Program Book & Proceedings of the

WITC 2025

World Congress on Information Technology Application and Services

Feb 17-19, 2025, Jeju, Korea

The 2025 World Congress on Information Technology Applications and Services

"Advanced Mobile, Communications, Security, Multimedia, Vehicular, Cloud, IoT, and Computing"

February 17-19, 2025
Jeju, Korea

Organized by

World IT Congress & KCIA

2025 International Conferences
(Sponsored/Technically Sponsored by KCIA)

The 19th International Conference on Multimedia and Ubiquitous Engineering (MUE 2025)
- April 24-26 2025, Hunan, China
- http://www.mue-conference.org/2025/

The 20th International Conference on Future Information Technology (FutureTech 2025)
- April 24-26 2025, Hunan, China
- http://www.futuretech-conference.org/2025/

The International Conference on Big data, IoT, and Cloud computing (BIC 2025)
- Aug 13-15, 2025, Phnom Penh, Cambodia
- http://www.bic-conference.org/2025/

The 17th International Conference on Computer Science and its Applications (CSA 2025)
- Dec 18-20, 2025
- http://www.csa-conference.org/2025/

General Chairs' Message from the World IT Congress 2025

The 2025 World Congress on Information Technology Applications and Services (World IT Congress 2025) - "Advanced Mobile, Communications, Security, Multimedia, Vehicular, Cloud, IoT, and Computing" will be held in Jeju, Korea on February 17~19, 2025. The World IT Congress 2025 is aimed at the address key themes on "Advanced Mobile, Communications, Security, Multimedia, Vehicular, Cloud, IoT, and Computing." World IT Congress 2025 will be the most comprehensive conference focused on information technology, computing, and applications, and will provide an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of Advances in IT, Applications, and Services. In addition, the conference will publish high quality papers which are closely related to the various theories and practical applications in advanced IT. Furthermore, we expect that the conference and its publications will be a trigger for further related research and technology improvements in this important subject.

Accepted and presented papers highlight new trends and challenges of computer science and its applications. The presenters will show how new research could lead to novel and innovative applications. We hope you will find these results useful and inspiring for your future research.

We would like to express our sincere thanks to Steering Committee: James J. (Jong Hyuk) Park (SeoulTech, Korea), Hamid R. Arabnia(The University of Georgia, USA), Han-Chieh Chao (National Ilan University, Taiwan), Young-Sik Jeong (Dongguk University, Korea), Jianhua Ma (Hosei University, Japan), Qun Jin (Waseda University, Japan). Our special thanks go to the program chairs, all program committee members and all the additional reviewers for their valuable efforts in the review process, which helped us to guarantee the highest quality of the selected papers for the conference.

We cordially thank all the authors for their valuable contributions and the other participants of this conference. The conference would not have been possible without their support. Thanks are also due to the many experts who contributed to making the event a success.

World IT Congress 2025
General Chairs

Jungho Kang, Baewha Women's University, Korea
Yi Pan, Georgia State University, USA
Ka Lok Man, Xi'an Jiaotong-Liverpool University, China

Program Chairs' Message from the World IT Congress 2025

Welcome to the 2025 World Congress on Information Technology Applications and Services (World IT Congress 2025) - "Advanced Mobile, Communications, Security, Multimedia, Vehicular, Cloud, IoT, and Computing", which will be held in Jeju, Korea on February 17~19, 2025. This congress will be the most comprehensive conference focused on the various aspects of Advances in IT, Applications, and Services (AITA).

This congress provides an opportunity for academic and industry professionals to discuss the latest issues and progress in the area of computer science. In addition, the conference contains high quality papers which are closely related to the various theories and practical applications in computer science. Furthermore, we expect that this congress and its publications will be a trigger for further related research and technology improvements in this important subject. This congress contains high quality research papers submitted by researchers from all over the world. Each submitted paper was peer-reviewed by reviewers, who are experts in the subject area of the paper. Based on the review results, the program committee accepted papers.

For organizing this congress, the support and help of many people is needed. First, we would like to thank all authors for submitting their papers. We also appreciate the support from program committee members and reviewers who carried out the most difficult work of carefully evaluating the submitted papers.

We would like to give my special thanks to James J. (Jong Hyuk) Park (SeoulTech, Korea), Hamid R. Arabnia(The University of Georgia, USA), Han-Chieh Chao (National Ilan University, Taiwan), Young-Sik Jeong (Dongguk University, Korea), Jianhua Ma (Hosei University, Japan), Qun Jin (Waseda University, Japan) as the Steering Committee of World IT for their strong encouragement and guidance to organize the conference. We would like to thank World IT 2025 General Chairs for their advices to make possible organization of The World IT 2025. We would like to express special thanks to execute members for their timely unlimited support.

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Gyeongjin Jeon, JIN INFRA, Korea
Jaejin Lee, Neighbor system co.,Ltd , Korea

Workshop Chairs
Michael Hwa Young Jeong, Kyung Hee University, Korea

Invited Speaker

Edge Computing for IoT-Enabled Smart Grid: The future of Energy

Prof. Le Anh Ngoc

Ph.D. Info & Comm. Eng.
Director, Swinburne Innovation Space, Swinburne Vietnam (SUT)
Director, International Association for Convergence Science & Technology (IACST)

Abstract:

The explosive development of electrical engineering in the early 19th century marked the birth of the 2nd industrial revolution, with the use of electrical energy in place of steam power, as well as changing the history of human development. The versatility of electricity allows people to apply it to a multitude of fields such as transportation, heat applications, lighting, telecommunications, and computers. Nowadays, with the breakout development of science and technology, electric energy sources are formed by many different technologies such as hydroelectricity, solar power, wind power, coal power, etc. These energy sources are connected to form grid systems to transmit electricity to cities, businesses and homes for life and work. Electrical energy today has become the backbone of all modern technologies. To ensure the safe, reliable and energy-efficient operation of the grid, a wide range of grid management applications have been proposed. However, a significant challenge for monitoring and controlling grids is service response time. In recent times, to solve this problem, smart grid management applications based on IoT and edge computing have been proposed. In this talk, we perform a comprehensive survey of edge computing for IoT-enabled smart grid systems. In addition, recent smart grid frameworks based on IoT and edge computing are discussed, important requirements are presented, and the open issues and challenges are indicated. We believe that in the Internet of Things era, the smart grid will be the future of energy. We hope that these study results will contribute important guidelines for in-depth research in the field of smart grids and green energy in the future.

Biography:

Dr. Le Anh Ngoc (Jimmy) is the Director of Swinburne Innovation Space and an IT Professor at Swinburne University of Technology, Vietnam, where he leads the Intelligent Systems and Networks Research Group (ICISN). His previous roles include Director of Development Programs at the Differentiated Automotive Platform (DAP) - FPT Global Automotive & Manufacturing, Vice-Dean of the Faculty of Electronics & Telecommunications at EPU, and Head of the Communication Network Group at Vinh University's Information Technology Department. He also served as a Researcher at the Telecommunications Networks Laboratory (TENET Lab) at Kyungpook National University (KNU), South Korea. Dr. Le is currently the Director of the International Association for Convergence Science & Technology (IACST) and a fellow of the Korea Computer Industry Association (KCIA). With nearly 30 years of experience in academia and industry, Dr. Le has demonstrated expertise in training, research, innovation management, and technology transfer. His research interests encompass Embedded and Intelligent Systems, Communication Networks, the Internet of Things (IoT), Image/Video Processing, AI, and Big Data Analysis. Dr. Le is actively involved in academic activities, serving as a Keynote Speaker, Chair of International Conferences, Founder of the Global Swin Hackathon, Journal Editor for IET Smart Cities and Human-centric Computing and Information Sciences (HCIS), TPC member, Session Chair, Book Editor, and Reviewer for international conferences and journals. Beyond academia, Dr. Le is a Digital Transformation & IT Consultant/Specialist/Mentor for organizations such as the Vietnam–Korea Businessmen and Investment Association (VKBIA), Vietnam-Korea Experts and Intellectuals Association (VKEIA), and the Vietnam Innovation Network in Korea (VINK).

FOR
WOLRD IT CONGRESS 2025

Day 1, February 17, 2025		
Time	**Min**	**HALL A**
09:00-09:20	20	**Workshop Registration**
09:20-11:40	140	**Session A-1** **Korea-China Workshop**
11:40-13:00	80	**Lunch**
13:00-13:20	20	**Registration**
13:20-14:00	40	**Keynote Speech** **Le Anh Ngoc** **“Edge Computing for IoT-Enabled Smart Grid: The future of Energy”** **Chair: Joon-Min Gil**
14:00-14:10	10	**Coffee Break**
14:10-15:50	100	**Session A-2** **WITC 2025 & HCIS 2025 Winter Workshop** **Chair: Abir El Azzaoui**
15:50-16:00	10	**Coffee Break**
16:00-17:40	100	**Session A-3** **WITC 2025 & HCIS 2025 Winter Workshop** **Chair: Jin-Ho Park**
17:40-18:30	50	**Break**
18:30-20:00	90	**Banquet** **(Only for Invited Members)**

Day 2, February 18, 2025		
Time	**Min**	**HALL A**
10:00-12:00	120	**Session A-4 (Private)** **SICNS Workshop for NRF Korea - EU**
12:00-13:30	90	**Lunch**
13:30-15:30	120	**Organizing Committee Meeting I**
15:30-16:00	30	**Break**
16:00-18:00	120	**Executive Meeting – Organized by World IT Congress 2025**

Day 3, February 19, 2025		
Time	**Min**	**HALL A**
09:00-10:20	80	**Local Arrangement Committee Meeting**
10:20-10:40	20	**Break**
10:40-12:00	80	**Organizing Committee Meeting II**

1. **A paper presentation should be made by one of authors of the paper for A paper presentation should be made by one of authors of the paper for 15 minutes (10 minutes for the presentation itself and 5 minutes for Q/A).**
2. **All speakers of each session should meet the session chair at their room 10 minutes before the session begins.**
3. **Windows 10 laptops running the Adobe Reader and Microsoft Office for paper presentations will be prepared. Please prepare for your presentation.**
4. **For Q&A in the online section, please email the author.**

DETAILED SCHEDULE FOR THE 2025 WORLD CONGRESS ON INFORMATION TECHNOLOGY, APPLICATIONS AND SERVICES (WORLD IT CONGRESS 2025)

Day 1, Feb. 17, 2025 (Monday)

09:00-09:20 **Registration**

09:20-11:40 **Session A-1 Korea-China Workshop**

NRF - Large-scale joint research between industry, academia, and research institutes

11:40-13:00 **Lunch**

13:00-13:20 **Registration**

13:20-14:00 **Invited Speaker**
(Chair: Joon-Min Gil)

Prof. Le Anh Ngoc
"Edge Computing for IoT-Enabled Smart Grid: The future of Energy"
Director, Swinburne Innovation Space, Swinburne Vietnam (SUT)
Director, International Association for Convergence Science & Technology (IACST)

14:00-14:10 **Coffee Break**

14:10-15:50 **Session A-2 WITC 2025 & HCIS 2025 Winter Workshop**
(Chair: Abir El Azzaoui)

1. **Study on the Acceptance Analysis of Security Education by Applying Gamification**
   Jongwan Kim, Hangbae Chang
2. **Design of Insider Threat Detection Model for University Research Environments**
   Giwan Hong, Yeji Choi, Jimin Lee, Hangbae Chang

3. **Core-TechAnnotator: An Automated Technical Document Labeling Methodology Based on the Relevance of National Core Technologies in the Display Industry**
   Yuna Han, Hangbae Chang
4. **A Review of Insider Data Leakage Detection based on Non-Invasive Methods: Stress-Inducing Factors and Behavioral Patterns**
   Jihye Park, Sangtae Lee, Yelim Jeon, Hangbae Chang
5. **A Case Study on the Establishment of a Diverse Converged Service Network Based on Quantum Cryptographic Communication Equipment**
   Changuk Jang, Hyeongyeop Kim, Okyeon Yi
6. **A Web-Compatible Secure Pre-Authentication Scheme Using Port Sequences**
   Sunghyun Yu, Yoojae Won
7. **Implementing Zero Trust in Cloud Environments: Case Studies**
   Jongwoo Hong, Yoojae Won

15:50-16:00 Coffee Break

16:00-17:40 Session A-3 WITC 2025 & HCIS 2025 Winter Workshop
(Chair: Jin-Ho Park)

1. **Advancing Network Security: Addressing Emerging Threats in Modern Infrastructures**
   Minji Kim, Jong Hyuk Park
2. **An Edge-Intelligence Framework Using Digital Twin for IoV in Smart Cities**
   Heeji Park, Jong Hyuk Park
3. **Combined Autoscaling and Offloading for Efficient Resource Management in Fog Computing**
   Subin Jeong, Eun-Ha Song, Byeonghui Jeong, Young-Sik Jeong
4. **AI-Based Security Solution for Preventing Data Sniffing in Mobile Communication Networks**
   Na Yeong Kim, Jong Hyuk Park
5. **A Survey on AI based Advanced Cyber Attacks on IIoT Environments**
   Byung Hyun Jo, Jong Hyuk Park
6. **Paper-Keyword Graph Representation for Research Papers Classification using GRCN Model**
   Dipto Biswas, Tae-Young Byun, Joon-Min Gil
7. **How to predict early dementia in the elderly by automatically analyzing psychological images with artificial intelligence**
   Kyung-yeul Kim, Young-bo Yang, Jihie Kim, Ji Su Park
8. **Studying Security Requirements in Quantum Systems Environment**
   Ji Su Park
9. **Hybrid Quantum Fuzzy Neural Network Approach for Predictive Modeling in Smart Factory**
   Abir EL Azzaoui, Jong Hyuk Park
10. **Quantum-Enhanced Anomaly Detection in Digital Twin-Based Distributed Cloud Architectures for IIoT**
    Abbas Azhar, Jong Hyuk Park
11. **Decentralized Blockchain-Driven Privacy Model for Distributed Medical Data Sharing**
    Nguyen Van Giang, Abir EL Azzaoui, Jong Hyuk Park

17:40-18:30 Break

18:30-20:00 Banquet
(Only for Invited Members)

WITC World Congress on Information Technology Applications and Services

KCIA Korea Computer Industry Association

Day 2, Feb. 18, 2025 (Tuesday)

10:00-12:00 **Session A-4 Korea-EU Workshop (Private)**

NRF - SICNS Workshop for Korea - EU

12:00-13:00 **Lunch**

13:00-15:00 **Organizing Committee Meeting I**

15:00-15:30 **Coffee Break**

15:30-17:30 **Executive Meeting – Organized by World IT Congress 2025**

Day 3, Feb. 19, 2025 (Wednesday)

09:00-10:20 **Local Arrangement Committee Meeting**

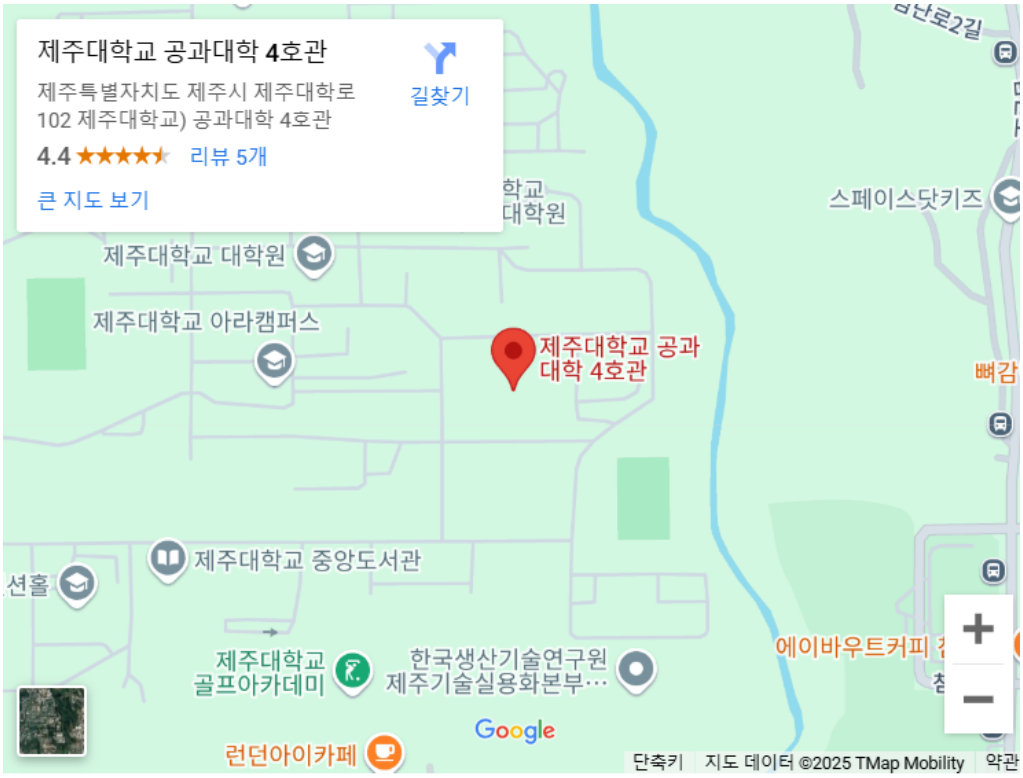
10:20-10:40 **Coffee Break**

10:40-12:00 **Organizing Committee Meeting**

Conference Venue

Jeju National University Ara Campus

310, 102 Jeju Daehak-ro, Jeju-si, Jeju Special Self-Governing Province,
College of Engineering Building 4, Jeju National University, Korea
TEL: 064)754-2114
FAX: 064)755-6130



How to get into the Jeju National University Ara Campus, Korea

- ***Jeju International Airport -> Jeju National University Ara Campus***
  - Boarding at Jeju International Airport (Jeju-bound) stop: No transfer (takes about 1 hour)
    - 365, 3003 (late night) -> Get off at Jeju National University stop
  - Boarding at Jeju International Airport (Pyoseon, Seongsan, Namwon) stop: 1 transfer (takes about 40-50 minutes)
    - 112, 122, 132 -> Transfer at Jeju National University Hospital stop -> 270, 341, 342, 345, 346, 351, 352, 355, 356, 360, 365, 366 (weekdays), 446, 447, 455, 477, 3003 (late night) -> Get off at Jeju National University stop

- ***Jeju City Hall -> Jeju National University Ara Campus***
  - Get on at Jeju City Hall stop: No transfer (takes about 25 minutes)
    - 341, 342, 351, 352, 355, 360, 365, 446, 447, 455, 3003 (late night) -> Get off at Jeju National University stop


WITC
World Congress on Information Technology Applications and Services


KCIA
Korea Computer
Industry Association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