ICEIC 2024

International Conference on Electronics, Information, and Communication 2024

CONTENTS

Welcome to ICEIC 2024

Respected Participants and Honored Colleagues,

Welcome to the 23rd ICEIC !

On behalf of IEIE, we sincerely welcome you to ICEIC 2024 held in Taiwan, renowned for its beautiful landscapes, special cuisine, and convenient transportation.

As we participate in this significant event, reflecting on the technological journey of the past few years, it is evident that the remarkable innovations in IT sector have not only transformed our lives but also elevated the status of nations. ICEIC 2024 provides a valuable opportunity to explore the essence of these technological advancements. So, we are sure the conference program promises richness with diverse invited talks and captivating sessions, and we express deep gratitude to all authors who have submitted valuable research results.

First and foremost, we extend our thanks to all members of the Organizing Committee and Technical Program Committee for organizing this scholarly event and crafting an excellent academic program.

Special thanks are extended to our distinguished keynote speakers, including Prof. Ching-Ting Lee, who will discuss the future of integrated electronics, Dr. Michael Shebanow, who will enlighten us about the computing for AI semiconductors, and Prof. Dr.-Ing. Nilesh Madhu, who will delve into the machine Learning-based speech and audio signal processing. Their expertise will undoubtedly enrich our collective understanding.

In addition, we are delighted to offer four tutorial sessions focusing on deep learning, AR/VR technologies, etc. These sessions will provide in-depth insights into the latest developments in these exciting fields. Our sincere appreciation goes to the speakers, namely Prof. Itaru Kitahara, Prof. Hansung Kim, Dr. Sungho Suh, and Mr. Chaeun Lee, for planning and presenting these tutorials.

Beyond the keynote, invited, and tutorial sessions, various presentations will showcase the latest research results. Our heartfelt thanks go to all participants and contributors. You are the protagonists of this event! We applaud your efforts, and hope you enjoy both excellent research presentations and the relaxation in beautiful Taiwan.

We extend gratitude to the sponsoring organizations that have contributed to the success of ICEIC 2024.

In conclusion, we genuinely hope ICEIC 2024 becomes a rich and enjoyable experience for each participant. May your time in Taiwan be healthy, joyful, and filled with meaningful moments.

Sincerely,

General Chair, President of IEIE

Prof. Chungyong Lee (Yonsei University, Korea)

General Co-chair, President of IEEE CT Society

Prof. Wen-Chung Kao (National Taiwan Normal University, Taiwan)

OC Chair

Prof. Won Woo Ro (Yonsei University, Korea)

OC Co-chair

Prof. Thomas K.F. Lei (Chang Gung University, Taiwan)

OC Co-chair

Prof. Itaru Kitahara (University of Tsukuba, Japan)

TPC Chair

Prof. Hyun Kim (Seoul National University of Science and Technology, Korea)

TPC Co-chair

Prof. Seongjae Cho (Ewha Womans University, Korea)

TPC Co-chair

Prof. Hansung Kim (University of Southampton, U.K.)

Technical Program Overview

It is great pleasure to welcome all participants to ICEIC 2024 on behalf of the technical program committee (TPC). Also, we would like to express our sincere appreciation to all TPC members and organizing members who contributed to the technical program in ICEIC 2024.
In this year, around 402 papers from 16 countries have been submitted to regular and special sessions. After review process, the technical program committee selected the qualified papers that cover a broad range of research issues in the field of computer & information, signal processing, communication, semiconductor devices & circuits, and emerging technologies. The selected papers were organized into 19 regular oral sessions, 8 regular poster sessions, and 17 special sessions. Especially, 17 special sessions will provide interesting and profound presentations about various state-of-the-art research topics including AI, semiconductor, and information & communications technologies.

In ICEIC 2024, we invited two valuable plenary speakers: Dr. Michael Shebanow (SAPEON) and Prof. Ching-Ting Lee (National Cheng Kung University / Yuan Ze University). We also prepared one invited talk of Prof. Nilesh Madhu (Ghent University). In addition, four tutorials were planned to provide both fundamental theories and practical techniques on AI, video processing, and virtual reality.

We believe that ICEIC 2024 will provide the interesting technical program you can enjoy as well as the best opportunity to interact and collaborate with your colleagues.

Thank you very much.

TPC Chair

Hyun Kim
Seoul National University of Science and Technology (Korea)

TPC Co-chairs

Seongjae Cho
Ewha Womans University (Korea)

Hansung Kim
University of Southampton (United Kingdom)

Committee

Organizing Committee

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Chungyong Lee (Yonsei University)

General co-chair

Wen-Chung Kao (National Taiwan Normal University, CT Society President)

Organizing Committee Chair

Won Woo Ro (Yonsei University)

Organizing Committee Co-Chair

Thomas K.F. Lei (Chang Gung Univ.)
Itaru Kitahara (University of Tsukuba)

TPC chair

Hyun Kim (Seoul National University of Science and Technology)

TPC co-chairs

Seongjae Cho (Ewha Womans University)
Hansung Kim (University of Southampton)

Best paper track Chair

Kwanseo Park (Yonsei University)
Kyuho Lee (UNIST)

Special Session Chair

Jong-Ho Bae (Kookmin University)
Albert No (Hongik University)
Jungmok Seo (Yonsei University)

Special Session Co-Chair

Ren Ohmura (Toyohashi University of Technology)

Tutorial Chair

Minsuk Koo (Incheon National University)
Jungwook Choi (Hanyang University)

Financial Chair

Sangwan Kim (Sogang University)

Registration Chair

Youngha Hwang (Soongsil University)

WiEIC

Seungah Lee (Yonsei University)
Sooyoun Kim (Dongguk University)

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Wonbo Shim (Seoul National University of Science and Technology)

Publication Chair

Young-Hoon Park (Sookmyung Women's University)

Local Arrangement Chair

I-Chyn Wey (Chang Gung Univ)

Conference Activity Chair

Joohyung Chae (KwangWoon University)

Conference Secretary Chair

Min-Seong Choo (Hanyang University)

Technical Program Committee

TPC Member

Xuan Truong (Seoul National University)
Woohwan Jung (Hanyang University)
Hyunmin Jung (Seoul National University of Science and Technology)
Woong Choi (Sookmyung Women's University)
Yong Shim (Chung-Ang University)
Hyokeun Lee (North Carolina State University)
Tae Sung Kim (Sunmoon University)
Byung Chul Jang (Kyungpook National University)
Min Woo Kwon (Gangneung-Wonju National University)
Sungmin Hwang (Korea University)
Janghyun Kim (Ajou University)
Hyunwoo Kim (KonKuk University)
Maryam ABATA (Sidi Mohamed Ben Abdellah University Fez, Morocco)
Myounggon Kang (Korea National University of Transportation)
Sungjun Kim (Dongguk University)

Time Table

Sunday, January 28, 2024

Time	Garden Villa (8F)	Meeting Room 1 (5F)	Meeting Room 2 (5F)	Meeting Room 3 (5F)	Meeting Room 4 (5F)	Meeting Room 5 (5F)	Lobby (5F)
15:00~16:30	Registration (Lobby)						
17:30~	Welcome Reception						

Monday, January 29, 2024

Time	Garden Villa (8F)	Meeting Room 1 (5F)	Meeting Room 2 (5F)	Meeting Room 3 (5F)	Meeting Room 4 (5F)	Meeting Room 5 (5F)	Lobby (5F)
08:30~16:30	Registration (Lobby)						
09:00~10:15		Tutorial 1 Prof. Itaru Kitahara	SS1 Novel High-Speed and Low-Power Memory Technology (Invited)	OS1 System and Control (1)	OS2 Artificial Intelligence and Signal Processing (1)	OS3 Semiconductor Devices/Circuits (1)	Poster Session 1 Artificial Intelligence and Signal Processing (1)
10:15~10:20	Break Time						
10:20~10:30	Opening Ceremony (Garden Villa)						
10:30~11:05	**Plenary Talk 1** (Garden Villa) : Dr. Michael Shebanow (CTO of SAPEON Inc.)						
11:05~11:40	**Plenary Talk 2** (Garden Villa) : Prof. Ching-Ting Lee (National Cheng Kung University / Yuan Ze University)						
11:40~13:00	Lunch						
13:00~14:15		Tutorial 2 Prof. Hansung Kim	SS2 Software Aspects and Possible Future Applications of Processing-in-Memory Technique	SS3 Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology (1) (Invited)	OS4 Artificial Intelligence and Signal Processing (2)	OS5 Semiconductor Devices/Circuits (2)	Poster Session 2 Artificial Intelligence and Signal Processing (2)
14:15~15:30		SS4 Next generation multimedia processing	SS5 Novel Devices and Circuits for Advanced Computing Technologies (1) (Invited)	SS6 Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology (2) (Invited)	OS6 Communications (1)	OS7 Semiconductor Devices/Circuits (3)	Poster Session 3 Artificial Intelligence and Signal Processing (3)
15:30~15:45	Coffee Break						
15:45~17:00		SS7 Applied AI @ SeoulTech (Invited)	SS8 Novel Devices and Circuits for Advanced Computing Technologies (2) (Invited)	SS9 Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology (3) (Invited)	OS8 Communications (2)	OS9 Computer and Information (1)	Poster Session 4 Computer and Information & Emerging Technologies

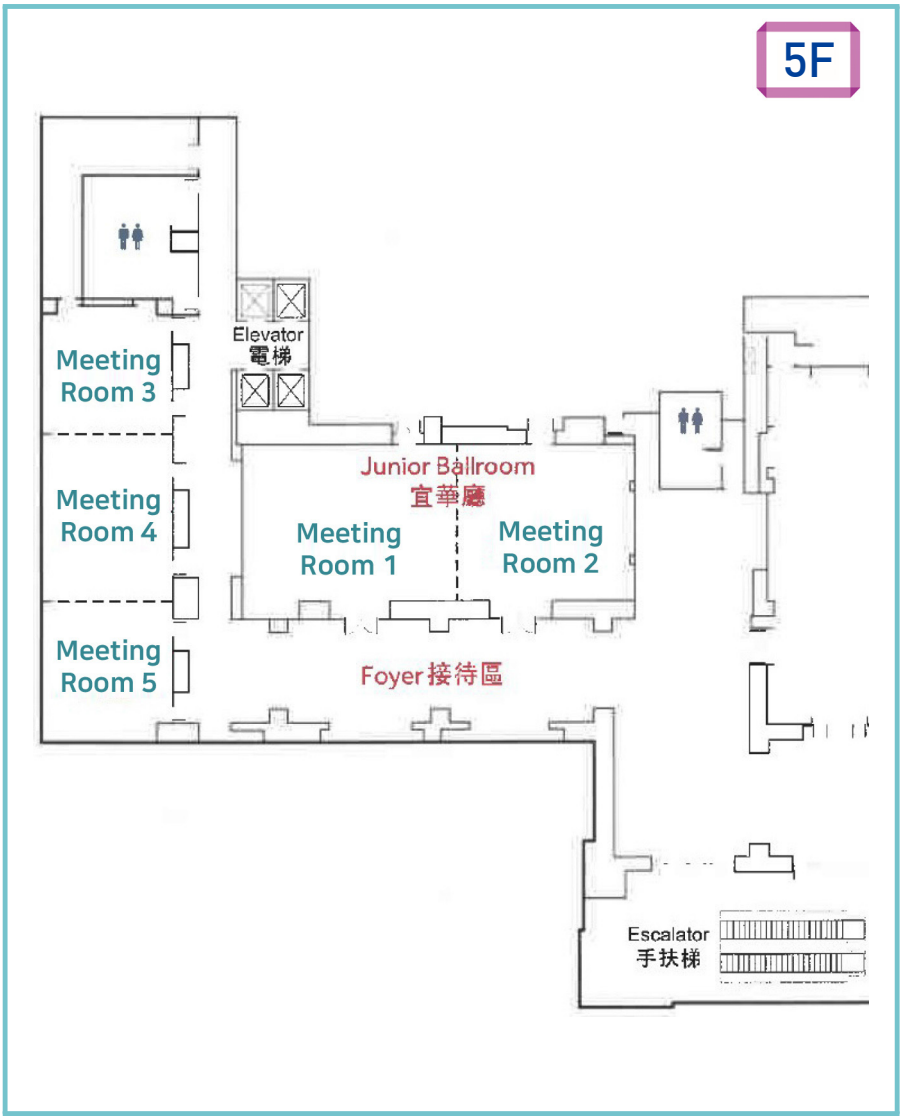
Tuesday, January 30, 2024

Time	Garden Villa (8F)	Meeting Room 1 (5F)	Meeting Room 2 (5F)	Meeting Room 3 (5F)	Meeting Room 4 (5F)	Meeting Room 5 (5F)	Lobby (5F)
09:00~16:30	Registration (Lobby)						
09:30~10:45		OS10 System and Control (2)	SS10 High-speed wireline IO (Invited)	SS11 Future Brain-Inspired Intelligence System Semiconductor	OS11 Communica-tions (3)	OS12 Semiconductor Devices/Circuits (4)	Poster Session 5 Semiconductor Devices/Circuits (1)
10:45~10:55	Break Time						
10:55~11:30	**Invited Talk** (Garden Villa) : Prof. Dr.-Ing. Nilesh Madhu (IDLab / Ghent University)						
11:30~13:00	Lunch						
13:00~14:15		Tutorial 3 Dr. Sungho Suh	SS12 Recent Progresses in Electronic and Electrical Engineering at Ewha Womans University (Invited)	SS13 Exploring Cutting-Edge Technologies for Electronic Devices and Signal Processing – Yonsei University and Chang-Gung University Joint Session	OS13 Artificial Intelligence and Signal Processing (3)	OS14 Semiconductor Devices/Circuits (5)	Poster Session 6 Semiconductor Devices/Circuits (2)
14:15~15:30		Tutorial 4 Mr. Chaeun Lee	SS14 Next-Generation Intelligent Mobility Platforms @ SeoulTech (Invited)	SS15 Charge-Trap Memory, Circuits, and Systems for Hardware On-Chip Learning (Invited)	OS15 Artificial Intelligence and Signal Processing (4)	OS16 Emerging Technologies (1)	Poster Session 7 Semiconductor Devices/Circuits (3)
15:30~15:45	Coffee Break						
15:45~17:00		OS17 Computer and Information (2)	SS16 Development for Processing Software on AI Semiconductor Devices @ SeoulTech	SS17 i-EoT System IC (Invited)	OS18 Artificial Intelligence and Signal Processing (5)	OS19 Emerging Technologies (2)	Poster Session 8 Communications & Systems and Control
18:00~	Banquet						

Wednesday, January 31, 2024

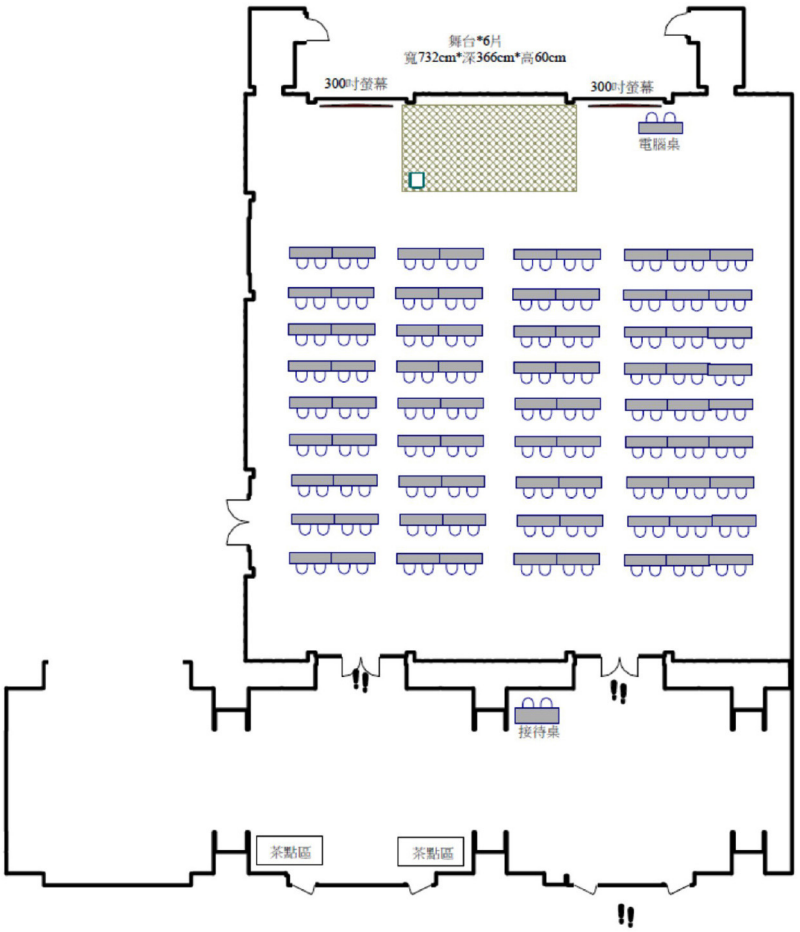
Time	Garden Villa (8F)	Meeting Room 1 (5F)	Meeting Room 2 (5F)	Meeting Room 3 (5F)	Meeting Room 4 (5F)	Meeting Room 5 (5F)	Lobby (5F)
09:30 – 10:30	ICEIC Committee Meeting / Closing Ceremony (Organizing Committee Only)					SEOULTECH LINC 3.0: Industry-Academic Cooperation Matching Day for Multidisciplinary Research Training	

Floor Map


5F
Elevator
電梯
Meeting Room 3
Meeting Room 4
Meeting Room 5
Junior Ballroom
宜華廳
Meeting Room 1
Meeting Room 2
Foyer接待區
Escalator
手扶梯

Garden Villa

8F



Conference Information

Social Program

Opening Ceremony

Date : Monday, January 29, 2024
Time : 10:20-10:30 Place : Garden Villa
All registered participants are cordially invited to join us and celebrate the official opening.

Plenary Talk 1

Date : Monday, January 29, 2024
Time : 10:30-11:05 Place : Garden Villa

Plenary Talk 2

Date : Monday, January 29, 2024
Time : 11:05-11:40 Place : Garden Villa

Invited Talk

Date : Tuesday, January 30, 2024
Time : 10:55-11:30 Place : Garden Villa

Award & Banquet

Date : Tuesday, January 30, 2024
Time : 18:00- Place : Garden Villa

ICEIC Committee Meeting

Date : Wednesday, January 31, 2024
Time : 09:30-10:30

SEOULTECH LINC 3.0: Industry-Academic Cooperation Matching Day for Multidisciplinary Research Training

Date : Wednesday, January 31, 2024
Time : 09:30-10:30

Lunches

Full Registration and Student Registration include two lunches on the following dates:

- Monday, January 29, 2024, from 11:40 to 13:00
- Tuesday, January 30, 2024, from 11:30 to 13:00

For **Undergraduate Registration**, one lunch will be provided on:

- Monday, January 29, 2024, from 11:40 to 13:00

Registration

Registration

The due date for pre-registration:

(1) Full registration with accepted paper(s): December 15, 2023

(2) Non-author registration (attendees without paper): Jaunary 8, 2024

All authors should register for the conference by December 15, 2023.

* Authors with one accepted paper must pay at least one full registration fee. (Regardless of the author's title)
* Authors with more than two accepted papers are required to pay one full registration fee for one paper and a student registration fee for each additional paper. (Please refer to the table below.)

※ Please note that the receipt and the participation certificate will be issued to authors who paid the conference registration fees. (Receiver's name cannot be changed once issued.)

# of Accepted Papers	Required Registration
One Paper	One Full Registration
Two Papers	One Full Registration + One Student Registration
Three Papers and More	One Full Registration + Two Student Registrations

Registration Fee

Category	Domestic		Overseas	
	IEIE/IEEE members	Non-members & On-site	IEIE/IEEE members	Non-members & On-site
Full Registration	KRW 850,000	KRW 950,000	USD 680	USD 780
Student Registration	KRW 450,000	KRW 550,000	USD 350	USD 450
Undergraduate Student	KRW 300,000	KRW 380,000	USD 250	USD 300
Additional Banquet	KRW 140,000		USD 90	

* Full Registration includes the banquet, but Student and Undergraduate Registrations do not include the banquet.

Registration Fee Includes

Full Registration

Admission to All Sessions, Proceedings, Coffee Breaks, Banquet, Two Lunches, Gift

Student Registration

Admission to All Sessions, Proceedings, Coffee Breaks, Two Lunches, Gift

* A banquet ticket is not included.

Undergraduate Student Registration

Admission to All Sessions, Proceedings, Coffee Breaks, One Lunch, Gift

* A banquet ticket is not included.

Payment Method

Credit Card

All transactions by credit card will appear on your statement as payment to Conference by 'Allat'

Bank Transfer

- Name of Bank: SUHYUP BANK (ALSO KNOWN AS NATIONAL FEDERATION OF FISHERIES CO-OPERATIVES)
- Account Number: 1010-2330-5537
- Name of Account Holder: The Institute of Electronics and Information Engineers
- Swift Code (Overseas Transfer): NFFCKRSEXXX

* You should transfer registration fee within 7 days from registration.
* You should send a copy of transaction with your name on it to the secretariat by fax (+82 2 552 6093) or e-mail (inter@theieie.org) for confirmation.
* All bank remittance charges are to be paid by the registrants.

Cancellation and Refund Policy

To cancel your registration, please notify the secretariat by an email to inter@theieie.org. Refunds will be made if cancellation occurs before December 8, 2023, with the processing fee of USD 100 (KRW130,000). No refund will be made after jaunary 8, 2024, or for no show. If you have any questions regarding the registration, please contact the secretariat.

All dates and time are indicated in KST (The local time in Korea)

To Troubleshoot Issues with Registration:

During the registration, if **All@Pay Active X.0296** is not installed automatically, please install it by clicking the link below and proceed the registration again:

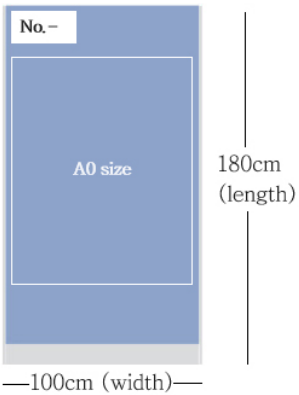
Presentation Guidelines

Oral Presentations

- Please go into the session room at least 15 minutes before the session starts and identify yourself to the session chair.
- Please submit the presentation slide. You need to bring your ppt file on USB memory, and load it on the computer in your session room. You also need to confirm whether it is working properly. This is very important to pay attention to this time frame. The visual equipment provided is a beam projector.
- Time assignment including discussion is as follow
  - Tutorial : 75 minutes
  - Plenary Talk : 35 minutes
  - Invited Talk : 35 minutes
  - Oral Presentation (SS + Oral) : 15 minutes presentation per presenter (3 minutes of Q&A included)

Poster Presentations

- The size of the poster board is 100cm (width) × 180cm (length).
- You need to prepare your poster within this size and attach it on the poster board in your session room at least 10 minutes before the session starts, and then remove your poster immediately after the session finishes.



- Authors (or presenters) are expected to adhere to the following formal guidelines:
  1. Set up your posters in advance of the session.
  2. Be in attendance with your poster throughout the poster session.
  3. Present and elucidate your papers to the assembled audience.

Plenary Talks

Plenary Talk 1

10:30~11:05 Monday, January 29, 2024

Garden Villa (8F)

Dr. Michael Shebanow
CTO of SAPEON Inc.

The Ocean of Compute

Abstract

Computing implementation technology has provided an “ocean of compute” at our disposal. Data centers with millions of cores, exaflops of math, petabytes of high-speed DRAM, and exabytes per second of memory bandwidth are now possible. With those capabilities comes problems of cost, both in capital equipment and in the energy needed to power such centers. However, and perhaps equally challenging, are problems of writing software to control and take advantage of such capability. We need a new programming paradigm, one that makes it easier to leverage the immense capability of future computing centers.

Biography

Michael Shebanow is currently CTO at Sapeon, a startup developing AI inference accelerators for the cloud. Michael received his Ph.D. from UC Berkeley in Computer Architecture, focusing on high performance computer architecture. He then worked at several companies developing high performance, out-of-order superscalar CPUs (Motorola, HaL, Cyrix, AMD). After that, he worked at NVIDIA on several GPUs (G80, Fermi) and project Denver (CPU) as well as NV Research. After NVIDIA, he joined Samsung where he helped build a team developing Samsung’s first mobile GPU. After Samsung, he joined Cadence where he was VP Of Engineering of the Tensilica group. After leaving Cadence, Michael joined Silicon Catalyst as an advisor to several startups, finally joining member company AlphaICs as its CTO. After leaving AlphaICs, he joined Sapeon. Michael is an IEEE Fellow.

Plenary Talk 2

11:05~11:40 Monday, January 29, 2024

Garden Villa (8F)

Prof. Ching-Ting Lee
National Cheng Kung University / Yuan Ze University

Integrated Electronics using GaN-based Complementary Enhancement Mode and Depletion Mode Metal-Oxide-Semiconductor High-Electron Mobility Transistors

Abstract

Gallium nitride (GaN)-based semiconductors have become promising candidate for the high frequency and high power operation Integrated Circuits (ICs) due to their high breakdown voltage, high speed and high power performances. To achieve the high power operation and handling capability, the conventional Schottky gate structure was replaced by using the metal-oxide-semiconductor structure to fabricate GaN-based devices. In this research, AlGaN/GaN-based structure was used to fabricate complementary metal-oxide-semiconductor high electron mobility transistors (CMOS-HEMTs) composed of an enhancement mode (E-mode) and a depletion mode (D-mode) HEMT devices. In the electronic IC circuit design, CMOS devices can simplify circuit design, improve safety capability, and reduce power consumption. However, the congenital two-dimensional election gas channel of AlGaN/GaN was usually dominated by D-mode devices, but E-mode devices were still a great challenge to meet the criteria of high-speed, high power and normally-off design. In this study, the gate-recessed region and the gate oxide layer of D-mode MOS-HEMTs were directly etched and were directly grown by using the PEC etching method and the PEC oxide method, respectively. Furthermore, E-mode MOSHEMTs were first accomplished by using photoelectrochemical (PEC) etched gate-recessed structure. Furthermore, a LiNbO3 ferroelectric gate oxide layer and Al2O3/HfO2/LiNbO3 ferroelectric gate stacked oxide layers were deposited on the AlGaN/GaN structure, respectively. To form the monolithic CMOS unskewed inverter, the current ratio of E/D-mode MOSHEMTs was adjusted by changing various etching depths in the AlGaN layer of the load type D-mode transistors. Compared to the conventional tuning method by adjusting the channel width, this etching process method was beneficial to scaling down the chip area of CMOS-HEMTs due to the matching size of the E-mode and D-mode MOSHEMTs. In this

research, we demonstrate that as the input signal was 5 V, the output swing of the resulting CMOS-HEMTs with the E/D-mode transistor current ratio (β) of 22 was 4.9 V. The noise margin high and low were about 1.99 V and 1.73 V, respectively. As to the voltage transfer curve (VTC), the corresponded VIN about 2.5 V was closer to VDD/2 (= 2.5 V) as the VOUT was 2.49 V, which revealed that the resulting CMOS-HEMTs with the β of 22 could be operated as an unskewed inverter.

Biography

Ching-Ting Lee received his B.S. and M.S. degrees in the Electrical Engineering Department of the National Cheng Kung University, Taiwan, in 1972 and 1974, respectively. He received his Ph.D. degree from the Electrical Engineering Department from the Carnegie-Mellon University, Pittsburgh, PA, in 1982. He joined on National Cheng Kung University as the Dean of the College of Electrical Engineering and Computer Science from 2003 to 2009, and was the chair professor at the Institute of Microelectronics, Department of Electrical Engineering of the National Cheng Kung University. He joined on Yuan Ze University as the vice president from 2018 to 2022, and now he is the chair professor in Yuan Ze University. Among the awards and honors, he has received are Fellow of IEEE and Fellow of IET, Asia-Pacific Academy Fellow, International Association of Advanced Materials Fellow in Sweden, the Outstanding Research Professor Fellowship from the National Science Council (NSC), Engineering Medal from the Electrical engineering Society, distinguish service award from Institute of Electrical Engineering Society, the Optical Engineering Medal from Optical Engineering Society, Distinguish Electrical Engineering professor award from Chinese Institute of Electrical Engineering Society, and Distinguish Engineering professor award from the Chinese Institute of Engineers. He received the ASIA's Education Excellence Awards from Singapore, International Association of Advanced Materials (IAAM) Fellow from Sweden, and Chair Professor of National Research Council from Canada. His research activities have also investigated III-V semiconductor lasers, photodetectors and high-speed electronic devices, and their associated integration for electrooptical integrated circuits.

Invited Talk

10:55~11:30 Tuesday, January 30, 2024

Garden Villa (8F)

Prof. Dr.-Ing. Nilesh Madhu
IDLab / Ghent University

"All the better to understand you with"
The exciting opportunities and open challenges in listening augmentation

Abstract

Effective communication is important for a harmonious, well-adapted society. This requires a clear and timely exchange of messages and intent. Especially in the field of tele-communications, engineers have been working on this problem for decades and, given the wide range of challenges in this field, they will remain busy for several years to come. In this talk I shall introduce the 3 fundamental hurdles to an effective communication and show how almost all of speech- and audio-related research is focused on tackling these hurdles. Further, I shall present how the solutions to these challenges fit a standard machine learning framework and demonstrate these solutions in practical scenarios encountered in daily life. Lastly, I will briefly reflect upon the value of domain knowledge and simplified stochastic models, and their role in the data-driven algorithmic landscape of today. The ultimate goal of the talk is not only to develop a good understanding of the open challenges in the field of speech communication, but also to stimulate discussion on how to best leverage current progress in deep learning to overcome these challenges.

Biography

Nilesh Madhu is professor for audio, speech and signal processing at Ghent University, Belgium. He is passionate about signal processing and is especially interested in its applications in the fields of communications, healthcare, and automation. A key focus of his group is the exploitation of domain knowledge within data-driven, deep-learning based approaches, yielding explainable algorithms for robust signal detection and enhancement.

He was granted his Dr.-Ing. degree (summa cum laude) from the Ruhr-Universität Bochum in 2009. His dissertation was on algorithms for the localisation and separation of acoustic sources using microphone arrays. Following this he was awarded a Marie-Curie fellowship for a two-year postdoctoral stay at the KU Leuven, Belgium, where he gained expertise in the fields of hearing prostheses and biomedical signal analysis. During his industry tenure at NXP Semiconductors, Belgium, he held the position of principal scientist within the product line Mobile Audio Solutions. He and his team successfully developed beyond state-of-the-art algorithms for audio and speech enhancement, which are incorporated in mobile devices of major OEMs today.

Tutorials

Tutorial 1

09:00~10:15 Monday, January 29, 2024

Garden Villa (8F)

Prof. Itaru Kitahara
University of Tsukuba

Novel Viewpoint Synthesis in a Large-Scale Space for Live Free Viewpoint Sports Broadcast

Abstract

Since sports broadcasting is a key content of visual media, various technologies for video processing, communication, and analysis have been developed to improve the visual quality of the broadcasts. This tutorial overviews the development of free viewpoint video generation and browsing methods from the dawn of research activities aimed at realizing live free viewpoint broadcast for large-scale spaces in the early 2000's, including the introduction of practical applications. Also, the possibility of camera work control using artificial intelligence and novel viewpoint synthesis technology based on deep learning are discussed.

Biography

Itaru Kitahara received his B.E. and M.E. degrees in Science Engineering from University of Tsukuba, Japan in 1994 and 1996, respectively. In 1996, he joined Sharp Corporation. 2000-2003, he was a research associate of University of Tsukuba. He received his Ph.D. in 2003. 2003-2005, he was a researcher at ATR. 2005-2019, he was an assistant professor and associate professor at the University of Tsukuba. Since 2019, he has been a professor at the Center for Computational Sciences, University of Tsukuba. He is also technical/academic advisor for IT companies. His research interests include computer vision, mixed reality, and intelligent image media.

[Education and Qualifications Obtained]

Doctor of Engineering (Ph.D.), University of Tsukuba (March 2003) Master of Engineering, University of Tsukuba (March 1996) Bachelor of Engineering, University of Tsukuba (March 1994)

[Work Experience]

- 2019-08 - (current) Professor, Center for Computational Sciences, University of Tsukuba & Center for Cybernics Research, University of Tsukuba
- 2023-04- (current) Academic Advisor, Space-Time Observatory Ltd.
- 2020-07 - (current) Board member, Research Institute for Connected Societies
- 2019-01- (current) Technical Advisor, Denqvision, Inc.
- 2016-04 - 2019-07 Associate Professor, Center for Computational Sciences, University of Tsukuba
- 2011-10 - 2016-03 Associate Professor, Faculty of Engineering, Information and Systems, University of Tsukuba Systems, University of Tsukuba
- 2005-04 - 2008-07 Assistant Professor, Graduate School of Systems and Information Engineering, University of Tsukuba
- 2003-04 - 2005-03 Researcher, Advanced Telecommunications Research Institute International (ATR)
- 2000-04 - 2003-03 Research Associate, Center for Tsukuba Advanced Research Alliance (TARA), University of Tsukuba
- 1996-04 - 1999-03 Sharp Corporation, Image Media Laboratory

Tutorial 2

13:00~14:15 Monday, January 29, 2024

Garden Villa (8F)

Prof. Hansung Kim
School of Electronics & Computer Science, University of Southampton, UK

Immersive 3D Audio-Visual Room Reproduction in Virtual Reality

Abstract

As personalized immersive display systems have been intensely explored in Virtual Reality (VR), plausible 3D audio corresponding to the visual content is required to provide more realistic experiences to users. In this talk, a complete pipeline to simultaneously reconstruct 3D geometry and acoustic properties of the environment from a panoramic (360^0) image is introduced. A semantic scene reconstruction and completion method using a deep convolutional neural network has been developed to estimate the complete semantic scene geometry in order to adopt spatial audio reproduction to the scene.

Biography

Dr. Hansung Kim is an Associate Professor in the School of Electronics & Computer Science at the University of Southampton, UK. He received his BSc, MSc and Ph.D degrees in electronic and electrical engineering from Yonsei University, South Korea. He was employed as a researcher of Knowledge Science Lab (KSL) at Advanced Telecommunications Research Institute International (ATR), Japan, from 2005 to 2008, and as a senior research fellow at the Centre for Vision, Speech, and Signal Processing (CVSSP) at the University of Surrey, UK, from 2008 to 2020. His research for last 20 years includes 3D computer vision, Stereo image processing, 3D reconstruction, Augmented/Virtual Reality, Multi-modal data processing, Audio-visual data processing and Media production with over 100 published articles in 16 research projects.

Tutorial 3

13:00~14:15 Tuesday, January 30, 2024

Garden Villa (8F)

Dr. Sungho Suh
German Research Center for Artificial Intelligence (DFKI)

Solving Sensor-Based Activity Recognition Problems Using Self-supervised Learning and Generative Models

Abstract

Feature extraction is at the core of Human Activity Recognition (HAR), which involves automatically determining the activity being performed. Traditionally, the HAR community relied on statistical metrics and distribution-based representations to condense movement information from sensor data windows into feature vectors. In recent times, learned representations have emerged as effective alternatives to manually engineered features. Notably, self-supervised methods, harnessing large-scale unlabeled data for initial representation learning and subsequent fine-tuning for target applications, have piqued significant interest in the community. This tutorial focuses on representations for both single-sensor and multi-modal configurations, surpassing the current standard for representation learning. It also explores the efficient use of existing representations, especially through transfer learning and domain adaptation. The tutorial introduces cutting-edge methods for representation learning in HAR, providing a platform for researchers in mobile and ubiquitous computing to not only assess the field's current state but also to outline future directions, including the path to resolving the activity recognition challenge. Additionally, we will explore the integration of generative models to synthesize sensor data, further enhancing HAR performance.

Biography

Dr. Sungho Suh is a Senior Researcher at the German Research Center for Artificial Intelligence (DFKI) in Germany since 2021. He received the Ph.D. degree in Computer Science at the Technische Universität Kaiserslautern, Germany in 2021, and the B.S. and M.S. degrees from the School of Electrical Engineering and Computer Science, Seoul National University, Seoul, South Korea, in 2009 and 2011, respectively. Before joining DFKI, he worked at KIST Europe in Germany for three years, and at Samsung Electro-Mechanics, Korea from 2011 to 2018. His research interests are machine learning algorithms, such as sensor data processing, computer vision, multimodal processing, and generative models, with a focus on industrial applications.

Tutorial 4

14:15~15:30 Tuesday, January 30, 2024

Garden Villa (8F)

Mr. Chaeun Lee
SAPEON Korea Inc.

Recent advances in quantization for deep learning models from algorithms to system level

Abstract

To efficiently train and infer CNN-based deep neural networks in edge devices with limited resources, a range of model quantization techniques has been developed. Collecting data for such quantization, however, poses significant privacy challenges. To overcome this, data-free post-training quantization, which bypasses the need for the original data, has emerged as a solution. Additionally, the advancement in deep learning models extends to various tasks beyond traditional domain-specific recognition tasks such as vision and speech recognition introduces new and more complex model architectures. Particularly noteworthy are transformer-based large models known for their extensive parameter sets. However, these models often run into memory-bound limitations. Addressing these challenges, low-bit integer/floating-point quantization algorithms designed for these models and system-level optimization techniques have been proposed. This tutorial provides an overview of quantization algorithms and introduces emerging data-free quantization. It specifically addresses the application of different quantization algorithms to recent deep learning models and delves into system-level optimizations for transformer-based models, focusing on memory-bound issues.

Biography

Chaeun Lee received the B.S. and M.S. degrees in Electrical and Computer Engineering from Seoul National University (SNU) in 2018 and 2020, respectively. From 2020 to 2021, he worked as a researcher at Inter-university Semiconductor Research Center (ISRC) and Pohang University of Science and Technology (POSTECH). From 2022, he joined SAPEON Korea Inc. as a software engineer of algorithm team. His research topics are lightweight deep learning models, hardware-software co-optimization, and methodologies of simulation and emulation for lightweight models in customized devices.

Technical Program

Oral Sessions

SS1 Novel High-Speed and Low-Power Memory Technology Invited

09:00~10:15 Monday, January 29, 2024

Meeting Room 2 (5F)

Chair: Chang-Ki Baek (POSTECH)

01 **Low-power and Tunable Artificial Neuron using Resistive Switching Transistor based on Heterojunction**

Yijoon Kim, Hyangwoo Kim, Ju Hong Park, and Chang-Ki Baek

POSTECH, Korea

02 **Design of Capacitorless Memory for Low-power and GHz Operations**

Hyangwoo Kim, Ju Hong Park, and Chang-Ki Baek

POSTECH, Korea

03 **Hafnia-based Ferroelectric Materials for Memory and Neuromorphic Device Applications**

Jang-Sik Lee

POSTECH, Korea

04 **Multi-state Non-volatile Memory device with long Retention characteristics based on amorphous TMD**

S.M. Sattari-Esfahlan[1], Keun Heo[2], and J-H. Lee[1]

[1]Ajou University, Korea, [2]Jeonbuk National University, Korea

OS1 System and Control (1)

09:00~10:15 Monday, January 29, 2024

Meeting Room 3 (5F)

Chair: Hansung Kim (University of Southampton)

01 **Improving Real-Time Omnidirectional 3D Multi-Person Human Pose Estimation with People Matching and Unsupervised 2D-3D Lifting**

Pawel Knap[1], Peter Hardy[1], Alberto Tamajo, Hwasup Lim[2], and Hansung Kim[1]

[1]University of Southampton, United Kingdom, [2]KIST, Korea

02 **A Study on the UWB/Encoder/IMU Sensor Fusion Position Estimation System for the Development of Driving Assistance Technology in Autonomous Driving Wheelchairs**

Eunsu Jang, Su-hong Eom, Daewe Kim, and Eunghyuk Lee

Tech University of Korea, Korea

03 **Image Reconstruction in Electrical Resistance Tomography Using Particle Swarm Clustered Optimization Method**

Anil Kumar Khambampati, Min ho Jeon, Felipe Alberto Solano Sanchez, and Kyung Youn Kim

Jeju National University, Korea

04 **Enhancing UAV Stability: A Deep Reinforcement Learning Strategy**

Junyoung Kim and Soyi Jung

Ajou University, Korea

05 **A Method of Extending the Transmission and Reception Range of Ultrasonic Sensors for Stable Following in a Narrow Indoor Space**

Ga-Young Kim, Su-Hong Eom, Eung-Hyuk Lee, and Jeon-Min Kang

Department of Electronic Engineering Tech University of Korea Siheung, Republic of Korea

OS2 Artificial Intelligence and Signal Processing (1)

09:00~10:15 Monday, January 29, 2024

Meeting Room 4 (5F)

Chair: Hyunmin Jung (SEOULTECH)

01 **Mental Health Identification Through Face Emotion Recognition Using Machine Learning**
Dr.N. Magadevi[1] and M. Indumathi[2]
[1]S.A. Engineering College, India, [2]Jeppiaar Institute Of Technology, India

02 **Detection of Circulating Tumor Cells in Blood Using Random Forest**
Hua Wei[1], Takahiro Natori[2], Tomohiro Tanaka[3], Shin Aoki[1], Takeshi Yamada[4], and Naoyuki Aikawa[1]
[1]Tokyo University of Science, Japan, [2]Tokai University, Japan, [3]Okayama University, Japan, [4]Nippon Medical School, Japan

03 **Vehicle-to-Vehicle Communication Channel Estimator Based on Gate Recurrent Unit**
Jun-Han Wang[1], He He[1], Kosuke Tamura[1], Shun Kojima[2], Jaesang Cha[1], and Chang-Jun Ahn[1]
[1]Chiba University, Japan, [2]The University of Tokyo, Japan

04 **Serial Skeletal Detection using a Kalman Filter in Combination with OpenPose**
Sota Sugiyama, Masataka Yamamoto, Hiroshi Takemura, and Naoyuki Aikawa
Tokyo University of Science, Japan

05 **Improved Generalization from Limiting Attention in a Transformer for Sleep Stage Classification**
Dongyoung Kim, Dong-Kyu Kim, and Jeong-Gun Lee
Hallym University, Korea

OS3 Semiconductor Devices/Circuits (1)

09:00~10:15 Monday, January 29, 2024

Meeting Room 5 (5F)

Chair: Hoyoung Yoo (Chungnam National University)

01 **A Current Mirror Based Read Circuit Design with Multi-Level Capability for Resistive Switching Devices**
Stefan Pechmann[1], Eduardo Perez[2,3], Christian Wenger[2,3], and Amelie Hagelauer[1,4]
[1]Technical University of Munich, Germany, [2]IHP, Germany, [3]Brandenburg University of Technology, Germany, [4]Fraunhofer EMFT, Germany

02 Thermal Shutdown implementation in BLE microcontroller for TPMS and Industrial application
Aritra Chowdhury and Venkatesh G. Kadlimatti
Texas Instruments (India) Pvt. Ltd., India

03 Low-power, 25-Gb/s Active Voltage Current Feedback Transimpedance Amplifier in 65-nm CMOS
Koji Tominaga and Yasuhiro Takahashi
Gifu University, Japan

04 A 32-channel DAC-based Driver IC for Optical Phased Array
Kihun Kim and Woo-Young Choi
Yonsei University, Korea

05 Physical Unclonable Function using Programmable Delay Lines
Jiho Park, Heehun Yang, Donghun Lee, and Hoyoung Yoo
Chungnam National University, Korea

SS2 Software Aspects and Possible Future Applications of Processing-in-Memory Technique

13:00~14:15 Monday, January 29, 2024

Meeting Room 2 (5F)

Chair: Kyuhyun Choi (KETI)

01 Building an Inference Server Platform for Large Language Models Using Dataflow PIM Platform
Kyu Hyun Choi and Taeho Hwang
KETI, Korea

02 Supporting Multi-Channels to DRAM-based PIM Execution for Boosting the Performance
Junil Kim, Seok Young Kim, and Seon Wook Kim
Korea University, Korea

03 Low Overhead PIM-to-PIM Communication on PCIe-based Multi-PIM Platforms for Executing Large-Scale AI Models
Mun Seong Park, Seok Young Kim, and Seon Wook Kim
Korea University, Korea

04 **Integrated Framework Design Methodologies to Support Processing-In-Memory Platforms**
Enhyeok Jang, Hongju Kal, Jaewon Kwon, and Won Woo Ro
Yonsei University, Korea

SS3 Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology (1) Invited

13:00~14:15 Monday, January 29, 2024

Meeting Room 3 (5F)

Chair: Joo-Hyung Chae (Kwangwoon University)

01 **Implementation of Tiled Point-wise Convolution in MobileNet for Parallel Processing**
Hyeon Seok Hong and Hyun Kim
Seoul National University of Science and Technology, Korea

02 **Analyzing the Scaling Characteristics of Transformer Feed-forward Networks for the Trillion-Parameter Era and Beyond**
Taehyun Kim and Hyuk-Jae Lee
Seoul National University, Korea

03 **A 1-Kb 6T 1C XNOR-DRAM Compute-In-Memory Macro With Signed Bit Adder Block for CNN Operations**
Ho-Sung Lee and Joo-Hyung Chae
Kwangwoon University, Korea

04 **Exploring Diverse Color Spaces in Frequency Domain-Based Image Augmentation for Corruption Robustness**
Hyunha Hwang[1], Kyujoong Lee[2], and Hyuk-Jae Lee[1]
[1]Seoul National University, Korea, [2]Sungshin Women's University, Korea

05 **Reconfigurable One-Adder Multiplication for CNN Acceleration**
Kihwan Kim, Hyuk-Jae Lee, and Xuan Truong Nguyen
Seoul National University, Korea

OS4 Artificial Intelligence and Signal Processing (2)

13:00~14:15 Monday, January 29, 2024

Meeting Room 4 (5F)

Chair: Itaru Kitahara (University of Tsukuba)

01 **Construction of Multi-View Capturing System for Laparotomy**
Ryotaro Takatsuki, Chun Xie, Koichiro Kumano, Daichi Kitaguchi, Shinji Hashimoto, Tatsuya Oda, and Itaru Kitahara
University of Tsukuba, Japan

02 **Effect of Inference Methods in Back-Translation with Generated Data**
Hiroshi Tasaki and Incheon Paik
University of Aizu, Japan

03 **Spin Estimation for Back Spin Serves in Table Tennis Using Racket Speed and Angle**
Hiroki Matsumiya[1], Xiangbo Kong[2], Ami Tanaka[1], Hiroki Nishikawa[3], and Hiroyuki Tomiyama[1]
[1]Ritsumeikan University, Japan, [2]Toyama Prefectural University, Japan, [3]Osaka University, Japan

04 **Ready-to-Serve Detection in Badminton Videos**
See Shin Yue, Raveendran Paramesran, and Ganesh Krishnasamy
Monash University Malaysia, Malaysia

05 **Improving ASR Performance with OCR Through Using Word Frequency Difference**
Kyudan Jung[1], Seungmin Bae[2], Nam Joon Kim[2], Hyun Gon Ryu[3], and Hyuk-Jae Lee[2]
[1]Chung-Ang University, Korea, [2]Seoul National University, Korea, [3]NVIDIA, USA

OS5 Semiconductor Devices/Circuits (2)

13:00~14:15 Monday, January 29, 2024

Meeting Room 5 (5F)

Chair: Young-Ha Hwang (Soongsil University)

01 **Impacts of Clock Frequency and Sampling Intervals on Power Side-Channel Leakage of AES Circuits**
Yuto Miura[1], Hiroki Nishikawa[2], Xiangbo Kong[3], and Hiroyuki Tomiyama[1]
[1]Ritsumeikan University, Japan, [2]Osaka University, Japan, [3]Toyama Prefectural University, Japan

02 A 25-Gb/s Active Feedback Transimpedance Amplifier in 65-nm CMOS
Yasuhiro Takahashi[1], Daisuke Ito[1], Makoto Nakamura[1], Akira Tsuchiya[2], Toshiyuki Inoue[2], and Keiji Kishine[2]
[1]Gifu University, Japan, [2]The University of Shiga Prefecture, Japan

03 Fast 32-bit and 48-bit Multipliers for FPGA
Wakana Ohashi[1], Aoi Yamaguch[1], Hiroki Nishikawa[2], and Hiroyuki Tomiyama[1]
[1]Ritsumeikan University, Japan, [2]Osaka University, Japan

04 PSP Model-Based Emulation Method for Geometry-Dependent Cryogenic Effects in 28-nm Bulk CMOS Technology
Seunghoon Yi, Hee-Cheol Joo, Seung Chae Jung, Yoochang Kim, and Young-Ha Hwang
Soongsil University, Korea

05 Development of Diode Triggering SCR-Based ESD Protection Circuit with Improved Trigger Voltage For Low Voltage Application
U Yeol Seo[1], Sang wook Kwon[1], Jeong Seung Gu[1], Jeong Min Lee[1], Kwang Yeob Lee[2], and Yong Seo Koo[1]
[1]Dankook University, Korea, [2]Seokyeong University, Korea

SS4 Next generation multimedia processing

14:15~15:30 Monday, January 29, 2024

Meeting Room 1 (5F)

Chair: Sanghoon Lee (Yonsei University)

01 Denoising Diffusion for Multi-view Stereo
Suwoong Heo and Sanghoon Lee
Yonsei University, Korea

02 Exposure Correction Framework via Vector Quantization for Image Enhancement
Seonghwa Choi and Sanghoon Lee
Yonsei University, Korea

03 Tone-mapping Resilient HDR Image Watermarking based on Multi-Transforms and Saliency Detection
Ahmed Khan[1], KokSheik Wong[1], Minoru Kuribayashi[2], and Vishnu Monn Baskaran[1]
[1]Monash University Malaysia, Malaysia, [2]Tohoku University, Japan

04 **Self-Supervised Transmission-Guided Network for Underwater Image Enhancement**
Cheng-Han He, Chia-Hung Yeh, and Chen Lo
National Taiwan Normal University, Taiwan

05 **Language-Guided Negative Sample Mining for Open-Vocabulary Object Detection**
Yu-Wen Tseng[1], Hong-Han Shuai[2], Ching-Chun Huang[2], Yung-Hui Li[3], and Wen-Huang Cheng[1]
[1]National Taiwan Normal University, Taiwan, [2]National Yang Ming Chiao Tung University, Taiwan, [3]Hon Hai Research Institute, Taiwan

06 **Sparse Basis Approach for Lightweight AI System Design**
Wei-Chieh Lee, Gwo Giun Chris Lee, and Chu-Chun Yang
National Cheng Kung University, Taiwan

SS5 Novel Devices and Circuits for Advanced Computing Technologies (1)

Invited

14:15~15:30 Monday, January 29, 2024

Meeting Room 2 (5F)

Chair: Jong-Ho Bae (Kookmin University)

01 **An Architecture-level Framework for Enabling Processing-Using-Memory Simulations in Deep Neural Networks**
Inseong Hwang, Jihoon Jang, and Hyun Kim
Seoul National University of Science and Technology, Korea

02 **Analysis on Memory Properties of Amorphous InGaZnO-Based 2T-DRAM Cell for Processing-In-Memory Application**
Seongwon Lee[1], Junseong Park[1], Haesung Kim[1], Hyojin Yang[1], Sanghyuk Yun[1], Ha Neul Lee[1], Sejun Park[1], Hyeonsik Kim[1], Hyunwook Jeong[1], Seongjae Cho[2], and Jong-Ho Bae[1]
[1]Kookmin University, Korea, [2]Ehwa Womans University, Korea

03 **A Dataset of ReRAM Technology for Artificial Neural Network-based Compact Modeling**
Taeheon Lee[1], Marin Franot[1,2], and Sungyeop Jung[1]
[1]Seoul National University, Korea, [2]ENSEEIHT, France

04 **Compute-In-Memory with SAR ADC and 2T1C DRAM for MAC Operations**
Tae Eun Jang, Kyu Hyun Lee, Gi Yeol Kim, Su Yeon Yun, Da-Hyeon Youn, Hyunggu Choi, Jihyang Kim, Soo Youn Kim, and Minkyu Song
Dongguk University, Korea

SS6 Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology (2) Invited

14:15~15:30 Monday, January 29, 2024

Meeting Room 3 (5F)

Chair: Min-Seong Choo (Hanyang University)

01 **Comparison of Out-of-Distribution Detection Performance of CLIP-based Fine-Tuning Methods**
Jeonghyeon Kim, Jihyo Kim, and Sangheum Hwang
Seoul National University of Science and Technology, Korea

02 **Efficient CRC-BCH Unified Encoder for Global Positioning System**
Yongtaek Hwang, Jiwoo Hwang, Yuseok Lee, and Hoyoung Yoo
Chungnam National University, Korea

03 **Mitigation of Over-Confidence in Scale-Adjusted Training for Early-Exit Networks**
Ji-Ye Jeon, Xuan Truong Nguyen, and Hyuk-Jae Lee
Seoul National University, Korea

04 **Enhancing Object Detection Accuracy Through RGB and Event Fusion in Motion Blurred Images**
Hyeok Jin Son, Kyung Dae Park, and Chae Eun Rhee
Inha University, Korea

05 **Hardware and Software Co-Simulation Methodology for Processing-In-Memory Bitcell application**
Jae-Gun Lee, Shin-Uk Kang, and Min-Seong Choo
Hanyang University, Korea

OS6 Communications (1)

14:15~15:30 Monday, January 29, 2024

Meeting Room 4 (5F)

Chair: Albert No (Hongik University)

01 **Bayesian interference based cooperative spectrum sensing under mixed attack**
Yongkai LIU and Abdul Hayee SHAIKH
Nanjing University of Aeronautics and Astronautics, China

02 **Efficient Dual-Mode Generalized Spatial Modulation Detection with Enhanced DNN Architecture**
Zihui Wang[1], Xue-Qin Jiang[1], Jinming Yu[1], Miaowen Wen[2], Jun Li[3], and Han Hai[1]
[1]Donghua University, China, [2]South China University of Technology, China, [3]Guangzhou University, China

03 **Secure V2V Ad Hoc Routing Protocol Using Digital Signatures**
Dan Shinato, Michiko Harayama, and Miwako Mishima
Gifu University, Japan

04 **Detection of BGP Hijacking based on AS Hegemony**
Kenta Nakashima, Michiko Harayama, and Miwako Mishima
Gifu University, Japan

05 **Scenarios and Performance Analysis of 5G-NR-V2X Communication Performance for the Autonomous Platooning Service**
Byoungman An, Jimin Lee, Seonghyun Jang, Sanghun Yoon, and Kitaeg Lim
KETI, Korea

OS7 Semiconductor Devices/Circuits (3)

14:15~15:30 Monday, January 29, 2024

Meeting Room 5 (5F)

Chair: Seongjae Cho (Ewha Womans University)

01 **Data Retention Assessment of 1T DRAM with SiC/Si/SiC Quantum Well for Automotive Application**
Md. Hasan Ansari[1], Soomin Kim[2], Nazek El-Atab[1], Seongjae Cho[2], and Hyungcheol Shin[3]
[1]KAUST, Saudi Arabia, [2]Ewha Womans University, Korea, [3]Seoul National University, Korea

02 A Ge/SiGe Quantum-Well Surface-Normal C-Band Optical Modulator
Donguk Nam[1] and Seongjae Cho[2]
[1]Nanyang Technological University, Singapore, [2]Ewha Womans University, Korea

03 Si Bridge with Chessboard Patterned Interconnect (CPI): Enabling High Density, High Efficiency Heterogeneous Integration
Seungkyu Kim[1,2], Kihun Ok[1], and Kee-won Kwon[1]
[1]Sungkyunkwan University, Korea, [2]Samsung Electronics Co., LTD., Korea

04 A 28 GHz 5-Bit Phase Shifter MMIC with 5.4° RMS Phase Error in GaN HEMT Process
Soyeon Seo, Jinho Lee, Yongho Lee, and Hyunchol Shin
Kwangwoon University, Korea

05 A 11.4-ENOB First-Order Noise-Shaping SAR ADC With PVT-Insensitive Closed-Loop Dynamic Amplifier and Two CDACs
Jae-Hyeon Nam and Sang-Gyu Park
Hanyang University, Korea

SS7 Applied AI @ SeoulTech Invited

15:45~17:00 Monday, January 29, 2024

Meeting Room 1 (5F)

Chair: Kyoungwon Seo (SEOULTECH)

01 A Simplified Feature Alignment Strategy for Image Classification Across Domains
Jin Shin and Hyun Kim
Seoul National University of Science and Technology, Korea

02 GDS: Gradient Distribution Scaling-based Gradient Quantization for Low-complexity and Hardware-friendly Training of Instance Segmentation Models
Da Hun Choi and Hyun Kim
Seoul National University of Science and Technology, Korea

03 Multitask Autoencoder-based Two-Phase Framework using Multilevel Feature Fusion for EEG Emotion Recognition
ChangGyun Jin, ChanWoo Shin,Hanul Kim, and Seong-Eun Kim
Seoul National University of Science and Technology, Korea

04 **Early Screening of Mild Cognitive Impairment using Multimodal VR-EP-EG-MRI (VEEM) Biomarkers via Machine Learning**

Se Young Kim[1], Bogyeom Park[1], Dohyun Kim[1], Hojin Choi[2], Jinseok Park[2], Hokyoung Ryu[2], and Kyoungwon Seo[1]
[1]Seoul National University of Science and Technology, Korea, [2]Hanyang University, Korea

05 **Satellite Based Burn Severity Mapping Using Machine Learning Approaches**

Byeongcheol Kim, Seonyoung Park, and Kyungil Lee
Seoul National University of Science and Technology, Korea

SS8 Novel Devices and Circuits for Advanced Computing Technologies (2)

Invited

15:45~17:00 Monday, January 29, 2024

Meeting Room 2 (5F)

Chair: Min-Woo Kwon (Gangneung-Wonju National University)

01 **Preliminary Investigation on High-k-Based Memristor as Synapse for 3D Vertical Structure**

Yoonseok Lee[1], Sungjun Kim[1], and Deji Akinwande[2]
[1]Dongguk University, Korea, [2]The University of Texas at Austin, USA

02 **Low Power Self-Rectifying Resistive Switching Memory based on Two-dimensional Molybdenum Disulfide Nanosheet Electrodes**

DongJun Jang and Min-Woo Kwon
Gangneung-Wonju National University, Korea

03 **The SPICE Simulation of Channel Potential in 3D NAND Flash Memory having Double Strings**

Sunghyun Woo and Myounggon Kang
Korea National University of Transportation, Korea

04 **The Study of Channel Potential at Inhibited 3D NAND Flash Memory according to the Pattern**

Taeyoung Cho and Myounggon Kang
Korea National University of Transportation, Korea

SS9 Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology (3) Invited

15:45~17:00 Monday, January 29, 2024

Meeting Room 3 (5F)

Chair: Min-Seong Choo (Hanyang University)

01 **NAS-OD: Neural Architecture Search for Object Detection**
Amrita Rana and Kyung Ki Kim
Daegu University, Korea

02 **NIR to LWIR Image Translation for Generating LWIR Image Datasets**
Jin Young Choi[1], Dong-Goo Kang[2], Minhye Chang[2], Kye Young Jeong[2], and Byung Cheol Song[1]
[1]Inha University, Korea, [2]KERI, Korea

03 **Analysis of ADC Quantization Effect in Processing-In-Memory Macro in Various Low-Precision Deep Neural Networks**
Seung-Mo Jin, Shin-Uk Kang, and Min-Seong Choo
Hanyang University, Korea

04 **Speed-Area-Power Efficient Ternary Logic Gate Implementation Based on Typical MOS Transistors**
Gihyeon Jeon and Daejin Park
Kyungpook National University, Korea

05 **Parallel Processing of 3D Object Recognition by Fusion of 2D Images and LiDAR for Autonomous Driving**
Heuijee Yun and Daejin Park
Kyungpook National University, Korea

OS8 Communications (2)

15:45~17:00 Monday, January 29, 2024

Meeting Room 4 (5F)

Chair: Albert No (Hongik University)

01 **Efficient Joint Estimation Methods of Channel and IQ Imbalance for MIMO-OFDM Systems**
Koji Nishibe, Takanori Shibakura, Koki Miyamoto, Jaesang Cha, and Chang-Jun Ahn
Chiba University, Japan

02 Dynamic Channel Allocation Method Using Analytic Hierarchy Process in Wireless LAN
Manami ENDO and Shigenobu SASAKI
Niigata University, Japan

03 A heuristic stable time via two-hop dissimilar trees in wireless sensor networks
Yoshihiro Kaneko
Gifu University, Japan

04 Efficient Framework for Homopolymer Constraint Transitions: A Versatile Approach to DNA Storage Encoding
Sanghoon Kang[1], Yunfei Gao[2], and Albert No[2]
[1]University of Florida College of Pharmacy, USA, [2]Hongik University, Korea

05 Intelligent UAV and LEO-Assisted Edge Computing Systems for Real-time IoT Applications
Sooyeob Jung[1], Joon Gyu Ryu[1], Seongah Jeong[2], Jinkyu Kang[3], and Joonhyuk Kang[4]
[1]ETRI, Korea, [2]Kyungpook National University, Korea, [3]Myongji University, Korea, [4]KAIST, Korea

OS9 Computer and Information (1)

15:45~17:00 Monday, January 29, 2024

Meeting Room 5 (5F)

Chair: Jungwook Choi (Hanyang University)

01 Robust 3D Hand Tracking with Multi-view Videos
Jongyoo Kim[1] and Sanghoon Lee[2]
[1]Microsoft Research Asia, China, [2]Yonsei University, Korea

02 A Non-Work Conserving Algorithm for Dynamic Scheduling of Moldable Gang Tasks on Multicore Systems
Tomoki Shimizu[1], Hiroki Nishikawa[2], Xiangbo Kong[3], and Hiroyuki Tomiyama[1]
[1]Ritsumeikan University, Japan, [2]Osaka University, Japan, [3]Toyama Prefectural University, Japan

03 Lightweight Error Correction for In-Storage Acceleration of Large Language Model Inference
Jinwoo Jeong[1], Byungmin Ahn[2], Dongmin Shin[2], and Jungwook Choi[1]
[1]Hanyang University, Korea, [2]Samsung Electronics Co., Ltd., Korea

04 AI-enabled Abnormal Behavior Detection and Visualization Technology on Blockchain Network
Byung-Suk Seo, Jong-Min Baek, and Kwang-Man Ko
Sangji University, Korea

05 **Efficient Image Compression through Differential Encoding of Super-Resolution Images**
YongHwan Kim, Minhyeok Lee, Jungho Lee, and Sangyoun Lee
Yonsei University, Korea

OS10 System and Control (2)

09:30~10:45 Tuesday, January 30, 2024

Meeting Room 1 (5F)

Chair: Seung-Chan Lim (Hankyong National University)

01 **Deep Reinforcement Learning-Based Path-Tracking for Unmanned Vehicle Navigation Enhancement**
Seung Geon Yang, Eun Ho Cho, Jeongyun Kim, and Seung-Chan Lim
Hankyong National University, Korea

02 **Designing an End-to-End UAV System for Insulator Inspection under Transmission Tower Environments**
Jinyeong Jeong[1], Seongsu Park[1], Sanghoon Lee[1], Donghyeon Youn[2], and Min Jun Kim[1]
[1]KAIST, Korea, [2]KEPCO, Korea

03 **Study on Improving the Durability of Shaded Pole Induction Motors Used for Refrigerator Fans**
Jae-Hyeon Yeo[1], Dong-Kyu Lee[1], Bong-Jik Kim[1], and Gyu-Sik Kim[1,2]
[1]SPG Co. Ltd., Korea, [2]University of Seoul, Korea

04 **An Indoor Autonomous Delivery Robot System with ROS**
Seongjin Kong[1], Hyongwoo Kim[2], and Wonchang Lee[3]
[1]Pukyong National University, Korea, [2]LIG NEX1 Co., Ltd., Korea, [3]Pukyong National University, Korea

SS10 High-speed wireline IO Invited

09:30~10:45 Tuesday, January 30, 2024

Meeting Room 2 (5F)

Chair: Kwanseo Park (Yonsei University)

01 **Design of Single-Ended PAM-3 Transmitter with Crosstalk Cancellation for Memory Interface**
Dongwoo Kang and Kwanseo Park
Yonsei University, Korea

02 A 48-Gb/s 2.4-pJ/b PAM-4 Receiver with Stochastic Baud-Rate Phase Detector

Haram Ju and Kwangho Lee
KETI, Korea

03 An Analysis of 32-Gb/s and Full-Rate Phase Interpolator based Clock and Data Recovery

Dong-Hoe Heo[1], Tae-Hyeon Kim[1], Kwang-ho Lee[2], and Min-Seong Choo[1]
[1]Hanyang University, Korea, [2]KETI, Korea

04 A Study on the Effects of Power Loading Profile in Discrete Multitone Wireline Serial-Data Transceiver with Fixed-Point DSP-SerDes Simulator

Seoyoung Jang, Jaewon Lee, and Gain Kim
DGIST, Korea

05 Area Optimization of the Feed-Forward Equalizer for ADC-Based High-Speed Wireline Receiver Using Channel Characteristics

Yujin Choi, Seoyoung Jang, and Gain Kim
DGIST, Korea

SS11 Future Brain-Inspired Intelligence System Semiconductor

09:30~10:45 Tuesday, January 30, 2024

Meeting Room 3 (5F)

Chair: Sangwan Kim (Sogang University)

01 Motion Mask-driven Improvements in Monocular Dynamic Novel View Synthesis

Suwoong Yeom[1], Hosung Son[1], Chanhee Kang[1], Joonsoo Kim[2], Kug-jin Yun[2], Won-Sik Cheong[2], and Suk-ju Kang[1]
[1]Sogang University, Korea, [2]ETRI, Korea

02 A Dynamic ReRAM Compact Model and its Auto-Calibration Method

Minsun Cho, Taeheon Lee, and Sungyeop Jung
Seoul National University, Korea

03 Vertical-Ferroelectric-Metal Field-Effect Transistor (V-FeMFET) for Low-Power Non-Volatile Memory

Heebum Kang[1], Seungwon Go[1], Seungmin Kang[1], Kihoon Kim[1], Jiwon Han[1], Tae-Hyeon Kim[2], Sangwan Kim[1], and Sihyun Kim[1]
[1]Sogang University, Korea, [2]Georgia Institute of Technology, USA

04 **Investigation on Electron Back Tunneling Effect in Charge Trap Flash Memory with SiO_2-Si_3N_4 (ON) Gate Dielectric**
Jaekyun Son[1], Jae Yeon Park[1], Tae-Hyeon Kim[2], Sihyun Kim[1], and Sangwan Kim[1]
[1]Sogang University, Korea, [2]Georgia Institute of Technology, USA

05 **CNN-based Encoder and Transformer-based Decoder for Efficient Semantic Segmentation**
Seunghun Moon and Suk-ju Kang
Sogang University, Korea

OS11 Communications (3)

09:30~10:45 Tuesday, January 30, 2024

Meeting Room 4 (5F)

Chair: Intae Hwang (Chonnam National University)

01 **Energy-Aware Controller Load Distribution in Software-Defined Networking**
Poom Somwong and Yuthapong Somchit
Chiang Mai University, Thailand

02 **Discrete Time Two-Frequency Shift Keying**
Paramote Wardkein, Chanapat Kaew-In, Thanaree Wanprasert, Pandaree Philuek, Nateekan Moonthongnoi, and Peeramed Chodkaveekityada
King Mongkut's Institute of Technology Ladkrabang, Thailand

03 **I2Match: Optimization Techniques on Subgraph Matching Algorithm using Label Pair, Neighboring Label Index, and Jump-Redo method**
Chi Qin Cheng, Kok Sheik Wong, and Lay Ki Soon
Monash University, Malaysia

04 **Aggregate Interference Impact of Multiple Aeronautical ESIM Communicating with Non-GSO FSS Space Stations on Terrestrial Station in Ka-band**
Daesub Oh
ETRI, Korea

05 **V2X Communication Technology Trends in South Korea**
Kitaeg Lim, Seonghyun Jang, Byoungman An, and Sanghun Yoon
KETI, Korea

OS12 Semiconductor Devices/Circuits (4)

09:30~10:45 Tuesday, January 30, 2024

Meeting Room 5 (5F)

Chair: Min-Jae Seo (Gachon University)

01 **Mixed-signal Dot-product Processor with Switched-Capacitors for Machine Learning**
Kyu-hyoun Kim[1] and Mingu Kang[2]
[1]IBM Thomas J. Watson Research Center, USA, [2]University of California, USA

02 **Flash-Based Hardware Neural Networks Using Positive Feedback Binary Neuron Devices**
Dongseok Kwon[1] and Sung Yun Woo[2]
[1]University of California, USA, [2]Kyungpook National University, Korea

03 **Timing-aware Tier Partitioning for 3D ICs with Critical Path Consideration**
Sojung Park and Heechun Park
Kookmin University, Korea

04 **A Hardware-efficient Rate Encoding Hardware with Latch-based TRNG**
Sun-A Jo, Ji-won Seo, and Min-jae Seo
Gachon University, Korea

05 **A 40MHz Skewed Crystal Oscillator with Duty Cycle Corrector and Frequency Doubler for WIFI 6 in a 22nm CMOS**
Young-Ryul Yun, Jeong-Su Mok, and In-Chul Hwang
Kangwon University, Korea

SS12 Recent Progresses in Electronic and Electrical Engineering at Ewha Womans University Invited

13:00~14:15 Tuesday, January 30, 2024

Meeting Room 2 (5F)

Chair: Suhyun Park (Ewha Womans University)

01 **Assessment of Accuracy and Power Consumption of a Processing-in-Memory Architecture Based on SiNx Memristor Synapse Array**
Soomin Kim[1], Yeji Lee[1,2], and Seongjae Cho[1]
[1]Ewha Womans University, Korea, [2]Hankyong National University, Korea

02 **Automatic segmentation of pancreatic cancer cells for cytological images**
Qian Liu, Yeonwoo Moon, Minjeong Kim, and Suhyun Park
Ewha Womans University, Korea

03 **Longest Prefix Matching Using Longest-First Search in a Leaf-Pushing Trie**
Jinsol Lee and Hyesook Lim
Ewha Womans University, Korea

04 **Effects of Misaligned Gate Lapping over the Channel on Performances of Ultra-Thin Vertical-Pillar MOSFET**
Soomin Kim and Seongjae Cho
Ewha Womans University, Korea

05 **2D Motion Tracking for Vascular Wall in Ultrasound Imaging**
Anika Tabassum Sejuty, Jeongwung Seo, and Suhyun Park
Ewha Womans University, Korea

06 **Store Object Recognition using Deep Learning Approach**
Kangwon Seo[1], Yan Yizhuo[1], Min Jeong Kim[1], Yeon Woo Moon[1], Tae in Lee[1], Jiwon Lee[1], You Jin Jeon[1], Hyohoon Choi[2], and Suhyun Park[1]
[1]Ewha Womans University, Korea, [2]Pixel, Inc., Korea

SS13 Exploring Cutting-Edge Technologies for Electronic Devices and Signal Processing - Yonsei University and Chang-Gung University Joint Session

13:00~14:15 Tuesday, January 30, 2024

Meeting Room 3 (5F)

Chair: Won Woo Ro (Yonsei University)

01 **Memory Device Reliability Modeling of V-NAND using Calibrated Technology Computer-aided Design**
Jinwoo Kim[1,2] and Ilgu Yun[1]
[1]Yonsei University, Korea, [2]Samsung Electronics Co., Ltd., Korea

02 **Functional Bioelectronic Materials for Long-Term Biocompatibility and Functionality**
Jungmok Seo
Yonsei University, Korea

03 **Reconfigurable Bit Precision and Adaptive Power Adjustment In-memory Computing Circuit Design**
Chun-Fu Chen[1], I-Chieh Hsu[2], Chia-Wei Su[2], Ting-Yu Kuo[2], and I-Chyn Wey[2]
[1]National Taiwan University of Science and Technology, Taiwan, [2]Chang-Gung University, Taiwan.

04 **Establishment of Paper - based Biological Cell Analytical Platform for Cellular and Molecular Assays**

Kin Fong Lei
Chang Gung University, Taiwan

OS13 Artificial Intelligence and Signal Processing (3)

13:00~14:15 Tuesday, January 30, 2024

Meeting Room 4 (5F)

Chair: Jaeha Kung (Korea University)

01 **A Neural Network based 2D Polynomial Fitting Approach for Electrical Properties Tomography in 3T MRI**

Thierry G. Meerbothe[1], Stefano Mandija[1], Kyu-Jin Jung[2], Chuanjiang Cui[2], Mina Park[3], Cornelis A.T. van den Berg[1], and Dong-Hyun Kim[2]
[1]University Medical Center Utrecht, The Netherlands, [2]Yonsei University, Korea (South), [3]Gangnam Severance Hospital, Korea (South)

02 **What's Next?: Exploring Machine Learning-Based Approaches to Content Suggestions using IMDb Movie Reviews**

Gabriel Avelino Sampedro
University of the Philippines Open University, Philippines, De La Salle University, Philippines

03 **How You Like That?: Development of a Korean Drama Recommendation System through Sentiment Analysis**

Gabriel Avelino Sampedro
University of the Philippines Open University, Philippines, De La Salle University, Philippines

04 **Predicting Pre-Order Sales Using Time Series Algorithm, Forecasting, and ARIMA Model in Python for Small Businesses**

Gabriel Avelino Sampedro
University of the Philippines Open University, Philippines

05 **A Full SW-HW Demonstration of GEMM Accelerators with RISC-V Instruction Extensions**

Seonghun Jeong[1], Jooyeon Lee[2], and Jaeha Kung[1]
[1]Korea University, Korea, [2]DGIST, Korea

OS14 Semiconductor Devices/Circuits (5)

13:00~14:15 Tuesday, January 30, 2024

Meeting Room 5 (5F)

Chair: Donguk Nam (Nanyang Technological University)

01 **Optically-Pumped Photoluminescence from Ge Quantum-Well Disk Cavity**
Donguk Nam[1] and Seongjae Cho[2]
[1]Nanyang Technological University, Singapore, [2]Ewha Womans University, Korea

02 **Comparative Analysis of Passive, Active, and Hybrid Cell Balancing for Optimal Battery Performance**
Wu Cong Lim, Boon Chiat Terence Teo, Xian Yang Lim, Liter Siek, and Eng Leong Tan
Nanyang Technological University, Singapore

03 **A Review on Integrated RC Frequency References for IoT Applications**
Woojun Choi
Kyung Hee University, Korea

04 **Optimizing Gate Insulator Conditions via Interfacial Oxidation in Vertical Structure TFTs**
Sang Hun Hwang, Byung Seol Hwang, Sang Ho Hwang, Seung Jae Moon, Jong Mo Lee, and Byung Seong Bae
Hoseo University, Korea

05 **A CMOS Analog Front-End for Hall Sensor Readout IC**
Kang-Il Cho[1], Jun-Ho Boo[2], Jae-Geun Lim[3], and Gil-Cho Ahn[3]
[1]KETI, Korea, [2]Samsung Electronics Co., Ltd., Korea, [3]Sogang University, Korea

SS14 Next-Generation Intelligent Mobility Platforms @ SeoulTech Invited

14:15~15:30 Tuesday, January 30, 2024

Meeting Room 2 (5F)

Chair: Wonbo Shim (SEOULTECH)

01 **Mixed Precision Quantization with Hardware-friendly Activation Functions for Hybrid ViT Models**
Beom Jin Kang, Da Hun Choi, and Hyun Kim
Seoul National University of Science and Technology, Korea

02 **Extreme Pruning Technique Based on Filter Deactivation Using Sparsity Training for Deep Convolutional Neural Networks**
Kwanghyun Koo and Hyun Kim
Seoul National University of Science and Technology, Korea

03 **Low Power Design Method of Split-Gate NOR Flash Memory Device for Compute-in-Memory**
Chan-Gi Yook and Wonbo Shim
Seoul National University of Science and Technology, Korea

04 **Detecting Backdoors Embedded in Ensembles**
SeokHee Kim and Changhee Hahn
Seoul National University of Science and Technology, Korea

05 **Converter Control Interaction Phenomenon in a Multi-infeed HVDC System**
Sung-Wook Yi, Haesong Cho, Man-Gil Bu, and Do-Hoon Kwon
Seoul National University of Science and Technology, Korea

SS15 Charge-Trap Memory, Circuits, and Systems for Hardware On-Chip Learning

Invited

14:15~15:30 Tuesday, January 30, 2024

Meeting Room 3 (5F)

Chair: Kee-Won Kwon (Sungkyunkwan University)

01 **Comparative Analysis of TFT-Type Synaptic Device Characteristics with P-Type Doped Body Structures**
Jeong-hyun Kim[1], Min-Kyu Park[1], Joon Hwang[1], Jong-Won Back[1], Jong-Ho Bae[2], and Jong-Ho Lee[1]
[1]Seoul National University, Korea, [2]Kookmin University, Korea

02 **Random Synaptic Weights for Error Backpropagation in NAND Flash Memory Based Synaptic Devices**
Sung-Tae Lee
Hongik University, Korea

03 **Mitigating the Impact of Device Nonideality in Analog PIM-based Neural Networks via Training**
Sugil Lee[1], Chenghao Quan[1], Jongeun Lee[1], Mohammed Fouda[2], and Fadi Kurdahi[2]
[1]UNIST, Korea, [2]University of California-Irvine, USA

04 **Highly Linear Charging/Discharging of Charge Trap FET using Regulated Single Pulse for Neural Accelerator**
Jeong-In Choi, Seo-Yoon Lee, Chan-Woong Park, Jin-Gon Oh, Ji Hoon Kang, and Kee-Won Kwon
Sungkyunkwan University, Korea

OS15 Artificial Intelligence and Signal Processing (4)

14:15~15:30 Tuesday, January 30, 2024

Meeting Room 4 (5F)

Chair: Hansung Kim (University of Southampton)

01 **Magtanim Ay 'Di Biro: Regional Prediction of Crop Yield Success Rate in the Philippines using Geographic Trend Analysis Algorithm**
Gabriel Avelino Sampedro
University of the Philippines Open University, Philippines

02 **Energy-Efficient AI at the edge for Biomedical Applications**
Zhuoyue Li[1], Rucheng Jiang[1], Chne-Wuen Tsai[1], and Jerald Yoo[1,2]
[1]National University of Singapore, Singapore, [2]N.1 Institute for Health, Singapore

03 **A Dynamic Gesture Recognition Algorithm Using Single Halide Perovskite Photovoltaic Cell for Human-Machine Interaction**
An Kyung-Chan[1], Li Jun-Ying[1], Yang Chu-Feng[1], Ng Si En Timothy[1], Shibi Varku[1], Wu Qinjie[1], Priyanka Kajal[1], Nripan Mathews[1], Arindam Basu[2], and Tony Tae-Hyoung Kim[1]
[1]Nanyang Technological University, Singapore, [2]City University of Hong Kong, Hong Kong

04 **Deep Learning to classify Bacterial species in the same genus**
Sherin Sheela[1], May Phu Piang[1], Sakda Sakorntanant[2], and Suvit Poomrittigul[1]
[1]King Mongkut's Institute of Technology Ladkrabang, Thailand, [2]Pathumwan Institute of Technology, Bangkok, Thailand

05 **Omnidirectional depth estimation for semantic segmentation**
Jiaqi Zhou[1], Yihong Wu[1], Hwasub Lim[2], and Hansung Kim[1]
[1]ECS University of Southampton, United Kingdom, [2]KIST, Korea

OS16 Emerging Technologies (1)

14:15~15:30 Tuesday, January 30, 2024

Meeting Room 5 (5F)

Chair: **Shingo Yamaguchi** (Yamaguchi University)

01 **Multi-Trip Routing of Delivery Drones with Load-Dependent Flight Speed**
Mao Nishira[1], Hiroki Nishikawa[2], Xiangbo Kong[3], and Hiroyuki Tomiyama[1]
[1]Ritsumeikan University, Japan, [2]Osaka University, Japan, [3]Toyama Prefectural University, Japan

02 **Mesa-Based Simulator of Botnet Defense System and Impact Evaluation of Botnet Infection Rates**
Shingo Yamaguchi
Yamaguchi University, Japan

03 **Analysis of the Subscription Rate Plan in the DC Fast Charger for Electric Vehicles**
Dong Sik Kim[1], Young Mo Chung[2], Young Il Lee[3], and Beom Jin Chung[3]
[1]Hankuk University of Foreign Studies, Korea, [2]Hansung University, Korea, [3]Seoul National University of Science and Technology, Korea

04 **A study on Guest-Host liquid crystal polarizer technology to improve the transmittance of polarized Closed-circuit Television**
Na-Kyung Lee, Hyeon-Sik Ahn, and Yoonseuk Choi
Hanbat National University, Korea

05 **Digital Transformation of Cultural Heritage for Various Museum Applications**
Jae-Ho Lee, Chan-Woo Park, and Hee-Kwon Kim
ETRI, Korea

OS17 Computer and Information (2)

15:45~17:00 Tuesday, January 30, 2024

Meeting Room 1 (5F)

Chair: **Jungwook Choi** (Hanyang University)

01 **Breast Cancer Detection in the Philippines Using Machine Learning Approaches**
Maria Maura S. Tinao, Ruth B. Rodriguez, and Eunelfa Regie F. Calibara
University of the Philippines Open University, Philippines

02 Spatial-Temporal Flood Hazard Mapping Using Integration of Telemetry Data and Prediction Model
Pornnapa Panyadee and Paskorn Champrasert
Chiang Mai University, Thailand

03 Searching Optimal Floating-Point Format for Sub-8-bit Large Language Model Inference
Youngdeok Hwang[1], Janghwan Lee[2], Jiwoong Park[2], Jieun Lim[3], and Jungwook Choi[2]
[1]City University of New York, USA, [2]Hanyang University, Korea, [3]SAPEON Korea Inc. Korea

04 Synergizing CXL with Unified Memory for Scalable GPU Memory Expansion
Junseung Lee and Jungrae Kim
Sungkyunkwan University, Korea

SS16 Development for Processing Software on AI Semiconductor Devices @ SeoulTech

15:45~17:00 Tuesday, January 30, 2024

Meeting Room 2 (5F)

Chair: Won-Young Lee (SEOULTECH)

01 Enhancing Pseudo-labeling Performance in Object Detection Using Gaussian Mixture Modeled Uncertainty
Seungil Lee and Hyun Kim
Seoul National University of Science and Technology, Korea

02 A Novel Refresh Technique for Capacitor-less DRAM-based Processing-in-Memory
Do Hyun Kim, Hui-Jae Choi, and Wonbo Shim
Seoul National University of Science and Technology, Korea

03 Design of a Low-Jitter Digitally Controlled Oscillator With Supply Noise Compensation
Min-Ji Kim and Won-Young Lee
Seoul National University of Science and Technology, Korea

04 Informative Words-Based Curriculum Learning Strategy for Personality Detection
Naae Kwon, Yuenkyung Yoo, and Byunghan Lee
Seoul National University of Science and Technology, Korea

05 Optimized Variable-to-Variable Length Coding for Enhanced Efficiency in DNA Storage
Sanghoon Kang[1], Yunfei Gao[2], and Albert No[2]
[1]UF College of Pharmacy, USA, [2]Hongik University, Korea

SS17 i-EoT System IC Invited

15:45~17:00 Tuesday, January 30, 2024

Meeting Room 3 (5F)

Chair: Kwang-Hyun Baek (Chung-Ang University)

01 **Switching Technique of Capacitive DAC for Low-Power SAR ADC**
Seongjun Byun, Tae-Hyun Kim, Junghun Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

02 **An Output-Voltage-Aware Charge Control Method for Low Cross-Regulation SIMO DC-DC Buck Converter**
Dong-Hyun Shin, Chunghee Jang, Jong-Hyeon Seo, Youngkyu Kim, Joohee Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

03 **A Hybrid phase-interpolator implemented in 2.4 GHz Fractional-N Sub-Sampling PLL**
Jeetaeck Seo, Jong-Hyeon Seo, Joohee Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

04 **Accelerating Object Detection in Medical Images with Edge Computing**
Munkyu Lee, Sihoon Seong, Hyunho Ahn, and Cheol-Ho Hong
Chung-Ang University, Korea

OS18 Artificial Intelligence and Signal Processing (5)

15:45~17:00 Tuesday, January 30, 2024

Meeting Room 4 (5F)

Chair: Sungho Suh (German Research Center for Artificial Intelligence (DFKI))

01 **On the Disentanglement and Robustness of Self-Supervised Speech Representations**
Yanjue Song[1], Doyeon Kim[2], Nilesh Madhu[1], and Hong-Goo Kang[2]
[1]Ghent University, Belgium, [2]Yonsei University, Korea

02 **Bitrate-Informed Coded Speech Enhancement Model**
Haixin Zhao and Nilesh Madhu
Ghent University, Belgium

03 **Fault Diagnosis of Indium Tin Oxide Electrodes by Multi-channel S-parameter Patterns**
Sungho Suh[1], Haebom Lee[2,3], and Tae Yeob Kang[4]
[1]University of Kaiserslautern-Landau, Germany, [1]German Research Center for Artificial Intelligence (DFKI), Germany, [2]Heidelberg University, Germany, [3]AIMMO Co., Ltd., Korea, [4]The University of Suwon, Korea

04 **Image Generation of Ultra-Thin Polymer Films Using Diffusion Models from Tensile Testing for Mechanical Failure Prediction**
Sungho Suh[1], Haebom Lee[2,3], and Tae Yeob Kang[4]
[1]University of Kaiserslautern-Landau, Germany, [1]German Research Center for Artificial Intelligence (DFKI), Germany, [2]Heidelberg University, Germany, [3]AIMMO Co., Ltd., Korea, [4]The University of Suwon, Korea

05 **SliceFormer: Deep Dense Depth Estimation from a Single Indoor Omnidirectional Image using a Slice-based Transformer**
Yihong Wu, Yuwen Heng, Mahesan Niranjan, and Hansung Kim
University of Southampton, United Kingdom

OS19 Emerging Technologies (2)

15:45~17:00 Tuesday, January 30, 2024

Meeting Room 5 (5F)

Chair: Jerald Yoo (National University of Singapore)

01 **Development of A Pressure-Sensitive Triboelectric Self-Powered Sensor using Protruded Hemispherical Array Structures**
Jie-Wei Gim, Lei-Jun Siau, Jen-Hahn Low, Eng-Hock Lim, and Pei-Song Chee
Universiti Tunku Abdul Rahman, Malaysia

02 **Body-coupled power transfer and energy harvesting for wearables**
Jia Yi Fong[1], Zhuoyue Li[1], and Jerald Yoo[1,2]
[1]National University of Singapore, Singapore, [2]N.1 Institute for Health, Singapore

03 **An Ultrasound Imaging System with RX Beamfocusing for UAV Applications**
Jiaqi Guo[1], Junwei Feng[1], Silin Chen[1], and Jerald Yoo[1,2]
[1]National University of Singapore, Singapore, [2]N.1 Institute for Health, Singapore

04 **Depth-resolved feature detection of skin with portable optical coherence tomography**
Tai-Ang Wang[1], Yin-Shen Cheng[1], Hsiang-Chieh Lee[1], Chien-Yu Lin[2], Chau Yee Huang[2,3], and Meng-Tsan Tsai[2,3]
[1]National Taiwan University, Taiwan, [2]Chang Gung University, Taiwan, [3]Chang Gung Memorial Hospital, Taiwan

05 **Distributed Computation Offloading in Dynamic Fog Computing Networks: A Learning based Matching Approach**
Hoa Tran-Dang and Dong-Seong Kim
Kumoh National Institute of Technology, South Korea

Poster Sessions

PS1 Artificial Intelligence and Signal Processing (1)

09:00~10:15 Monday, January 29, 2024

Lobby (5F)

Chair: Kyuho Lee (UNIST)

01 **FMCW Radar-Based Hand Gesture Recognition with Novel Time-Spectrograms and Lightweight Convolutional Neural Network for Mobile Device**
Seungbin Kim[1], Jin Myeong Heo[1], Sangho Lee[1], Kiseo Kim[2], Jaeuk Choi[2], Gangil Byun[1], and Kyuho Lee[1,3]
[1]KAIST, Korea, [2]UNIST, Korea, [3]Samsung Display Co., Ltd., Korea

02 **Anomaly Segmentation for Unmanned Ground Vehicle in Complex Scenes**
Suyeon Kim, Youngjo Lee, and Euntai Kim
Yonsei University, Korea

03 **Quad-Bayer CFA Demosaicing Using Steering Kernel and Adaptive Residual Interpolation**
Jongeun Park and Moon Gi Kang
Yonsei University, Korea

04 **DDANet: Dilated Deformable Attention Network for Dynamic Scene Deblurring**
Byungnam Kim[1], Hyungjoo Jung[2], and Kwanghoon Sohn[1]
[1]Yonsei University, Korea, [2]KIST, Korea

05 **The Limitations of Shared Batch Normalization Layers in Mixing-Based Data Augmentation**
Donghyeon Baek, Jongyoun Noh, and Bumsub Ham
Yonsei University, Korea

06 **Instance-wise Adaptive Label Smoothing for Network Calibration**
Jongyoun Noh, Hyekang Park, Donghyeon Baek, and Bumsub Ham
Yonsei University, Korea

07 **Active Contrastive Learning with Noisy Labels in Fine-Grained Classification**
Byeong-il Kim and Byung Chul Ko
Keimyung University, Korea

17 **Enhanced Small Ship Detection Method for Unmanned Surface Navigation Using the Divide and Conquer Approach and ByteTrack**

Junhee Lee[1], Jisang You[1], and Kyoungson Jhang[2]
[1]Ground Technology Research Institute Agency for Defense Development Daejeon, Korea, [2]Chungnam National University, Korea

18 **Single Image Deraining Network Using Fusion of LSTM-Based Feature in Wavelet Domain**

So Young Choi[1], Su Yeon Park[1], Tae Hee Park[2], and Il Kyu Eom[3]
[1]Pusan National University Republic of Korea, [2]Tongmyong University Republic of Korea, [3]National University Republic of Korea

19 **Vital Signal Estimation Using Various Radars and the Contact Measurement Equipment**

Sewon Yoon[1], Taeyun Kim[1], Soobum Kim[2], Youngseok Baek[3], Bontae Koo[3], Inoh Choi[4], Jooho Jung[5], and Sanghong Park[1]
[1]Pukyong National University, Korea, [2]Radsys, Korea, [3]ETRI, Korea, [4]Korea Maritime & Ocean University, Korea, [5]Konkuk University, Korea

20 **Light Field Synthesis from a Monocular Video using Neural Radiance Fields**

Hyungsun Baek and In Kyu Park
Inha University, Korea

21 **BEV Perception Methods for Autonomous Driving**

Kayeon Kim, Minho Cho, Minseong Park, Jangwon Oh, Seokwon Choi, and Euntai Kim
Yonsei University, Korea

22 **Invariant Risk Minimization in Medical Imaging with Modular Data Representation**

Jun-Hyun Bae[1], Chanwoo Kim[2], and Taeyoung Chang[2]
[1]Kyungpook National University, Korea, [2]Seoul National University, Korea

23 **Efficient Approximate Parallel Prefix Adder Design**

Jihwan Lim, Yuseok Lee, Donghun Lee, and Hoyoung Yoo
Chungnam National University, Korea

24 **EVTCNet : Efficient Vision Transformer With Convolution Network**

Se-Hun Kim[1], Chunmyung Park[1], Kyujoong Lee[2], and Hyuk-Jae Lee[1]
[1]Seoul National University, Korea, [2]Sungshin Women's University, Korea

25 **Channel-Aided Random Access for Supporting Secure Edge Computing**

Taehoon Kim[1], Manjoro Ashleigh Tatenda[1], Soo Mee Kim[2], and Inkyu Bang[1]
[1]Hanbat National University, Korea, [2]Korea Institute of Ocean Science & Technology, Korea

26 **Transparent Dual-Band Reflectarray Antenna Based on Mesh-Type Unit-Cell for LEO Satellite Communications**

Bagas Satriyotomo[1], Hwanhee Yoo[1], Ji-Woong Hyun[1], Jae-Hoon Bang[2], and Seongmin Pyo[1]
[1]Hanbat National University, Korea, [2]AFRAM Co., Ltd., Korea

27 **Artificial Noise Assisted Secure Transmission for Low Earth Orbit Satellite Communications**
Inkyu Bang[1], Seong Ho Chae[2], and Taehoon Kim[1]
[1]Hanbat National University, Korea, [2]Tech University of Korea, Korea

PS2 Artificial Intelligence and Signal Processing (2)

13:00~14:15 Monday, January 29, 2024

Lobby (5F)

Chair: Xuan Truong Nguyen (Seoul National University)

01 **Utilizing Unclean Samples with Label Correction in a Neural Network**
Jongmin Shin[1], Jonghyeon Won[1], Hyun-Suk Lee[2], and Jang-Won Lee[2]
[1]Yonsei University, Korea, [2]Sejong University, Korea

02 **Robust Pseudo-Panchromatic Image Estimation via Patch-wise SVD for Multispectral Demosaicking**
Jinook Lee and Moon Gi Kang
Yonsei University, Korea

03 **Boundary-aware Camouflaged Object Detection via Deformable Point Sampling**
Minhyeok Lee, Suhwan Cho, Chaewon Park, Dogyoon Lee, Jungho Lee, and Sangyoun Lee
Yonsei University, Korea

04 **Defense Issue Analysis using BERT and LDA Topic Modeling: Focused on Defense Innovation 4.0**
Doohong Park[1,2], Donggoo Kang[2], and Joonki Paik[2]
[1]Republic of Korea Army, [2]Chung-Ang University, Korea

05 **Enhancing Video Frame Interpolation with Flow-Guided Deformable Convolution**
DongWoo Kang, Sangjin Lee, Chajin Shin, and Sangyoun Lee
Yonsei University, Korea

06 **Real-time Semantic Segmentation with Bilateral Patch Attention**
Minseok Kang, Minhyeok Lee, and Sangyoun Lee
Yonsei University, Korea

07 **Optimizing Real-time NIR Image Segmentation: Enhancing Accuracy through Bilateral Fusion for False Negative Mitigation**
Haejun Bae[1], Dong-Goo Kang[2], Minhye Chang[2], Kye Young Jeong[2], and Byung Cheol Song[1]
[1]Inha University, Korea, [2]KERI, Korea

08 Exploring Biological Features of Electroencephalography Signals for Explanation-Guided Learning

Hyosung Joo, Dongseok Kim, Le Thi Trang, Luong Do Anh Quan, and Jihwan Woo
University of Ulsan, Korea

09 Drone Detection and Identification Using Multi-Sensor Fusion

Seung-Kyu Han, Seul-Ae Gwon, and Young-Ho Jung
Korea Aerospace University, Korea

10 Error-Resilient Inference with an Error-Aware Activation Function in a Deep Neural Network

Jeong-Gun Lee and Dongyoung Kim
Hallym University, Korea

11 Ambiguity analysis of multiple-target localization in a bistatic radar

Ho Jae Kim and Hyoung-Nam Kim
Pusan National University, Korea

12 Arbitrary Multi-Directional Style Transfer for Magnetic Resonance Images via Multiple Discriminators

Hanbyol Jang, Hyeongyu Kim, Geonhui Son, and Dosik Hwang
Yonsei University, Korea

13 Segmentation-Guided Neural Radiance Fields for Foreground Object 3D Reconstruction

Seon Bin Kim and Byoung Chul Ko
Keimyung University, Korea

14 Monocular 3D Indoor Scene Reconstruction with Slot Attention

Minseok Kang and Sangyoun Lee
Yonsei University, Korea

15 Detection of LPI Radar Signals Based on Periodicity Analysis

Do-Hyun Park and Hyoung-Nam Kim
Pusan National University, Korea

16 Enhancing Defense Surveillance: Few-Shot Object Detection with Synthetically Generated Military Data

Chanyeong Park[1], Seongjun Lee[2], Hankyul Choi[3], Donghyun Kim[4], Yunyoung Jeong[5], and Joonki Paik[1]
[1]Chung-Ang University, Korea, [2,3]Republic of Korea Army, [4]Republic of Korea Marine Corp, [5]Republic of Korea Air Force

17 SC-ERM: Speaker-Centric Learning for Speech Emotion Recognition

Juhwan Yoon, Seyun Um, Woo-Jin Chung, and Hong-Goo Kang
Yonsei University, Korea

PS3 Artificial Intelligence and Signal Processing (3)

14:15~15:30 Monday, January 29, 2024

Lobby (5F)

Chair: Hyunmin Jung (SEOULTECH)

01 **U-Net Based Enhanced Lane Detection Learning with Directional Lane ROIs for Harsh Environments**
Seung-Hwan Lee and Sung-Hak Lee
Kyungpook National University, Korea

02 **Segmented Neural Light Field for Virtual Reality Targeting Large Spaces**
In-Gyu Jeong and Hyunmin Jung
Seoul National University of Science and Technology, Korea

03 **Filter Bank Algorithm-Based Remote Heart Rate Measurement**
Jukyung Lee, Hyosung Joo, Dongseok Kim, and Jihwan Woo
University of Ulsan, Korea

04 **Deep Color Constancy Based on RGB-to-NIR Conversion**
Dong-Hoon Kang, Dong-Keun Han, and Jong-Ok Kim
Korea University, Korea

05 **Referring Video Inpainting**
Minhyeok Lee, Minseok Kang, and Sangyoun Lee
Yonsei University, Korea

06 **Analysis of Explainable Convolutional Neural Network for Weak Radar Signal Detection**
Da-Min Shin, Do-Hyun Park, and Hyoung-Nam Kim
Pusan National University, Korea

07 **Enhancing Anomaly Detection Performance in Manufacturing Industry through Improved Alignment Algorithms**
Hyeongdong Ban, Daehwan Kim, Hyungmin Kim, and Hansang Cho
Samsung Electro-Mechanics, Korea

08 **Enhanced Visual Object Tracking and Segmentation in Military Environments: Overcoming Camouflage and Deformation Challenges**
Injae Lee[1], Sanga Lee[2], Jinseop Kim[2], Hyeonjoon Choi[3], Sinyoung Park[4], and Joonki Paik[1]
[1]Chung-Ang University, Korea, [2]Republic of Korea Air Force, [3]Republic of Korea Army, [4]Cyber Operation CMD, Korea

19 Trade-off Experiments in Efficient Blind Video Quality Assessment: An Analysis on Sampling Strategies across CPU and GPU

Hong, Sungman
InnoWireless Co. Ltd., Korea

20 Deep Illuminant Estimation Using RGB and NIR Images

Dong-Keun Han, Dong-Hoon Kang, and Jong-Ok Kim
Korea University, Korea

21 A Capacitorless Low Dropout Voltage Regulator with Enhanced Transient by Voltage Spike Detector

Kyounghwan Kim, Kyeongsik Nam, Mookyoung Yoo, Sanggyun Kang, Byeongkwan Jin, Hyeoktae Son, Jihyang Wi, Kibae Nam, and Hyoungho Ko
Chungnam National University, Korea

22 A 100 KS/s 12-bits SAR ADC with RC Hybrid DAC Structure Using Low Leakage Current Sampling Switch

Hyeoktae Son, Mookyoung Yoo, Sanggyun Kang, Byeonkwan Jin, Kyounghwan Kim, Jihyang Wi, Gibae Nam, and Hyoungho Ko
Chungnam National University, Korea

23 A New Virtual Keyboard System Using Pinch Gestures

Donggyu Kim[1], Viduranga Munasinghe[1], Tae-Ho Lee[1], Hyun-Jun Jin[2], Tae Sung Kim[3], Jin-Sung Kim[3], and Hyuk-Jae Lee[1]
[1]Seoul National University, Korea, [2]Kangwon National University, Korea, [3]Sunmoon University, Korea

24 Traffic Modeling on Virtual Platform for Optimized AI SoC

Taegyung Kim[1,2], Jaeyun Lim[1,2], Seoyeon Park[1,2], and Ji-Hoon Kim[1,2]
[1]Department of Electronic and Electrical Engineering, Ewha Womans University, Korea, [2]Graduate Program in Smart Factory, Ewha Womans University, Korea

25 3-Stage Pipelined Architecture for Block Prediction Mode in VDC-M Decoder

Hannah Yang[1,2], Sohyun Kim[1,2], Saeyeon Kim[1,2], Jiyoung Lee[1,2], Huijin Roh[1,2], and Ji-Hoon Kim[1,2]
[1]Department of Electronic and Electrical Engineering, Ewha Womans University, Korea, [2]Graduate Program in Smart Factory, Ewha Womans University, Korea

26 Multi-Cycle Hardware Architecture for Transform Mode in VDC-M Decoding

Huijin Roh[1,2], Sohyeon Kim[1,2], Saeyeon Kim[1,2], Hannah Yang[1,2], Jiyong Lee[1,2], and Ji-Hoon Kim[1,2]
[1]Department of Electronic and Electrical Engineering, Ewha Womans University, Korea, [2]Smart Factory Multidisciplinary Program, Ewha Womans University, Korea

PS4 Computer and Information & Emerging Technologies

15:45~17:00 Monday, January 29, 2024

Lobby (5F)

Chair: Young-Hoon Park (Sookmyung Women's University)

01 **Evaluating Performance of Shared On-Chip Caches in Multi-GPUs**
Gun Ko and Won Woo Ro
Yonsei University, Korea

02 **Implementation and analytical study of NTRU Key Generation regarding SVP**
Hye-Won Park and Yo-Han Park
Keimyung University, Korea

03 **Multi-Players Quoridor agent based on AlphaZero**
Jae-Mo Yang, Min-Seok Kim, Dong-Gi Kim, Dong-Won Lee, Han-Dong Kim, Min-Gi Kang, Doo-Hyun Choi, and Byoung-Ju Yun
Kyungpook National University, Korea

04 **Parallel Programming for Deep Learning with PyTorch Custom Kernel**
Hyuck Yi, Sunho Baek, Hyeran Hong, and JunSeong Kim
Chung-Ang University, Korea

05 **Design of a Load Balancing Technique for Edge Computing-based XR Interaction Data Management System**
Hyuntae Ju and Yong Mu Jeong
KETI, Korea

06 **Systolic Array Architecture Supporting Multiple Scaling Factors for U-Net Quantization**
Hyunwuk Lee and Won Woo Ro
Yonsei University, Korea

07 **A Multi-DNN Acceleration Architecture for Balanced QoS and Throughput**
Ipoom Jeong[1], Sungji Choi[2], Minjae Kim[3], Enhyeok Jang[4], Seokjin Go[3], and Won Woo Ro[3]
[1]University of Illinois Urbana-Champaign, USA, [2]Samsung Electronics, Korea, [3]Yonsei University, Korea

08 **Design of 5G NR-V2X DB Analysis Software**
Jimin Lee, Kitaeg Lim, Sanghun Yoon, Seonghyun Jang, and Byoungman An
KETI, Korea

09 **Design of a Modularized Recognition System Based on Embedded Edge Devices for XR Interactions**
Keonhee Lee, Hyuntae Ju, and Yong Mu Jeong
KETI, Korea

10 **An Analysis of Solidity Security Weaknesses Using GNN**
Ji-Seok Yang, Hyeon-Jin Jeon, SeungHyun Woo, Nnubia Pascal Nnamdi, and Yunsik Son
Dongguk University, Korea

11 **BDA: Blockchain-based decentralized authentication system for autonomous vehicle under Ad-hoc network**
Ji-sung Bae and Seung-Woo Seo
Seoul National University, Korea

12 **Channel-Wise Activation Map Pruning Using Max-Pool for Reducing Memory Accesses**
Chaehyeon Shin and Jongsun Park
Korea University, Korea

13 **Digital Calligraphy Based on Handwritten Calligraphy**
Choong Ho Lee
Hanbat National University, Korea

14 **Clipped Quantization Aware Training for Hardware-Friendly Implementation of Image Classification Networks**
Kyungchul Lee and Jongsun Park
Department of Electrical Engineering, Korea University, Korea

15 **Alphabet Eye-Writing Recognition Based on Wearable Eye Tracker**
Sumin Jeong, Dongseok Kim, Hyosung Joo, and Jihwan Woo
University of Ulsan, Korea

16 **Face Recognition for Soldiers with Bulletproof Helmets Using Generative Networks and Data Augmentation**
Minseo Choi[2,3], Wunjong Shin[2,3], Heesu Pyo[1,3], Wootaek Song[2,3], Byungjun Jung[2,3], Minwoo Shin[3], and Joonki Paik[3]
[1]Republic of Korea Navy, [2]Republic of Korea Army, [3]Chung-Ang University, Korea

17 **Efficiency Enhancement of Multi-Coil WPT using Phase-Shift and Coil Tilt-Angle Control Method**
Patrick Danuor and Young-Bae Jung
Hanbat National University, Korea

18 **Single-Shot Fabrication of Light Modulating Phase Mask for Lensless Camera Using Off-The-Shelf Components**
Nakkyu Baek[1], Kyung Chul Lee[1], Junghyun Bae[2], Joonsik Park[3], Taeyoung Kim[1], Donggeon Bae[1], Wook Park[4], and Seung Ah Lee[1]
[1]Yonsei University, Korea, [2]KIST, Korea, [3]Sejong University, Korea, [4]Kyung Hee University, Korea

29 **Control-Optimized Hardware Architecture for Mid-Point Prediction Mode in VDC-M Decoder**
Jiyoung Lee, Sohyeon Kim, Saeyeon Kim, Hannah Yang, Huijin Roh, and Ji-Hoon Kim
Ewha Womans University, Korea

30 **Custom DRAM Memory Controller for DDR4 ALPG Testing**
Seoyeon Park[1,2], Saeyeon Kim[1,2], Eunkyung Ham[1,2], Sunyoung Park[1,2], and Ji-Hoon Kim[1,2]
[1]Department of Electronic and Electrical Engineering, Ewha Womans University, Korea, [2]Smart Factory Multidisciplinary Program, Ewha Womans University, Korea

PS5 Semiconductor Devices/Circuits (1)

09:30~10:45 Tuesday, January 30, 2024

Lobby (5F)

Chair: Minsuk Koo (Incheon National University)

01 **Dual-Channel Vertical NAND Flash Memory for the High-Density and High-Accuracy Ternary-State Quantized Neural Networks**
Jin Ho Chang[1], Jae Seung Woo[1], Suk Kang Sung[2], Ki Whan Song[2], and Woo Young Choi[1]
[1]Seoul National University, Korea, [2]Samsung Electronics Co., Ltd., Korea

02 **Impact of Verification Errors on Off-Line Training in AND-Type Flash**
Junsu Yu, Donghyun Ryu, and Woo Young Choi
Seoul National University, Korea

03 **Out-of-Band Blocker Rejection Broadband CMOS Low-Noise Amplifier for Advanced Cellular Applications**
Juhui Jeong, Yujung Kim, Junhyeop Kim, and Junghwan Han
Chungnam National University, Korea

04 **Improved sensitivity of III-nitride based high temperature Hall effect sensor**
Cheng Han[1], Younghoon Kim[1], Mingi Seo[1], Jongwon Lee[1], John Son[2], and Junseok Heo[1]
[1]Ajou University, Korea, [2]Genicom Co. ,Ltd., Korea

05 **Investigating Work-Function Variation with a Gate Insulator Stack Based Dopingless Tunnel Field-Effect Transistors**
Su Yeon Jung and Jang Hyun Kim
Ajou University, Korea

06 **Low-temperature polycrystalline Ge growth on PtSe2 for BEOL compatible devices**
Hwayong Choi[1], Sukkyung Kang[2], Minseung Gyeon[2], Yeji Kim[1], Minhyeok Jeong[1], Kibum Kang[2], Sanha Kim[2], and Junseok Heo[1]
[1]Ajou University, Korea, [2]KAIST, Korea

17 **Temperature dependence of threshold voltage instability in E-mode GaN HEMTs with p-GaN gate**
Myeongsu Chae and Hyungtak Kim
Hongik University, Korea

18 **Stacked RRAM based nvSRAM and CNN implementation method**
Ji-Hoon Ahn[1], Minsuk Koo[2], and Yoon Kim[1]
[1]University of Seoul, Korea, [2]Incheon National University, Korea

19 **Spike-Predictable Neuron Circuits with Adaptive Threshold Value for Lowpower SNN System**
Seung Joon Lee, Jiin Moon, Dahyeon Youn, Minkyu Song, and Soo Youn Kim
Dongguk University, Korea

20 **Two-Step Classification Neurons for Low-Power Spiking Neural Networks**
Jiin Moon, Seung Joon Lee, Dahyeon Youn, Minkyu Song, and Soo Youn Kim
Dongguk University, Korea

21 **Ultra Low-Power Single-Slope ADC for Always-On Image Sensor Applications**
Kyungmin Lee, Su Yeon Yun, Minkyu Song, and Soo Youn Kim
Dongguk University, Korea

22 **In-Sensor Binarized Neural Network Processing for Face Detection Applications**
Yu Chan Yun, Hyunggyu Choi, Minkyu Song, and Soo Youn Kim
Dongguk University, Korea

23 **Improved high-k ZrO_2 dielectrics on Ge by interlayer optimization**
Jongwon Lee, Hwayong Choi, and Junseok Heo
Ajou University, Korea

24 **Floating Storage Node Effect in 2T DRAM Operation**
Juhong Min[1], Jang Hyun Kim[1], Soomin Kim[2], and Seongjae Cho
[1]Ajou University, Korea, [2]Ewha Womans University, Korea

25 **Improved InGaAs/InP photodiode with sulfur and polymer passivation**
WonJu Kim, Byeong M. Oh, Jong H. Kim, and Junseok Heo
Ajou University, Korea

26 **Thermal and Electrical Characteristics of Asymmetric MOSFET Using Various High-κ Spacer**
Yeon Sil Yang and Jang Hyun Kim
Ajou University, Korea

27 **Analysis of Thermal Effects According to Channel and Drain Contact Metal Distance**
Dogyun An and Jang Hyun Kim
Ajou University, Korea

28 **Enhanced Tunneling Electroresistance Ratio of Ferroelectric Tunnel Junction: Utilization of Non-Ferroelectric Resistive Switching Mechanism**

Wonjun Shin and Jong-Ho Lee
Seoul National University, Korea

29 **High performance of α-Ga_2O_3 solar blind UVC photodetector**

Mingi Seo[1], Young Hoon Kim[1], Dae Woo Jeon[2], John son[3], and Junseok Heo[1]
[1]Ajou University, Korea, [2]Korea Institute of Ceramic Engineering and Technology, Korea, [3]Genicom Co., Ltd., Korea

PS6 Semiconductor Devices/Circuits (2)

13:00~14:15 Tuesday, January 30, 2024

Lobby (5F)

Chair: Soo Youn Kim (Dongguk University)

01 **A 12-bit, 3200-μm^2 Multi-Step Incremental ADC with Zoom and Extended Counting**

Woojin Jo, Byungchoul Park, and Youngcheol Chae
Yonsei University, Korea

02 **Tunnel FET-based Charge Trapping Memory for Low Power Neuromorphic Systems**

Jae Seung Woo and Woo Young Choi
Seoul National University, Korea

03 **A 100MHz Fully Integrated Three Level Step Down Converter Using Package Bond-Wire Inductor**

Jeong Seop Lee[1,2], Ju Hyoung Kim[1], Sung Jae Lee[1], and Kang-Yoon Lee[1]
[1]Sungkyunkwan University, Korea, [2]Samsung Electronics Co., Ltd., Korea

04 **High Efficiency RF-DC Converter Operating Wide Input Power Range for Energy Harvesting Systems**

Je-Hoon Youn, Kyung-Duk Choi, and Kang-Yoon Lee
Sungkyunkwan University, Korea

05 **Self-Starting Boost Converter for RF-DC Converter**

Yeon Jun Kim, Dong Min Kim, Yu sub Sin, Kyung Duk Choi, and Kang Yoon Lee
Sungkyunkwan University, Korea

06 **Design and Implementation of Low Dropout Regulator (LDO) with Wide Input Voltage Range and Stability Using Class AB Super Source Follower**

Won Hyeong Lim, Kyung Duk Choi, Dong Min Kim, and Kang Yoon Lee
Sungkyunkwan University, Korea

07 A design of low power ZCD for Energy Harvesting system
Yu Sub Shin, Kyung Duk Choi, Dong Min Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

08 A 5.8GHz CMOS power amplifier using adjustive bias with temperature compensation
Seok Jae Hur, Ji Sung Jang, Ho Won Kim, and Kang-Yoon Lee
Sungkyunkwan University, Korea

09 A 28Gb/s Adaptive Single-Stage Feedforward Continuous Time Linear Equalizer for NRZ Receiver in 28nm CMOS
Joonhee Park, Jongmin Park, Yosep Cho, and Jinwook Burm
Sogang University, Korea

10 On-Chip Spiral Inductor Design Optimization Using ANN-Based Bayesian Optimization
GiWon Kim, HyunJoon Jeong, and SoYoung Kim
Sungkyunkwan University, Korea

11 Silicon-Germanium (SiGe) Metal-Ferroelectric-Metal-Insulator-Semiconductor (MFMIS) Tunnel Field-Effect Transistors (FeTFETs)
Jaemin Yeom, Minjeong Ryu, and Woo Young Choi
Seoul National University, Korea

12 Binary Neural Networks Using Nanoelectromechanical Memory Switches
Geun Tae Park and Woo Young Choi
Seoul National University, Korea

13 Design Optimization of TFET-Based Memory
Chang Heon Park, Hyung Jun Noh, Seon Ho Lee, and Woo Young Choi
Seoul National University, Korea

14 Analog Neuron Circuits for Hardware-Based Spiking Neural Networks
Jonghyuk Park and Woo Young Choi
Seoul National University, Korea

15 TFET-Based Nonvolatile Memory Optimization Regarding Trap Positions
Hyung Jun Noh, Chang Heon Park, Seon Ho Lee, and Woo Young Choi
Seoul National University, Korea

16 Analysis of the Extensibility of FPGA Reverse Engineering
Soyeon Choi, Yunjin Noh, Dohun Kim, and Hoyoung Yoo
Chungnam National University, Korea

17 Influence of Doping Concentrations of Gate-Source/Drain Overlap Region on MFMIS FeFETs
Changha Kim[1], Dong-Oh Kim[1,2], and Woo Young Choi[1]
[1]Seoul National University, Korea, [2]Samsung Electronics Co., Ltd., Korea

29 **Internal Compensation X-ray Detector Pixel Circuit with IGZO TFT and Perovskite Single Crystal**
Janghoo Lee[1], Youngjin Kim[1], Hyekang Park[1], Seoyun Kim[1], Seyong Choi[1], Seungjae Moon[1], Wei Lei[2], and Byoung Seong Bae[1]
[1]Hoseo University, Korea, [2]Southeast University, China

30 **MEMS Based Si Strain Gauge With Arc-Shaped Piezoresistors (ICEIC 2024)**
Ji-Hoon Han[1], Eun-Sang Lee[1], and Nam Ki Min[2]
[1]Inha University, Korea, [2]Korea University, Korea

PS7 Semiconductor Devices/Circuits (3)

14:15~15:30 Tuesday, January 30, 2024

Lobby (5F)

Chair: Sungjun Kim (Dongguk University)

01 **The High-performance convolution design and implementation using parallel memory processing and shift register pipeline**
YoungSeok Baek and BonTae Koo
ETRI, Korea

02 **A Highly-Sensitive and Compact Interconnect Delay Monitoring Circuit for 3-Dimensional System Packages**
Seung-Mo Noh[1,2], Seungkyu Kim[1,2], Seo-Yoon Lee[1], and Kee-Won Kwon[1]
[1]Sungkyunkwan University, Korea, [2]Samsung Electronics, Korea

03 **Post-layout Parasitic Capacitance Prediction Methodology Using Bayesian Optimization**
Giseok Kim, Jaehyun Park, and Seong-Ook Jung
Yonsei University, Korea

04 **Analysis of Nonuniformity-aware Degradation for Single-photon Avalanche Diodes for Solid-state Photomultiplier using SPICE Modeling**
Heewon Bang[1], Soo-Hyun Baek[2], Sunho Kim[2], and Ilgu Yun[1]
[1]Yonsei University, Korea, [2]Wooriro Co., Ltd., Korea

05 **Comparison of Stress Effects between Constant-Stress and Step-Stress Tests for Planar InP/InGaAs Avalanche Photodiodes**
Yunseok Han[1], Soo-Hyun Baek[2], Sunho Kim[2], and Ilgu Yun[1]
[1]Yonsei University, Korea, [2]Wooriro Co., Ltd., Korea

16 **Comparison of Electrical Characteristics Between SiC and Si substrate**
Si Eun Oh, Seo Yoon Kim, Se Yong Choi, Seung Jae Moon, Jong Mo Lee, and Byung Seong Bae
Hoseo University, Korea

17 **Energy Efficient Tributary SOT-MRAM Cell**
Yunho Jang, and Jongsun Park
Korea University, Korea

18 **Compact Characteristic Modeling of Cryo-CMOS Transistors Based on Commercial Process Design Kit**
Seung Chae Jung, Hee-Cheol Joo, Seunghoon Yi, Yoochang Kim, and Young-Ha Hwang
Soongsil University, Korea

19 **Feasibility analysis of high-aspect ratio pin mounting in semiconductor packaging**
Kwang-Hee Lee and Chul-Hee Lee
Inha University, Korea

20 **New Approximate 4:2 Compressor for High Accuracy and Small Area Using MUX Logic**
Sohyeon Jeon, Jeawook Jeon, Yubin Lee, and Youngmin Kim
Hongik University, Korea

21 **Trade-off between the benefit of electron injection and the increment of trap sites in alkali metal-halide interlayer for using organic electronics**
Moonsoo Kim and Byoungdeog Choi
Sungkyunkwan University, Korea

22 **Compute-In-Memory using 2T1C DRAM array**
Kyu Hyun Lee, Tae Eun Jang, Gi Yeol Kim, Minkyu Song, and Soo Youn Kim
Dongguk University, Korea

23 **Self-oscillating Double-balanced Subharmonic Mixer**
Nam-Jin Oh
Korea National University of Transportation, Korea

24 **Micro LED Pixel Circuit with Threshold Voltage Compensation**
Youngjin Kim, Janghoo Lee, Seyong Choi, Hyekang Park, Seo Yun Kim, Seung Jae Moon, and Byoung Seong Bae
Hoseo University, Korea

25 **Design of 8-bit Up Counter Using High Speed True Single Phase Clock D Flip-Flop**
Ye-Ryun Jang, Woongbi Lee, Ji-Min Kang, Jaeduck Yoon, Jaeuk Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

26 **An 8-bit Up Counter Design with Edge Triggered D Flip-Flop**
Seojin Kim, Jaesung Kim, Taejun Kim, Minseop So, Seon-U Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

PS8 Communications & Systems and Control

15:45~17:00 Tuesday, January 30, 2024

Lobby (5F)

Chair: **Jingon Joung** (Chung-Ang University)

01 **Load Balancing Beam Selection Alogorithm using Fingerprint DB in UAV Supported Cellular Systems**

Seungseok Sin[1], Yuna Sim[1], Jina Ma[1], Kyunam Kim[2], Huaping Liu[3], Sangmi Moon[1], and Intae Hwang[1]
[1]Chonnam National University, Korea, [2]Alps Electric Korea Co., Ltd., Korea, [3]Korea Nazarene University, Korea

02 **Optimization Algorithm for Physical Layer Security in Multiple Flying RISs-based Systems**

Yuna Sim[1], Seungseok Sin[1], Jina Ma[1], Kyunam Kim[2], Huaping Liu[3], Sangmi Moon[4], and Intae Hwang[1]
[1]Chonnam National University, Korea, [2]Alps Electric Korea Co., Ltd., Korea, [3]Oregon State University, USA, [4]Korea Nazarene University, Korea

03 **Blind-spotless Low-Complexity mmWave Switched Beam Flat-panel Antenna Module**

Jong-Sik Min, Junhyuk Cho, and Han Lim Lee
Chung-Ang University

04 **Highly Efficient mmWave Multibeam Spatial Vector Combining Transmitter**

Jong-Sik Min, Seung-Won Oh, and Han Lim Lee
Chung-Ang University, Korea

05 **IRS-Aided Rate Balancing Precoding for STLC-Based Downlink MIMO Transmission**

Sumin Han[1], Yundong Kim[1], Jeong-Il Byeon[1], Jihoon Choi[1], and Jingon Joung[2]
[1]Korea Aerospace University, Korea, [2]Chung-Ang University, Korea

06 **Weighted Sum-Rate Comparisons in IRS-Aided STLC Systems Considering Signaling Overhead**

Taehee Choi, Jaehong Kim, and Jingon Joung
Chung-Ang University, Korea

07 **Received SNR Lower Bound Derivation of Channel Shuffling Double Space–Time Line Coded Systems**

Jaehong Kim[1], Jingon Joung[1], and Jihoon Choi[2]
[1]Chung-Ang University, Korea, [2]Korea Aerospace University, Korea

08 **Analysis of T-Policy Platoon Formation**

Yutae Lee
Dong-eui University, Korea

20 A Two-Stage Receiver for MIMO Systems
Yongjae Noh and Dongkyu Sim
Chungbuk National University, Korea

21 Theoretical Evaluation of Photonic Radar Communication Using Optically Injection-Locked Semiconductor Lasers
Anh-Hang Nguyen, Hyo-Sang Jeong, and Hyuk-Kee Sung
Hongik University, Korea

22 COLREGs-compliant Collision Avoidance Based on Navigation Status Analysis Using Vector Operations for Unmanned Surface Vessel
Yong-Kuk Kim, Eui-Jung Jung, Min-Gyu Kim, Ju-Hyun Kim, Ye-Jun Lee, Jung-Tak Min
Korea Institute of Robotics and Technology Convergence (KIRO), Korea

23 Development of wearable ECG monitoring device using flexible capacitive electrodes
TaeMu Lee and HyunJae Baek
Soonchunhyang University, Korea

24 Interoperability Level Evaluation of Power System
Seon-Hack Hong and Tae-Il Choi
Seoil University, Korea

25 Robotic Diagnostic System for Quantitative Diagnosis of Chronic Venous Insufficiency
Byeongseon Choi, Hyeonwook Hong, and Jaebyung Park
Jeonbuk National University, Korea

26 A Low Power D-Flip Flop based 8bit Counter Design
Sumin Bark, Taejun Kim, Hyeongseok Moon, Eunse Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

27 High Speed Pipelined Phase Acculmulator with Inverted TSPC Flip-Flop
Yongseok Seo, HyungJin Yu, Seonu Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

28 An Area Efficient Pipelined Phase Acculmulator Using CMOS 28T adder and TSPC Flip-Flop
Daeho Seo, Junhyuk Kwon, Minseob So, and Kwang-Hyun Baek
Chung-Ang University, Korea

29 High Speed Low power 16-bit Phase accumulator with enhanced TSPC Flip-Flop
Dongmin Son, Hyoungkyu Park, Jaeuk Lee, and Kwang-Hyun Baek
Chung-Ang University, Korea

30 Power-Efficient Phase Accumulator with Truncaed Outputs for DAC Interface
Seung Hyeon Lee, Jaesung Kim, Dawon Ryoo, and Kwang-Hyun Baek
Chung-Ang University, Korea

Venue & Accommodation

Taipei Marriott Hotel

Taipei Marriott Hotel holds the proud distinction of being a large integrated destination complex in Taiwan, providing an urban-style retreat with shopping, dining, an arcade and a state-of-the-art convention center. Boasting a prime location in the center of the city's Dazhi district, our modern guest rooms and suites showcase panoramic views of Taipei City.

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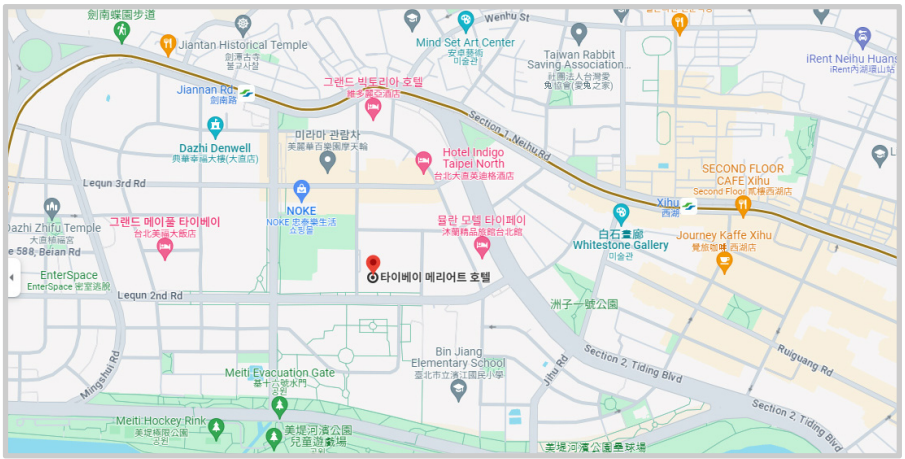

About Taiwan

臺北101 大樓 Taipei 101

Taipei 101 was once the world's tallest building, reaching 508 meters in height. The inspiration for he building comes from the bamboo plant, as each segment resembles a section of bamboo, symbolizing continuous growth. Visitors here can take a ride on the world's fastest elevator and enjoy the exhilarating sensation of going to the top in 37 seconds. The Observatory on the 89th floor offers a 360-degree field of vision and a birds-eye view of Taipei. The brilliant scene at nighttime is especially dazzling.

野柳地質公園 (Yehliu Geopark)

Entirely formed by nature, Yehliu Geopark is a popular scenic spot on the North Coast with unique geological terrains and strange rock formations. Erosion, weathering and crustal movement have all contributed to the strange rock formations such as sea trenches, candle rocks, mushroom rock, tofu rock, honeycomb rock, potholes, and melting erosion panels. The popular Queen's Head, fairy's shoe and candlestick rocks are famous representations of the world's sea erosion landscapes.

中正紀念堂 (Chiang Kai-shek Memorial Hall)

Chiang Kai-shek Memorial Hall was built to commemorate the late President Chiang Kai-shek. The building's roof resembles Tiantan (Temple of Heaven) in Beijing and the wall structure resembles the Egyptian pyramids. The towering majestic façade models classic Chinese ancient palace-style architecture. On either side of the memorial hall are the National Concert Hall and National Theater. Many international and Taiwan-based cultural performances are held here. The Guard Changing Ceremony at 9:00am and 5:00pm each day is an activity that many foreign visitors love to capture with their video cameras.

臺北龍山寺 (Longshan Temple)

Longshan Temple in Mengjia is the most popular temple in Taipe i . The octagon shaped ceiling and bronze engraved dragon columns are representative of the unique features and adornments in traditional Taiwanese temples. The Front Hall, Grand Hall and Back Hall are divided into many worship rooms, containing more than 100 statues of gods and goddesses, and housing 7 incense burners. During WWII, the Main Hall of Longshan Temple was hit by gunfire and everything was destroyed except for the temple god – Bodhisattva. This manifestation of efficacy made believers worship here even more.

平溪天燈 (Pingxi)

Pingxi Sky Lantern In the ancient times, due to the difficulties in communicating with neighbors in the remote mountain area, villagers used to l ight sky lanterns as a way to signal for help when bandits come to cause trouble. This custom has lasted until now, and has become a symbol of blessings for locals. Every year during the Lantern Festival, Pingxi's lantern blessing event attracts thousands of visitors, who gather in the area to release lanterns in the sky and pray for good fortune. When thousands of lanterns slowly rise to the sky, the view is amazing and unforgettable. Nowadays, due to the demands from visitors, businesses are set up to teach visitors how to make lanterns so they can also pray for blessings for their friends and family.

九份老街Jiufen (Old Street)

Jiufen (meaning 9 portions) got its name because in the early days there were only 9 families that lived here. Due to transportation difficulties in the mountain area, whomever went to town to buy goods would always divide the goods into 9 portions to share among the 9 families. During the late 18th century when gold was discovered here, the area became very prosperous. Taiwan's first theater – Shengping Theater is located on Jiufen Old Street. During the 1950s, as gold mining decreased, the area slowly declined. Visitors can still get a glimpse of the glorious old days when they pass by the old architectures and teahouses along Jiufen Street. Some of the must-not-miss old-time favorite local snacks in Jiufen are taro balls, taro cakes, caozaiguo (sweet glutinous rice dough filled with mugwort herbs) and A-Po's fish balls.

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