects aimed at the digital transformation of railway facility management.



Keynote Session 7

09:00~09:30

Wed, August 20, 2025

Room : Conference Hall

Dr. Lee, Junwon
[Samsung SDS, Korea]



Secure and Scalable IoT: An IoT Network Platform Based on Network Overlay and MAC

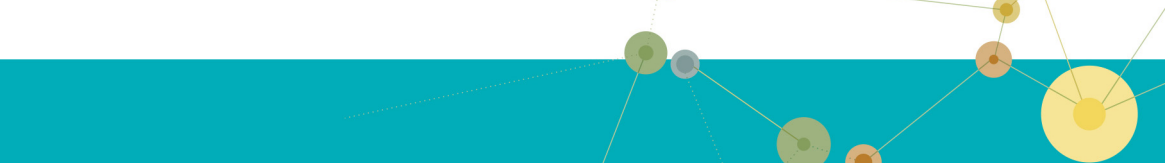
Abstract

In the VPN (with data encryption) applied to protect the distributed network over the public internet, the small computing resource of low-spec devices limits TCP/IP-based VPN use. Although lightweight IoT communication protocols such as LoWPAN are used, TCP/IP-based VPNs such as IPsec and OpenVPN require bandwidth, CPU/memory, and electric power.

To provide a safe and lightweight network, we propose a secure and scalable IoT platform (SSI) that can prevent security threats while minimizing the usage of computing resources. SSI, which has a lower load than TCP/IP-based VPN, is a layer 2 VPN and supplies data link frame encryption. L2TP and VXLAN are provided for a scalable layer 2 VPN, and the MACsec algorithm encrypts layer 2 frames. Furthermore, SSI shows 30% network speed improvement and 31.6% CPU usage reduction compared to the network applied OpenVPN.

Biography

He is currently serving as a Principal Engineer at Samsung SDS and holds a Ph.D. in Computer Science and Engineering. He began in 2002 as a Network Engineer, dedicating eight years to consulting and developing network infrastructures for notable companies



including Tesco, Hynix, and Samsung. Since 2011, he has advanced his career at the Samsung Security Center as a Security Engineer, where his main duties encompass cloud security auditing, evaluating system architecture for security, and managing security incidents.

His doctoral research delved into AI-based traffic detection and IoT platform security, culminating in contributions to various journals and conferences. More recently, his research interests have shifted towards developing methods for verifying network data through graph embedding techniques. And He is actively working on projects that apply these studies to the security of the company.



Keynote Session 8

09:30~10:00

Wed, August 20, 2025

Room : Conference Hall

Dr. DANG Bang Viet
(Vietnam Electricity (EVN), Vietnam)



Deputy Director of Science Technology & Digital Transformation Department

Abstract

The presentation begins with a comprehensive overview of Vietnam's power system, encompassing the structure and current status of electricity generation, high-voltage transmission networks, and the distribution and retail sector. The next section will discuss key development directions for Vietnam's power system based on the Power Development Plan 8. Following this, the presentation addresses some pressing research issues for Vietnam's power system. In the final part, the presentation highlights Vietnam's latest policies to promote innovation in the energy sector, including new regulations, R&D incentives, and increased collaboration among industry, academia, and policymakers. These efforts aim to foster technological advancement and support the sustainable growth of Vietnam's power sector.

Biography

Dr. Dang Bang Viet graduated from Hanoi University of Science and Technology with an Engineer's degree in Power Systems Engineering in 2002. He completed his Master's program at Grenoble Institute of Technology (France) in 2003. In 2006, he obtained his Ph.D. degree in Power Electronics from Grenoble 1 University (France). From 2007 - 2008, Dr. Viet worked as a research associate at the University of Manchester (UK), where he participated in a high power DC-DC converter design project.

Currently, Dr. Viet is the Deputy Director of the Science, Technology & Digital Transformation Department at Vietnam Electricity (EVN). His work focuses on promoting R&D projects as well as establishing the innovation management system within EVN, aiming to enhance operational efficiency and foster digital transformation in the power sector.



Keynote Session 9

10:00~10:30

Wed, August 20, 2025

Room : Conference Hall

Prof. SangYule Choi
(Induk University, Korea)



The Development of Weather Based Intelligent Demand Controller

Abstract

Direct Load Control(DLC) program is an advanced agreement between a power utility and customers to control some customers' appliances (e.g., air conditioners and water heaters). It is an incentive-based demand response system in which the utility provides the affected customer with financial incentives. Under the existing DLC program, the utility turn on/off customers' appliances without considering the customer's inconvenience. that causes a lot of customers are reluctant to participate in the DLC program. In this paper, To solve this problem, the author present weather based intelligent demand controller to analyze correlation between weather condition and customers energy consumption and to predict customers energy consumption. To demonstrate the validity of the proposed demand controller, porto type demand controller are developed and applied to real customer load.

Biography

He received his B.S, M.S, and Ph.D degrees in electrical engineering from Sung Kyun Kwan University, Suwon, South Korea, in 1996, 1998 and 2002, respectively. Since 2004, he has been a Professor in the Department of Mechatronics Engineering, Induk University, Seoul, Korea. His research interests include demand control, load forecasting and power distribution automation



Keynote Session 10

10:50~11:20

Wed, August 20, 2025

Room : Conference Hall

Prof. Zhanna Suimenbayeva
(ALT University, Kazakhstan)



Rail Transport Energy in Kazakhstan: A Strategic Vector in the Era of Green Transformation

Abstract

Modern challenges—such as the growing volume of freight and passenger transportation, the need to reduce greenhouse gas emissions, and the global shift toward sustainable technologies—demand a rethinking of energy strategies in Kazakhstan's railway sector. This keynote will explore key development directions including electrification, the integration of renewable energy sources, improvements in rolling stock energy efficiency, and the potential use of alternative fuels. Special attention will be given to the role of rail transport energy in achieving the national decarbonization strategy and building a sustainable transportation infrastructure.

Biography

Zhanna Suimenbayeva has 20 years of scientific experience. Specialist in the field of space, information and satellite technologies. Also she was a project manager in international projects funded by 6 Erasmus+, USAID, UNDP and International Union of Railways. She is the author of 2 textbooks, 1 patent and more than 45 scientific publications in local publications, publications of near and far abroad (including those with a non-zero impact factor).



Keynote Session 11

11:20~11:50

Wed, August 20, 2025

Room : Conference Hall

Prof. Assel Mukasheva
(Kazakh-British Technical University, Kazakhstan)



Resilience of UNet-Based Models under Adversarial Conditions in Medical Image Segmentation

Abstract

Adversarial modifications of input data can degrade the stability of deep neural networks in medical image segmentation. This study evaluates the robustness of UNet and Att-UNet++ architectures using the NuInsSeg dataset with annotated nuclear regions from various tissue sources. Both models were trained and tested under eight perturbation types, including gradient-based, iterative, and stochastic methods, with identical parameter settings. In the absence of perturbations, Att-UNet++ produced higher segmentation results with a Dice of 0.7160 and a mean IoU of 0.6190 compared to 0.6424 and 0.4732 for UNet. Under NI-FGSM and Gaussian noise, Att-UNet++ experienced a greater reduction in mean IoU, reaching 0.1215 and 0.0658, while UNet maintained 0.1968 and 0.2329. Loss landscape analysis showed smoother surfaces for Att-UNet++, yet revealed increased responsiveness to directional gradients. The findings suggest that improvements in segmentation accuracy through architectural modifications may be accompanied by increased vulnerability to input perturbations, highlighting the necessity of robustness evaluation in model development for medical image analysis.

Biography

Professor Mukasheva currently holds the position of Professor at the School of IT and Engineering at Kazakh-British Technical University (KBTU), where she has been contributing for the past three years. Her professional expertise is computer science and data analytics and cyber security. She has authored over 100 peer-reviewed papers in various international journals. She became the winner of the contest “Best University Teacher - 2022” and received a grant from the Ministry of Science and Higher Education of the Republic of Kazakhstan. Also in 2023 she received a grant from the U.S. Embassy in Kazakhstan to conduct research in the field of cyber security. By the Decision of the committee for quality assurance in the field of Science and higher Education under the Ministry of Science and Higher Education of the Republic of Kazakhstan, Professor Mukasheva was awarded the Title of Associate Professor in the specialty “Computer Science and Information Technology” in 2024. She has published a number of monographs and textbooks. Her research and teaching focus on advancing education, research, and innovation in her field.



Keynote Session 12

11:50~12:20

Wed, August 20, 2025

Room : Conference Hall

Prof. Aydogan Ozdemir
(Kadir Has University, Turkey)



Resilient traction power supply systems in railways with interconnected microgrid

Abstract

The increasing demand for sustainable and reliable railway transportation has spurred innovations in traction power supply systems, particularly through the integration of microgrids. This talk presents a comprehensive overview of resilient traction power supply systems in modern railways, emphasizing the role of interconnected microgrids in enhancing operational reliability, energy efficiency, and system flexibility.

We explore key architectural advancements that enable bi-directional power flow, dynamic load management, and fault tolerance. Particular attention is given to the coordination between railway substations, renewable energy sources, energy storage systems, and intelligent control frameworks that form the backbone of interconnected microgrids. Case studies and simulation insights highlight how these systems can effectively mitigate power outages, reduce dependency on centralized grids, and support the transition toward greener railway networks. The speech concludes with a discussion on current challenges, future research directions, and policy implications for large-scale deployment.

Biography

Dr. Aydogan Ozdemir earned his B.Sc., M.Sc., and Ph.D. degrees in electrical engineering from Istanbul Technical University (ITU) in Istanbul, Turkey, in 1980, 1982, and 1990, respectively. With over 40 years of experience at ITU, he currently serves as a full professor and the R&D Director at Kadir Has University in Istanbul. His research interests focus on electric power systems and high-voltage engineering, particularly in asset management, reliability analysis, and the application of intelligent methods in power system modeling, simulation, analysis, control, smart grids, and building automation systems. He has published more than 200 technical papers and has been involved in several research projects. Additionally, he is a member of the National Chamber of Turkish Electrical Engineering and a Senior Member of IEEE PES.



Oral Session 1

KNUT Special Session 1

13:30~14:50

Tue, August 19, 2025

Room 1

Chair: Prof. Jeong Won Kang (KNUT, Korea)

OS1-1 Web Based Boarding and Alighting Verification System for Safety Personnel on Driverless Trains

13:30~13:50

Seung Yong Won and Jeong Won Kang[†]
Korea National University of Transportation, Korea

OS1-2 A study on the Continuous Implementation of Position Display of Trains with Communication Disruption in RF-CBTC Train Control System

13:50~14:10

Wook Jin Hwang and Jeong-Won Kang[†]
Korea National University of Transportation, Korea

OS1-3 A Study on Integrated Operation of VHF and Complex Communication Facilities for Railway

14:10~14:30

Seon-Kyo Kim, Dong-Hoon Park, and Jeong-Won Kang[†]
Korea National University of Transportation, Korea

OS1-4 A Study on the Development of a Search App for Urban Railway Emergency Recovery Equipment

14:30~14:50

Seok-Woo Im, Jong-Hak Park, and Jeong-Won Kang[†]
Korea National University of Transportation, Korea



Oral Session 2

KNUT AI Session

13:30~14:50

Tue, August 19, 2025

Room 2

Chair: Prof. Jeonghwan Gwak (KNUT, Korea)

OS2-1 Performance Comparison of Full Fine-Tuning and Parameter-Efficient Fine-Tuning of BioBERT for Pathogenicity Classification on the ClinVar

13:30~13:50

Namjung Kim, Changjoon Park, Xufeng Hu, Junhwi Park, Jaehyun Lee, and Jeonghwan Gwak[†]
Korea National University of Transportation, Korea

OS2-2 Enhancing Generalization Performance in Medical Few-Shot Learning through MSE-Based Regularization

13:50~14:10

Changjoon Park, Namjung Kim, Xufeng Hu, Junhwi Park, Jaehyun Lee, and Jeonghwan Gwak[†]
Korea National University of Transportation, Korea

OS2-3 A Parameter-Efficient Feature Fusion Framework for Breast Tumor Segmentation with Ambiguous Boundaries

14:10~14:30

Xufeng Hu, Namjung Kim, Changjoon Park, Junhwi Park, Jaehyun Lee, and Jeonghwan Gwak[†]
Korea National University of Transportation, Korea

OS2-4 A MAML-Based Multi-Task Learning Approach for Few-Shot Disease Classification on Chest X-Ray Dataset

14:30~14:50

Junhwi Park, Changjoon Park, Namjung Kim, Xufeng Hu, Jaehyun Lee, and Jeonghwan Gwak[†]
Korea National University of Transportation, Korea



Oral Session 3

Future Electrics

15:30~16:30

Tue, August 19, 2025

Room 1

Chair: Dr. Nguyen Nho Khai (HCMUT, Vietnam)

OS3-1 Design of PI controller based on neural network trained through reinforcement learning for PMSM speed control

15:30~15:50

Trung Khanh Cong Do¹, Tien-Loc Tien Le^{2,†}, and Tam Minh Nguyen^{1,†}

¹Ho Chi Minh City University of Technology and Education, Vietnam, ²Lac Hong University, Vietnam

OS3-2 Study on the harmonic countermeasures for passive line reactor for AC single-phase system

15:50~16:10

Changdae Joo¹, Taekue Kim^{1,†}, Donha Hwang², and Suji Han¹

¹Changwon National University, Korea, ²Korean Electrotechnology Research Institute, Korea

OS3-3 Design of Reactive Power Compensators for a Large-Scale Offshore Wind Farm in Compliance with the Korean Grid Code

16:10~16:30

MINH CHAU DINH[†], Byeong-Soo Go, Ga-Eun Jung, Jae-In Lee, and Seok-Ju Lee

Changwon National University, Korea

**Oral Session 4****Artificial Intelligence**

15:30~16:30

Tue, August 19, 2025

Room 2

Chair: Prof. Young Park (HBNU, Korea)

OS4-1 A Study on Estimating Reasonable Insurance Price Based on the XGBoost Algorithm

15:30~15:50 Jooho Park[†], Semyung Park, and Juhee Choi
Sangmyung University, Korea

**OS4-2 Artificial Intelligence Study on Dysarthria Detection using Acoustic Feature
Embedding**

15:50~16:10 Dina Koishiyeva¹, Assel Mukasheva^{1,†}, and Jeong-Won Kang^{2,†}
¹Kazakh-British Technical University, Kazakh, ²Korea National University of Transportation, Korea

**OS4-3 A Study on Parameter-Efficient Fine-Tuning of Large Language Models for Sepsis
Classification**

16:10~16:30 Jaehyun Lee, Junhwi Park, Changjoon Park, Namjung Kim, Xufeng Hu, and Jeonghwa Gwak[†]
Korea National University of Transportation, Korea



Oral Session 5

HBNU Special Session 1

15:30~16:30

Tue, August 19, 2025

Room 3

Chair: Prof. Wonseok Choi (HBNU, Korea)

OS5-1 Dead-Time Compensation Using Intermediate Switching States in Five-Level ANPC Inverters

15:30~15:50

Dohyeon Kim and Jungmin Kwon[†]
Hanbat National University, Korea

OS5-2 Dynamo-based Rebar Modeling in Building Information Modeling

15:50~16:10

Hojeong Jeong and Sungjin Kim[†]
Hanbat National University, Korea

OS5-3 Development and Application of a Supporting Device for Precise Shape Implementation of Free-form Concrete Panels

16:10~16:30

Kyeongtae Jeong and Donghoon Lee[†]
Hanbat National University, Korea



Oral Session 6

KNUT Special Session 2

13:30~14:30

Wed, August 20, 2025

Room 2

Chair: Prof. Jintea Kim (KNUT, Korea)

OS6-1 Development of a Deep Learning Color Recognition Model for the Electrical Railway

13:30~13:50 Dong-Uk Kim and Jeong-Won Kang[†]
Korea National University of Transportation, Korea

OS6-2 Human Factor-based 3D Verification of Railway Communication Center Design Guide

13:50~14:10 Sanghoon Sun, Yoon-Kyung Lee, and Jeong-Won Kang[†]
Korea National University of Transportation, Korea

OS6-3 Recent Development of Electrical Railway Vehicles

14:10~14:30 Byung-il Oh, Haram Kim, and Jeong-Won Kang[†]
Korea National University of Transportation, Korea



Oral Session 7

HBNU Specail Session 2

13:30~14:30

Wed, August 20, 2025

Room 3

Chair: Prof. Dongsu Kim (HBNU, Korea)

OS7-1 **Comparative Analysis of Residential Building-Applied Renewable Energy Systems Based on Tilt Angle and Climate Variations: (Focusing on Photovoltaic (PV), Solar Thermal (ST), and Photovoltaic Thermal (PVT) Systems)**

13:30~13:50

Junyoung Lee¹, Dongsu Kim^{1,†}, Jaeyoon Koh², Ruda Lee¹, Jongho Yoon¹, and Hansol Lim¹
¹Hanbat National University, Korea, ²LG Electronics, Korea

OS7-2 **Evaluation of Multifunctional Adaptive Facade Design for Office Building**

13:50~14:10

Kwanghyun Song¹, Dongsu Kim^{1,†}, Jongho Yoon¹, Dawon Lee², Hyojung Kim², and Phillip Lee³
¹Hanbat National University, Korea, ²Junglim Architecture, Korea, ³Korea Institute of Science and Technology, Korea

**Poster Session 1**

16:00~17:00

Wed, August 20, 2025

Room : Main Conference Hall

Chair: Dr. Chulmin PARK (Korea Railroad Research Institute, Korea)
Prof. Jeamoon Kim (KNUT, Korea)
Prof. Dieu Vo (HCMUT, Vietnam)

- PS1-01 A Study on Enhancing User Safety and Convenience through the Introduction of Dynamic Car Number Indicators and Passage Guidance Indicators on Railway Platforms**
Junoh Kim and Jeong Won KANG[†]
Korea National University of Transportation, Korea
- PS1-02 A Study on the Design of HILS system for Controller Performance Verification Using a One-Link Robot**
Juyeon Hyun, Donghwi Son, Taekue Kim[†], and Seungkyu Park
Changwon National University, Korea
- PS1-03 Output Estimation Methods of LCC Resonant Converter for High Voltage Application**
Seung-Ho Song[†], Ui-Chang Mun, and Sang-Min Lee
Korea National University of Transportation, Korea
- PS1-04 Output Estimation Method of DCM Resonant Converter for Filament Power Supply**
Seung-Ho Song[†], Pyeong-Kang Kim, and Sang-Min Lee
Korea National University of Transportation, Korea
- PS1-05 Design and Analysis of Cryogenic Flexible Hoses for Liquid Hydrogen Transfer in Aircraft Electrical Propulsion Systems**
BYEONGSOO GO, WONMI JUNG, and SEOKJU LEE[†]
Changwon National University, Korea
- PS1-06 Review of DSO operation necessity and overseas operation plan due to increased DER**
Iseul Nam[†]
Korea Electrical Safety Corporation, Korea
- PS1-07 A Study on the Mitigation of De-wiring and Arc Faults in Rigid Overhead Conductor Rail (R-Bar) Systems for Electrified Railway Tunnels**
Chan Hee Weon, Yong Eun Choi, Sang Nyeong Park, Chi Won Sung, and Jae Moon Kim[†]
Korea National University of Transportation, Korea

PS1-08 Numerical and Experimental Analysis of DC Corona-Streamer Discharges in a Tip-Plate Electrode Configuration

Hyun-Min Kang¹, Don-Ha Hwang², and Ho-Young Lee^{1,†}

¹Changshin University, Korea, ²Korea Electrotechnology Research Institute, Korea

PS1-09 FDS Based Numerical Analysis of Fire Propagation in Electrical Cable Trays Using a FLASH-CAT Based Pyrolysis Model

Hyun-Min Kang¹, Jaiho Lee², Young-Seon Moon², Ho-Young Lee^{1,†}

¹Changshin University, Korea, ²Korea Institute of Nuclear Safety, Korea

PS1-10 Research on control strategies considering the energy efficiency of series hybrid combat vehicles

Suji Han, Taekue Kim[†], and Changdae Joo

Changwon National University, Korea

PS1-11 Integration of HVDC Technology into Vietnam's 500 kV Grid: A Case Study of the Quang Trach-Pho Noi Transmission Line

Tran Tuan Anh^{1,†}, Nguyen Phuc Khai^{1,†}, and Nguyen Tan Minh Trung²

¹Faculty of Electrical and Electronics Engineering, Ho Chi Minh City University of Technology, Viet Nam,

²Power Engineering Consulting Joint Stock Company 2, Viet Nam

PS1-12 Development of an EBSD-Based Method for Root Cause Analysis of Electrical Fires

Kim JeongHwan[†], Kim Jeongki, Choi Chiwoo, and Park Kwangmuk

Korea Electrical Safety Corporation, Korea

PS1-13 Development of an Arc Flash Hazard Calculation Application for Enhancing Electrical Work-site Safety

Jeong-Gi Kim[†], Jin-Sik Lee, Jae-Hyun Kim, and Jeong-Hwan Kim

Korea Electrical Safety Corporation, Korea

PS1-14 Enhancing Electrical Fire Cause Analysis through Explainable AI: Molten Mark Classification and Interpretability using CNN and Grad-CAM

Chi-Woo Choi[†], Jeong-Hwan Kim, Kwang-Muk Park, and Jeong-Chay Jeon

Korea electricity safety corporation, Korea

PS1-15 Reconfiguring the distribution power network considering the reliability of power distribution grids in Cao Lanh city

Quang Dang Pham^{1,†}, Khai Phuc Nguyen^{1,†}, and Hung Thanh Phan²

¹Ho Chi Minh City University of Technology, Viet Nam, ²Dong Thap Power Company, Viet Nam

PS1-16 A Study on the Generation of Common Mode Voltage Based on ESS Operating Conditions

Yong Eun Choi, Sang Nyeong Park, Chi Won Sung, Chin Young Chang, and Jae Moon Kim[†]

Korea National University of Transportation, Korea

PS1-17 Evaluation of BO-LID Recovery Characteristics in PV Modules under Various DH Recovery ConditionsYoungHo Cho^{1,2} and Doggun Lim^{2,†}¹Chungbuk Technopark, Korea, ²Korea National University of Transportation, Korea**PS1-18 Evaluation of Acceleration Factors and Equivalent Lifetimes of PV Modules Using EVA and POE Encapsulants under DH and IAC Test Conditions**YoungHo Cho^{1,2} and Doggun Lim^{2,†}¹Chungbuk Technopark, Korea, ²Korea National University of Transportation, Korea**PS1-19 Development of a Diagnostic Testbed for System-Level Degradation Evaluation of UPS under Electrical Stress Conditions**Young-chan Kim, Ji-yeon Kim, Gun-ho Yi, and Sun-bae Bang[†]

Korea Electrical Safety Corporation, Korea

PS1-20 An Adaptive Threshold Algorithm for Incipient Fault Detection in ESS based on Insulation Resistance DynamicsYoung PARK^{1,†}, Hunseo Lee², JiHun Ha¹, and Jiwon Lim¹¹Hanbat National University, Korea, ²KOREA ELECTRICAL SAFETY CORPORATION, Korea**PS1-21 Analysis of Global and Domestic Trends in Autonomous Train Technology and Its Future Applications**Min Gyu LEE, Jae Moon KIM[†], Yong Eun CHOI, Sang Nyeong PARK, and Chi Won SUNG

Korea National University of Transportation, Korea

PS1-22 Analysis of Degradation Factors in Lithium-ion Batteries across Cell, Module, Rack, and ESS System LevelsHyeRyeon Jeon, You-Na Kim, Young-Kyu Mo, Min Hwang, and Young-Seok Kim[†]

KESCO, Korea

PS1-23 Self-powered IoT sensor enabled by a uniform double-layer triboelectric nanogenerator using P2VP@BaTiO₃ nanoparticlesChangduk Yang[†]

Ulsan National Institute of Science and Technology (UNIST), Korea

PS1-24 Design of an Integrated Automatic Fire Suppression System for Thermal Runaway Events in ESSPark Hyeong Gyoong[†], Kim Dong Min, and Go Eun Sung

Hanbit Safety Engineering Corporation, Korea

PS1-25 Comprehensive evaluation of L2 normalization with various image transformationsJong-Nam Kim¹, Dina Koishiyeva², Kuanysh Alipbayev³, Adil Mukhamedgali²,Assel Mukasheva², and Jeong-Won Kang^{1,†}¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan,³Almaty University of Power Engineering and Telecommunications, Kazakhstan

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- PS1-26 Deep learning analysis on respiratory sound with multi-head attention**
 Donguk Kim¹, Dina Koishiyeva², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-27 Deep learning analysis of loss function of colon polyp segmentation under class imbalance**
 Jonghee Kim¹, Dina Koishiyeva², Alibek Bissembayev², Assel Mukasheva², and Jeong Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-28 Artificial intelligence study on medical image segmentation**
 Junoh Kim¹, Dina Koishiyeva², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-29 Neural network algorithms for data preprocessing on brain tumor detection**
 Haram Kim¹, Adeliya Bekturova², Alibek Bissembayev², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-30 Artificial Intelligence Comparative Analysis of the Predictive Risk Assessment Modeling Technique**
 Anel Tolkyzbekova¹, Dina Koishiyeva¹, Alibek Bissembayev¹, Dinargul Mukhammejanova², Assel Mukasheva^{1,†}, and Jeong-Won Kang^{3,†}
¹Kazakh-British Technical University, Kazakhstan, ²International Information Technology University, Kazakhstan, ³Korea National University of Transportation, Korea
- PS1-31 A Study on the Optimization Efficiency of Software Development with Low-Code Platforms**
 Hae San Park¹, Erdana Seitzhan², Alibek Bissembayev², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-32 Evaluating Low-Code Development Platforms using A MULTI-MOORA Approach**
 Seonkyo Kim^{1,†}, Danial Serekov², Alibek Bissembayev², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-33 Analysis of Kazakhstan's sectoral international trade**
 Sanghoon Sun¹, Yermakhan Kuanyshbekov², Alibek Bissembayev², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan
- PS1-34 Deep learning analysis on Skin Lesions**
 Byungil Oh¹, Dina Koishiyeva², Alibek Bissembayev², Assel Mukasheva², and Jeong-Won Kang^{1,†}
¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan



Poster Session 2

17:00~18:00

Wed, August 20, 2025

Room : Main Conference Hall

Chair: Prof. SangYule Choi (Induck Univ, Korea)

Prof. Nho Nguyen Van (HCMUT, Vietnam)

Dr. Hyungchul Kim (Korea Railroad Research Institute, Korea)

PS2-35 EEG Signals Spectral Analysis for Parkinson's Disease Classification

Chanhee Weon¹, Dina Koishiyeva², Assel Mukasheva², and Jeong-Won Kang^{1,†}

¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan

PS2-36 Machine Learning Study on Glaucoma Detection in Fundus Imaging

Sokwoo Lim¹, Dina Koishiyeva², Assel Mukasheva², and Jeong-Won Kang^{1,†}

¹Korea National University of Transportation, Korea, ²Kazakh-British Technical University, Kazakhstan

PS2-37 Real-Time Position Control of a 3-Axis Robot Using PC-Based Powerlink Communication

Donghwi Son, Taekue Kim[†], and Juyeon Hyun

Changwon National University, Korea

PS2-38 Systematic Collection and Preprocessing of Power System Data for Deep Learning-Based Fault Diagnosis

Dong-Hee Yoon[†]

Korea National University of Education, Korea

PS2-39 AI-Based Load Current Forecasting for Embedded Implementation of Auxiliary Power Supply

Yongki Kim¹, Kang-moon Park^{2,†}, Jeong Won Kang², and Hag-Wone Kim²

¹University of Colorado, Boulder, USA, ²Korea National University of Transportation, Korea

PS2-40 A study on replacement priorities selection by railway route and section by performance evaluation of electrical equipment

Hyungchul Kim[†]

Korea Railroad Research Institute, Korea

PS2-41 Development of an Automatic Cleaning System for Rigid Overhead Contact Lines

Chulmin PARK¹, Sangjin SON², and Young PARK^{3,†}

¹Korea Railroad Research Institute, Korea, ²Myeong-sung Rollingstock & Plant Co. Ltd, Korea,

³Hanbat National University, Korea

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- PS2-42 Development of a Mobile App-Integrated Smart Power Shutdown and Restoration System for Railway Traffic Control Innovation**
Hae-San Park and Jeong-Won Kang[†]
Korea National University of Transportation, Korea
- PS2-43 A study on continuous implementation of position display of CBTC train control**
Wook Jin Hwang and Jeong Won Kang[†]
Korea National University of Transportation, Korea
- PS2-44 A Study on the selection of representative models of subway stations using clustering analysis techniques for energy performance evaluation of subway stations**
SEUNG KWON SHIN[†]
Korea Railroad Research Institute, Korea
- PS2-45 Proposing Local Mobility Strategies Independent of ITS: A Case Study of Cheonan City**
Jaehyung Lee and Jin-Tae Kim[†]
Korea National University of Transportation, Korea
- PS2-46 A Study on the Development of Quantitative and Qualitative Evaluation Methods for Autonomous Shuttle Services**
Tae Gun Lee and Jin-Tae Kim[†]
Korea National University of Transportation, Korea
- PS2-47 A Study on the Quantitative Evaluation Methodology of Traffic Signal Status Information (TSI) Service**
Jae-Ho Jo and Jin-Tae Kim[†]
Korea National University of Transportation, Korea
- PS2-48 Analysis of fault characteristics and development of countermeasures for renewable energy-interconnected railway feeding system**
Gyu-Jung Cho[†]
Pai Chai University, Korea
- PS2-49 Enhancing Energy Efficiency of DC Railway Using Active Power Control**
Chi-Myeong Yun¹, Hosung Jung^{2,†}, Hanmin Lee², Hwanhee Cho², and Hyungchul Kim²
¹Samsung C&T, Korea, ²Korea Railroad Research Institute, Korea
- PS2-50 An Advanced Study on the Standardization of Load-Breaking Switch Remote Terminal Unit for Overhead Catenary Systems**
Won-Kyu Choi, Jae-Moon Kim[†], Yong-Eun Choi, Sang-Nyeong Park, Chi-Won Sung, and Chin-Young Chang
Korea National University of Transportation, Korea

- PS2-51 Improvement of Real-time Railway Safety Monitoring and Control System for Osong Railway Test Track Safety Management**
Sangahm Kim[†] and Eun Ju Song
Korea Railway Research Institute, Korea
- PS2-52 Study on Human Error Accident Prevention Based on Risk Assessment for Railway Workers**
EunJu Song and Sangahm Kim[†]
Korea Railroad Research Institute, Korea
- PS2-53 A Study on Topology Configuration Methods and Regenerative Power Distribution Optimization Techniques for MVDC Railway Electrification Systems**
KISUK KIM¹ and HANSANG LEE^{2,†}
¹Ulsan College, Korea, ²Semyung University, Korea
- PS2-54 THD Reduction of Grid-Connected Converters using Spread Spectrum Techniques**
Chaehyun Ahn and Mina Kim[†]
Hanbat National University, Korea
- PS2-55 Evaluation of Outdoor Air Intake Range for Enthalpy based Economizer System in a Data Center**
Ahmin Jang, Dongsu Kim, Seong Ju Lee, and Sung Lok Do[†]
Hanbat National University, Korea
- PS2-56 Analysis of annual power generation based on the installation angle and orientation of solar power generation systems using Korean typical meteorological data**
Eunho Kang, Junyoung Lee, Jongho Yoon, and Dongsu Kim[†]
Hanbat National University, Korea
- PS2-57 Power Management Optimization of BIPV Systems with Energy Storage System Integration**
Seong-Han Ryu[†]
Hanbat National University, Korea
- PS2-58 A study on literature review and test method proposal for testing free-form concrete panels under impact loading.**
Minje Jo, Kyeongtae Jeong, and Donghoon Lee[†]
Hanbat National University, Korea
- PS2-59 Design and Technological Trends of BIPV Systems for Sustainable Architecture**
Jeong Hun Park[†]
Hanbat National University, Korea
- PS2-60 Performance Evaluation of Cement Boards Incorporating Graphite Powder and TiO2**
Minje Jo, Kyoungjun Chae, and Sangsoo Lee[†]
Hanbat National University, Korea

PS2-61 Core-shell carbon nanofiber-based gas sensor for detection of nitrogen dioxide

Seokhun Kwon, Dohyeon Kim, Young Park, and Hyunil Kang[†]

Hanbat National University, Korea

PS2-62 Synthesis of Laser-Induced Graphene-Based Carbon Nanomaterials for Anode Applications in Lithium-Ion Batteries

Kangmin Kim, Seokhun Kwon, Seungcheol Yoo, Jihwan Noh, Hyunil Kang, and Wonseok Choi[†]

Hanbat National University, Korea

PS2-63 Characteristics of colored glass manufactured using RF magnetron sputtering method for BIPV module application

Seungcheol Yoo, Jihwan Noh, and Wonseok Choi[†]

Hanbat National University, Korea

PS2-64 Comprehensive investigation of rooftop photovoltaic systems in apartment buildings

RUDA LEE, JONGHO YOON[†], DONGSU KIM, and JUNYOUNH LEE

Hanbat National University, Korea

PS2-65 Performance Evaluation of Transparent Photovoltaic Windows for an Office Building

Jaewon Kim, Ruda Lee, Kwanghyun Song, Dongsu Kim, and Jongho Yoon[†]

Hanbat National University, Korea

PS2-66 Protection Coordination in District Heating CHP Plants with High Renewable Penetration: A Case Study of Outage Events

Wonsik Moon[†], Dong-Il Cho, Yoon-Jin Cho, and June-Hyuk Nam

Soongsil University, Korea

PS2-67 Fire Detection Based AI Model Using Multi-Sensors (Heat, Smoke, and CO)

WOO-SEOK LEE^{1,†}, KYUNG-WAN KOO^{1,†}, JEE-HWAN AHN², JAE-WOO AHN², and CHANGHYEK LEE³

¹Hoseo University, Korea, ²Sedna, Korea, ³Safesystem, Korea

PS2-68 Current Status and Challenges for Sustainable Development of Wind Power in Vietnam

WOO-SEOK LEE^{1,†}, JUNG-NAM LEE¹, MI-YOUNG KIM¹, MIN-KOO JI², and KYUNG-WAN KOO^{1,†}

¹Hoseo University, Korea, ²West Sea Energy Development, Korea

PS2-69 Sensitivity analysis of building cooling and heating energy simulation using manufacturer-verified performance data: Focusing on variable refrigerant flow (VRF) heat pump system

Seongju Lee, Jaeyoon Koh, Sunglok Do, Jongho Yoon, and Dongsu Kim[†]

Hanbat National University, Korea



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