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# ICFICE 2023

## THE 15TH INTERNATIONAL CONFERENCE ON FUTURE INFORMATION & COMMUNICATION ENGINEERING

**10-13th January, 2023**

Nha Trang Horizon Hotel, Vietnam

Proceedings
QR Code

KIICE THE KOREA INSTITUTE OF INFORMATION AND COMMUNICATION ENGINEERING

Ministry of Science and ICT

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# Welcome Message from General Chair

Dear scholars and experts,

On behalf of the Conference Committee, I welcome you to ICFICE2023, the 15th International Conference on Future Information and Communication Engineering, to be held from January 10 to 13, 2023 at the Horizon Hotel in Nha Trang, Vietnam.

Even though the middle of 2022 has passed, the entire human society is still fighting the coronavirus. At one time, the zealous pursuit of eradicating the virus with the goal of ending the corona virus turned out to be human arrogance. Now, it is a daunting situation to find a solution that can coexist while dealing with this virus within a stable management range. It is still too early to know exactly where the COVID-19 pandemic will start and how far it will spread. However, it is clear that this pandemic. Therefore, it is necessary to take a new approach across all fields of order, system, culture, and lifestyle created by humans. Therefore, our society must also advance successfully in the IT field.

As the General Chair of ICFICE2023, notable papers were published here, and I am pleased to share the research results with surrounding researchers as several papers have been published in related SCI and SCOPUS journals such as MDPI, JICT, and JICCE. We would like to thank the Program Committee and Organizing Committee members, keynote speakers, judges and authors who contributed to the success of this conference. I hope this conference is meaningful and happy for you.

Dr. & Prof. Seong-Yoon Shin
General Chair of ICFICE2023

# Conference Committee

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Dongsik Jo (University of Ulsan, Korea)

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Dae Hee Kim (Soonchunhyang University, Korea)
Hyun-Ho Choi (Hankyong National University, Korea)
Kisong Lee (Dongguk University, Korea)
Seunggyu Byeon (Silla University, Korea)
Cao Kerang (Shenyang University of Chemical Technolog, China)
Sungkwan Youm (Wonkwang University, Korea)
Sukhoon Lee (Kunsan National University, Korea)
Jeongkyu Hong (Yeungnam University, Korea)
Changsu Kim (PaiChai University, Korea)
Jimin Cheon (Kumoh National Institute of Technology, Korea)
Jaemin Kwak (Mokpo National Maritime University, Korea)
Gwanghyun Jo (Kunsan National University, Korea)
Wooseok Ryu (Catholic University of Pusan, Korea)

# Conference Schedule Overview

## ◉ 11th January, 2023

### • Registration

- Time : 09:00 ~ 12:00 (11th January, 2023)
- Place : Orchid Hall(2F), Nha Trang Horizon Hotel, Vietnam

### • Opening Ceremony / Keynote Speech

- Time : 10:40 ~ 11:40 (11th January, 2023)
- Place : Pensee Hall(2F), Nha Trang Horizon Hotel, Vietnam
- Keynote Speech

  Title : Smart Transportation Projects For Smart Cities

  Speaker : Dr. Hyun Ae Lee (Hyundai Motor Group)

### • Luncheon (Lunch ticket sales)

- Time : 11:40~13:30 (11th January, 2023)
- Place : Restaurant(1F), Nha Trang Horizon Hotel, Vietnam

### • Chair. Meeting

- Time : 09:30 ~ 09:40 / 13:20~13:30 (11th January, 2023)
- Place : Orchid Hall(2F), Nha Trang Horizon Hotel, Vietnam

### • Technical Session

- Time : 09:40 ~10:30 / 13:30 ~ 17:00 (11th January, 2023)
- Place : Lotus Hall(2F), Pensee Hall(2F), VIP Room(1F), Nha Trang Horizon Hotel, Vietnam

### • Dinner

- Time : 18:00 ~ 20:00 (11th January, 2023)
- Place : Korean Restaurant, Vietnam

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<tr><td colspan="2">ICFICE 2023<br>THE 15th INTERNATIONAL CONFERENCE ON FUTURE INFORMATION & COMMUNICATION ENGINEERING</td></tr>
<tr><td colspan="2">11th January, 2023, Nha Trang Horizon Hotel, Vietnam</td></tr>
<tr><td>Technical Session :<br>ORAL</td><td>Session CA-A, UN-A<br>Prof. Gwanghyun Jo (Kunsan National University)</td></tr>
<tr><td rowspan="4">09:40<br>~<br>10:30<br>(VIP Room, 1F)</td><td>CA-1</td></tr>
<tr><td>CA-2</td></tr>
<tr><td>CA-3</td></tr>
<tr><td>UN-1</td></tr>
<tr><td>Technical Session :<br>ORAL</td><td>Session IB-A, NS-A, MD-A<br>Prof. Young Woon Woo (Dong-eui University)</td></tr>
<tr><td rowspan="3">09:40<br>~<br>10:30<br>(Lotus Hall, 2F)</td><td>IB-1</td></tr>
<tr><td>NS-1</td></tr>
<tr><td>MD-1</td></tr>
<tr><td>10:40~11:40<br>(Pensee Hall, 2F)</td><td>Opening Ceremony / Keynote Speech</td></tr>
<tr><td>11:40~13:30<br>(Restaurant, 1F)</td><td>Luncheon</td></tr>
</table>

※ CA : Communication System and Applications
UN : Ubiquitous Sensor Network
IB : IoT and Big Data
NS : Networking and Security
MD : Multimedia and Digital Convergence

| ICFICE 2023<br>THE 15th INTERNATIONAL CONFERENCE ON FUTURE INFORMATION & COMMUNICATION ENGINEERING | |
|---|---|
| 11th January, 2023, Nha Trang Horizon Hotel, Vietnam | |
| Technical Session : **ORAL** | **Session AI-A**<br>Prof. Choong Ho Lee (Hanbat National University) |
| 13:30 ~ 14:40 (Lotus Hall, 2F) | **AI-1** |
| | **AI-2** |
| | **AI-3** |
| | **AI-4** |
| | **AI-5** |
| Technical Session : **ORAL** | **Session AI-B**<br>Prof. Won-Kwang Park (Kookmin University) |
| 13:30 ~ 14:40 (VIP Room, 1F) | **AI-6** |
| | **AI-7** |
| | **AI-8** |
| | **AI-9** |
| | **AI-10** |

※ AI : AI and Intelligent Information System

<table>
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<tr><td>Technical Session :<br>ORAL</td><td>Session IT-A<br>Prof. Seong-Yoon Shin (Kunsan National University)</td></tr>
<tr><td rowspan="5">14:50<br>~<br>16:00<br>(Lotus Hall, 2F)</td><td>IT-1</td></tr>
<tr><td>IT-2</td></tr>
<tr><td>IT-3</td></tr>
<tr><td>IT-4</td></tr>
<tr><td>IT-5</td></tr>
<tr><td>Technical Session :<br>ORAL</td><td>Session BI-A, DA-A, SC-A<br>Prof. Jongwook Jang (Dong-eui University)</td></tr>
<tr><td rowspan="4">14:50<br>~<br>16:00<br>(VIP Room, 1F)</td><td>BI-1</td></tr>
<tr><td>BI-2</td></tr>
<tr><td>DA-1</td></tr>
<tr><td>SC-1</td></tr>
</table>

※ IT : IT Convergence Technology
BI : Biomedical Imaging and Engineering
DA : Database and Internet Application
SC : Semiconductor and Communication Services

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| ICFICE 2023<br>THE 15th INTERNATIONAL CONFERENCE ON FUTURE INFORMATION & COMMUNICATION ENGINEERING | |
|---|---|
| 11th January, 2023, Nha Trang Horizon Hotel, Vietnam | |
| Technical Session :<br>**ORAL** | **Session MD-B**<br>Prof. Kwang Seong Shin (Wonkwang University) |
| 16:10<br>~<br>17:00<br>(Lotus Hall, 2F) | **MD-2** |
| | **MD-3** |
| | **MD-4** |
| | **MD-5** |
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| 16:10<br>~<br>17:00<br>(VIP Room, 1F) | **AI-11** |
| | **AI-12** |
| | |
| | |

※ MD : Multimedia and Digital Convergence
AI : AI and Intelligent Information System

| ICFICE 2023<br>THE 15th INTERNATIONAL CONFERENCE ON FUTURE INFORMATION & COMMUNICATION ENGINEERING | | | |
|---|---|---|---|
| 11th January, 2023, Nha Trang Horizon Hotel, Vietnam | | | |
| Technical Session :<br>**POSTER** | **Session MD-C, NS-B, AI-D**<br>Prof. Daehwan Kim (University of Ulsan) | | |
| 14:50<br>~<br>15:20<br>(Pensee Hall, 2F) | **MD-6** | **MD-12** | **NS-4** |
| | **MD-7** | **MD-13** | **NS-5** |
| | **MD-8** | **MD-14** | **NS-6** |
| | **MD-9** | **MD-15** | **NS-7** |
| | **MD-10** | **NS-2** | **AI-13** |
| | **MD-11** | **NS-3** | **AI-14** |
| Technical Session :<br>**POSTER** | **Session AI-E, SC-B, UN-B**<br>Prof. Jin-Woo Jung (Dongguk University) | | |
| 15:40<br>~<br>16:10<br>(Pensee Hall, 2F) | **AI-15** | **AI-21** | **AI-27** |
| | **AI-16** | **AI-22** | **SC-2** |
| | **AI-17** | **AI-23** | **SC-3** |
| | **AI-18** | **AI-24** | **UN-2** |
| | **AI-19** | **AI-25** | **UN-3** |
| | **AI-20** | **AI-26** | |

※ MD : Multimedia and Digital Convergence
NS : Networking and Security
AI : AI and Intelligent Information System
SC : Semiconductor and Communication Service
UN : Ubiquitous Sensor Network

<table>
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<tr><td>Technical Session :<br>POSTER</td><td colspan="3">Session CA-B, IT-B, IB-B<br>Prof. Semin Kim (Jeonju National University of Education)</td></tr>
<tr><td rowspan="6">16:30<br>~<br>17:00<br>(Pensee Hall, 2F)</td><td>CA-4</td><td>CA-10</td><td>IT-11</td></tr>
<tr><td>CA-5</td><td>IT-6</td><td>IT-12</td></tr>
<tr><td>CA-6</td><td>IT-7</td><td>IT-13</td></tr>
<tr><td>CA-7</td><td>IT-8</td><td>IB-2</td></tr>
<tr><td>CA-8</td><td>IT-9</td><td></td></tr>
<tr><td>CA-9</td><td>IT-10</td><td></td></tr>
</table>

※ CA : Communication System and Applications
IT : IT Convergence Technology
IB : IoT and Big Data

# 11th January, 2023

## Session CA-A : Communication System and Applications

## Session UN-A : Ubiquitous Sensor Network

**Session Chair** : Prof. Gwanghyun Jo
(Kunsan National University)

**09:40~10:30**

**CA-1 : A Schedule of Context-awareness Distributed Clustering for DTN ····· 3**
Dong-keun Oh, Youngjun Oh, and Kangwhan Lee
(Korea University of Technology and Education)

**CA-2 : Digital Dashboard Design for Condition Status Monitoring of Online Rotating Equipment ····· 6**
Andrian Julianto[1], Aria Bisma Wahyutama[2], and Mintae Hwang[2]
([1]Pertamina Litd. Company, [2]Changwon National University)

**CA-3 : Model of Farming Consultation Integration Toward Smart Agricultural Community in Traditional Village ····· 10**
Asep Somantri (Pasundan University)

**UN-1 : Dual-Rotor Electromagnetic-Based Energy Harvester for Powering a Wireless Sensor System Using Multi-layer PCB Coils on Marine Rotating Shaft ····· 14**
Van Ai Hoang and Young Chul Lee (Mokpo National Maritime University)

## Session IB-A : IoT and Big Data

## Session NS-A : Networking and Security

## Session MD-A : Multimedia and Digital Convergence

**Session Chair** : Prof. Young Woon Woo
(Dong-eui University)

**09:40~10:30**

**IB-1 : E-commerce Service with IoT-based Capacity Information Collection of the Recyclables ····· 21**
JinSe Park, Aria Bisma Wahyutama, Mintae Hwang, and Hoon Lee
(Changwon National University)

**NS-1 : Prime Number based Energy Efficient Scheduling Methods for Wireless Sensor Networks ····· 26**
Jong-Hoon Youn[1], Woosik Lee[2], and Teuk-Seob Song[3]
([1]University of Nebraska at Omaha, [2]Social Security Information Service, [3]Mokwon University)

**MD-1 : Flow and Engagement in Animation through Interactive Storytelling ····· 29**
Elisa Adriana and HongSik Pak (Dongseo University)

## Session AI-A : AI and Intelligent Information System

**Session Chair** : Prof. Choong Ho Lee
(Hanbat National University)

**13:30~14:40**

**AI-1 : Blockchain for storing and protecting healthcare data using Hyperledger Fabric ····· 35**
Muhammad Usama Abid, Md Ariful Islam Mozumder, Muhammad Mohsan Sheerazand, and Hee-Cheol Kim (Inje University)

**AI-2 : Design of Sundanese Script Detection Based on Deep Learning using Roboflow and YOLO ····· 39**
Handoko Supeno, Dwi Yanto Subastian, Mellia Liyanthy, and Muhammad Tirta Mulia (Pasundan University)

**AI-3 : Machine learning-based approach for the classification of cancer disease patients using clinical data ····· 43**
Ali Maisam, Abdullah,Yaseen Muhammad, and Hee-Cheol Kim
(Inje University)

**AI-4 : Machine Learning-based Hand Movement Classification of Stroke Patients using EEG Signals ····· 49**
Yassen Muhammad, Abdullah, Ali Maisam, Shah Mahsoom Ali, and Hee-Cheol Kim (Inje University)

**AI-5 : Utilizing Context for Enhancing Performance of On-device AI Inference ····· 54**
Seokjun Lee, Chungjae Choe, and Nakmyung Sung
(Korea Electronic Technology Institute)

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**Session Chair** : Prof. Won-Kwang Park
(Kookmin University)

**13:30~14:40**

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Seung-Won Yoon, In-Woo Hwang, Jae-In Kim, and Kyu-Chul Lee
(Chung-nam National University)

**AI-7 : A Study on Transportation in the Metaverse: The Mediating Effect of Identification, Social Attraction, and Self-Awareness** ····· **66**
Soyoung Kim, Youn-Jung Park, In-jae Lim, and Heejo Keum
(Sungkyunkwan University)

**AI-8 : Forecasting of dissolved oxygen for Anyang Stream based on ANN-XGB** ····· **74**
Gwanghyun Jo[1], Keun Young Lee[2], and Seong-Yoon Shin[1]
([1]Kunsan National University, [2]Sejong University)

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Huong Nguyen Dinh, SeungHyun Woo, Hyeon-Jin Jeon, Ji-Seok Yang, and Yunsik Son (Dongguk University)

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Aria Bisma Wahyutama and Mintae Hwang
(Changwon National University)

## Session IT-A : IT Convergence Technology

**Session Chair** : Prof. Seong-Yoon Shin
(Kunsan National University)

**14:50~16:00**

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Young-Bong Ko and Dae-woo Park (Hoseo Graduate School of Venture)

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## Session BI-A : Biomedical Imaging and Engineering

## Session DA-A : Database and Internet Application

## Session SC-A : Semiconductor and Communication Service

**Session Chair** : Prof. Jongwook Jang
(Dong-eui University)

**14:50~16:00**

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Tran Tuyen[1] and Nguyen Dinh Nhu Ha[2]
([1]Ho Chi Minh City University of Education and Technology, [2]Ho Chi Minh City Nong Lam University )

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(Sungkyunkwan University)

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([1]Can Tho University, [2]UMMISCO 209)

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**Session Chair** : Prof. Teuk-Seob Song

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## Session MD-C : Multimedia and Digital Convergence

## Session NS-B : Networking and Security

**Session Chair** : Prof. Daehwan Kim
(University of Ulsan)

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([1]Graduate School of Namseoul University, [2]Namseoul University)

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SH. Nasanjargal[1], Song Chuangxiang[2], Kwang Seong Shin[3], Gwanghyun Jo[4], and Seong-Yoon Shin[4]
([1]Erdmiin Khishing School, [2]Shaanxi Province, [3]Wonkwang University, [4]Kunsan National University)

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([1]JiuJiang University, [2]Kunsan National University)

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([1]Wonkwang University, [2]Kunsan National University)

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([1]Jeonju National University of Education, [2]Jeonju University)

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([1]GyeongGi University of Science and Technology, [2]Catholic University of Pusan, [3]Kwangwoon University)

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