IMCOM 2023, January 3 - 5,

Suwon, Korea

Conference Program

| Hosted by |

Sungkyunkwan University, Korea
Universiti Kuala Lumpur, Malaysia

IEEE

IEEE SMC Systems, Man, and Cybernetics Society

초대의 글

IEEE 학술대회로 성균관대가 후원하며 말레이시아 UniKL과 공동 주관하는 제 17회 International Conference on Ubiquitous Information Management and Communication (IMCOM)이 2023년 1월 3일(화)부터 5일(목)까지 온·오프라인 하이브리드로 개최됩니다. 미래사회에서는 인간, 컴퓨터, 사물 간의 상호작용을 위한 새로운 패러다임의 생성, 라이프로그의 활용, AI 컴패니언 디바이스의 역할, 특성, 맞춤 등 그에 따른 변화를 요구합니다. IMCOM 2023에서는 컴패니언 IoT 그리고 인공지능의 시대를 준비하며 새로운 패러다임에 기여하는 학술 교류 및 전문 지식의 전파를 위해서 세계 최고 수준의 전문가들을 모시고 과기부/IITP G-ITRC의 틀 안에서 심도 있는 토론의 장을 마련하고자 합니다.

IMCOM 2023는 SCOPUS와 EI에 등재되어 있어 국제학술대회로서의 높은 권위를 유지하고 있습니다. 금년에는 20개국 이상의 나라에서 참여하였으며, 국내논문 17편, 외국논문 88여 편 정도가 최종 선정되었고, 수준 높은 학술 교류를 위해 네 분의 기조강연자를 모셨습니다. 웹서비스, 클라우드 컴퓨팅, 빅데이터 등 분산 시스템에서의 보안 전문가이신 CSIRO의 Surya Nepal 박사님, 인도 삼성 연구소에서 5G 네트워크 솔루션 및 5G/6G 표준화 연구를 이끌고 계신 Mohan Rao Goli 부사장님, 암 치료를 위한 AI의료영상처리와 같은 의료・컴퓨터비전 전문가이신 성균관대 박현진 교수님, Spatiotemporal 데이터베이스 및 데이터 마이닝 분야의 전문가이신 일본 나고야대 Yoshiharu Ishikawa 교수님을 초청하였습니다. 열띤 토론과 학술정보의 교환은 물론 폭넓은 친교를 통해 성대한 만남의 장과 성공적인 학술회의가 이루어질 수 있도록 부디 적극 참석하셔서 본 학술회의를 더욱 빛내 주시길 부탁드립니다.

대한민국 성균관대에서 2006년 기획되어 2007년부터 시작된 작은 학술회의가 이제 매년 200편 이상의 논문이 제출되고 서로 아끼며 주목하는 세계수준의 학술회의로 자리 잡았습니다. 많은 분들께서 노력해 주심으로 인해 미국과 유럽 중심의 저명한 국제학술회의와 어깨를 견줄 정도로 발전하고 있음에 진심으로 감사드립니다. 모두의 노력과 희생이 헛되지 않도록 아시아-태평양 지역에서 더욱 성실하게 성장하는 학술회의가 되도록 운영진 모두가 최선의 노력을 다하겠습니다.

여러분의 가정에 항상 평화가 있으시길 기원합니다.

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Duc-Tai Le

IMCOM 2023 학회장 이 석 한
Lajos Hanzo
Roslan Ismail

운영위원장 추 현 승

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Message from General Co-Chairs

On behalf of the organizing committee, we welcome you to Seoul, Korea for the 17th International Conference on Ubiquitous Information Management and Communication (IMCOM 2023). We are very fortunate and honored to have renowned people of their respective fields gathering getting involved in the process of submitting papers, chairing sessions, reviewing papers, and organizing the conference.

Over the years IMCOM has evolved into a distinguished conference in Asia Pacific region. Behind this success, is the hardship of many committee members who have devoted their precious time to promote and advertise IMCOM pole to pole. The conference is an amalgam of high-quality submissions brought forward by thorough research to meet the high standard required, as of in today's world.

On the occasion of 17th conference of the IMCOM series, we proudly present you with terrific technical and social programs. Three days of technical programs are carefully designed to cover encyclopedic diversity, inspiration and technicality. Your active participation in the sessions will be awarded with timely messages and valuable future insight from not only the four high-profile keynote speakers but also other authors.

Again, we would like to express our sincere gratitude to the committee members' and referees' contributions in this event. Our special thanks are due to Prof. Roslan Ismail and Ms. Kim De Silva: the Malaysian Conference Organizers, Profs. Dongsoo S. Kim, Taketoshi Ushiama, and Duc-Tai Le: the Program Committee Co-Chairs, Prof. Samratul Janin Sidal: the Local Arrangement Co-Chairs, Profs. Hyunseung Choo, Hyoungshick Kim, and Syed M. Raza: the Treasurer and Operation Co-Chairs, and all other Chairs. Last but not least, we appreciate the support from international and domestic partnerships for this event, that is, the partnerships between Sungkyunkwan University, Korea, and Universiti Kuala Lumpur, Malaysia.

We wish your participation in IMCOM 2023 being a memorable one with valuable technical exchanges.

Sukhan Lee
Lajos Hanzo
Roslan Ismail
General Co-Chairs
IMCOM 2023

Sukhan Lee
Sungkyunkwan University
Korea

Lajos Hanzo
University of Southampton
United Kingdom

Roslan Ismail
Universiti Kuala Lumpur
Malaysia

Message from Program Co-Chairs

Welcome to the 17th International Conference on Ubiquitous Information Management and Communication (IMCOM) 2023, the first hybrid IMCOM due to ongoing pandemic. It is tremendous to see the great leaps of technology in last two decades making this hybrid conference a possibility.

IMCOM 2023 aims to provide a platform for promoting new visionary approaches and interdisciplinary researches. New evolving technology and futuristic ideas in the areas of information management, interaction management, communication technologies and their implications for social interaction, lays the firm foundation of the conference. The conference has served as a vital platform for researchers to exchange innovative ideas and significant research achievements; and provides a unique opportunity in which both technology and social science meet. Two main tracks for information processing management and communication will be held, covering both research and application works of information management, intelligent information processing, interaction management, networking /telecommunications, and social interaction.

This year's conference contains 4 outstanding speeches from distinguished keynote speakers, 4 regular sessions, 4 short-presentation sessions, and 4 online-presentation (poster style) sessions. This year we received 260 submissions from 22 countries and 83 institutions around the world, resulting in a very competitive and rigorous review process. The program committee has dropped several good papers to deliver a very strong and pivotal conference program. Total 105 papers are accepted based on significance of contribution, relevance to the conference scope, and review scores (40.4% acceptance rate). All the accepted papers not only consist of novel ideas, new results, work in progress, and state-of-the-art techniques, but also provide us with the directions and stimulation for future research activities in the area of information management and communication technologies.

We are grateful to all the authors, reviewers, and members of the program committee for their remarkable efforts and contributions. Without their most valued help and cooperation, the tedious task of submission handling and paper reviewing could not have been successfully accomplished. We also praise the valiant effort by session chairs who accepted our request to virtually manage sessions of the conference, which is a new experience for many of us.

We thank the General Co-Chairs, Sukhan Lee, Lajos Hanzo, and Roslan Ismail for their great support and help. We also thank everyone who has contributed to the program – the authors, the reviewers, the program committee members and other organizing committee members for their splendid work.

We wish you to have a productive and enjoyable experience of this virtual conference and hope that next year we can personally meet again.

Dongsoo S. Kim
Taketoshi Ushiama
Duc-Tai Le
Program Co-Chairs
IMCOM 2023

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Program at a Glance

| January 02, 2023 (Monday) |

17:00-20:00	Organizing and Steering Committee Meeting

| January 03, 2023 (Tuesday) |

	Room 26310	Room 26312
08:30-09:00	**Registration**	
09:00-09:50	Regular 1: **Towards User Comfort**	Regular 2: **Beyond 5G and More**
09:50-10:00	**Opening Remarks**	
10:00-10:45	**Room 26312** Keynote Speech 1: **Surya Nepal** Research Group Leader, CSIRO, Australia	
10:45-11:30	**Room 26312** Keynote Speech 2: **Mohan Rao Goli** Corporate Vice President and CTO, Samsung, India	
11:30-11:45	**Break**	
11:45-12:45	Short Presentation 1: **Advanced Networks Applications and Security**	Short Presentation 2: **Ethological Analytics**
12:45-13:00	Regrouping for Reception	
13:00-14:30	**Room 26312** **Welcome Reception (lunch box)**	
14:30-16:00	**Staff Debriefing and Planning**	

Program at a Glance

| January 04, 2023 (Wednesday) |

	Room 26310	Room 26312
08:30-09:00	**Registration**	
09:00-09:50	Regular 3: **Image Insight**	Regular 4: **Data Analytics**
09:50-10:00	**Break**	
10:00-10:45	**Room 26312** Keynote Speech 3: **Hyunjin Park** Sungkyunkwan University, Korea	
10:45-11:30	**Room 26312** Keynote Speech 4: **Yoshiharu Ishikawa** Nagoya University, Japan	
11:30-11:45	**Break**	
11:45-12:45	Short Presentation 3: **Intelligent Imaging**	Short Presentation 4: **Industrial Applications**
12:45-13:00	**Regrouping for Banquet**	
13:00-14:30	**Conference Banquet**	
14:30-20:00	**Tour: Lotte World Tower Seoul**	

Program at a Glance

| January 05, 2022 (Thursday) |

	Online Presentations (Poster Style) on Whova
09:00-09:25	Online Presentation 1: **Data-Centric Applications and Security**
09:25-09:30	**Break**
09:30-09:55	Online Presentation 2: **Performance Tuning**
09:55-10:00	**Break**
10:00-10:25	Online Presentation 3: **Data Exploration and Exploitation**
10:25-10:30	**Break**
10:30-10:55	Online Presentation 4: **Social Interaction**
10:55-11:00	**Break**
11:00-12:30	Workshop: **ICT Creative Consilience Program**
12:30-14:00	**Lunch and Wrap up**
14:00-15:00	**Committee Takeaway Meeting**

Keynote Speakers

Tuesday, January 03, 2023, 10:00-10:45 (KST)

Dr. Surya Nepal

Research Group Leader/Senior Principal Research Scientist
Distributed Systems Security, CSIRO's Data61

Deputy Research Director
Cyber Security Cooperative Research Centre (CSCRC)

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IEEE Transactions on Dependable and Secure Computing (TDSC)
ACM Transactions in Internet Technology (TOIT)
Frontiers in Big Data (Data Privacy and Cyber Security)

Research Interests
Data Privacy, Cyber Security, Distributed Systems

Security and Privacy of AI Systems

AI/ML technology has the potential to bring significant benefits to the economy and society. It is a tremendous promise. The technology has been developed, deployed, and adopted in many real-life critical applications to fulfil its promise. It helps us drive cars, doctors to diagnose, employers to hire people, governments to create policies, make our cyberspace secure and safe, and address the skill shortage through automation. However, it also introduces significant risks that need to be managed. For example, Backdoor attacks insert hidden associations or triggers to the deep learning models to override correct inferences such as classification and make the system perform maliciously according to the attacker-chosen target while generally behaving normally in the absence of the trigger. In addition, it has been demonstrated that ML models learn more than necessary from the data and endanger individuals' privacy. Hence, AI/ML systems must have the properties of trustworthy computing, such as security and privacy. This talk provides a brief overview of security and privacy issues in deep neural networks, then presents recent efforts in building trustworthy deep neural networks, and finally, some challenges and opportunities.

Surya Nepal is a Senior Principal Research Scientist at CSIRO Data61 and deputy research director of the Cyber Security Cooperative Research Centre (CRC). He has been working at CSIRO since 2000. His main research interest is in the development and implementation of technologies in the area of distributed systems, including Web Services, Cloud Computing, and Big Data, with a specific focus on security, privacy, and trust. He obtained his B.E. from the National Institute of Technology, Surat, India; M.E. from Asian Institute of Technology, Bangkok, Thailand; and PhD from RMIT University, Australia. At CSIRO, he researched in the area of multimedia databases, web services, and service-oriented architectures, social networks, and security, privacy and trust in a collaborative environment and cloud systems, and big data platforms. He has more than 300 publications to his credit. Many of his works are published in top international journals and conferences such as ACM CCS, NDSS, ASIA CCS, RAID, ACM MM, VLDB, ICDE, ICWS, SCC, CoopIS, ICSOC, IEEE Transactions on Service Computing, IEEE Transactions on Parallel and Distributed Systems, ACM Transaction on Internet Technology, IEEE Transactions on Computers, Communications of the ACM and ACM Computing Survey. Some of his papers have received the best paper award in international conferences such as IEEE CCGRID, IEEE Big Data, WISE, etc. His lifetime citation is 12251, with an h-index 51 and i10-index 210. Dr. Nepal has received several publications and invention awards at CSIRO.

Keynote Speakers

Tuesday, January 03, 2023, 10:45-11:30 (KST)

Mr. Mohan Rao Goli

CVP & CTO
Samsung Research Institute India - Bangalore, India

Research Interests
5G/6G

Evolution of Wireless Networks for the Beyond 5G ERa

Ever since the World first 5G service got commercially launched in South Korea in the year 2019, the research community around the world started thinking on what lies beyond 5G. 5G standardization not only aimed to address the peak and average data rates but also the latency needs of various low latency use cases. 5G also considered the needs of machines as users apart from human needs. A trend that started during the 4G era itself but now getting accelerated with 5G deployments is the trend of network feature virtualization. A virtual network which can be deployed in cloud makes it easier to operate and scale up, scale down quickly as per the needs. Intelligence will have a big role to play once the automation and scalability needs to happen on run-time in open cloud networks to ensure that the experience of multiple services is jointly optimized. On a whole these trends are helping operators to reduce their operational expenses as well as capital expenses. During 4G and 5G development, the role of AI was limited to the system management, operations and maintenance purposes. It was a peripheral function and the standards never assumed the presence of intelligent decision making abilities in the network nodes or in the terminals. Going forward this will change as the 6G network design is being expected to be AI-native. 6G is expected to bring life to new use-cases like immersive XR, holographic communication and digital replicas. Hence the cloud-native and AI-native evolution of Beyond 5G networks is important to meet the performance requirements, architectural requirements which will define the 6G for the future

Mohan Rao Goli holds an MBA degree from IIM-Bangalore and a BE degree from Nagarjuna University. He has received numerous awards like Zinnov's "High impact Global role" award in 2019, Zinnov's "Best in Class CoE" award in 2022 and the "Best Overseas R&D Employee" twice from the President of Samsung Electronics. Mohan is the Corporate Vice President and Chief Technology Officer at Samsung Research Institute India - Bangalore (SRI-B). He has spent over 24 years with Samsung in various capacities. He currently heads the Communication R&D encompassing the 5G/6G standards and pre-standards research as well as the 5G terminal and network solution development. He leads the 5G pre-standards research and testbed development at Samsung, India which finally culminated with the 5G commercial launch in world-wide markets. His team has just embarked on the 6G research and testbed development. Prior to this he spearheaded global 4G and 5G R&D programme for Samsung Mobile business closely collaborating with the eco-system partners across the world. He and his team have been key contributors in the development of communication services like IMS, RCS and MC-PTT Mohan is also a key proponent of Open-source development. In addition to the Virtual core and Virtual RAN solutions, his team also contributes actively to the Open-RAN development. As CTO, he also oversees the overall technology strategy of Samsung India. He has over 20 inventions in the communication networks space and his current areas of interest include Next generation communication systems and AI-in-Wireless.

Keynote Speakers

Wednesday, January 04, 2023, 10:00-10:45 (KST)

Prof. Hyunjin Park

Professor
School of Electronic and Electrical Engineering,
Sungkyunkwan University, Korea

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Research Interests
Medical Image Registration and Segmentation, Medical Image Analysis for Cancer Management, Neuroimaging Analysis

Medical Image Analysis Using Machine Learning

Machine learning is a disruptive technology that is making a significant impact in many scientific disciplines and the field of medicine is no different. Machine learning, especially the deep learning variant, has been playing a crucial role in analyzing various medical imaging modalities such as computed tomography and magnetic resonance imaging. Rapid developments in computer vision technology are rich sources of innovation for medical image analysis, but they cannot be applied blindly to the medical domain. Domain-specific adaptations such as sample imbalance, organ conditions, and imaging physics are needed. This talk introduces our studies of medical image analysis using machine learning. 1) Radiomics is a general framework to extract high-dimensional handcrafted features that is widely used in radiology research. Here, I will discuss how to combine data-driven deep learning features with existing the radiomics framework in the lung imaging context. 2) Graph theory is a pervasive technology and is widely used in neuroimaging analysis. Here, I will discuss how machine learning can be used for mining biomarkers for various brain conditions within the graph framework. 3) Joint analysis of high-dimensional data has significant benefits in revealing new latent dimensions. Here, I will describe a framework to jointly analyze two types of representative high-dimensional data in medicine (imaging and genomic data) known as imaging genetics.

Hyunjin Park received a B.E. in electrical engineering from Seoul National University, Seoul, Korea in 1997, an M.S. in electrical engineering from University of Michigan in 2000, and a Ph.D. in biomedical engineering from University of Michigan, Ann Arbor, USA in 2003. He was a research faculty with University of Michigan Hospital in the Department of Radiology. He is currently a Professor of electrical engineering at Sungkyunkwan University, Korea. His research interest includes image processing methods for medical imaging, medical image analysis for cancer management, and computer vision application for medical imaging. He is on the editorial boards of several SCIE index papers with 150+ papers, 4166 citations, and an h-index of 33 (google scholar) as of October 2022.

Keynote Speakers

Wednesday, January 04, 2023, 10:45-11:30 (KST)

Prof. Yoshiharu Ishikawa

Professor
Graduate School of Informatics, Nagoya University, Japan

Associate Editor
ACM/IMS Transactions on Data Science
The VLDB Journal

Fellow
Information Processing Society of Japan (IPSJ)
The Institute of Electronics, Information and Communication Engineering (IEICE)

Research Interests
Spatio-temporal Databases, Data Mining, Information Retrieval, Web Information Systems

Approximate Database Query Processing with Error Guarantees

In recent years, query processing in databases has become more important with the increase in data and the sophistication of analysis requirements. Research on approximate query processing (AQP) has been conducted to efficiently execute queries on big data and significantly reduce response time. However, without theoretical guarantees for the quality of the approximation, the query results cannot be fully trusted. Based on this background, we are working on a research topic called bounded approximate query processing. It is based on a novel synopsis construction method that focuses on aggregate queries and enables error-guaranteed efficient query processing. In this talk, the trends in research on AQP are briefly reviewed first, then our approach to bounded query processing is explained with the experimental results.

Yoshiharu Ishikawa received the B.S., M.E., and Dr.Eng. degrees in computer science, all from University of Tsukuba, in 1989, 1991, and 1995, respectively. He joined Nara Institute of Science and Technology (NAIST) in 1994 as an associate professor. In 1999, he moved to University of Tsukuba, where he later became an associate professor. In 2006. he joined Information Technology Center, Nagoya University as a professor, and he moved to Graduate School of Informatics at the same university in 2013. During this period, he was a visiting scholar at University of Maryland, College Park and Carnegie Mellon University in from 1997 to 1998 and a visiting professor at National Institute of Informatics (NII) from 2010 to 2015. His research interests include databases, big data, data mining, and scientific databases. In recent years, he has been particularly interested in database query processing, indexing methods, spatio-temporal databases, and stream processing. He has made many contributions to society, especially in the field of databases. His major contributions include program co-chair of DASFAA 2010, general co-chair of VLDB 2020, and an associate editor of the VLDB Journal (2017-now). He is an IEICE Fellow and an IPSJ Fellow. He is a member of ACM, IEEE CS, IEICE, IPSJ, and DBSJ.

Conference Program

| 09:00-09:50, Tuesday, January 03, 2023 |

Regular 1: Towards User Comfort
09:00-09:50, Tuesday, January 03, 2023

Room: 26310
Session Chair: Dr. Junghyun Bum

1-1	**AACstive Touchpad: An Electronic Augmentative and Alternative Communication Touchpad for Post-Stroke Aphasic Patients Basic Support** Kent Bryant Jimenez (*Eastern Visayas State University, Philippines*), Arnold Cera (*Eastern Visayas State University, Philippines*), Nicko Ceblano (*Eastern Visayas State University, Philippines*), Roxcella Reas (*Eastern Visayas State University, Philippines*), Argel Bandala (*De La Salle University, Philippines*), Ronnie Concepcion II (*De La Salle University, Philippines*), Adrian Genevie Janairo (*De La Salle University, Philippines*), Mike Louie Enriquez (*De La Salle University, Philippines*), Andres Philip Mayol (*De La Salle University, Philippines*), Ryan Rhay Vicerra (*De La Salle University, Philippines*), Elmer P. Dadios (*De La Salle University, Philippines*)
1-2	**Building a Recommendation System of Consumers' Preferable Choice Using a Collaborative-Filtering Approach** Nishanthinee Velloo (*Universiti Sains Malaysia*), Noor Farizah Ibrahim (*Universiti Sains Malaysia*), Zuraini Zainol (*Universiti Pertahanan Nasional Malaysia*)
1-3	**Siamese Neural Networks for Content-based Visual Art Recommendation** Ran Li (*San Jose State University, United States*), Melody Moh (*San Jose State University, United States*), Teng-Sheng Moh (*San Jose State University, United States*)
1-4	**A Development of an Early Detection System of Pre-frailty in Senior Citizens Living Inside** Tomihiro Utsumi (*Akita University, Japan*) , Masashi Hashimoto (*Akita University, Japan*)
1-5	**Learning Support System using Question Generation to Encourage Critical Thinking in Online Lectures** Saki Inoue (*Kwansei Gakuin University, Japan*), Yuanyuan Wang (*Yamaguchi University, Japan*), Yukiko Kawai (*Kyoto Sangyo University and Osaka University, Japan*), Kazutoshi Sumiya (*Kwansei Gakuin University, Japan*)

Conference Program

| 09:00-09:50, Tuesday, January 03, 2023 |

Regular 2: Beyond 5G and More 09:00-09:50, Tuesday, January 03, 2023	**Room: 26312** Session Chair: Prof. Syed M. Raza
2-1	**Caching and Containerization of IP Addresses Allocation in 5G Core Networks for Performance Improvements** Anh Tuan Nguyen (*Viettel High Technology Corporation, Vietnam*), Quoc Hung To (*Viettel High Technology Corporation, Vietnam*), Tai Hung Nguyen (*Hanoi University of Science and Technology, Vietnam*), Tien Dong Nguyen (*Viettel High Technology Corporation, Vietnam*), Viet Quan Dinh (*Viettel High Technology Corporation, Vietnam*)
2-2	**Asynchronous traffic handling in time-sensitive in-vehicle network** MinHo Kim (*Sungkyunkwan University, Korea*), YoungSoo Do (*Sungkyunkwan University, Korea*), Jonghun Kim (*Sungkyunkwan University, Korea*), Jaewook Jeon (*Sungkyunkwan University, Korea*)
2-3	**Software-Defined Networking Integrated with Cloud Native and Proxy Mechanism: Detection and Mitigation System for TCP SYN Flooding Attack** Chun-I Fan (*National Sun Yat-sen University, Taiwan*), Jun-Huei Wang (*National Sun Yat-sen University, Taiwan*), Cheng-Han Shie (*National Sun Yat-sen University, Taiwan*), Yu-Lung Tsai *(Chunghwa Telecom, Taiwan)*
2-4	**Traffic-Adaptive Scheme for SDN Control Plane with Containerized Architecture** Anh Khoa Dang (*Hanoi University of Science and Technology, Vietnam*), Trung Kiem Nguyen (*Hanoi University of Science and Technology, Vietnam*), Trung Kien Nguyen *(University of Wurzburg, Germany),* Ngoc Tuan Nguyen (*Hanoi University of Science and Technology, Vietnam*), Huu Thanh Nguyen (*Hanoi University of Science and Technology, Vietnam*)
2-5	**A Network Scheduling Method for Convergence of Industrial Wireless Network and TSN** Min Wei (*Chongqing University of Posts and Telecommunications, China*), Shujie Yang (*Chongqing University of Posts and Telecommunications, China*)

Conference Program

| 11:45-12:45, Tuesday, January 03, 2023 |

Short Presentation 1: Advance Network Applications and Security 11:45-12:45, Tuesday, January 03, 2023	**Room: 26310** Session Chair: Prof. Syed M. Raza
S1-1	**A Load Balancing Protocol for Improved Video on Demand in SDN-Based Clouds** Taleni Shirley Andjamba (*Namibia University of Science and Technology, Namibia*), Guy-Alain Lusilao Zodi (*Namibia University of Science and Technology, Namibia*)
S1-2	**Lightweight energy-efficient offloading framework for mobile edge/cloud computing** Akhmed Sakip (*Nazarbayev University, Kazakhstan*), Ramazan Yersainov (*Nazarbayev University, Kazakhstan*), Mokhira Atashikova (*Nazarbayev University, Kazakhstan*), Timur Rakhimzhan (*Nazarbayev University, Kazakhstan*), Dinh-Mao Bui (*Nazarbayev University, Kazakhstan*), Eui-Nam Huh (*Kyung Hee University, Korea*), Sungyoung Lee (*Kyung Hee University, Korea*)
S1-3	**An Improved Reverse Distillation Model for Unsupervised Anomaly Detection** Nguyen Van Duc (*Ho Chi Minh City University of Technology, Vietnam*), Hoang Huu Bach (*Ho Chi Minh City University of Technology, Vietnam*), Le Hong Trang (*Ho Chi Minh City University of Technology, Vietnam*)
S1-4	**Boundary-Seeking GAN Approach to Improve Classification of Intrusion Detection Systems Based on Machine Learning Model** Ramli Ahmad (*Chaoyang University of Technology, Taiwan*), Li-Hua Li (*Chaoyang University of Technology, Taiwan*), Alok Kumar Sharma (*Chaoyang University of Technology, Taiwan*), Radius Tanone (*Chaoyang University of Technology, Taiwan*)
S1-5	**A two-stage detection system of DDoS attacks in SDN using a trigger with multiple features and self-adaptive thresholds** Muyuan Niu (*Kyushu University, Japan*), Yaokai Feng (*Kyushu University, Japan*), Kouichi Sakurai (*Kyushu University, Japan*)
S1-6	**UAV-Integrated IoT System for Handling Widespread Events** Tien Pham Van (*Hanoi University of Science and Technology, Vietnam*), Van-Nguyen Pham (*Sungkyunkwan University, Korea*)
S1-7	**Method and Analysis for the Improvement of Preemption Performance in IEEE 802.1 TSN** YoungSoo Do (*Sungkyunkwan University, Korea*), MinHo Kim (*Sungkyunkwan University, Korea*), JongHun Kim (*Sungkyunkwan University, Korea*), JaeWook Jeon (*Sungkyunkwan University, Korea*)
S1-8	**A Multi-Stage Method for Time Synchronization in Acoustic Underwater Communications** Van Duc Nguyen (*Hanoi University of Science and Technology, Vietnam*), Van Huy Nguyen (*Hanoi University of Science and Technology, Vietnam*), Quoc Khuong Nguyen (*Hanoi University of Science and Technology, Vietnam*), Tien-Dung Nguyen (*Hanoi University of Science and Technology, Vietnam*)
S1-9	**Efficient Data Communication Automotive Gateway System for CAN-Ethernet Networks** Sung Bhin Oh (*Sungkyunkwan University, Korea*), Min Jeong Lee (*Sungkyunkwan University, Korea*), Jae Wook Jeon (*Sungkyunkwan University, Korea*)
S1-10	**Data Exchange Protocol for Weak Links with Hybrid-RIS in Wireless Networks** Jung-Min Yoon (*Sungkyunkwan University, Korea*), Kyoung Min Kim (*Sungkyunkwan University, Korea*), Tae-Jin Lee (*Sungkyunkwan University, Korea*)

Conference Program

| 11:45-12:45, Tuesday, January 03, 2023 |

Short Presentation 2: Ethological Analytics
11:45-12:45, Tuesday, January 03, 2023

Room: 26312
Session Chair: Prof. Tran Khanh Dang

S2-1	**Promoting Social Interaction and Communication in Ubiquitous Learning: A Co-Skilling Approach** L. G. Pee (*Nanyang Technological University, Singapore*)
S2-2	**A bibliometric analysis of Metaverse research using VOSviewer** Dongyan Nan (*Sungkyunkwan University, Korea and Nanyang Technological University, Singapore*), Seungjong Sun (*Sungkyunkwan University, Korea*), Shreya Gopi (*Nanyang Technological University, Singapore*), Kwan Min Lee (*Nanyang Technological University, Singapore*), Jang Hyun Kim (*Sungkyunkwan University, Korea*)
S2-3	**CIA based Analysis for E-Learning Systems Threats and Countermeasures in Malaysian Higher Education: Review Paper** Abdulaziz Aborujilah (*Universiti Kuala Lumpur, Malaysia*), Jibril Adamu (*Universiti Kuala Lumpur, Malaysia*), Abdulaleem Z. Al-Othmani (*Montfort University Leicester, United Kingdom*), Elham Yahya Al-alwi (*International Islamic University Malaysia, Malaysia*), Dawood Abdulmalek Yahya Al-Hidabi (*International Islamic University Malaysia, Malaysia*)
S2-4	**Examining the Most Popular Users in Twitter' Covid 19 Conversations** Stevanus Wisnu Wijaya (*Universitas Prasetiya Mulya, Indonesia*), Indria Handoko (*Universitas Prasetiya Mulya, Indonesia*)
S2-5	**What Makes Rumor Rebuttals Viral on Social Media?** Anjan Pal (*University of York, United Kingdom*), Snehasish Banerjee (*University of York, United Kingdom*), Avneet Kaur (*University of St Andrews, United Kingdom*)
S2-6	**Process mining to discover online learning behaviour** Husna Sarirah Husin (*Universiti Kuala Lumpur, Malaysia*), Muhammad Sufiyan Abdul Wahid (*Universiti Kuala Lumpur, Malaysia*), Megat F. Zuhairi (*Universiti Kuala Lumpur, Malaysia*), Zuraini Zainol (*Universiti Pertahanan Malaysia, Malaysia*)
S2-7	**Social Media Benefit for Advancing Language Ability in E-learning Environment: A Systematic Literature Review** Arti Prihatini (*Universitas Muhammadiyah Malang, Indonesia*), Gamal Kusuma Zamahsari (*BINUS University, Indonesia*), Fida Pangesti (*Universitas Muhammadiyah Malang, Indonesia*)
S2-8	**Topical Analysis of Depressive Mood Changes in Youth during the COVID-19 Pandemic** Ziyue Zhu (*Yamaguchi University, Japan*), Yuanyuan Wang (*Yamaguchi University, Japan*)
S2-9	**Dramatism of A Video Conferencing Class: Student's Behavior and Expectations** Ferane Aristrivani Sofian (*Bina Nusantara University, Indonesia*)
S2-10	**An Application for Learning Sorting Algorithm using Human Pictograms** Taichi Watanabe (*Aoyama Gakuin University, Japan*), Yuichi Oie (*Aoyama Gakuin University, Japan*), Kazunari Ito (*Aoyama Gakuin University, Japan*)

Conference Program

| 09:00-09:50, Wednesday, January 04, 2023 |

Regular 3: Image Insight 09:00-09:50, Wednesday, January 04, 2023	**Room: 26310** Session Chair: Prof. Taketoshi Ushiama
3-1	**Autonomous Navigation System for Agricultural Vehicles Using Machine Vision Recognition and Localization of Panoramic Landmarks** De Yu Hong *(National Yang Ming Chiao Tung University, Taiwan)*, Stone Cheng *(National Yang Ming Chiao Tung University, Taiwan)*, Yan Xiang Ding *(National Yang Ming Chiao Tung University, Taiwan)*
3-2	**Detection of Synthesized Satellite Images Using Deep Neural Networks** Wen-Hung Liao *(National Chengchi University, Taiwan)*, Yi-Shan Chang *(National Chengchi University, Taiwan)*, Yi-Chieh Wu *(National Chengchi University, Taiwan)*
3-3	**Modified Fast and Robust Fuzzy C-means Algorithm for Flood Damage Assessment using Optimal Image Segmentation Cluster Number** Marck Herzon C. Barrion *(De La Salle University-Manila, Philippines)*, Argel A. Bandala *(De La Salle University-Manila, Philippines)*
3-4	**Real-time human detection and behavior recognition using low-cost hardware** Bojun Wang *(Sungkyunkwan University, Korea)*, Sajid Ali *(Sungkyunkwan University, Korea)*, Xinyi Fan *(Sungkyunkwan University, Korea)*, Tamer Abuhmed *(Sungkyunkwan University, Korea)*
3-5	**Two-Branch Stacked Transformer for 2D Skeleton-based Action Recognition** Yerassyl Zhalgasbayev *(Nazarbayev University, Kazakhstan)*, Anh Tu Nguyen *(Nazarbayev University, Kazakhstan)*

Conference Program

| 09:00-09:50, Wednesday, January 04, 2023 |

Regular 4: Data Analytics 09:00-09:50, Wednesday, January 04, 2023	**Room: 26312** Session Chair: Prof. Suriana Ismail
4-1	**Extracting Implicit Twitter Replies to News Topics** Riku Takahashi *(Kyushu University, Japan)* Taketoshi Ushiama *(Kyushu University, Japan)*
4-2	**Dual ResNet-based Environmental Sound Classification using GAN** Seunghui Jang *(Towson University, United States)*, Yanggon Kim *(Towson University, United States)*
4-3	**DeepDLP: Deep Reinforcement Learning based Framework for Dynamic Liner Trade Pricing** Xueyan Li *(Shanghai JiaoTong University, China)*, Yongyi Hu *(Shanghai JiaoTong University, China)*, Yumeng Bai *(Shanghai JiaoTong University, China)*, Xiaofeng Gao *(Shanghai JiaoTong University, China)*, Guihai Chen *(Shanghai JiaoTong University, China)*
4-4	**Maximal gSpan: Multi-Document Summarization through Frequent Subgraph Mining** Riva Malik *(National University of Computer and Emerging Sciences, Pakistan)*, Kifayat Ullah Khan *(National University of Computer and Emerging Sciences, Pakistan)*, Waqas Nawaz *(Islamic University of Madinah, Saudi Arabia)*
4-5	**Risk Management and Innovation: Analytical Mapping of Risk Management in Innovation Using CiteSpace** Shaopeng Che *(Sungkyunkwan University, Korea)*, Shunan Zhang *(Sungkyunkwan University, Korea)*, Dongyan Nan *(Sungkyunkwan University, Korea)*, Jang Hyun Kim *(Sungkyunkwan University, Korea)*

Conference Program

| 09:00-09:50, Wednesday, January 04, 2023 |

Short Presentation 3: Intelligent Imaging 11:45-12:45, Wednesday, January 04, 2023	**Room: 26310** Session Chair: Prof. Syed M. Raza
S3-1	**Disease Identification in Potato Leaves using Swin Transformer**
	Li-Hua Li *(Chaoyang University of Technology, Taiwan)*, Radius Tanone *(Chaoyang University of Technology, Taiwan)*
S3-2	**Extraction of small water body information based on Res2Net-UNet**
	Yong Wang *(Hobai University, China)*, Yaqi Li *(Bank of Nanjing Co., China)*, Dingsheng Wang *(Hobai University, China)*
S3-3	**Machine Learning Model to Evaluate the Appropriateness of Layout for Automatic Generation of Graphic Design Works**
	Kohei Ishiyama *(Kyushu University, Japan)*, Taketoshi Ushiama *(Kyushu University, Japan)*
S3-4	**Detecting multi-class kidney abnormalities using Deep learning**
	Ahmed Affan *(National University of Computer and Emerging Sciences, Pakistan)*, Shujaat Hussain *(National University of Computer and Emerging Sciences, Pakistan)*
S3-5	**End-To-End Training Of Object Segmentation Task And Video Question-Answering Task**
	Hidemoto Nakada *(National Institute of Advanced Institute of Science and Technology, Japan)*, Hideki Asoh *(National Institute of Advanced Institute of Science and Technology, Japan)*
S3-6	**Cassava Disease Detection using MobileNetV3 Algorithm through Augmented Stem and Leaf Images**
	Aaron Ckyle P. Calma *(Mapúa University, Philippines)*, Jabez Daniel M. Guillermo *(Mapúa University, Philippines)*, Engr. Charmaine C. Paglinawan *(Mapúa University, Philippines)*
S3-7	**Classifying Electrical Resistivity Tomography Profiles of Underground Utilities using Convolutional Neural Network**
	Jullian Dominic D. Ducut *(De La Salle University, Philippines)*, Joseph Aristotle De Leon *(De La Salle University, Philippines)*, Mike Louie Enriquez *(De La Salle University, Philippines)*, Ronnie Concepcion II *(De La Salle University, Philippines)*, Argel A. Bandala *(De La Salle University, Philippines)*, Ryan Rhay P. Vicerra *(De La Salle University, Philippines)*, Renann P. Baldovino *(De La Salle University, Philippines)*
S3-8	**Rainy Day Travel Planning System That Combines Tourism Potential Map with Static Characteristics of Spots**
	Eriko Yamano *(Onomichi City University, Japan)*, Tsuyoshi Takayama *(Onomichi City University, Japan)*
S3-9	**Analysing Wireless Capsule Endoscopy Images Using Deep Learning Frameworks to Classify Different GI Tract Diseases**
	Rupesh Kumar Dey *(Asia Pacific University of Technology & Innovation, Malaysia)*, Muhammad Ehsan Rana *(Asia Pacific University of Technology & Innovation, Malaysia)*, Vazeerudeen Abdul Hameed *(Asia Pacific University of Technology & Innovation, Malaysia)*
S3-10	**Self-Supervised Augmentation of Quality Data Based on Classification-Reinforced GAN**
	Seunghwan Kim *(Sungkyunkwan University, Korea)*, Sukhan Lee *(Sungkyunkwan University, Korea)*

Conference Program

| 09:00-09:50, Wednesday, January 04, 2023 |

Short Presentation 4: Industrial Applications 11:45-12:45, Wednesday, January 04, 2023	**Room: 26312** Session Chair: Prof. Suriana Ismail
S4-1	**An Implementation of Web Based Application which Aims at Deepening Understanding of Key Cryptosystem** Hiroto Maeda *(Aoyama Gakuin University, Japan)*, Yuichi Oie *(Aoyama Gakuin University, Japan)*, Kazunari Ito *(Aoyama Gakuin University, Japan)*
S4-2	**Food Safety Block Chain System using Ontology in UHT Milk Factory** Priyakorn Hemnin *(Chiang Mai University, Thailand)*, Ekkarat Boonchieng *(Chiang Mai University, Thailand)*, Sukhuntha Osiriphun *(Chiang Mai University, Thailand)*
S4-3	**Performance Evaluation of Decentralized Social Media on Near Protocol Blockchain** Dwynn Tama *(Universitas Multimedia Nusantara, Indonesia)*, Arya Wicaksana *(Universitas Multimedia Nusantara, Indonesia)*
S4-4	**Finite Element Method for System-in-Package (SiP) Technology: Thermal Analysis Using Chip Cooling Laminate Chip (CCLC)** Aziz Oukaira *(Université du Québec en Outaouais, Canada)*, Dhaou Said *(Université de Sherbrooke, Canada)*, Jamal Zbitou *(University of Abdelmalek Essaadi, Moroco)*, Ahmed Lakhssassi *(Université du Québec en Outaouais, Canada)*
S4-5	**Data Acquisition Platform for The Energy Management of Smart Factories and Buildings** Shah M. Mahir *(Purdue University, United States)*, Jared Herne *(Indiana University-Purdue University Indianapolis, United States)*, Graham Koch *(Indiana University-Purdue University Indianapolis, United States)*, John J. Lee *(Indiana University-Purdue University Indianapolis, United States)*
S4-6	**No Programming, Configurable Z-Wave Node with Multi-Sensor-Protocol Support** Graham Koch *(Indiana Univ. Purdue Univ. Indianapolis, United States)*, Shah M. Mahir *(Purdue University, United States)*, Stanley Chien *(Indiana Univ. Purdue Univ. Indianapolis, United States)*, Jared Herne *(Indiana Univ. Purdue Univ. Indianapolis, United States)*, Audrey Cheshire *(Indiana Univ. Purdue Univ. Indianapolis, United States)*, John J. Lee *(Indiana Univ. Purdue Univ. Indianapolis, United States)*
S4-7	**Dual-Branch Neural Networks for Predicting Shared Bikes** Huigyu Yang *(Sungkyunkwan University, Korea)*, Syed M. Raza *(Sungkyunkwan University, Korea)*, Duc-Tai Le *(Sungkyunkwan University, Korea)*, Dongsoo S. Kim *(Indiana University-Purdue University, Indianapolis, USA)*, Hyunseung Choo *(Sungkyunkwan University, Korea)*
S4-8	**Enhancement of fundamental frequency extraction capabilities for detecting diver carrying SCUBA open-circuit in shallow water** Nhat Hoang Bach *(Academy of Science and Technology, Vietnam)*, Van Duc Nguyen *(Hanoi University of Science and Technology, Vietnam)*, Le Ha Vu *(Academy of Science and Technology, Vietnam)*, Duy Phong Pham *(Electric Power University, Vietnam)*,
S4-9	**VNLES: A Reasoning-enable Legal Expert System using Ontology Modeling-based Method: A Case Study of Vietnam Criminal Code** Quoc Tuan Dao *(Ho Chi Minh University of Technology, VNU-HCM, Vietnam)*, Tran Khanh Dang *(Ho Chi Minh City University of Food Industry, Vietnam)*, Thi Phuong Hoa Nguyen *(Ho Chi Minh City University of Law, Vietnam)*, Thi Minh Chau Le *(Ho Chi Minh City University of Technology and Education, Vietnam)*
S4-10	**Intelligent Aeroponic System for Real-time Control and Monitoring of Lactuca sativa Production** Cris Ramil Calzita *(Eastern Visayas State University, Philippines)*, Kehndee Ann Jubilo *(Eastern Visayas State University, Philippines)*, Glenn Permejo *(Eastern Visayas State University, Philippines)*, Roxcella Reas *(Eastern Visayas State University, Philippines)*, Jonah Jahara Baun *(De La Salle University, Philippines)*, Ronnie Concepcion II *(De La Salle University, Philippines)*, Joseph Aristotle de Leon *(De La Salle University, Philippines)*, Argel Bandala *(De La Salle University, Philippines)*, Andres Philip Mayol *(De La Salle University, Philippines)*, Ryan Rhay Vicerra *(De La Salle University, Philippines)*, Elmer Dadios *(De La Salle University, Philippines)*

Conference Program

| 09:00-09:25, Thursday, January 05, 2023 |

Online Presentation 1: Data Centric Applications and Security — **Room: Whova**
09:00-09:25, Thursday, January 05, 2023

P1-1	**Picuit - An Application of pictogram content creation using state transition diagram** Kazunari Ito (*Aoyama Gakuin University, Japan*)
P1-2	**Exploring Deep Learning for Detection of Poultry Activities – Towards an Autonomous Health and Welfare Monitoring in Poultry Farms** Ivan Roy S. Evangelista (*De La Salle University, Phillipines*), Lenmar T. Catajay (*Sultan Kudarat State University, Phillipines*), Argel A. Bandala (*De La Salle University, Phillipines*), Ronnie S. Concepcion II (*De La Salle University, Phillipines*), Edwin Sybingco (*De La Salle University, Phillipines*), Elmer P. Dadios (*De La Salle University, Phillipines*)
P1-3	**Comparison of Ensemble Models as Solutions for Imbalanced Class Classification of Datasets** Yoga Pristyanto (*Universitas Amikom Yogyakarta, Indonesia*), Anggit Ferdita Nugraha (*Universitas Amikom Yogyakarta, Indonesia*), Rifda Faticha Alfa Aziza(*Universitas Amikom Yogyakarta, Indonesia*), Ibnu Hadi Purwanto (*Universitas Amikom Yogyakarta, Indonesia*), Mulia Sulistiyono (*Universitas Amikom Yogyakarta, Indonesia*), Akhmad Dahlan (*Universitas Amikom Yogyakarta, Indonesia*)
P1-4	**Comparison of Different Political Figures and Evaluation of Twitter Utilization Over Time in The Political Communication Media** Irmawan Rahyadi (*Bina Nusantara University, Indonesia*), Airlangga Muhammad Syahraihan (*Bina Nusantara University, Indonesia*), Debora Agustina (*Bina Nusantara University, Indonesia*), Dhea Amelia Irawan (*Bina Nusantara University, Indonesia*)
P1-5	**HDA-TIP: A framework for Heterogeneous Data Aggregation for Threat Intelligence Platform** Afzal Yasmeen (*National University of Computer and Emerging Sciences, Pakistan*), Khan Kifayat Ullah (*National University of Computer and Emerging Sciences, Pakistan*), Asim Muhammad (*National University of Computer and Emerging Sciences, Pakistan*)
P1-6	**GAN vs. LSTM: Network State Prediction** Gyurin Byun (*Sungkyunkwan University, Korea*), Huigyu Yang (*Sungkyunkwan University, Korea*), Syed M. Raza (*Sungkyunkwan University, Korea*), Moonseong Kim (*Seoul Theological University, Korea*), Hyunseung Choo (*Sungkyunkwan University, Korea*)
P1-7	**A New Technique of Blackboard Architecture in Decision-Making for Timber Harvesting** Hana Munira Muhd Mukhtar (*Universiti Kuala Lumpur, Malaysia*), Roslan Ismail (*Universiti Kuala Lumpur, Malaysia*)
P1-8	**Travel blogger credibility scoring method for recommendation system** Akihiro Kondo (*Tokyo Denki University, Japan*), Hironobu Abe (*Tokyo Denki University, Japan*)
P1-9	**Local Hashing and Fake Data for Privacy-Aware Frequency Estimation** Gatha Varma (*Amity University, India*)
P1-10	**A Study on Partially Homomorphic Encryption** Jihyeon Ryu (*Sungkyunkwan University, Korea*), Khan Kifayat Ullah (*National University of Computer and Emerging Sciences, Pakistan*), Asim Muhammad (*National University of Computer and Emerging Sciences, Pakistan*)
P1-11	**Self-Supervised Augmentation of Quality Data Based on Classification-Reinforced GAN** Sammy Yap Xiang Bang (*Sungkyunkwan University, Korea*), Kim-Ngoc Thi Le (*Sungkyunkwan University, Korea*), Duc-Tai Le (*Sungkyunkwan University, Korea*), Hyunseung Choo (*Sungkyunkwan University, Korea*)

Conference Program

| 09:30-09:55, Thursday, January 05, 2023 |

Online Presentation 2: Performance Tuning 09:30-09:55, Thursday, January 05, 2023	**Room: Whova**
P2-1	**Adaptive Holt-Winters Forecasting Method based on Artificial Intelligence Techniques**
	Noppakun Sangkhiew (*Silpakorn University, Thailand*), Arnat Watanasungsuit (*Hydrocarbon Solutions Company Limited, Thailand*), Choat Inthawongse (*Muban Chombueng Rajabhat University, Thailand*), Peerapop Jomthong (*Christian University, Thailand*), Kawinthorn Saicharoen (*Silpakorn University, Thailand*), Choosak Pornsing (*Silpakorn University, Thailand*)
P2-2	**Improved Evolution Performance for Genetic Programming with Method to Search Numbers of Trees**
	Takashi Ito (*Aoyama Gakuin University, Japan*)
P2-3	**Covert Communication over Federated Learning Channel**
	Sang Wu Kim (*Iowa State University, USA*)
P2-4	**Multi-Core ECU Load-Reducing Method using Time-Division Processing**
	JongHun Kim (*Sungkyunkwan University, Korea*), YoungSoo Do (*Sungkyunkwan University, Korea*), MinHo Kim (*Sungkyunkwan University, Korea*), JaeWook Jeon (*Sungkyunkwan University, Korea*)
P2-5	**Improve symbolic music pre-training model using MusicTransformer structure**
	Yingfeng Fu (*University of Tsukuba, Japan*), Yusuke Tanimura (*National Institute of Science and Technology, Japan*), Hidemoto Nakada (*National Institute of Science and Technology, Japan*)
P2-6	**Optimization of VLF Capacitive-Resistive Dipole Electromagnetic Fields for Underground Utility Pipe Detection Using Artificial Bee Colony, Circle-inspired, and Genetic Metaheuristics**
	Mike Louie Enriquez (*De La Salle University, Philippines)*, R-Jay Relano (*De La Salle University, Philippines)*, Kate Francisco (*De La Salle University, Philippines)*, Ronnie Concepcion II (*De La Salle University, Philippines)*, Jonah Jahara Baun (*De La Salle University, Philippines)*, Adrian Genevie Janairo (*De La Salle University, Philippines)*, Joseph Aristotle de Leon (*De La Salle University, Philippines)*, Argel Bandala (*De La Salle University, Philippines)*, Ryan Rhay Vicerra (*De La Salle University, Philippines)*, Elmer Dadios (*De La Salle University, Philippines)*
P2-7	**Optimizing Low Power Near L-band Capacitive Resistive Antenna Design for in Silico Plant Root Tomography Based on Genetic Big Bang-Big Crunch**
	Ronnie Concepcion II (*De La Salle University, Philippines*), R-Jay Relano (*De La Salle University, Philippines*), Kate Francisco (*De La Salle University, Philippines*), Jonah Jahara Baun (*De La Salle University, Philippines*), Adrian Genevie Janairo (*De La Salle University, Philippines*), Joseph Aristotle de Leon (*De La Salle University, Philippines*), Llewelyn Espiritu (*De La Salle University, Philippines*), Andres Philip Mayol (*De La Salle University, Philippines*), Mike Louie Enriquez (*De La Salle University, Philippines*), Ryan Rhay Vicerra (*De La Salle University, Philippines*), Argel Bandala (*De La Salle University, Philippines*)

Conference Program

Online Presentation 2: Performance Tuning 09:30-09:55, Thursday, January 05, 2023	**Room: Whova**
P2-8	**Analytical Hierarchy Process-based Selection of Underground Imaging Antenna Enclosure Material for Optimized Power Transfer** Mike Louie Enriquez (*De La Salle University, Philippines*), Ronnie Concepcion II (*De La Salle University, Philippines*), R-Jay Relano (*De La Salle University, Philippines*), Kate Francisco (*De La Salle University, Philippines*), Adrian Genevie Janairo (*De La Salle University, Philippines*), Jonah Jahara Baun (*De La Salle University, Philippines*), Joseph Aristotle de Leon (*De La Salle University, Philippines*), Ryan Rhay Vicerra (*De La Salle University, Philippines*), Argel Bandala (*De La Salle University, Philippines*), Elmer Dadios (*De La Salle University, Philippines*)
P2-9	**Study of Adam and Adamax Optimizers on AlexNet Architecture for Voice Biometric Authentication System** Noor Azwana Mat Ariff (*International Islamic University, Malaysia*), Amelia Ritahani Ismail (*International Islamic University, Malaysia*)
P2-10	**Little tricks leading to a significant acceleration of the calculation of the reliability of a random graph** Alexey Rodionov (*Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Novosibirsk, Russia*)

Conference Program

| 10:00-10:25, Thursday, January 05, 2023 |

Online Presentation 3: Data Exploration and Exploitation 10:00-10:25, Thursday, January 05, 2023	**Room: Whova**
P3-1	**Systematic Review of Qualitative and Quantitative Studies on Perceived Employability of Graduates** Fareed Kaleem Khaiser (*Universiti Kuala Lumpur, Malaysia*), Amna Saad (*Universiti Kuala Lumpur, Malaysia*), Cordelia Mason (*Universiti Kuala Lumpur, Malaysia*)
P3-2	**TK-BERT: Effective Model of Language Representation using Topic-based Knowledge Graphs** Chanwook Min (*Kwangwoon University, Korea*), Jinhyun Ahn (*Jeju National University, Korea*), Taewhi Lee (*Electronics and Telecommunications Research Institute, Korea*), Dong-Hyuk Im (*Kwangwoon University, Korea*)
P3-3	**Korean Language NLP Model Based Emotional Analysis of LGBTQ Social Media Communities** Younghyun Chi (*Sungkyunkwan University, Korea*), Jang Hyun Kim (*Sungkyunkwan University, Korea*), Seungjong Sun (*Sungkyunkwan University, Korea*)
P3-4	**Recommender Performance for Users with Interest in Several Fields on Collaborative Topic Regression through Vocabulary Completion** Akihiro Nishimura (*Osaka University, Japan*), Yoshinori Hijikata (*Kwansei Gakuin University , Japan*), Kosuke Sato (*Osaka University, Japan*)
P3-5	**Improve symbolic music pre-training model using MusicTransformer structure** Ritu Chauhan (*Amity University, India*), Nidhi Gola (*Amity University, India*), Eiad Yafi (*University of Technology Sydney, Australia*)
P3-6	**HDFR: A Hydrologic Data and Modeling System with On-Demand Access to Environmental Sensing Data for Decision Making** Daniel Luna (*University of Pittsburgh, United States),* Felipe Hernández (*University of Pittsburgh, United States),* Yao Liang (*University Indianapolis, United States),* Xu Liang (*University of Pittsburgh, United States)*
P3-7	**Localizing and Analyzing the Infographics in Document Using Deep Learning** Talha Nazar (*National University of Computer and Emerging Sciences, Pakistan*), Shujaat Hussain Kausar (*National University of Computer and Emerging Sciences, Pakistan*), Kifayat Ullah Khan (*National University of Computer and Emerging Sciences, Pakistan*)
P3-8	**Pictorial Map Generation based on Color Extraction and Sentiment Analysis using SNS Photos** Yuanyuan Wang (*Yamaguchi University, Japan*)
P3-9	**DTW Threshold Determination for English Word Utterances in Filipino Accent using MFCC** Christian C. Anabeza (*De La Salle University, Philippines*), Galvin Brice S. Lim (*De La Salle University, Philippines*), Mark Lawrence P. Velasco (*De La Salle University, Philippines*), Edwin Sybingco (*De La Salle University, Philippines*), Dino Dominic Ligutan (*De La Salle University, Philippines*)
P3-10	**Distributed Learning of Pure Non-IID data using Latent Codes** Anirudh Kasturi (*BITS Pilani, Hyderabad, India*), Akshat Agrawal (*BITS Pilani, Hyderabad, India*), Chittaranjan Hota (*BITS Pilani, Hyderabad, India*)
P3-11	**Chest Radiograph Enhancement with Contrast Limited Adaptive Histogram Equalization** Hyeri Lee (*Sungkyunkwan University, Korea*), Duc-Tai Le (*Sungkyunkwan University, Korea*), Junghyun Bum(*Sungkyunkwan University, Korea*), Hyunseung Choo (*Sungkyunkwan University, Korea*)

Conference Program

| 10:30-10:55, Thursday, January 05, 2023 |

Online Presentation 4: Social Interaction 10:30-10:55, Thursday, January 05, 2023	**Room: Whova**
P4-1	**Multi-Objective Information Maximization in a Social Network** Kundan Kandhway (*Indian Institute of Science Education and Research Bhopal, India*)
P4-2	**When social networks meet payment: a security perspective** Nivedita Singh (*Sungkyunkwan University, Korea*), Mohsen Ali Alawami (*Sungkyunkwan University, Korea*), Hyoungshick Kim (*Sungkyunkwan University, Korea*)
P4-3	**Maximizing Spread of a Message in the Susceptible-Infected-Recovered Process** Kundan Kandhway (*Indian Institute of Science Education and Research Bhopal, India*)
P4-4	**The Effect of Inclusive Design on Easy Accessibility for Disabled E-Commerce Users in Indonesia** Chindy Jessika Trielsa (*Bina Nusantara University, Indonesia*), Mia Angeline (*Bina Nusantara University, Indonesia*)
P4-5	**Ramadan Spirit: A Digital Game Incorporating Malaysian Culture to Teach Malaysian Muslim Children the Islamic Essence of Ramadan** Suhaili Din (*Universiti Kuala Lumpur, Malaysia*), Maisarah Mohd Ramli (*Universiti Kuala Lumpur, Malaysia*)
P4-6	**Assistive Technology for Children with Learning Disabilities: A Systematic Literature Review** Ahmad Haiqal Abd Khalid (*International Islamic University, Malaysia*), Nur Nazihah Mohkhlas (*International Islamic University, Malaysia*), Noor Azura Zakaria (*International Islamic University, Malaysia*), Mazidah Mat Rejab (*Universiti Tun Hussien Onn Malaysia, Malaysia*), Ruwinah Abdul Karim (*Penawar Special Learning Centre, Malaysia*), Suharsiwi (*Universitas Muhammadiyah Jakarta, Indonesia*)
P4-7	**Cultivating Social Media Utilization by Television Stations: An Analysis of Instagram Practices in Czech Republic** Daniel Messele Balcha (*Czech Life Science University, Czech Republic),* Irmawan Rahyadi (*Binus University, Indonesia),* Ayu Agung Mirah Krisnawati (*Binus University, Indonesia),* Rifa Bestari (*Binus University, Indonesia)*
P4-8	**Pedatren: Educational Administration Applications for Simplifying Paiton Probolinggo's Nurul Jadid Islamic Boarding School's Management** Gamal Kusuma Zamahsari (*Binus University, Indonesia*), Agus Purnomo AP (*IAIN Madura, Indonesia*), Agus Purnomo AP (*IAIN Madura, Indonesia*), Agik Nur Efendi (*IAIN Madura, Indonesia*), Moh Hafid Effendy (*IAIN Madura, Indonesia*), Ika Cahya Adiebia (*IAIN Madura, Indonesia*)
P4-9	**An Evaluation of Smartwatch Contribution in Improving Human Health** Kok Yin Long (*Asia Pacific University of Technology & Innovation, Malaysia*), Kamalanathan Shanmugam (*Asia Pacific University of Technology & Innovation, Malaysia*), Muhammad Ehsan Rana (*Asia Pacific University of Technology & Innovation, Malaysia*)
P4-10	**The Effect of Portable Laboratory Integrated with Local Wisdom (PL-ILW) for Physics Learning** Rudi Susanto (*Universiti Kuala Lumpur, Malaysia*), Mohd Nizam Husen (*Universiti Kuala Lumpur, Malaysia*), Adidah Lajis (*Universiti Kuala Lumpur, Malaysia*),
P4-11	**Space from Line: What can Metaverse Support in Education/Learning Activity?** Toyohide Watanabe (*Nagoya Industrial Science Research Institute, Japan*)

Maps - From the Incheon International Airport to the conference venue -

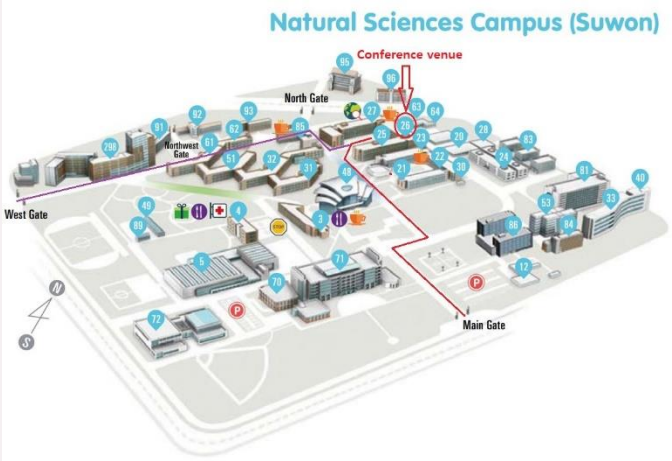
| From Incheon International Airport to Natural Sciences Campus, Sungkyunkwan University, Suwon, South Korea |

Conference Venue is located approx. 60 kilometers from Incheon International Airport. The journey from the airport to the resort takes **approximately 50 minutes to 1 hour by car**. From airport you can arrive at the conference location by **taxi, subway or by bus**. However, it is recommended to take a taxi if you are not familiar with the use of other options.

English address: (16419) Engineering 2 building (26th building), Sungkyunkwan University, 2066 Seobu-ro, Jangan-gu, Suwon-si, Gyeonggi-do, South Korea

Korean address: (16419) 경기도 수원시 장안구 서부로 2066 성균관대학교 제2공학관 26동

More detail: Visit http://imcom.org/gnu/venue.htm



❖ **Regular Taxi (Airport -> Natural Sciences Campus, Sungkyunkwan University, Suwon)**

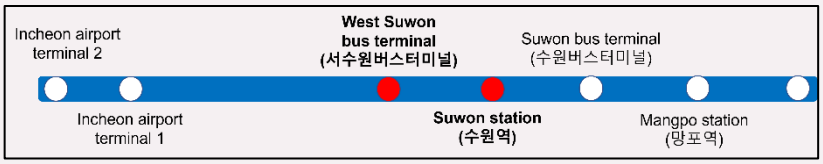
We recommend this way to go to the conference venue, as it is much faster than bus. You can find regular taxi at 5C, 6C, 6D, 7C and 8C at Terminal 1 as shown in figure below.

More information regarding the taxi and transport is available on the following link.

❖ **Bus + Taxi (Airport ->Natural Sciences Campus, Sungkyunkwan University, Suwon)**

From Incheon airport, you can use the bus A4100 to go to West Suwon bus terminal (the ticket price is 13,500 KRW).

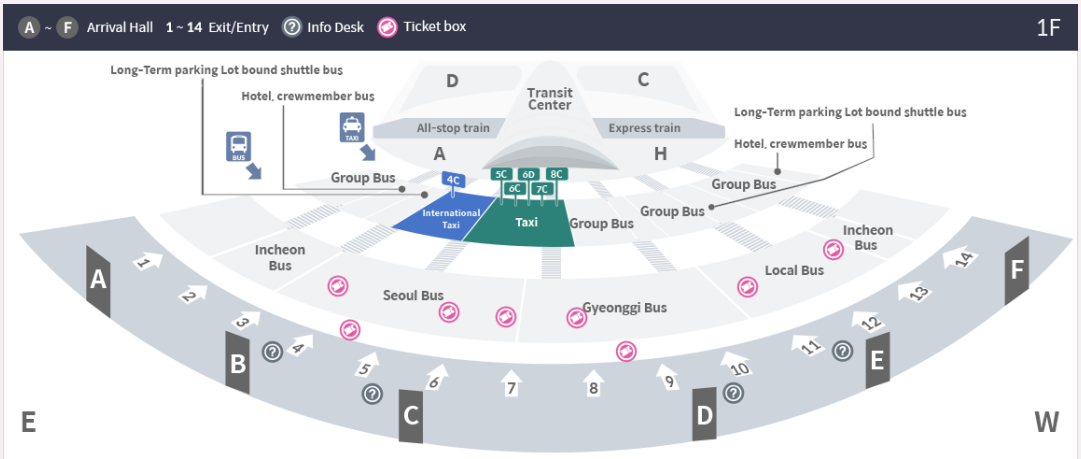
+ The route of the bus A4100 is illustrated in the figure below.



+ You can find the bus schedule and the places to catch the bus at each terminal here: https://www.airport.kr/ap/en/tpt/busRouteList.do (select Gyeongggi, then 4100)

+ From West Suwon bus terminal, you can grab a taxi to Sungkyunkwan University, Suwon Campus (5,000~8,000 KRW)

Note: When using a taxi, please show the driver the Korean address of the conference venue mentioned above



Welcome Reception

| Sungkyunkwan University, Suwon Campus |

Address:
Kor: 자연과학캠퍼스 (16419) 경기도 수원시 장안구 서부로 2066, 26312호
Eng: Natural Sciences Campus: Room 26312, Engineering Building 2, 2066 Seobu-ro, Jangan-gu, Suwon-si, Gyeonggi-do (16419), Korea
Tel: +82-31-290-7226
Website: http://www.imcom.org/
Organization co-chairs: Duc-Tai Le, Huigyu Jang

SUNG KYUN KWAN UNIVERSITY(SKKU)

AGENDA	
Date: Tuesday, January 3, 2023 **Food: Lunch box** **Venue: Rooms 26310, 26311, 26312** **Attire: Casual**	
12:45	Picking up the lunch box at the registration desk
13:00	Lunch begins
14:00	Lunch ends

Conference Banquet

| 길림성 – Korean-Chinese Restaurant|

Address:

Kor: 경기도 수원시 장안구 송원로 2 (송죽동 2,3층)

Eng: Songwon-ro 2, Jangan-gu, Suwon-si, Gyeonggi-do (2nd and 3rd floors of Songjuk-dong)

Tel: +82-31-252-1001

Website: http://길림성.com/ or https://naver.me/GdbmYd0X

Organization co-chairs: Hyunseung Choo and Siwon Kim

CHINESERESTAURANT 中國式食堂 吉林城

AGENDA	
Date: Wednesday, January 04, 2023 **Food: Korean-Chinese set menu** **Venue: 길림성 – Korean-Chinese restaurant, Suwon** **Attire: Smart Casual**	
12:45	Gathering all participants at the registration desk
12:55	Getting on bus and departing to the restaurant
13:10	Lunch begins
13:45	Contribution award
14:00	Farewell message and announcement of next year IMCOM
14:15	Photo session all together
14:30	Conference Banquet ends

Lotte World Tower Seoul

| Lotte World Tower Seoul|

Address:

Kor: 05551, 서울시 송파구 올림픽로 300(신천동 29)

Eng: 05551, Olympic-ro 300, Songpa-gu, Seoul (Sincheon-dong 29)

Tel: +82-2-3213-5000

Website: https://www.lwt.co.kr/

Organization co-chairs: Hyunseung Choo and Siwon Kim

Note: We will provide a ticket (~30,000 KRW) to go to the top of the tower

AGENDA	
Date: Thursday, January 04, 2023 **Venue: Lotte World Tower** **Attire: Smart Casual**	
14:30	Gathering all participants
14:45	Getting on bus and departing to the Lotte World Tower
16:00	Arriving at the Lotte World Tower
16:15	The tour begins
19:30	The tour ends and departing to Sungkyunkwan University

Travel Information - About Conference Venue -

| About Suwon |

Suwon is a historical landmark and the capital city of Gyeonggi Province. Suwon almost became the national capital in the 18th century, when King Jeongjo of the Joseon Dynasty selected it as the site for a fortification with 5.7-kilometer-long walls before moving the palace south. But the king died, power remained in Seoul, and Suwon became a great tourist attraction. Traditionally known as the "City of Filial Piety," Suwon is located about 30 kilometers south of Seoul and is bordered by Uiwang City to the north, Yongin City to the east, Hwaseong City to the south and southwest, and Ansan City to the west. Suwon is a major industrial and cultural center in Korea. Suwon Hwaseong Fortress, a UNESCO-designated World Heritage Site, is a representative landmark of Suwon. It is one of the few cities in Korea to possess a fortress, which has become a leading popular tourist destination in Gyeonggi Province. In addition, the headquarters of Samsung Electronics is located in Suwon. Suwon, also popular in Korea for its sports. It is home to the Suwon Samsung Bluewings, a soccer team that has won four K-League titles and two AFC Champions League titles, and the KT Wiz baseball team is also based in Suwon. Suwon is known for Suwon galbi, a variation on the style beef short rib enjoyed throughout Korea. The city also has the same variety of Korean dishes served throughout the peninsula and has a wide variety of restaurants serving food from outside Korea. Since 1995, Galbi festival has been held annually, attracting many tourists.

| About Conference Venue |

Sungkyunkwan University was founded at the beginning of the Joseon Dynasty in 1398 as the highest national educational institute in the early years of the Joseon Dynasty in Korea. As the oldest university in East Asia, it has fostered leaders of our society for over 600 years. 'SKKU's main ideology, 수기치인 (修己治人) pronounced 'Su-Gi-Chi-In', teaches that SKKU students strive to perfect themselves as leaders and contribute to our society. This ideology is the fundamental principle by which SKKU brought up leaders of our society for over 600 years, thus contributing to evolution of our society. Sungkyunkwan University,' continuously strives to integrate its founding tradition philosophy with the modern technology in order with a view to cultivating global graduate' s talents who will lead the 21st century. Old Sungkyunkwan was founded over 600 years ago by royal decree to promote education the scholarship in Confucianism. As nation's highest educational institution, Old Sungkyunkwan went through vicissitudes with the country it served over the centuries. Though a long history alone cannot guarantee the excellence of an institution, the rich culture, which exudes from a long tradition, is surely a unique and valuable asset of the University. What the University has achieved in the past fifty years meets and exceeds that of the preceding history. We take pride in the University's innovative spirit; as a result of the long efforts to place natural sciences on an equal footing with our strong foundation in humanities, we now operate two campuses: the Humanities and Social Sciences Campus and the Natural Sciences Campus. Based on a highly successful partnership with Samsung which has generously funded several core initiatives, the University has been rapidly developing and prospering since 1996.

Travel Information - General Information -

| Covid Regulations |

Regardless of your vaccination history or visa status, in bound travelers to Korea are now exempt from quarantine. (Only confirmed cases will be required to quarantine.) Travelers are no longer required to submit negative COVID-19 test results for either the PCR (polymerase chain reaction) or RAT (rapid antigen test) tests.
Medicines such as Tylenol and Aspirin are available at pharmacies or can be purchased at convenience stores.

| Accommodation |

Detailed information for the reservation is available on: imcom.org / VENUE / Accommodation

Name	Location	Contact	Price per day (KRW)
Novotel	Nearby Suwon Station	+82 31-547-6600	165,000
Partyz Hotel	Nearby West Suwon Bus Terminal	+82 31-278-7780	90,000
AMARE Hotel		+82 31-291-0068	80,000

| Climate |

Suwon has a wet and very humid climate during the su mmer season, with cold and dry weather during the wi nter season. Spring (although windy) and autumn are mild but are short in duration. These seasons are consi dered the best time to visit Seoul.

| Electricity |

In Korea the standard voltage is 220V and the frequency is 60Hz. You can use your electric appliances in Korea, if the standard voltage in your country is in between 220-240V (as is in the UK, Europe, Australia and most of Asia and Africa). Manufacturers take these small deviations into account. If the standard voltage in your country is in the range of 100-127V (as is in the US, Canada and most South American countries), you need a voltage converter in South Korea. You can also consider a combined power plug adapter/voltage converter.

| Language |

Korean (한국어, Hanguko) is the official language of Korea. The Korean dialect (사투리, Satoori) is also commonly spoken, especially in the southern and rural areas. English is by far the most popular foreign language, and large numbers of people speak it fluently. In particular, those working in hotels, business, or public organizations are likely to have a good command of the language. Moreover, many elderly people, especially those educated before World War II, can also speak Japanese, Chinese and North Korean dialect.

| Banking Service |

One of the most convenient ways to obtain local currency is to draw it from an ATM. Most ATMs throughout South Korea can be used to draw money from your bank account at home. Look for stickers displaying the Maestro, VISA, Mastercard, Cirrus or Plus logos. You should be aware that most local banks will charge a fee per withdrawal. If you have any questions while using ATM machines, call the Korea Travel Phone at 1330.

| Credit Card |

Credit cards are widely accepted in shops, but most vendors will only accept cash. Payment types that can easily be used in South Korea include Visa, Mastercard, American Express, and Samsung Pay.

| Currency |

The South Korean won is the official currency of South Korea. The currency code is KRW and is commonly abbreviated as ₩. Historically, exchange rates between KRW and USD have been around US$1 = ₩1,300

| Currency Exchange |

It is very easy to change major foreign currencies such as US dollar, euro (EUR), British Pound (BGP), Japanese yen (JYP), Australian dollar (AUD), Swiss franc(CHF). By visiting at designated banks or international tourism hotels, you will be able to easily and conveniently change your money. Travelers should keep the receipt. If travelers would like to exchange the remaining South Korean won, the receipt is required. KRW are most denominated in ₩1000, ₩5000, ₩10000, and ₩50000. Coins are issued in ₩10, ₩50, ₩100, and ₩500.

| Business and Office Hours |

Banks: Mon – Fri 9:30 A.M. to 4:00 P.M.
Offices: Mon – Fri 9:00 A.M. to 6:30 P.M.
Post Offices: Mon – Fri 9:00 A.M. to 6:00 P.M.
Museums: Mon – Sun 10:00 A.M. to 6:00 P.M.
Restaurants: Mon-Sun 11:00 AM – 10:00 PM.
Shops, Stores: Mon – Sun 11:00 A.M. to 10:00 P.M.
Pubs and Bars: Mon – Sun 06:00 P.M. to 02:00 A.M.

**Business and office hours may depend on the current COVID19 situation in South Korea.

| Time Zone |

South Korea Standard Time, GMT/UTC +9h during standard time. South Korea does not follow the Daylight-saving time.

Travel Information - General Information -

| Tipping & Tax |

Tipping is not required nor expected in Korea. But most major hotels add a compulsory 10% service charge to bills. This is on top of the 10% VAT (which is usually included in prices at most stores in Korea, but not in some high-end restaurants). Taxi drivers will appreciate it if you tell them to "keep the change" (or "jandon gajiseyo" in Korean), but this is not expected and they will have trouble understanding if you want to give them anything more than change (like "keep 1,500 won and return only 2,000 won to me".)

| Medical Service |

The services of Health and Safety at Seoul are as follows:

Gyeonggi Provincial Medical Center Suwon Hospital
경기 수원시 장안구 수성로245번길 69

Suwon Samsung Nursing Hospital (수원삼성요양병원)
경기 수원시 장안구 장안로 108

Sungkyunkwan University Health Care Center
자연과학캠퍼스 (16419) 경기도 수원시 장안구 서부로 2066

| Shopping |

Seoul, near Suwon, is a shopping mecca. Markets, malls and boutiques line the streets of this city. In fact, it can get downright confusing when it comes down to where to shop in Seoul, especially if you only have a few days. Myeongdong is one of the major shopping districts in Seoul. We suggest shopping here for Korean skincare and cosmetics but clothing, home goods, and snacks can be found here, as well. Go on a 'shop crawl' along Ewha Womans University Shopping Street. It's the destination for shoes, accessories and even beauty supplies for women. In addition to shopping, you can also treat yourself to a Korean makeover at one of the many salons. Hongdae is also known as the 'Harajuku' of Seoul; home to Hongik University, the area is populated by students so head to this shopping area if you're after edgy, indie fashion. After you shop 'til you drop, hang around to hit up a nearby bar for a live performance or grab a drink.

| Emergency Numbers |

Medical Emergencies and Fire Department: 119
Police Department: 112
Emergency Assistance : 1339
Travel information: 1330
Lost and Found Center: 182
Country calling code: +82

| Dress Code |

Korean citizens are generally kind and accepting of tourists, but in a culture that is far more conservative than western part of the world. Pack fairly conservative clothing. You don't need to cover every inch of skin, but don't expose your cleavage or wear mini skirts. Any skirt you wear should fall at least to the knee and be loose enough to allow you to sit on the floor comfortably, since you may need to do so while dining. Always wear shoes that are easy to slip in and out of; whenever you enter a temple, you'll be expected to remove your shoes. Wear socks so you won't have to walk around barefoot. In general, pack clothing you'd be comfortable wearing to a dressy dinner out. In large cities like Seoul, Koreans tend to dress up; you'll stand out in jeans and T-shirts.

| Public Transport |

There are plenty of transportation options in Suwon. Some are economical and fast while some, like the Hwaseong Trolley, are fanciful and geared toward tourists. The Seoul subway line extends to Suwon. The trip from Seoul to Suwon takes about one hour and passes through some beautiful Korean countryside after leaving Seoul's city limits, when it is above-ground. The subway is reasonably priced. Suwon's main station is located on the west side of downtown, and this is where you can also catch the trains, the trolley, or a bus.

| To/From the Airport |

Incheon International Airport is the main port of arrival for most flights from outside Korea. Located approximately 1 hour from downtown Suwon, there are a number of convenient ways to get to the city from the airport.

For further information visit the site:

https://english.visitseoul.net/essential-Info-article/Transportation-to-Seoul_/427

From Incheon airport, you can use a bus A4100 to go to West Suwon (the ticket price is 13,500 KRW). All recommended hotels are in the walking distance from either West Suwon bus terminal or Suwon station. You can find the bus schedule and the places to catch the bus at each terminal here:

https://www.airport.kr/ap/en/tpt/busRouteList.do

You can also catch a taxi from Incheon airport to your hotel (~70,000 KRW)

https://www.airport.kr/ap/en/tpt/pblcTptTaxi.do

From hotels to conference venue, the easiest way is to take a taxi with the cost of 5,000 ~ 8,000 KRW

Note: When using a taxi, please show the driver the Korean address of the conference venue:

(16419) 경기도 수원시 장안구 서부로 2066 성균관대학교 제2공학관 26동 (26310 & 26312호)

Travel Information - Foods -

| Bibimpap |

Colorful, healthy, fun to eat and easily adaptable to many food and dietary preferences, bibimbap is one of the most well-known dishes in Korea and very easy to find in Seoul. Bibimbap consists of rice, topped with a variety of vegetables, often beef, and comes with a fried egg on top. The whole bowl is mixed with gochujang (Korean chili paste) and tossed together to create a savory, flavorful combination that's filling without being too heavy.

| Jokbal |

Jokbal refers to a dish of pig's trotters braised in soy sauce, ginger, garlic, and rice wine. Other ingredients like onions, leeks, garlic, cinnamon, and black pepper can also be used. The trotters are simmered until fork tender before being deboned and cut into thick slices. They're typically served with saeujeot, cloves of raw peeled garlic, and spicy peppers.

| Bossam |

Bossam refers to a pork dish made with thinly sliced pork boiled in a broth with spices like star anise, ginger, scallion, garlic, doenjang, and soybean paste. Pork shoulder is the cut of choice though pork belly can also be used. Bossam is served with a variety of sides like sliced raw garlic, kimchi, and saeujeot (salted shrimp).

| Gogigui |

Gogigui means "meat roast" and refers to the method of grilling meat like beef, pork, or chicken on gas or charcoal grills that are usually built into your dining table. Different types of meat can be served marinated or unmarinated, some of the most popular being bulgogi (thin marinated slices of beef or pork) and galbi (marinated beef or pork ribs).

| Bulgogi |

This dish of grilled, marinated beef is one of the most popular Korean meat dishes. Beef is sliced thinly and put into a marinade that usually consists of some combination of soy sauce, sesame oil, sugar, and sometimes pureed Korean pear and ginger. Since the beef is cut so thinly is doesn't need to marinate for long and the dish is most often grilled.

| Samgyeopsal |

Samgyeopsal is another staple Korean dish that requires little culinary skills, where chunky slices of pork belly are cooked on a grill at the diners' table. It's then wrapped in lettuce or sesame leaf with dipping sauces and accompaniments such as button mushrooms, green chili peppers, green onions, raw onions and garlic, as well as kimchi.

Travel Information - Beverages -

| Gong Cha |

Gong Cha is the most famous milk tea brand in Korea. You may want to try the diverse milk tea flavors in different Korean milk tea stores. Gong Cha has a very diverse menu with about 60 types of Korean milk tea that are loved for good taste and creativity. Gong Cha is known for popular drinks such as: black milk tea, mango yogurt, matcha green tea, special Gong Cha tea, Passionfruit Green Tea, etc.

| Dalgona Milk Tea |

Dalgona coffee trend has definitely taken the internet by storm, but little known to many, Dalgona actually refers to a caramel-colored Korean candy made by combining sugar, water, and baking soda. Cafe Cha, a popular cafe in Seoul, specializes in the creation of Dalgona-inspired desserts and drinks such as Dalgona milk tea, which is a perfect mix for those who aren't a fan of coffee and its bitter notes.

| Makgeolli (막걸리) |

Makgeolli is the oldest alcoholic drink in Korea, and as of late, it has become one of the most popular. It is a traditional Korean rice wine that is made from various grains, but mostly rice. Makgeolli used to be regarded as a drink for farmers, but recently its popularity has been growing among all age groups. Younger generations create their own flavors by mixing Makgeolli with Chilsung Cider (South Korea's version of Sprite) or strawberry-flavored milk. It pairs well with Pajeon (파전), a savory pancake, or Bindaetteok (빈대떡), a mung bean pancake.

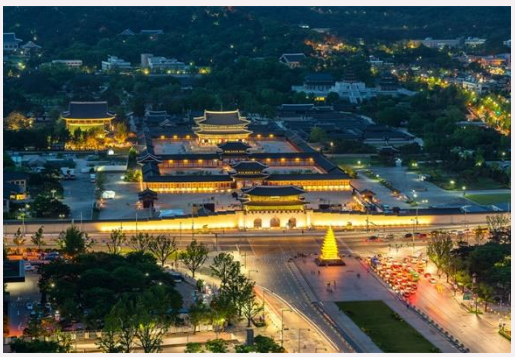
| Misutgaru 미숫가루 |

Misutgaru is a shake made from a powder of various healthy ingredients, such as nuts, beans, and grains. You can also add some honey to it if you like, or any other ingredient. This shake is good diet food, because it is high in protein and fiber and gives you nutrition with a variety of whole grains. It is an easy-to-make shake, since you can simply mix this ready-made powder with milk or water.

| Milkis |

Milkis is unlike any drink you've ever had up until this point. Milkis is a Korean drink that combines carbonation, milk, and corn syrup, so what you're left with is a fizzy, sweet drink that's oddly refreshing at the same time. Although the classic, unflavored Milkis is great on its own, you can also find this Korean drink in a variety of fruit flavors ranging from strawberry to banana to keep things interesting.

Travel Information - Tourist Attractions -



| Gyeongbokgung |

Gyeongbokgung Palace was the main legal residence of the royal family during the Joseon Dynasty. Carrying a meaning of "a place where the new king can enjoy prosperity of great blessings," this was the first palace built during the Joseon Dynasty. The palace is unique for its vast area and harmony of buildings and is the only palace to have all four major gates remaining to this day. Within the palace grounds, you can see a multitude of restored buildings.

| Namsan Seoul Tower |

Seoul's landmark attraction is none other than Namsan Seoul Tower, located atop Namsan Mountain in the center of the city. The tower draws in visitors year-round and is most famous for its nightscape view of the city. The tower features not only an observation deck, but also atmospheric coffees and restaurants among other facilities. Namsan Seoul Tower is a great place to spend an enjoyable evening with friends or loved ones, while taking in the beautiful nightscape over a cup of coffee.

| Lotte World |

If you are looking for a fun place to spend a whole day, check out Lotte World! This amusement park is open all year round, filled with dynamic events and performances. Even better, the park is located in downtown Seoul and is easily accessible via public transportation. The park is largely divided into two areas: Adventure located indoors, and the outdoor section of Magic Island. Adventure includes a plethora of attractions, including a carousel, Spanish pirate ship, flume ride and more, while Magic Island has big thrill rides like the Gyro Drop and Gyro Spin.

| Korean Folk Village |

Korean Folk Village (KFV) has since its foundation in 1974 been loved as a tourist destination that provides vivid cultural experience as well as traditional culture set in beautiful nature. The Korean tradition is the Korean people's mode of life that has permeated every portion of our contemporary life. The role of KFV consists in renewing the value of our traditional culture and preserving it so that it may shine throughout the world. Come and join in witnessing in the traditional culture cherished by KFV the value that it continues to create in experiencing past and present and opening up future.

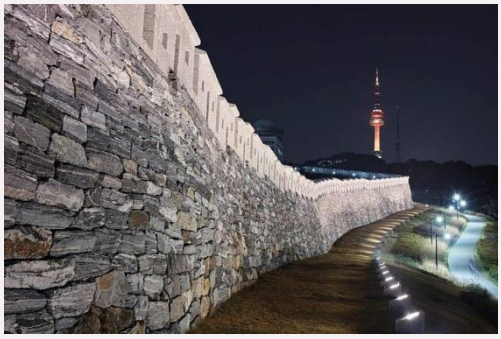
Travel Information - Tourist Attractions -

| Myeongdong |

Myeongdong is one of the main shopping districts in Seoul. This shopper drawer cares for every need of visitors. People are pleased with its beautiful mix of shopping providers, from department stores, modern malls, international retailers, factory outlets to small street boutiques. Among a wide variety of merchandise on offer, Korean cosmetics are the most sought-after stuff. All-time favorites and new creations are available at its thousands of cosmetic shops and skincare stores.

| Dongdaemun Design Plaza |

The Dongdaemun Design Plaza, also called the DDP, is a major urban development landmark in Seoul, South Korea designed by Zaha Hadid and Samoo, with a distinctively neo-futuristic design characterized by the "powerful, curving forms of elongated structures". The landmark is the centerpiece of South Korea's fashion hub and popular tourist destination, Dongdaemun, featuring a walkable park on its roofs, large global exhibition spaces, futuristic retail stores and restored parts of the Seoul fortress. The DDP has been one of the main reasons for Seoul's designation as World Design Capital in 2010.



| Seoul City Wall |

The wall, which follows the ridges of Baegak (Bugaksan), Naksan (Naktasan), Namsan (Mongmyeoksan) and Inwangsan, the four main mountains surrounding the center of Seoul, has been constantly managed since its initial construction in 1396. The wall measures between 5 and 8m high and is 18.6km long and it bears witness to the role played by a city wall in the life of a capital city, still sustained in modern day Seoul.

| Bukchon Hanok Village |

Surrounded by Gyeongbokgung Palace, Changdeokgung Palace and Jongmyo Shrine, Bukchon Hanok Village is home to hundreds of traditional houses, called hanok, that date back to the Joseon dynasty. The name Bukchon, which literally translates to "northern village," came about as the neighborhood lies north of two significant Seoul landmarks, Cheonggyecheon Stream and Jongno. Today, many of these hanoks operate as cultural centers, guesthouses, restaurants and tea houses, providing visitors with an opportunity to experience, learn and immerse themselves in traditional Korean culture.

Travel Information - Arts & Museums -

| Suwon Gwanggyo Museum (수원광교박물관) |

Located in Yeongtong-gu, Suwon Museum has one basement floor and two above-ground floors, spanning over an area of 6,535 ㎡. Suwon Museum consists of two main exhibition halls, Suwon Museum of History and Calligraphy Museum of Korea, showcasing approximately 33,000 relics, and a planned exhibition hall for special occasions and exhibitions. Suwon Museum of History recreates a scene of Yeongdong Market Street during the1960s. Children can learn and get secondhand experience of what Suwon was like in the past while adult visitors can reminisce the old times.

| Suwon Hwaseong Fortress|

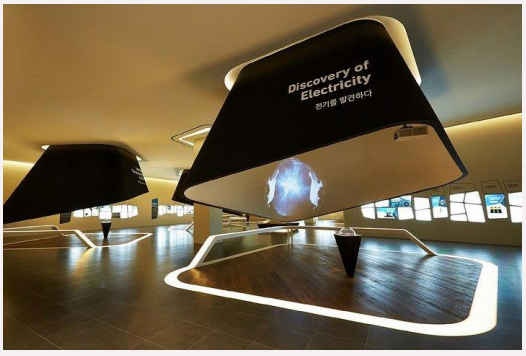
This UNESCO World Heritage Site is one of Korea's most important historical treasures and is the only remaining walled fortress in the country. Hwaseong is a piled-stone and brick fortress of the Joseon Dynasty that surrounds the center of Suwon City, of Gyeonggi-do Province. It was built in the late 18th century by King Jeongjo for defensive purposes, to form a new political basis and to house the remains of his father, Crown Prince Jangheon. The massive walls of the fortress, which are 5.74 km in length, enclose an area of 130 ha and follow the topography of the land. The Suwoncheon, the main stream in Suwon, flows through the center of the fortress.

| National Museum of Natural Science|

SuwonIPark Museum of Art is located outside the gate of Hwaseong Palace in Suwon City. It is a very modern building. The beautiful floor-to-ceiling glass outside the wall not only allows the venue to be light and transparent, but also very beautiful. Exhibitions and exhibitions are often held here. There are 3 halls upstairs, 2 halls downstairs, and a cafe for tourists to rest.

| Samsung Innovation Museum |

Samsung Innovation Museum is an electronic industrial museum run by Samsung, a major global company based in Korea. The museum mainly consists of three sections. Visitors can learn about the history of Korea's electronic industry, as well as the past, present and future of the semiconductor, display and mobile industries, where Samsung made great achievements. The museum also runs an education facility called Children's Display Research Institute.



Travel Information - Restaurants-

| Kabojung Kalbi |

Galbi, or grilled beef ribs, is a delicacy in the Suwon area. Kabojung , with three huge outlets just opposite the street, is the most famous place to sample Korean beef. Always a popular choice among locals, it serves some of the best barbecue in Korea. The legendary galbi is served tableside either plain or marinated. Definitely a must try in Korea!

Opening Hours: Daily 11:30--21:40
Address: 282, Jangdari-ro, Paldal-gu, Suwon, Gyeonggi-do 16481 South Korea
Tel: +82 31-238-3883

| Gyeongbokgung Yeongtong|

This place is very nicely set up with private dining rooms. Background music and comfortable seats make the place very enjoyable.

Opening Hours: Daily 11:30~22:00 ※BREAK TIMEWEEKDAY 15:00~17:00
Address: 31, Bandal-ro, Yeongtong-gu, Suwon, Gyeonggi-do 16705 South Korea
Tel: +82 31-206-7800

| Bonsuwon Galbi|

As one of Suwon's three major ribs, Bonsuwon Galbi is still striving to serve the finest high-quality ribs in a long tradition of 47 years.

Bonsuwon Galbi Main Store is located near Ajudae, Uman-dong, Paldal-gu, Suwon, and has branches of Suwongye, Gwacheon, Bottle, Yongin, and Icheon.

Opening Hours: Daily 11:30 – 14:30 and 17:30 – 22:00

Address: 41, Jungbu-daero 223beon-gil, Paldal-gu, Suwon, Gyeonggi-do 16496 South Korea

Tel: +82 31-211-8434

| TOKYO SIRLOIN Gwanggyo|

Tokyo sirloin is the finest water aging 1++ Grilled Korean beef as the main Sukiyaki and several Asian fusion dishes It's showcasing. All branches are operated as direct stores, Each branch is different Enjoy the décor and menu. If you are a meat /steak lover, this place is most appropriate one for you, The taste is delicious and meat is full of flavor.

Opening Hours: Daily 11:30-14:00 and 18:00-22:00
Address: 80, Gwanggyohosugongwon-ro, Yeongtong-gu Gwanggyo Alley 3F 310, Suwon, Gyeonggi-do 16514 South Korea
Tel: +82 31-214-8324

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