ITC-CSCC 2023

The 38th International Technical Conference on Circuits/ Systems, Computers, and Communications 2023

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Welcome to ITC-CSCC 2023

Welcome! On behalf of the committee members, we warmly welcome you to ITC-CSCC 2023, the 38th International Technical Conference on Circuits, Systems, Computers, and Communications. This year's conference will take place in Jeju Island, one of the most beautiful places in Korea. We extend our welcome to all participants and express our gratitude for the voluntary efforts of the committee members. We would like to give special thanks to the committee members from Japan and Thailand. During the conference, if you have the opportunity to meet any committee members, please take a moment to thank them for their dedicated efforts.

Over the years, ITC-CSCC has achieved significant milestones and has become one of the leading forums for the development and discussion of research advancements in the fields of Circuits, Systems, Computers, and Communications. This year's technical program spans four days and includes four plenary talks and three technical tutorials. Additionally, there will be 57 technical sessions, including 13 special sessions. With the participation of nearly 600 researchers and students, we have the opportunity to make a lasting impact on the history of ITC-CSCC. We extend our deepest and sincerest thanks to all the participants.

In addition to the technical programs, we have planned a series of social events to facilitate both academic and informal interactions among the participants. The opening ceremony will take place on the morning of June 26th, marking the start of the social events. The highlight of these events will be the banquet on Tuesday (June 27th), which promises an evening of celebration and awards.

Last but not least, we would like to express our appreciation to the organizing committee (OC) and the technical program committee (TPC) members of ITC-CSCC 2023. We are also grateful to the anonymous reviewers for their diligent work in reviewing the papers and coordinating the outstanding technical program. Special thanks go to the authors who have submitted their valuable research work to ITC-CSCC 2023. Once again, we extend our sincere gratitude to all the conference participants and sincerely hope that you find great inspiration from the technical discussions and interactions with your colleagues. May your time here in Jeju be truly unforgettable.

Sincerely,

Kwang-Hyun Baek
Chung-Ang University, Korea
General Chair of ITC-CSCC 2023
IEIE Auditor General

Jong-Ok Kim
Korea University, Korea
General Co-Chair

Chanon Warisarn
King Mongkut's Institute of
Technology Ladkrabang, Thailand
General Co-Chair

Satoshi Tanaka
Hiroshima University, Japan
General Co-Chair

Message from the Technical Program Committee Chair

On behalf of the Technical Program Committee (TPC), I sincerely thank all the authors for submitting their precious research and development papers to the 38th International Technical Conference on Circuits, Systems, Computers, and Communications of 2023 (ITC-CSCC 2023) and I am glad to introduce the technical program covering a wide range of topics on electronics research area. During ITC-CSCC 2023, 379 outstanding papers will be presented with papers from South Korea, Japan, Thailand, China, Malaysia, Taiwan, India, Bangladesh, Spain, Ghana, Czech Republic and Turkey. All submitted papers have been carefully reviewed in 5 technical tracks, "Circuits & Systems", "Signal Processing", "Computers", "Communications", and "Special Sessions". TPC selected 290 and 89 papers for oral and poster presentations, respectively. Because of the limited time and sessions available, it was impossible to select all excellent papers for inclusion in the technical program.

In addition to the contributed papers, 4 keynote speeches, 13 special sessions, and 3 tutorials are also presented in ITC-CSCC 2023.

I would like to express our sincere gratitude to all those who have contributed to the technical program, including authors, reviewers, special session organizers, organizing committee members, and technical program committee members. Without their devotion and efforts, it would be impossible to hold the successful ITC-CSCC 2023.

I hope that the technical programs as well as the social events are energizing and fun. Thank you very much and I wish you a most fruitful and pleasant time in Jeju Island and in the Republic of Korea.

Minsuk Koo
Incheon National University, Korea
TPC Chair of ITC-CSCC 2023

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Chung-Ang University, Korea
TPC Co-Chair

Taizo Yamawaki
Hitachi Ltd., Japan
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Panyapiwat Institute of Management, Thailand
TPC Co-Chair

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Time Table

Sunday, June 25, 2023

Time	Room 1	Room 2	Room 3	Room 4 & Room 5	Room 6	Room 7	Room 8	Loft Space 2, 3
13:00~15:30	Registration (Lobby)							
13:00~14:00	Undergraduate IC track (Korean Language Only)							
14:00~15:30				[Tutorial 1] Prof. Jinkyu Kim	[Tutorial 2] Dr. Kazuo ONO			
15:30~16:30				Circuits and Systems 1	Signal Processing 1			
16:40~17:55				Communications 1	Computers 1			

Monday, June 26, 2023

Time	Room 1	Room 2	Room 3	Room 4 & Room 5	Room 6	Room 7	Room 8	Loft Space 2, 3
08:00~15:30	Registration (Lobby)							
08:30~09:30				Circuits and Systems 6	Circuits and Systems 2	Computers 2	Computers 3	
09:45~10:00	Opening Ceremony - Main Room (Room1+2+3)							
10:00~10:45	Room 1+2+3	[Plenary Speaker 1] Innovations in Flash NAND development and AI utilization fields (Dr. Ki-Whan Song)						
10:45~11:30		[Plenary Speaker 2] Signal Detection Evolution in Ultra High-Density Magnetic Recording (Prof. Piya Kovintavewat)						
11:30~13:00	Lunch							
13:00~14:15	Circuits and Systems 3	Communications 2	Signal Processing 2	Circuits and Systems 7	SS 1 - Lightweight hardware optimization and implementation design of neural networks (KETI) (13:00-13:30 closed session, 13:30-14:15 open session)	[Tutorial 3] Prof. Lunchakorn Wuttisittikulkij	Computers 4	Graduate System IC track (Korean Language Only) (Loft Space 3 active too)
14:25~15:40	Circuits and Systems 4	Communications 3	Signal Processing 3	Graduate System IC track (Korean Language Only)	SS 2 - Cutting-Edge Innovations in Data Science	Circuits and Systems 8	SS 3 - Mathematical Systems Science and its Applications I	
15:40~16:00	Coffee Break							
16:00~17:15	Circuits and Systems 5	Communications 4	Signal Processing 4	Circuits and Systems 9	SS 4 - Artificial Intelligence in Science and Medicine	SS 5 - WEIE Workshop	SS 6 - Mathematical Systems Science and its Applications II	

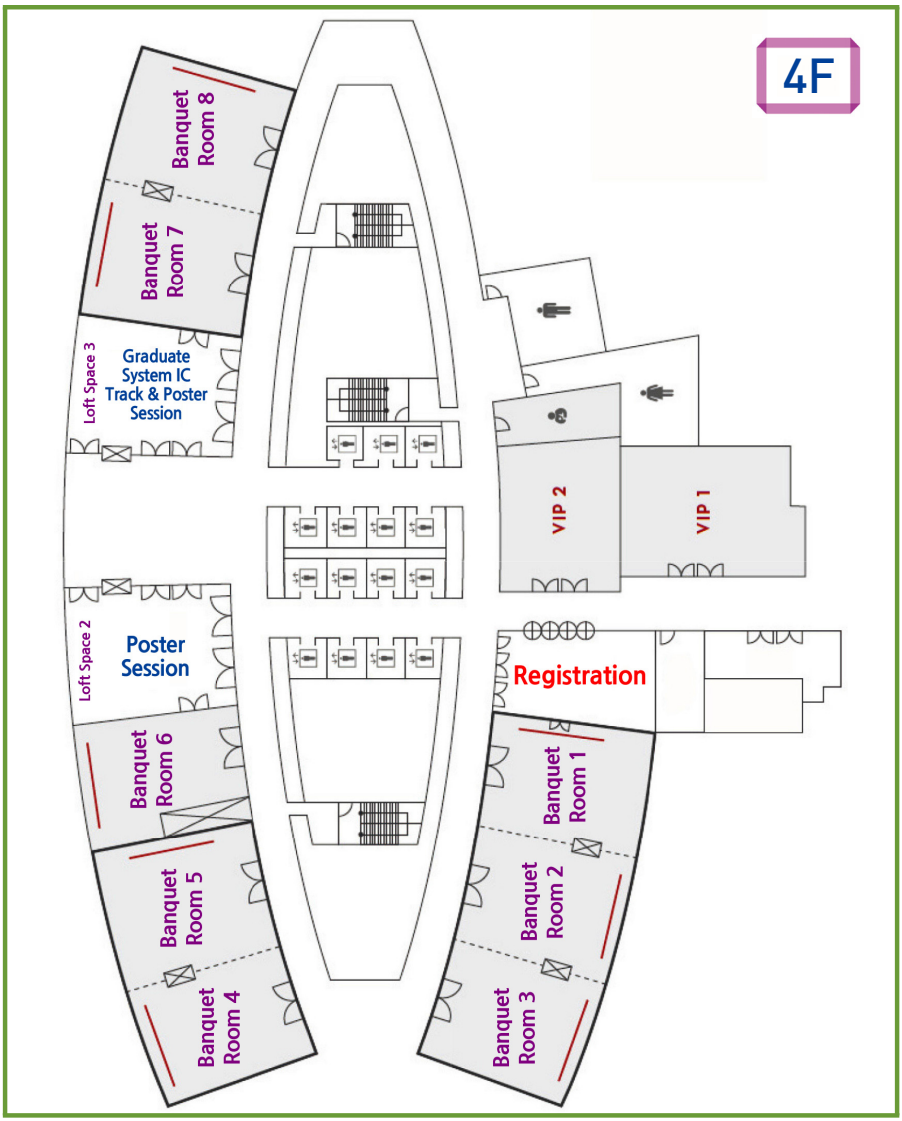
Tuesday, June 27, 2023

Time	Room 1	Room 2	Room 3	Room 4 & Room 5	Room 6	Room 7	Room 8	Loft Space 2, 3
08:00~15:30	Registration (Lobby)							
08:45~10:00	Circuits and Systems 10			Circuits and Systems 13	Signal Processing 5	Computers 5	Computers 9	
10:15~11:00	Room 1+2+3	[Plenary Speaker 3] Hardware Security and Safety of IC Chips (Prof. Makoto Nagata)						
11:00~11:45		[Plenary Speaker 4] Re-defining AI: Towards neuro-SW/HW Architectures (Dr. Kamran Eshraghian)						
11:45~13:15	Lunch							
13:15~14:30	Circuits and Systems 11	Communica-tions 5	SS 7 - Processing in-Memory Technology	Circuits and Systems 14	SS 8 - Emerging Technologies for Internet of Thing, Immersive Technology, and Machine Learning	Computers 6	Computers 10	Poster 1
14:40~15:55	Circuits and Systems 12	Circuits and Systems 15	SS 9 - Computer Architecture and Its Components	Career Development Session (Korean Language Only)	SS 10 - Computer Simulation for Manufacturing Technology	Computers 7	Computers 11	Poster 2
15:55~16:15	Coffee Break							
16:15~17:30					Communications 6	Computers 8	Computers 12	Poster 3
18:00~20:00	Banquet (Award Ceremony Included) - Main Room (Room1+2+3)							

Wednesday, June 28, 2023

Time	Room 1	Room 2	Room 3	Room 4 & Room 5	Room 6	Room 7	Room 8	Loft Space 2, 3
08:30~10:00	Registration (Lobby)							
09:00~10:15	Circuits and Systems 16	Communica-tions 7	Signal Processing 6	Computers 13				

Floor Map


4F
Banquet Room 8
Banquet Room 7
Loft Space 3
Graduate System IC Track & Poster Session
VIP 2
VIP 1
Loft Space 2
Poster Session
Registration
Banquet Room 6
Banquet Room 5
Banquet Room 4
Banquet Room 1
Banquet Room 2
Banquet Room 3

Conference Information

Social Program

Opening Ceremony

Date : Monday, June 26, 2023
Time : 09:45~10:00 Place : Room 1+2+3
All registered participants are cordially invited to join us and celebrate the official opening.

Plenary Talks 1, 2

Date : Monday, June 26, 2023
Time : 10:00~11:30 Place : Room 1+2+3

Plenary Talk 3, 4

Date : Tuesday, June 27, 2023
Time : 10:15~11:45 Place : Room 1+2+3

Lunches

Date : June 26 & 27, 2023
Lunch will be provided to the conditions of registration of participants.

Undergraduate : One lunch	
Date : 26, June	Place : Cafe 8 (Italian) Level8

Regular & Student Registration : Two lunches	
Date : 26 & 27, June	Place : NOKNAMU (Korean) Level3

Banquet

Date : Tuesday, June 27, 2023
Time : 18:00 Place : Place : Room 1+2+3, 4+5

We hope this banquet will offer you a good opportunity to promote friendship with participants. Delicious food and special performance will be offered at the banquet. A banquet ticket is included in the Regular Registration. Student Registration does not include the banquet.

Registration

Author Registration

All authors should register for the conference by May 31, 2023.

* Authors with one accepted paper must pay at least one regular registration fee. (Regardless of the author's title)

* Authors with more than two accepted papers are required to pay one regular 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 Regular Registration
Two Papers	One Regular Registration + One Student Registration
Three Papers and More	One Regular Registration + Two Student Registrations

Registration Fee

Due date for Early Registration is by May 31, 2023

Category		Domestic		Overseas	
		Early Registration	Onsite Registration	Early Registration	Onsite Registration
Regular Registration	Non-IEIE Member	KRW 700,000	KRW 820,000	USD 500	USD 600
	IEIE Member	KRW 600,000	KRW 720,000		
Student Registration	Non-IEIE Member	KRW 410,000	KRW 480,000	USD 300	USD 360
	IEIE Member	KRW 360,000	KRW 430,000		
Undergraduate Student		KRW 250,000	KRW 300,000	USD 200	USD 250

Registration Fee Includes

Regular Registration

Admission to All Sessions, Conference Proceedings, Lunch, Banquet

Student Registration

Admission to All Sessions, Conference Proceedings, Lunch

* A Banquet ticket is not included.

Undergraduate Student

Admission to All Sessions, Conference Proceedings, One day Lunch

* 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 'KG Mobilians'

Bank Transfer

- Name of Bank: SUHYUP BANK
- Account Number: 1010-2185-8957
- Name of Account Holder: The Institute of Electronics and Information Engineers
- Swift Code (Overseas Transfer): NFFCKRSE

* 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 May 31, 2023, with the processing fee of USD 100 (KRW130,000). No refund will be made after May 31, 2023 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:

- For KRW payment: Link
- For USD payment: Link

Presentation Guidelines

Oral Presentation

■ 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 : 90 minutes

▸ Plenary : 45 minutes

▸ Oral Presentation (Special+Regular Sessions) : 15 minutes
- 12-minutes presentation per presenter (+ 3-minute Q&A)

Poster Presentation

■ 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.

Plenary Speakers

Plenary Speaker 1

10:00~10:45 Monday, June 26, 2023

Room 1+2+3

Dr. Ki-Whan Song
Corporate EVP of SAMSUNG Electronics

Innovations in Flash NAND development and AI utilization fields

Abstract

Through the great innovations, Flash NAND devices have played an important role in mass data storage and computing systems. We will review the major innovations and forecast the mega trend for the future. In addition, We will introduce the AI utilization in the design and manufacturing fields.

Biography

Education :
2005/1996/1994 Ph.D./M.S./B.S E.E., Seoul National University

Career :
2022 Advanced Flash Technology Development Team
2020 Flash Product Engineering Team
2011 Flash Design Team
2005 Advanced Technology Development Team
1996 DRAM Design Team

Plenary Speaker 2

10:45~11:30 Monday, June 26, 2023

Room 1+2+3

Prof. Piya Kovintavewat
Nakhon Pathom Rajabhat University, Thailand

Signal Detection Evolution in Ultra High-Density Magnetic Recording

Abstract

Currently, a hard disk drive using a perpendicular recording technology is approaching its storage limit at 1 tera bits per square inch (Tb/in2) due to the super-paramagnetic effect. Many recording technologies have been proposed to overcome this limit, such as bit-patterned magnetic recording (BPMR), two-dimensional magnetic recording (TDMR), and multi-layer magnetic recording (MLMR). However, this talk will focus only on BPMR because it can now be deployed in a commercial market and can achieve the storage capacity up to 4 Tb/in2. This talk summarizes the sophisticated signal detection techniques used in BPMR such as 2D coding, multi-head multi-track detection, and Al-based data detection.

Biography

Dr. Piya Kovintavewat received the B.Eng. summa cum laude from Thammasat University, Thailand (1994), the M.S. degree from Chalmers University of Technology, Sweden (1998), and the Ph.D. degree from Georgia Institute of Technology (2004), all in Electrical Engineering.

He is currently a Professor in Electrical Engineering Program, Faculty of Science and Technology, Nakhon Pathom Rajabhat University (NPRU), Nakhon Pathom, Thailand. His main research interests include coding and signal processing as applied to digital data storage systems.

Prior to working at NPRU, he worked as an engineer at Thai Telephone and Telecommunication company (1994-1997), and as a research assistant at National Electronics and Computer Technology Center (1999), both in Thailand. He also had work experiences with Seagate Technology, Pennsylvania, USA (summers 2001, 2002, and 2004).

Plenary Speaker 3

10:15~11:00 Tuesday, June 27, 2023

Room 1+2+3

Prof. Makoto Nagata
Kobe University

Hardware Security and Safety of IC Chips

Abstract

IC chips are key enablers to a smartly networked society and need to be more compliant to security and safety. Semiconductor solutions for autonomous vehicles must meet stringent regulations and requirements. While designers develop circuits and systems to meet the performance and functionality of such products, countermeasures are proactively implemented in silicon to protect against harmful disturbances and even intentional adversarial attacks.

This talk will start with Electromagnetic Compatibility (EMC) techniques applied to IC chips for safety to motivate EMC-aware design, analysis, and implementation. It will then discuss IC design challenges to achieve higher levels of hardware security (HWS). Crypto-based secure IC chips are investigated to avoid the risks of side-channel leakages and side-channel attacks, corroborated with silicon demonstrating analog techniques to protect digital functionality. The EMC and HWS disciplines derived from electromagnetic principles are key to establishing IC design principles for security and safety.

Biography

Makoto Nagata received the B.S. and M.S. degrees in physics from Gakushuin University, Tokyo, Japan, in 1991 and 1993, respectively, and the Ph.D. degree in electronics engineering from Hiroshima University, Hiroshima, Japan, in 2001. He is currently a Dean and Professor with the Graduate School of Science, Technology and Innovation, Kobe University. His research interests include design techniques targeting high-performance mixed analog, RF and digital VLSI systems with particular emphasis on power/signal/substrate integrity and electromagnetic compatibility, testing and diagnosis, three-dimensional system integration, as well as their applications for hardware security and safety, and cryogenic electronics for quantum computing. Dr. Nagata is a Senior Member of IEEE and IEICE. He has been a member of a variety of technical program committees of international conferences such as International Solid-State Circuits Conference and Symposium on VLSI Circuits.

Plenary Speaker 4

11:00~11:45 Tuesday, June 27, 2023

Room 1+2+3

Dr. Kamran Eshraghian
President iDataMap Corporation

Re-defining AI: Towards neuro-SW/HW Architectures

Abstract

How does a coder/architect perceive AI? During the last sixty years the insight gained into the gap between functional Artificial Intelligence (as we know it today) and Artificial General Intelligence (AGI) highlights the unfathomable challenges encountered by circuits and systems architects in their quest for new pathways towards implementation of 'Reason, Learn, and Plan' design paradigm – the Holy Grail of future HW/SW neuromorphic architectures (c.f. GPT5, SpikeGPT). Functionalities of AI that we have become accustomed is identical with Extended Intelligence (EI). To alleviate the ambiguities it seems logical to redefine AI within EI domain and link the two with a 'Gap Function' G(w) matrix characterized by collective behavior of Cognitive, Emotional and Spiritual derived parameters where feasible. Very likely the building primitive in emerging architectures is basic element, the neuro-logic block (c.f. VLSI philosophy) that must cope with demands on power consumption, running cost, and CO2 foot-print. The insight into neuro-HW/SW complexities together with the decision matrix (derived from e.g., reductionism, consciousness, mirror-neurons, Qbit, and Limits) as an extension to our neuro-processing capability is likely to be a new design cockpit (yet to be defined) when venturing into upcoming SW/HW co-design, thus paving the way towards the inevitable 5th Industrial Revolution.

Biography

Kamran Eshraghian received his MEngSc. and Ph.D. from University of Adelaide, South Australia in 1977 and 1980 respectively, and 2004 was awarded Dr-Ing e.h. from University of Ulm, Germany. He is best known as one of the fathers of CMOS VLSI having influenced two generations of researchers and developers. Currently he is the executive chairman and president of iDataMap Corporation with a focus on digital healthcare and predictive medicine. In 1979 he

joined the Department of Electrical and Electronic Engineering, University of Adelaide. Subsequently in 1995 as Distinguished Professor and School Chair he led the School of Computer and Communication Engineering and Mathematics in Western Australia. In 2005 as Founder/President of ELabs he formulated new concepts for integration of nanoelectronics with those of bio and photon-based technologies. In 2007 he became the inaugural holder of Ferrero Family Chair in Electrical Engineering at University of California, Merced with focus on memristor driven architectures and SoS integration prior to his involvement with Korea's World Class University program at CBNU. His current research interest includes neurologic-SW/HW within the computational neuroscience domain. Prof Eshraghian is a Fellow and life member of IEAust

Tutorial Speakers

Tutorial Speaker 1

14:00~15:30 Sunday, June 25, 2023

Room 4 & Room 5

Prof. Jinkyu Kim
Korea University

Machine Learning for Autonomous Driving at Scale

Abstract

Self-driving vehicle perception and control have made dramatic progress in the last several years, and many auto vendors have pledged large-scale commercialization in a 2-3 year time frame. These controllers use a variety of approaches but recent successes suggest that neural networks will be widely used in self-driving vehicles. Classical AI systems involve carefully-crafted features and representations, while one of the new powers of deep learning methods is the ability to learn very effective latent representations from data. There have been a variety of approaches, which depend on the modular perception-prediction-planning-control pipeline, where each module can be built using deep learning methods. In this talk, I will introduce some of Waymo Research's recent work on deep learning for autonomous driving at scale and the variety of challenges towards fully self-driving ride on public roads.

Biography

Jinkyu Kim is an assistant professor of the Department of Computer Science and Engineering at Korea University. He was a research scientist at Waymo (formerly the Google self-driving car project), conducting cutting edge research to develop new solutions related to autonomous driving, in particular, to solve outstanding challenges in planning and behavior prediction. He received his Ph.D. in Computer Science from UC Berkeley (advisor: Prof. John Canny) and was part of Berkeley AI Research and Berkeley DeepDrive. He researched to build explainable and advisable models that can explain their rationale, characterize their strengths and weaknesses, and convey an understanding of how they will behave in the future. He received his B.S. and M.S. in Electrical Engineering from Korea University.

Tutorial Speaker 2

14:00~15:30 Sunday, June 25, 2023

Room 6

Dr. Kazuo ONO
Hitachi Ltd., Research and development group

Research on Ising Machines for Combinatorial Optimization: Chips to Systems

Abstract

Today, in order to realize comfortable life and economic development, optimization processing using a large amount of complex data is promising. Optimization processing with large amount of data using conventional computing technologies require a large amount of processing time. An annealing machine, a new-paradigm computing technology inspired by a quantum computer, was proposed to accelerate the optimization processing. Now, many implementations of annealing machines are developed and commercialized in various fields.

In this talk, the necessity of annealing machines is discussed for an actual social implementation and examples of real applications are also introduced. Then CMOS annealing, which is one implementation of annealing machine using CMOS process, is introduced. The annealing machine is newly developed technology and there are many challenges to spread the technology. The challenges are also explained.

Biography

Kazuo Ono received the D.E. degrees from the University of Tokyo, Tokyo, Japan, in 2006. In 2006, he joined Hitachi Ltd. Central Research Laboratory, Tokyo, where he has been engaged in the research and development of emerging memory technology. He developed spin-transfer torque memory and its applications in 2009, novel DNA sequencing technology in 2011, MEMS inertial sensor for automotive application in 2016, a FET type hydrogen sensor for harsh environment in 2018, retrofit wireless sensor system for analog gauge reading and abnormal sound detection for monitoring of industorial facilities in 2020. Since 2021, he has been leading research and development of CMOS annealing technology to solve large scale combinatorial optimization problems for social innovation. He was a visiting industrial fellow at Mechanical Engineering in University of California Berkeley under Professor Albert Pisano from 2012 to 2013. He won the young researcher award of the SSDM 2009.

Tutorial Speaker 3

13:00~14:15 Monday, June 26, 2023

Room 7

Assoc. Prof. Lunchakorn Wuttisittikulkij
Chulalongkorn University, Thailand

Developing an Immersive Virtual University Campus: A Practical Case Study of Intaniaverse.com

Abstract

Metaverse is a term used to describe a virtual world where humans live, learn, work, and interact with each other through digital avatars. Many envision the metaverse as the next evolution of the Internet: the future of social interaction, entertainment and commerce where humans experience and see life in ways they could not in the physical world. Recent advances in virtual reality, augmented reality and mixed reality technology are among key technology that provide truly immersive experiences in 3D virtual space. Despite its potential, the metaverse is still at early stage and in the foreseeable future no single platform will dominate every sectors. This tutorial presents how a virtual university campus can be built by academic sector and what benefits can the metaverse bring to academic world. An example of a virtual university campus, called intaniaverse.com, will be used as a practical study case. This tutorial will be useful for those who seek to construct a metaverse by themselves.

Biography

Dr. Lunchakorn Wuttisittikulkij received a Bachelor's degree in Electrical Engineering from Chulalongkorn University, Thailand, a Master of Science degree in Telecommunications and Information System, and a Ph.D in Electronic System Engineering both from University of Essex. He joined the department of Electrical Engineering, Chulalongkorn University in 1997. His research interests include wireless communications and networks, digital twins, smart factory, virtual reality and metaverse.

Career Development Session (Korean Language Only)

14:40-15:55 Tuesday, June 27, 2023

Room 4 & Room 5

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

Time	Title
14:40 - 15:00	**Current Status of Semiconductor Industry and Introduction of KETI** Lee, Kyu Bok Executive Vice President, KETI (Korea Electronics Technology Institute)
15:00 - 15:20	**Technology & Applications for Analog & Power Devices** Sang Gi Lee Senior Vice President , DB HiTek
15:20 - 15:40	**Si CMOS foundry and MPW service** Kang, Sung Weon Executive Vice President, ETRI (Electronics and Telecommunications Research Institute)
15:40 - 16:00	**Company Profile and Power Tech. Trend** Jonghwan Kim Senior Vice President, Silicon Mitus

Technical Program

Oral Sessions

CS1 Circuits and Systems 1

15:30-16:30 Sunday, June 25, 2023

Room 4 & 5

Chair: Min-Hwi Kim (Chung-Ang University)

01 **Implementation of Logic Operation in Embedded NOR Flash Memory for Processing-in-Memory Applications**
Jin Hyeok Kim[1], Sung Jin Bang[1], Minsuk Koo[2], and Yoon Kim[1]
[1]University of Seoul, Korea, [2]Incheon National University, Korea

02 **Verification of Floating-Gate FET (FGFET) for Logic Application in Logic Circuit**
Yunjae Kim and Myounggon Kang
Korea National University of Transportation, Korea

03 **The Analysis of Electron at Inhibited 3D NAND Flash Memory String**
Taeyoung Cho and Myounggon Kang
Korea National University of Transportation, Korea

04 **Refresh Methods and Accuracy Evaluation for 2T0C DRAM based Processing-in-memory**
Chan-Gi Yook and Wonbo Shim
Seoul National University of Science and Technology, Korea

SP1 Signal Processing 1

15:30-16:30 Sunday, June 25, 2023

Room 6

Chair: Haejoon Jung (Kyung Hee University)

01 **A Low-Complexity Patch Segmentation in the V-PCC Encoder**
Yura Kim and Yong-Hwan Kim,
KETI, Korea

02 U-Net Based Improved Lane Detection in Harsh Environments
Seung-Hwan Lee, Hyuk-Ju Kwon, and Sung-Hak Lee
Kyungpook National University, Korea

03 Enhanced Night-to-Day Image Conversion Using CycleGAN based Base-Detail Paired Training
Dong-Min Son, Hyuk-Ju Kwon, and Sung-Hak Lee
Kyungpook National University, Korea

04 GAN Based Dust Image Enhancement Using Multi-Scale Pair Training
Junru Huang, Dong-Min Son, Hyuk-Ju Kwon, and Sung-Hak Lee
Kyungpook National University, Korea

CM1 Communications 1

16:40-17:55 Sunday, June 25, 2023

Room 4 & 5

Chair: Jingon Joung (Chung-Ang University)

01 Analysis of Combination HEX and Minimal HEX Reprogramming methods using UDS protocol
Jung Ju Lee, Jong Hun Kim, Jae Bum Park, and Jae Wook Jeon
Sungkyunkwan University, Korea

02 A PDU-based Ethernet Routing using CAN Compression
Jinsun Lee, Sung Bhin Oh, YoungSoo Do, and Jae Wook Jeon
Sungkyunkwan University, Korea

03 A Preemption Method for QoS based on Time-Sensitive Network
Jong Hun Kim, Young Soo Do, Jung Ju Lee, and Jae Wook Jeon
Sungkyunkwan University, Korea

04 Analysis of Time Sensitive Networking (TSN) based Control Traffic Merger Methods for Automotive Network
YoungSoo Do, JongHun Kim, Sung Bhin Oh, and JaeWook Jeon
Sungkynkwan University, Korea

CP1 Computers 1

16:40-17:55 Sunday, June 25, 2023

Room 6

Chair: Shogo Muramatsu (Niigata University)

01 **One-Stage Mobile Palmprint Recognition via Keypoint Detection Network**
Jungho Lee, Sungjun Jang, Yongju Lee, and Sangyoun Lee
Yonsei University, Korea

02 **Machine Learning for Mental Health: A Systematic Study of Seven Approaches for Detecting Mental Disorders**
Muhammad Nadeem, Junaid Rashid, Hyeonjoon Moon, and Arailym Dosset
Sejong Uviversity, Korea

03 **Model for Prediction of Energy Consumption in Residential Buildings Based on Transfer Learning**
Sanghyun Ryu[1], Yunjae Kim[2], Jiwon Kim[1], Jihye Shin[1], Junseok Lee[1], and Hyeonjoon Moon[2]
[1]Sejong Uviversity, Korea, [2]Sejong Uviversity, Korea

CS6 Circuits and Systems 6

08:30-09:30 Monday, June 26, 2023

Room 4 & 5

Chair: Min-Hwi Kim (Chung-Ang University)

01 **Development of drifting data logger for water quality survey**
Yuta Kusunoki and Takeshi Kumaki
Ritsumeikan University, Japan

02 **12.8-kSPS Bridge Sensor Read-Out Circuit with Offset Voltage Compensation**
Junyoung Park and Suhwan Kim
Seoul National University, Korea

03 **A Memory based Concurrence Detector for SPAD ToF Image Sensors**
Jongha Park and Seong-Ook Jung
Yonsei University, Korea

04 **Variation Tolerant Reading Scheme with Self-Generated References and Dual-Reference Sense Amplifier for STT-MRAM**
Youjin Choi and Yoonmyung Lee
Sungkyunkwan University, Korea

CS2 Circuits and Systems 2

08:30-09:30 Monday, June 26, 2023

Room 6

Chair: Yong Shim (Chung-Ang University)

01 **Improvement of Data Retention Time in Gain-Cell Embedded DRAM using MOMCAP**
Wan-Gyu Lee and Joo-Hyung Chae
Kwangwoon University, Korea

02 **A 21-Gb/s PAM-3 Driver using ZQ Calibration with Middle-Level Calibration to Improve Level Separation Mismatch Ratio**
Byung-Du Choi and Joo-Hyung Chae
Kwangwoon University, Korea

03 **A Design of Low Power Supply and High-Performance Low Dropout Regulator for IoT Device**
Dong-Ha Kim[1,2], Young-Hun Kim[1], Young-Gun Pu[1], and Kang-Yoon Lee[1]
[1]Sungkyunkwan University, Korea, [2]SKAI Chips Co., Ltd, Korea

04 **A Design of 100-MHz Package Bondwire-Based Fully-Integrated 3-Level Buck Converter with Digital Pulse Width Modulation**
Ju Hyoung Kim[1], Jeong Seop Lee[2], Ji Hoon Song[1], Young Gun Pu[1], and Kang-Yoon Lee[1]
[1]Sungkyunkwan University, Korea, [2]Sungkyunkwan University, Korea

CP2 Computers 2

08:30-09:30 Monday, June 26, 2023

Room 7

Chair: Tian Song (Tokushima University)

01 **Modern robot bionic eye system**
Hongxin Zhang[1,2], Suan Lee[2], and Chi-Ho Lin[2]
[1]Jewxon Intelligent Technology Co., Ltd., China, [2]Semyung University, Korea

02 **Phased array HIFU prototype through measurement study of acoustic attenuation and acoustic impedance properties and B-mode ultrasound diagnosis analysis in HIFU treatment**
Xangui Ju and Chi-ho Lin
Semyung University, Korea

03 Analysis of EDF and RM scheduling algorithms for periodic and aperiodic tasks in multi-core ECU

Se Jeong Lim, Jong Hun Kim, and Jae Wook Jeon
Sungkyunkwan University, Korea

04 CNN and MKDE-based Classification of Synthetic Speech Attribution

Jungyu Choi and Sungbin Im
Soongsil University, Korea

CP3 Computers 3

08:30-09:30 Monday, June 26, 2023

Room 8

Chair: Mitsunori Makino (Chuo Univeristy)

01 A Safety System for Industrial Fields using YOLO Object Detection with Deep Learning

JeongYoon Rhee, JunHyuk Park, JaeIn Lee, HyunTae Ahn, Long Hoang Pham, and JaeWook Jeon
Sungkyunkwan University, Korea

02 Speech and Text-based Motion Generation and Matching System

Jonghyun Shin, Junho Park, and Sukju Kang
Sogang University, Korea

03 Super-resolution Model-based Versatile Video Coding for Light Field Video

Yuduo Zhang, Vinh Van Duong, and Byeungwoo Jeon
Sungkyunkwan University, Korea

04 A Deep Learning Approach to Generating Flattened CBCT Volume Across Dental Arch From 2D Panoramic X-ray for 3D Oral Cavity Reconstruction

Anusree P S[1] and Wonsang You[2]
[1]*Artificial Intelligence and Image Processing Laboratory, Korea,* [2]*Sun Moon University, Korea*

CS3 Circuits and Systems 3

13:00-14:15 Monday, June 26, 2023

Room 1

Chair: Wonbo Shim (Seoul National University of Science and Technology)

01 **Implementation of Multi-channel 600V-class EHD Driver to Drive-per-nozzle of Hybrid Inkjet Printer**

Jae-Hyoun Park
KETI, Korea

02 **Implementation of a 4-phase Square Waves Generator and Its Application for Measurement of Frequency Characteristics of an RCPF**

Lina Sato[1], Kazuhiro Shouno[1], Hiroshi Tanimoto[2], Cosy Muto[3], Seijiro Moriyama[4], Chikau Takahashi[5], and Michitaka Yoshino[6]
[1]University of Tsukuba, Japan, [2]Kitami Institute of Technology, Japan, [3]Nagasaki University, Japan, [4]Anagix Corporation, Japan, [5]Takamori Co., Ltd., Japan, [6]Hosei University, Japan

03 **Implementation of an RCPF and Its Measurement Circuitry for the Method Based on Superposition**

Kanata Fukagawa[1], Kazuhiro Shouno[1], Hiroshi Tanimoto[2], Cosy Muto[3], Seijiro Moriyama[4], Chikau Takahashi[5], and Michitaka Yoshino[6]
[1]University of Tsukuba, Japan, [2]Kitami Institute of Technology, Japan, [3]Nagasaki University, Japan, [4]Anagix Corporation, Japan, [5]Takamori Co., Ltd. Japan, [6]Hosei University, Japan

04 **Predicting ADC with error correction for low power SAR ADC**

Hyunchul Yoon[1,2]
[1]Yonsei University, Korea, [2]Samsung Electronics, Korea

CM2 Communications 2

13:00-14:15 Monday, June 26, 2023

Room 2

Chair: Seung-Chan Lim (Hankyong National University)

01 **Design and Implementation of Forward-Backward Processing Unit for LDPC Decoder**

Anusorn Wongsa and Watid Phakphisut
King Mongkut's Institute of Technology Ladkrabang, Thailand

02 Improvement of Deep Learning-Based Reference Signal Received Power Prediction for LTE Communication System

Danupol Chomsuay[1], Watid Phakphisut[1], Thongchai Wijitpornchai[2], Poonlarp Areeprayoonkij[2], Tanun Jaruvitayakovit[2], and Nattakan Puttarak[1]
[1]King Mongkut's Institute of Technology Ladkrabang, Thailand, [2]Advanced Wireless Network Company Limited, Thailand

03 Development of High Efficient LDPC Encoder for Deep Space Applications

Thanat Srisupha, Anusorn Wongsa, Chatuporn Duangthong, and Watid Phakphisut
King Mongkut's Institute of Technology Ladkrabang, Thailand

04 Multi-Agent Deep Q-Learning for Antenna Tilt Optimization in Wireless Networks

Tanutsorn Wongphatcharatham, Watid Phakphisut, and Nattakan Puttarak
King Mongkut's Institute of Technology Ladkrabang, Thailand

SP2 Signal Processing 2

13:00-14:15 Monday, June 26, 2023

Room 3

Chair: Jong-Ok Kim (Korea University)

01 Color Correction Method using Monocular Depth Estimation Model for Underwater Images

Hirotaka Tamaki, Takafumi Katayama, Tian Song, and Takashi Shimamoto
Tokushima University, Japan

02 YOLO-based Bitrate Control Algorithm for VVC

Kaito Goto, Takafumi Katayama, Tian Song, and Takashi Shimamoto
Tokushima University, Japan

03 Video Semantic Segmentation for Intersection by Domain Adaptation

Shota Suzuki, Takafumi Katayama, Tian Song, and Takashi Shimamoto
Tokushima University, Japan

04 Semantic Segmentation of River Video for Efficient River Surveillance System

Haruki Inoue, Takafumi Katayama, Tian Song, and Takashi Shimamoto
Tokushima University, Japan

CS7 Circuits and Systems 7

13:00-14:15 Monday, June 26, 2023

Room 4 & 5

Chair: Sung-Tae Lee (Hongik University)

01 **Design of Robust 18-Channel Monitoring IC with Integrated Protection Circuit to Prevent Breakdown Caused by Voltage Reversal in Fuel Cell Stack**
Joon-Ho Park, Sung-Hoon Bang, Su-Hun Yang, Seul-Ki-Rom Kim, Jae-Won Choi, and Sang-Ho Lee
Hyundai Mobis, Korea

02 **A 16-Gb/s by 4-Lane Silicon Photonics Receiver Array for Low-Power Chip-to-Chip Applications**
Kangyeob Park and Won-Seok Oh
Korea Electronics Technology Institute, Korea

03 **A Development of Coin Return Teaching Material to be Controlled by Embedded Systems Designed in a Student Experiment**
Sunao SAWADA
Kyushu Sangyo University, Japan

04 **Plant Growth Prediction method for Plant Factories Using LSTM Algorithm**
Masahiro Ogawa and Takeshi Kumaki
Ritsumeikan University, Japan

SS1 KETI - Lightweight hardware optimization and implementation design of neural networks

13:00-14:15 Monday, June 26, 2023

Room 6

Chair: Sang-Seol Lee (KETI)

01 **A Selective Multi-Unit Group Filter-Based Flexible Fast Light-CNN Training**
Chan Yung Kim, EunChong Lee, Yumi Kim, Aeri Kim, Sung-Joon Jang, and Sang-Seol Lee
Korea Electronics Technology Institute, Korea

02 **A Flexible Machine Vision AI System for Edge-Oriented Deep Learning Accelerators**
Joon Boum Song, Yumi Kim, Minkyu Lee, Sang-Seol Lee, and Kyungho Kim
Korea Electronics Technology Institute, Korea

03 Deep Neural Network Dataset Collection for Optimal Positioning of a Capacitive Compensated Schiffman Phase Shifter

Raymond Gyaang[1,2], Ahmed Abdul-Rahman[2], Dennis Agyemanh Nana Gookyi[3], Sung-Joon Jang[4], and Sang-Seol Lee[4]
[1]Bolgatanga Technical University, Ghana, [2]Kwame Nkrumah University of Science and Technology, Ghana, [3]The Council for Scientific & Industrial Research, Ghana, [4]Korea Electronics Technology Institute, Korea

04 Real-Time Inference Platform for Object Detection on Edge Device

Kwonseung Bok, Sang-Seol Lee, Aeri Kim, Sujin Han, and Kyungho Kim
Korea Electronics Technology Institute, Korea

05 Optimization Method and Implementation of Fake Quantization from The Perspective of Hardware Performance

Eunchong Lee, Minkyu Lee, Sanghyun Kim, Soyoung Lee, Sung-Joon Jang, and Sang-Seol Lee
Korea Electronics Technology Institute, Korea

CP4 Computers 4

13:00-14:15 Monday, June 26, 2023

Room 8

Chair: Md. Arshad Ali (Okayama University)

01 Enhancing MobileNetV2 Performance with Layer Replication and Splitting for 3D Face Recognition Task Using Distributed Training

Kritpawit Soongswang, Phattharaphon Romphet, and Chantana Chantrapornchai
Kasetsart University, Thailand

02 A High Precision Counting Framework for Cerithidea moerchii towards Low Power Implementation

Hang Zhang[1], Takafumi Katayama[1], Tian Song[1], Takashi Shimamoto[1], and Naotomo Ota[2]
[1]Tokushima University, Japan, [2]National Institute of Technology, Anan College, Japan

03 An Exploration of Interpolation - Machine Learning Model for Climate Model Downscaling Under the Limitation of Data Quantity

Chotirose Prathom and Paskorn Champrasert
Chiang Mai University, Thailand

04 Gene-Ants: Ant Colony Optimization with Genetic Algorithm for Traveling Salesman Problem Solving

Sarin Thong-ia and Paskorn Champrasert
Chiang Mai University, Thailand

CS4 Circuits and Systems 4

14:25-15:40 Monday, June 26, 2023

Room 1

Chair: Yoon Kim (University of Seoul)

01 **A Wide Input Range High Temperature Resistant Buck DC-DC Converter**

Si Han Zhao, Yu Jin, and Du Li Yu
Beijing University of Chemical Technology, China

02 **Step Response of Commensurate Fractional Lowpass Pseudo-Biquad: Critical Damping**

Dalibor Biolek[1], Viera Biolková[2], and Zdeněk Kolka[3]
[1]University of Defence Brno, Czech Republic, [2,3]Brno University of Technology, Czech Republic

03 **A 3V 12Bit 4MS/s Asynchronous SAR ADC with On-Chip 3-Step Background Calibration Using Split Structure**

Hojin Jeon, Jeeyeon Park, Kiryun Byeon, Jiho Jung, and Hongjin Kim
ABOV Semiconductor Co., Ltd, Korea

04 **A 12-Bit 5-MS/s RC Hybrid DAC Based SAR ADC With Digital Error Correction Logic**

Sunghun Yang, Jaehun Jeong, Youngwon Cho, and Jinwook Burm
Sogang University, Korea

CM3 Communications 3

14:25-15:40 Monday, June 26, 2023

Room 2

Chair: Jingon Joung (Chung-Ang University)

01 **Reference Signal Received Power Prediction Using Convolutional Neural Network with Residual Loss**

Thearrawit Ngenjaroendee[1], Watid Phakphisut[1], Thongchai Wijitpornchai[2], Poonlarp Areeprayoonkij[2], Tanun Jaruvitayakovit[2], and Nattakan Puttarak[1]
[1]King Mongkut's Institute of Technology Ladkrabang, Thailand, [2]Advanced Wireless Network Company Limited, Thailand

02 **5G Channel Coding Tool: Learning and Performance Evaluation**

Krittiyaporn Mueadkhunthod[1], Anusorn Wongsa[1], Thanat Srisupha[1], Chatuporn Duangthong[1], Kidsanapong Puntsri[2], and Watid Phakphisut[1]
[1]King Mongkut's Institute of Technology Ladkrabang, Thailand, [2]Rajamangala University of Technology, Thailand

03 Radio Planning of Using Both 5G and 6G Radio Plannings for Mobile Broadband Services
Supachart Chinkhong and Pasu Kaewplung
Chulalongkorn University, Thailand

SP3 Signal Processing 3

14:25-15:40 Monday, June 26, 2023

Room 3

Chair: Piya Kovintavewat (Nakhon Pathom Rajabhat University)

01 A State-Space Approach for Adaptive Notch Digital Filters with Unbiased Parameter-Estimation
Yoichi Hinamoto[1] and Shotaro Nishimura[2]
[1]National Institute of Technology, Japan, [2]Shimane University, Japan

02 Environmental Sound Classification Based on Data Augmented CNN Model
Shinnosuke Haraguchi and Shigeo Wada
Tokyo Denki University, Japan

03 Embedded Histogram of Oriented Gradients for Glaucoma Classification of Fundus Images
Wich Chanchalermchai and Ungsumalee Suttapakti
Burapha University, Thailand

04 Image Denoising with Self Operational and Convolutional Cycle-GANs
Hodaka Yamanouchi, Yusuke Sao, and Toshiyuki Uto
Ehime University, Japan

SS2 Cutting-Edge Innovations in Data Science

14:25-15:40 Monday, June 26, 2023

Room 6

Chair: Datchakorn Tancharoen (Panyapiwat Institute of Management)

01 Spam Text Detection using Machine Learning Model
Mahasak Ketcham[1], Thittaporn Ganokratanaa[2], and Patiyuth Pramkeaw[2]
[1]King Mongkut's University of Technology North Bangkok, Thailand, [2]King Mongkut's University of Technology Thonburi, Thailand

02 Online Exam Proctoring System
Nalawade Vinay S, Kulkarni Aditi A, Pathak Sakshi S, and Gavali Chaitrali N
S. B. Patil College Of Engineering, India

03 **A Convolutional Neural Network for Ultra-Wideband Radar-Based Hand Gesture Recognition**
Sakorn Mekruksavanich[1], Ponnipa Jantawong[1], Datchakorn Tancharoen[2], and Anuchit Jitpattanakul[3]
[1]University of Phayao, Thailand, [2]Panyapiwat Institute of Management, Thailand, [3]King Mongkut's University of Technology North Bangkok, Thailand

04 **Sensor-Based Cattle Behavior Classification using Deep Learning Approaches**
Sakorn Mekruksavanich[1], Ponnipa Jantawong[1], Datchakorn Tancharoen[2], and Anuchit Jitpattanakul[3]
[1]University of Phayao, Thailand, [2]Panyapiwat Institute of Management, Thailand, [3]King Mongkut's University of Technology North Bangkok, Thailand

CS8 Circuits and Systems 8

14:25-15:40 Monday, June 26, 2023

Room 7

Chair: Min-Hwi Kim (Chung-Ang University)

01 **Transient Flexible Memristor with Synaptic Plasticity for Eco-Friendly Wearable Neuromorphic Systems** Invited
Sin-Hyung Lee
Kyungpook National University, Korea

02 **A Simple Discrete-Time Recurrent Neural Network and Its Application**
Hiroki Nonaka and Toshimichi Saito
Hosei University, Japan

03 **A Simple Clustering Method for Binary Data based on a Binary Associative Memory**
Kazuma Kiyohara and Toshimichi Saito
Hosei University, Japan

04 **CAESAR: A CNN Accelerator Exploiting Sparsity And Redundancy Pattern**
Seongwook Kim[1], Yongjun Kim[2], Gwangeun Byeon[1], and Seokin Hong[1]
[1]Sungkyunkwan University, Korea, [2]Samsung Electronics, Korea

SS3 Mathematical Systems Science and its Applications I

14:25-15:40 Monday, June 26, 2023

Room 8

Chair: Koichi Kobayashi (Hokkaido University)

01 **An approximate solution using K-shortest paths for a communication link load balancing problem**
Himeno TAKAHASHI and Norihiko SHINOMIYA
Soka University, Japan

02 **Response property of sound acyclic asymmetric choice workflow net is co-NP complete**
Atsushi Ohta and Kohkichi Tsuji
Aichi Prefectural University, Japan

03 **Ensemble Learning-Based Approach for Deciding Acupoints in Acupuncture and Moxibustion Treatment**
Hang Yang[1], Ren Wu[2], Mitsuru Nakata[1], Zhenyu An[1], and Qi-Wei Ge[1]
[1]Yamaguchi University, Japan, [2]Yamaguchi Junior College, Japan

04 **Hybrid Tow-Stream Information for Skeleton-Based Action Recognition Using Ensemble Learning**
Qingqi Zhang[1], Ren Wu[2], Mitsuru Nakata[1], and Qi-Wei GE[1]
[1]Yamaguchi University, Japan, [2]Yamaguchi Junior College, Japan

05 **The Metabox Method for Three-Dimensional Container Packing Problem with Loading and Unloading Schedule**
Toshihiko Takahashi[1] and Taiki Suzuki[2]
[1]Niigata University, Japan, [2]Hitachi Solutions East Japan, Ltd., Japan

06 **A Multi-objective Optimization Method for Efficiency and Fairness in P2P Electricity Trading Model**
Sho AKIYAMA and Norihiko SHINOMIYA
Soka University, Japan

07 **Multi-Agent Reinforcement Learning Based on Event-Based Communication**
Hiroki Sunai, Koichi Kobayashi, and Yuh Yamashita
Hokkaido University, Japan

CS5 Circuits and Systems 5

16:00-17:15 Monday, June 26, 2023

Room 1

Chair: Sin-Hyung Lee (Kyungpook National University)

01 **Arrival Order Processing of Service Requests in Full Hardware Implementation of RTOS-Based Systems**
Masaki Nakahara and Nagisa Ishiura
Kwansei Gakuin University, Japan

02 **Automatic Generation of Management Module for Full Hardware Implementation of RTOS-Based Systems**
Hiro Minamiguchi[1], Nagisa Ishiura[1], Hiroyuki Tomiyama[2], and Hiroyuki Kanbara[3]
[1]Kwansei Gakuin University, Japan, [2]Ritsumeikan University, Japan, [3]ASTEM RI／Kyoto, Japan

03 **Timing Window Shifting for Crosstalk Avoidance in 3D-IC**
Mujun Choi, Inhye Kye, Myungwoo Jin, and Juho Kim
Sogang University, Korea

04 **Deep Reinforcement Learning Based Bus Stop-Skipping Strategy**
Mau-Luen Tham[1], Bee-Sim Tay[1], Kok-Chin Khor[1], and Somnuk Phon-Amnuaisuk[2]
[1]Universiti Tunku Abdul Rahman, Malaysia, [2]Universiti Teknologi Brunei, Brunei

CM4 Communications 4

16:00-17:15 Monday, June 26, 2023

Room 2

Chair: Seung-Chan Lim (Hankyong National University)

01 **Adaptive OFDM Communication System Robust to Multitone Interference (MTI)**
Kirill Vanin and Heung-Gyoon Ryu
Chungbuk National University, Korea

02 **Network Coding Aided Hybrid EB/PM Satellite-based FSO/QKD Systems**
Minh Q. Vu[1], Hoang D. Le[1], Ngoc T. Dang[2], and Anh T. Pham[1]
[1]University of Aizu, Japan, [2]Posts & Telecommunications Institute of Technology, Vietnam

03 **A Proposal of Medical Information Management System Based on Consortium Blockchain**
Jie Yang[1], Md. Arshad Ali[2], Yuta Kodera[1], and Yasuyuki Nogami[1]
[1]Okayama University, Japan, [2]Hajee Mohammad Danesh Science and Technology University, Bangladesh

SP4 Signal Processing 4

16:00-17:15 Monday, June 26, 2023

Room 3

Chair: Suk-Ju Kang (Sogang University)

01 **Proposal for Dry Eye Detection Caused by Contact Lenses Using a Smartphone with a Ring Light and Deep Learning Technology**
Kaito Okazaki and Makoto Hasegawa
Tokyo Denki University, Japan

02 **Proposal and Quality Evaluation of Skin Imaging Using Smartphone and Ring Light with Polarizing Film**
Aika Kuramoto and Makoto Hasegawa
Tokyo Denki University, Japan

03 **Herbal Liqueur Effect Through Sublingual Vein Imaging Using Smartphone and Deep Learning**
Maho Taniai, Kaito Okazaki, and Makoto Hasegawa
Tokyo Denki University, Japan

04 **A Robust Watermarking Based on Deep Learning**
Hirokazu Umekubo and Shigeo Wada
Tokyo Denki University, Japan

05 **Graph Fourier Transform Based Image Zero-Watermarking**
Yusuke Sao, Hodaka Yamanouchi, and Toshiyuki Uto
Ehime University, Japan

CS9 Circuits and Systems 9

16:00-17:15 Monday, June 26, 2023

Room 4 & 5

Chair: Junyoung Song (Incheon National University)

01 **A Design of Phase Shiftable PLL for Dual Band Beamforming for Wireless Power Transfer Application**
Jaehyung Jung[1,2] and Kang-Yoon Lee[1,2]
[1]Sungkyunkwan University, Korea, [2]SKAIChips Co., Ltd., Korea

02 **Design of High-Efficiency CMOS Radio-Frequency Rectifier for Wireless Power Transfer Systems**
SeungHyeon Park, Taeyeong Kim, and Ickhyun Song
Hanyang University, Korea

03 **Investigation of Device- and Circuit-level Reliability of Silicon-Germanium Heterojunction Bipolar Transistors (SiGe HBT)**
Taeyeong Kim[1], Pujan K. C. Mishu[2], Uppili Raghunathan[3], Anup P. Omprakash[4], Moon-Kyu Cho[5], John D. Cressler[4], and Ickhyun Song[1]
[1]Hanyang University, Korea, [2]Arizona State University, United States, [3]GlobalFoundries Inc., United States, [4]Georgia Institute of Technology, United States, [5]Korea National University of Transportation, Korea

04 **Fully Integrated CMOS Wideband Power Amplifier for Fifth Generation Mobile Communications**
Bonghyuk Park, Hui-Dong Lee, Seunghyun Jang, Sunwoo Kong, Seunghun Wang, and Jung-hwan Hwang
ETRI, Korea

SS4 Artificial Intelligence in Science and Medicine

16:00-17:15 Monday, June 26, 2023

Room 6

Chair: Thanapong Intharah (Khon Kaen University)

01 **Development of OO-Do-aware Parasite Egg Detection**
Nutsuda Penpong, Yupaporn Wanna, Cristakan Kamjanlard, Anchalee Techasen, and Thanapong Intharah
Khon Kaen University, Thailand

02 **Design and Testing of Spraying Drones on Durian Farms**
Pattharaporn Thongnim[1], Vasin Yuvanatemiya[1], Ekkapot Charoenwanit[2], and Phaitoon Srinil[1]
[1]Burapha University, Thailand, [2]King Mongkut's University of Technology North Bangkok, Thailand

03 **DeepBET: Estimating the Surface Area of Plant Carbon using SEM Image**
Chayakon Chanlun, Kittikhun Kiattisaksiri, Lapatrada Dangsungnoen, Kannika Wiratchawa, Likkhasit Thabtham, Supree Pinitsoontorn, and Thanapong Intharah
Khon Kaen University, Thailand

04 **DeepTooth: Estimating Age and Gender with Panoramic Radiograph Image**
Wanita Somdej[1], Athitiya Thamvongsa[1], Natthanich Hirunchavarod[1], Natnicha Sributsayakarn[2], Suchaya Pornprasertsuk-Damrongsri[2], Varangkanar Jirarattanasopha[2], and Thanapong Intharah[1]
[1]Khon Kaen University, Thailand, [2]Mahidol University, Thailand

05 mICKEY: Memory-Efficient Deep Learning for Personalized Biomarker Discovery and Cancer Origin Prediction from DNA Methylation Data

Pakanan Tussanapirom[1], Kasidech Aewsrisakul[1], Natthawadee Leephatarakit[2], Chanati Jantrachotechatchawan[3], and Kobchai Duangrattanalert[4]
[1]Triam Udom Suksa School, Thailand, [2]Hatyaiwittayalai School, Thailand, [3]Mahidol University, Thailand, [4]Chulalongkorn University, Thailand

SS5 WEIE Workshop

16:00-17:15 Monday, June 26, 2023

Room 7

Chair: Toshihisa Tanaka (Tokyo University of Agriculture and Technology)

01 Improving Performance of Neural Machine Translation using Ontology Graph

Ranto Sawai and Incheon Paik
School of Computer Science and Engineering, The University of Aizu, Fukushima, Japan

02 RGB to NIR Conversion via Two-Step Knowledge Distillation

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

03 Development of a quantitative evaluation system for the motor function of the brain using a tablet PC

Shigeyuki Igarashi[1,2], Ayami Kondo[1], Daeyoung Kim[3], and Jongho Lee[1]
[1]Komatsu University, Japan, [2]Fukui-ken Saiseikai Hospital, Japan, [3]Kanagawa Institute of Technology, Japan

04 Multipath Cluster-Based Scatterer Recognition by Object Detection Techniques Using Panoramic Images

Inocent Calist and Minseok Kim
Niigata University, Japan

05 Japanese Sign Language Recognition using Finger Character Feature

Tamon Kondo, Duk Shin, and Yousun Kang
Tokyo Polytechnic University, Japan

06 Color Assessment System using Object Detection for Plastic Components of Automobile

Keita Kadoya, Tamon Kondo, Duk Shin, and Yousun Kang
Tokyo Polytechnic University, Japan

SS6 Mathematical Systems Science and its Applications II

16:00-17:15 Monday, June 26, 2023

Room 8

Chair: Shingo Yamaguchi (Yamaguchi University)

01 **Notion of Opacity and Its Verification for Discrete-Time Piecewise Linear Systems**
Taiga Matsumae, Koichi Kobayashi, and Yuh Yamashita
Hokkaido University, Japan

02 **Formal verification of multi-car elevator systems using statistical model checking**
Yuki Kitahara, Masaki Nakamura, and Kazutoshi Sakakibara
Toyama Prefectural University, Japan

03 **Investigation of Formal Verification of the Autonomous Vehicle Control System by Specification Translation**
Yifan Wang, Masaki Nakamura, and Kazutoshi Sakakibara
Toyama Prefectural University, Japan

04 **On Countermeasure Against Repeatedly Occurring Botnets by Collective Reboot**
Yuji Katsura and Shingo Yamaguchi
Yamaguchi University, Japan

05 **Reduction of rules and knowledge acquisition in deep modular fuzzy models with genetic algorithms**
Ryosaku Miyake and Hirosato Seki
Osaka University, Japan

06 **Application to Estimating Roles in a Werewolf Game by Ensemble Learning Using SIRMs Connected Fuzzy Systems**
Shuhei Kita and Hirosato Seki
Osaka University, Japan

07 **Knowledge Acquisition using Weighted Deep Modular Fuzzy Inference Model**
Haruya Nagai and Hirosato Seki
Osaka University, Japan

CS10 Circuits and Systems 10

08:45-10:00 Tuesday, June 27, 2023

Room 1

Chair: Sin-Hyung Lee (Kyungpook National University)

01 **A Dual band Double layer FSS Director Using ICPW Structure for Wireless Communication System**

A. Namsang[1], S. Tawatchai[1], R. Lerdwanittip[1], and P. Jitjing[2]
[1]Civil Aviation Training Center, Thailand, [2]Rajamangala University of Technology, Thailand

02 **Effects of Parasitic Elements on LC/CL Matching Circuits**

Satoshi Tanaka, Takeshi Yoshida, and Minoru Fujishima
Hiroshima University, Japan

03 **Investigation of Antenna Topology Optimization Using Genetic Algorithms**

Yen-Sheng Chen
National Taipei University of Technology, Taiwan

04 **Design of Wideband Compact-Size Low-Noise Amplifier Using Active Inductor**

Gyungtae Ryu and Ickhyun Song
Hanyang University, Korea

CS13 Circuits and Systems 13

08:45-10:00 Tuesday, June 27, 2023

Room 4 & 5

Chair: Min-Hwi Kim (Chung-Ang University)

01 **Pareto-Based Dimensionality Reduction of Parameters in DC/DC Converters**

Ryunosuke Numata and Toshimichi Saito
Hosei University, Japan

02 **Single-Phase Series-Parallel Current Injection Resonant Converter Characterization of Normalized Harmonics Amplitude**

Mazratul Firdaus Mohd Zin, Mohammad Nawawi Seroji, and Ermeey Abdul Kadir
Universiti Teknologi MARA, Malaysia

03 **A 0.75V 30.1 ppm/℃ 300nW Bandgap Reference and Low Power Lowdropout Regulator with Hybrid form of Resistors as Size Reduction Technique**

Jiteck Jung, Hyunil Song, Jungeun Park, and Hongjin Kim
ABOV Semiconductor Co., Ltd., Korea

SP5 Signal Processing 5

08:45-10:00 Tuesday, June 27, 2023

Room 6

Chair: Datchakorn Tancharoen (Panyapiwat Institute of Management)

01 **Data Augmentation Method for Traffic Light Detection in Adverse Nighttime Conditions**
Yuuki Terashima and Shigeo Wada
Tokyo Denki University, Japan

02 **A Study and Exploration of Discrete Wavelet Transform for Speckle Noise Reduction in Ultrasound Images**
Paradee Namsopa, Santi Koonkarnkhai, Piya Kovintavewat, Harutai Dinsakul, and Sopapun Suwansawang
Nakhon Pathom Rajabhat University, Thailand

03 **Improvement of coding efficiency method based on super-resolution by learing decoded images in HEVC**
Katsuyuki Yoshizuka, Yuzuki Kashiwagi, and Gen fujita
Osaka Electro-Communication University, Japan

04 **Parameters Determination for Ill-defined Edge Detection Using Particle Swarm Optimization**
Pannawit Panwong and Sansanee Auephanwiriyakul
Chiang Mai University, Thailand

CP5 Computers 5

08:45-10:00 Tuesday, June 27, 2023

Room 7

Chair: Luchakorn Wuttisittikulk (Chulalongkorn University)

01 **Two Autoscaling Approaches on Kubernetes Clusters Against Data Streaming Applications**
Papon Choonhaklai and Chantana Chantrapornchai
Kasetsart University, Thailand

02 **A Dynamic Compression Technique for Efficient Offloading of Computation between Mobile Devices and Cloud**
Sunghern Choi, Hayun Lee, and Dongkun Shin
Sungkyunkwan University, Korea

03 **Improvement of Pose Estimation using Integrated NMS with Rotated Images**
Dohun Kim and Wonjong Kim
ETRI, Korea

04 **Cellular Metaverse: Enhancing Real-Time Communications in Virtual World**
Aisha Munir[1], Muhammad Zain Siddiqi[1], Siwanart Jeravongtakul[1], Shashi Shah[1], Ambar Bajpai[2], Piya Kovintavewat[3], and Lunchakorn Wittisittikulkij[1]
[1]Chulalongkorn University, Thailand, [2]Atria Institute of Technology, India, [3]Nakhon Pathom Rajabhat University, Thailand

CP9 Computers 9

08:45-10:00 Tuesday, June 27, 2023

Room 8

Chair: Incheon Paik (The University of Aizu)

01 **A Quantitative Evaluation Method Using Deep Learning for Quality Control of Chimeric Mice with Humanized Livers**
Takumi Fujisawa[1], Tetsushi Koide[1], Masaki Takahashi[2], Mutsumi Inamatsu[2], and Chise Tateno[2]
[1]Hiroshima University, Japan, [2]PhoenixBio Co., Ltd., Japan

02 **A Comparison of Route Optimization Algorithms on Capacitated Vehicle Routing Problem**
Chalermkiat Chanachan, Monai Sirisethakarn, Paopun Khapla, and Jumpol Povichai
King Mongkut's University of Technology Thonburi, Thailand

03 **Classifying Cybercrime and Threat on Thai Online News: A Comparison of Supervised Learning Algorithms**
Pongsarun Boonyopakorn, Nawaporn Wisitpongphan, and Ukid Changsan
King Mongkut's University of Technology North Bangkok, Thailand

04 **Vectorcardiographic reconstruction from standard 12-lead electrocardiogram using convolutional neural network**
Tanawan Tearwattanarattikal and Apiwat Lek-uthai
Chulalongkorn University, Thailand

CS11 Circuits and Systems 11

13:15-14:30 Tuesday, June 27, 2023

Room 1

Chair: Yong Shim (Chung-Ang University)

01 **Anti-Windup Design for Hybrid PI-IP Controller with Improved Dynamic Performance and Stability**
Go-eun Jeon, Ji-Eun Jung, and Kahyun Lee
Ewha Womans University, Korea

02 **Implement the Fuzzy Controller by Imitating the Tuned PID Controller Using Reinforcement Learning**
Somporn Tiacharoen
King Mongkut's University of Technology North Bangkok, Thailand

03 **Optimizing Hardware Resources for Low-Power Binary Neural Networks Using Approximate Bitwise Operation**
Dongchan Lee and Youngmin Kim
Hongik University, Korea

04 **An Efficient AER Interface Circuit for Scalable Spiking Neural Networks**
Sung-Eun Kim, Kwang-Il Oh, Taewook Kang, Sukho Lee, Hyuk Kim, Mi-Jeong Park, and Jae-Jin Lee
ETRI, Korea

CM5 Communications 5

13:15-14:30 Tuesday, June 27, 2023

Room 2

Chair: Seung-Chan Lim (Hankyong National University)

01 **Weighted Caching Strategy for LEO Satellite Communication Systems**
Hyunwoo Lee, Jehyun Heo, Joohyun Son, Minchul Hong, Hanwoong Kim, Seungwoo Sung, Gayeon Ahn, and Daesik Hong
Yonsei University, Korea

02 **A greedy stable time via LEACH-based 2-hop trees in wireless sensor networks**
Yoshihiro Yoshihiro[1] and Shuuji Oohira[2]
[1]Gifu University, Japan, [2]NEC Corporation, Japan

03 Proposal for Secure Electronic Medicine Notebook System and Performance Evaluation of the Blockchain Network on this System
Takumi KUSANO and Koichi GYODA
Shibaura Institute of Technology, Japan

SS7 Processing in-Memory Technology

13:15-14:30 Tuesday, June 27, 2023

Room 3

Chair: Yoon Kim (University of Seoul)

01 Compute-in-memory Technology for Huge AI Models
Wonbo Shim
Seoul National University of Science and Technology, Korea

02 SRAM-Based Compute-In-Memory Macro with Fully Parallel One-Step Multi-Bit Computation
Edward Jongyoon Choi[1], Injun Choi[1], Chanhee Jeon[1], Gichan Yun[1], Donghyeon Yi[1], Sohmyung Ha[2], Ik-Joon Chang[3], and Minkyu Je[1]
[1]KAIST, Korea, [2]New York University Abu Dhabi, UAE, [3]Kyung Hee University, Korea

03 In-memory Computing Technologies using Memory Device and Array Architecture
Hyungjin Kim
Inha University, Korea

04 Synaptic Array Architectures Based on NAND Flash Cell Strings
Sung-Tae Lee
Hongik University, Korea

CS14 Circuits and Systems 14

13:15-14:30 Tuesday, June 27, 2023

Room 4 & 5

Chair: Ickhyun Song (Hanyang University)

01 Improving of Fault Diagnosis Ability by Test Point Insertion and Output Compaction
Yoshinobu Higami[1], Tsutomu Inamoto[1], Senling Wang[1], Hiroshi Takahashi[1], and Kewal K. Saluja[2]
[1]Ehime University, Japan, [2]University of Wisconsin-Madison, United States

02 **Test Point Selection Using Deep Graph Convolutional Networks and Advantage Actor Critic (A2C) Reinforcement Learning**
Shaoqi Wei[1], Kohei Shiotani[1], Senling Wang[1], Hiroshi Kai[1], Yoshinobu Higami[1], Hiroshi Takahashi[1], and Gang Wang[2]
[1]Ehime University, Japan, [2]Beihua University, China

03 **Implementation of a fish size measurement system using a monocular camera**
Shogo Kumatoriya and Takeshi Kumaki
Ritsumeikan University, Japan

SS8 Emerging Technologies for Internet of Thing, Immersive Technology, and Machine Learning

13:15-14:30 Tuesday, June 27, 2023

Room 6

Chair: Chowarit Mitsantisuk (Kasetsart University)

01 **Detection Welding Performance of Industrial Robot using Machine Learning**
Onjira Duongthipthewa[1], Koonlachat Meesublak[2], Atsushi Takahashi[3], and Chowarit Mitsantisuk[1]
[1]Kasetsart University, Thailand, [2]National Electronics and Computer Technology Center, Thailand, [3]Tokyo Institute of Technology, Japan

02 **Pose Capturing and Evaluation in a VR Environment**
Karn Kiattikunrat[1], Teesid Leelasawassuk[2], Shoichi Hasegawa[3], and Chowarit Mitsantisuk[1]
[1]Kasetsart University, Thailand, [2]National Electronics and Computer Technology Center, Thailand, [3]Tokyo Institute of Technology, Japan

03 **Performance Evaluation of MR-CSC-DMD in River Model Experiment with Groynes**
Chen ZHANG, Eisuke KOBAYASHI, Daichi MOTEKI, Hiroyasu YASUDA, Kiyoshi HAYASAKA, and Shogo MURAMATSU
Niigata University, Japan

04 **Effects of Low-Geometrical-Precision PCB Manufacturing on mmWave Passive Metasurfaces**
Panithan La-aiddee[1], Paramin Sangwongngam[2,3], Pornanong Pongpaibool[3], Datchakorn Tancharoen[4], Lunchakorn Wuttisittikulkij[1], and Pisit Vanichchanunt[5]
[1]Chulalongkorn University, Thailand, [2]National Electronics and Computer Technology Center, Thailand, [3]National Science and Technology Development Agency, Thailand, [4]Panyapiwat Institute of Management, Thailand, [5]King Mongkut's University of Technology North Bangkok, Thailand

CP6 Computers 6

13:15-14:30 Tuesday, June 27, 2023

Room 7

Chair: takeshi kumaki (Ritsumeikan university)

01 **Convolutional Transformer-based Deblurring Model for X-ray Images**
HyunYong Lee, Nac-Woo Kim, Jungi Lee, and Seok-Kap Ko
ETRI, Korea

02 **A Roughness Grading Method for Skin Surface Microstructure Using Deep Learning for the Assessment of Atopic Dermatitis**
Tatsuki Ohta[1], Yuma Miyaji[1], Tetsushi Koide[1], Kenta Nakamoto[2], Yuki Hayashida[2], and Yumi Aoyama[2]
[1]Hiroshima University, Japan, [2]Kawasaki Medical School, Japan

03 **RDMI: Recursive Training-Based Diffusion Model for Multivariate Time Series Imputation**
Yu Min Hwang, Seung-Chul Son, Nacwoo Kim, Seok-Kap Ko, and Byung-Tak Lee
ETRI, Korea

04 **Car Driver's Behaviors Detections using Ensemble Model**
Chalermkiat Chanachan[1], Patthachaput Thanesmaneerat[1], Thanrada Mahasukon[1], Jumpol Povichai[1], and Surapol Dumkor[2]
[1]King Mongkut's University of Technology Thonburi, Thailand, [2]Cargolink Logistech Co.,Ltd., Thailand

CP10 Computers 10

13:15-14:30 Tuesday, June 27, 2023

Room 8

Chair: Md. Arshad Ali (Okayama University)

01 **An Improvement of Algorithm for Computing Final Exponentiation for Pairing on KSS36 Curve and its Implementation**
Yuta Kawada[1], Kazuma Ikesaka[1], Md. Arshad Ali[2], Yuta Kodera[1], and Yasuyuki Nogami[1]
[1]Okayama University, Japan, [2]Hajee Mohammad Danesh Science and Technology University, Bangladesh

02 **A Proposal of Eliminating Fruitless Cycle for Efficient Pollard's Rho Method by Adding a Constant Rational Point**
Takuro Manabe[1], Shota Kanzawa[2], Md Arshad Ali[3], Yasuyuki Nogami[1], Yuta Kodera[1], and Takuya Kusaka[4]
[1]Okayama University, Japan, [2]The Japan Research Institute, Limited., Japan, [3]Hajee Mohammad Danesh Science and Technology University, Bangladesh, [4]Shimane University, Japan

03 **Method to Eliminate Fruitless Cycles for Pollard's Rho Method with Splitting Table**
Shota Kanzawa[1], Takuro Manabe[2], Yuta Kodera[2], Yasuyuki Nogami[2], and Takuya Kusaka[3]
[1]The Japan Research Institute, Limited., Japan, [2]Okayama University, Japan, [3]Shimane University, Japan

04 **Optimization of Video Repetitive Action Counting for Efficient Inference on Edge Devices**
Hyunwoo Yu[1], Yubin Cho[1], Jong Pil Yun[2], and Sukju Kang[1]
[1]Sogang University, Korea, [2]Korea Institute of Industrial Technology, Korea

CS12 Circuits and Systems 12

14:40-15:55 Tuesday, June 27, 2023

Room 1

Chair: Hyungjin Kim (Inha University)

01 **Analysis of Vth distribution based on physical parameter variation for 3-D TLC NAND flash memory**
Sungju Kim and Hyungcheol Shin
Seoul National University, Korea

02 **Flexible and Transparent Organic Thin-Film Transistors with Solution Processable Polymer**
Yoojeong Ko[1], Hyo-Won Jang[1], Hyeok Kim[1], and Dong-Wook Park[1,2]
[1]University of Seoul, Korea, [2]Trans Bio Lab Co., Ltd., Korea

03 **Design Optimization of Leakage Based PUF Circuit targeting at Ultra-Low Voltage Operation**
Shunkichi Hata and Kimiyoshi Usami
Shibaura Institute of Technology, Japan

04 **Evaluation of a PUF Embedded in the Delay Testable Boundary Scan Circuit**
Hayato Miki, Eisuke Ohama, Hiroyuki Yotsuyanagi, and Masaki Hashizume
Tokushima University, Japan

CS15 Circuits and Systems 15

14:40-15:55 Tuesday, June 27, 2023

Room 2

Chair: Wonbo Shim (Seoul National University of Science and Technology)

01 **Design & Analysis of A MIM based Highly Sensitive H-Shaped Ring Resonator Embedded with Gold Nanodefects**
Ahmad Jarif Yeasir, Inan Marshad, Fahim Faisal, K. M. Sazid Hasan, MD Tahmidur Rahman Tamim, and Mirza Muntasir Nishat
Islamic University of Technology, Bangladesh

02 A Lightweight on Spiking Generative Adversarial Networks for IoT Applications
Seongmo Park, B.G. Choi, Piljae Park, Sungdo Kim, and K.W.Park
ETRI, Korea

03 Thermal coupling analysis and improved dynamic temperature control algorithm for 3D-LSI
Songxiang Wang and Kimiyoshi Usami
Shibaura Institute of Technology, Japan

04 Matrix Inversion Accelerated MCU Circuit for Image Recognition Pertinent Computation
Weisheng Wang[1], Yu Jin[1], Quan Yuan[1], and Heming Sun[2]
[1]Beijing University of Chemical Technology, China, [2]Waseda Research Institute for Science and Engineering, Japan

SS9 Computer Architecture and Its Components

14:40-15:55 Tuesday, June 27, 2023

Room 3

Chair: Kon-Woo Kwon (Hongik University)

01 In-DRAM Error Correction Codes with Minimal Aliasing for DDR5 to Mitigate Rowhammer Vulnerability
Kon-Woo Kwon
Hongik University, Korea

02 Introduction of High-Bandwidth Memory Interface
Junyoung Song
Incheon National University, Korea

03 Dynamic Core Allocation for Improving Energy Efficiency of Lantency-Critical Applications
Daehoon Kim
Daegu Gyeongbuk Institute of Science and Technology, Korea

04 Dynamic Precision Scaling for Efficient DNN Training
Jaeha Kung
Korea University, Korea

SS10 Computer Simulation for Manufacturing Technology

14:40-15:55 Tuesday, June 27, 2023

Room 6

Chair: Jatuporn Thongsri (College of Advanced Manufacturing Innovation, KMITL)

01 **A proper lubricant for a swage process in a hard disk drive factory determined by explicit dynamics analysis**

Watchara Bubpatha, Sorathorn Pattanapichai, and Jatuporn Thongsri
King Mongkut's Institute of Technology Ladkrabang, Thailand

02 **Neural Networks Input Techniques to Maintain a Small Skew Angle in Bit-Patterned Magnetic Recording with a V-Shaped Read-Head Array**

Kirana Alif Fatika[1], Santi Koonkarnkhai[2], Piya Kovintavewat[2], and Chanon Warisarn[1]
[1]King Mongkut's Institute of Technology Ladkrabang, Thailand, [2]Nakhon Pathom Rajabhat University, Thailand

03 **Effect of Nozzle Pressure and Shape Ratios on Gas Flow of a 122 mm Supersonic Rocket Nozzle investigated by CFD**

Chatchapat Chaiaiad and Jatuporn Thongsri
King Mongkut's Institute of Technology Ladkrabang, Thailand

04 **Thermal simulation of microwave kiln based on multiphysics**

Thodsaphon Jansaengsuk[1], Sorathon Pattanapichai[1], Piyawong Poopanya[2], Nonthawat Phimphakan[2], and Jatuporn Thongsri[1]
[1]King Mongkut's Institute of Technology Ladkrabang, Thailand, [2]Ubon Ratchathani Rajabhat University, Thailand

CP7 Computers 7

14:40-15:55 Tuesday, June 27, 2023

Room 7

Chair: Minsuk Koo (Incheon National University)

01 **Meal Recommendation System for the Elderly (MRS)**

Piyanuch Charernmool[1], Chonlasit Tawornying[2], Theerasak Prapakornwanichakun[2], Pavarit Vanijkachorn[2], Porawat Visutsak[2,3], and Fuangfar Pensiri[4]
[1]Chaopraya University, Thailand, [2]King Mongkut's University of Technology North Bangkok, Thailand, [3]Beijing Institute of Technology, China, [4]Kasetsart University, Thailand

02 **A Two-Stage Lesion Recognition System for Diagnostic Support in Colon NBI Endoscopy**
Yongfei Wu[1], Daisuke Katayama[1], Tetsushi Koide[1], Toru Tamaki[2], Shigeto Yoshida[3], Shin Morimoto[4] Yuki Okamoto[4], Shiro Oka[4], and Shinji Tanaka[4]
[1]Hiroshima University, Japan, [2]Nagoya Institute of Technology, Japan, [3]Medical Corporation JR Hiroshima Hospital, Japan, [4]Hiroshima University Hospital, Japan

03 **Multi Modal Deep Learning based on Feature Attention for Prediction of Blood Clot Elasticity**
Jiseon Moon, Sangil Ahn, Min Gyu Joo, Kyu Kwan Park, Hyoung Won Baac, and Jitae Shin
Sungkyunkwan University, Korea

04 **Development of Computer-Aided Diagnosis System Using Single FCN Capable for Indicating Detailed Inference Results in Colon NBI Endoscopy**
Daisuke Katayama[1], Yongfei Wu[1], Tetsushi Koide[1], Toru Tamaki[2], Shigeto Yoshida[3], Shin Morimoto[4], Yuki Okamoto[4], Shiro Oka[4], and Shinji Tanaka[4]
[1]Hiroshima University, Japan, [2]Nagoya Institute of Technology, Japan, [3]Medical Corporation JR Hiroshima Hospital, Japan, [4]Hiroshima University Hospital, Japan

CP11 Computers 11

14:40-15:55 Tuesday, June 27, 2023

Room 8

Chair: Yoon Kim (University of Seoul)

01 **Comparative Study on Analog and Digital Processing-in-Memory Architectures**
Hoon Shin, Rihae Park, and Jae W. Lee
Seoul National University, Korea

02 **Virtual Memory Support for PIM with Table-based Management**
Seung Jae Yong and Eui-Young Chung
Yonsei University, Korea

03 **Implementation of Modulo Multiplication with CAM-based Massive-parallel SIMD matrix core**
Kyosuke Kageyama[1], Hajime Hamano[2], Ryogo Kayama[2], Tetsushi Koide[3], and Takeshi Kumaki[2]
[1]Kindai University, Japan, [2]Ritsumeikan University, Japan, [3]Hiroshima University, Japan

04 **Brightness and Contrast Adaptive Face Recognition System**
Ki Tae Kim and Eui-Young Chung
Yonsei University, Korea

CM6 Communications 6

16:15-17:30 Tuesday, June 27, 2023

Room 6

Chair: Chanon Warisarn (King Mongkut's Institute of Technology Ladkrabang)

01 **Design of a Filtering Metallic Vivaldi Array Antenna**
Cheol-Soo Lee, Hong-Kyun Ryu, Beom-Jun Park, In-Seon Kim, and Joo-Rae Park
Agency for Defense Development, Korea

02 **DPU-based system evaluation with End-to-End Modular Simulation**
Young Ju Woo and Eui-Young Chung
Yonsei University, Korea

03 **Parametric Model and Estimator Classifier for Optimal Averaging in Mobile OFDM Systems with Superimposed Training**
Ignasi PiqUé Muntané and M. Julia Fernández-Getino García
Charles III University of Madrid, Spain

04 **SE-Based User Clustering for Sum Rate Maximization in Multi-UAV NOMA Networks**
Juhyun Park, Seokju Kim, and Chungyong Lee
Yonsei University, Korea

CP8 Computers 8

16:15-17:30 Tuesday, June 27, 2023

Room 7

Chair: Kon-Woo Kwon (Hongik University)

01 **Mining of High Average-Utility Alarm Rules in Telecommunication Network Data**
Serdar Iplikci[1], Hilkat Arslan[2], Ufuk Akbulut[2], and Aydin Cetin[2]
[1]Pamukkale University, Turkey, [2]Turkcell Telecomm. Services Inc., Turkey

02 **Handling Data Imbalance for Improving Blurriness Estimation using Convolutional Transformer**
HyunYong Lee, Nac-Woo Kim, Jungi Lee, and Seok-Kap Ko
ETRI, Korea

03 Tai Chi Exercise Posture Detection and Assessment for the Elderly using BPNN and 2 Kinect Cameras

Sarawin Kanchanapaetnukul[1], Rungarun Aunkaew[1], Piyanuch Charernmool[2], Mohamed Daoudi[3], Kobkiat Saraubon[1], and Porawat Visutsak[1]
[1]King Mongkut's University of Technology North Bangkok, Thailand, [2]Chaopraya University, Thailand, [3]University of Lille, France

CP12 Computers 12

16:15-17:30 Tuesday, June 27, 2023

Room 8

Chair: Jaeha Kung (Korea University)

01 P300-Based Partial Face Recognition With xDAWN Spatial Filter and Covariance Matrix

Ingon Chanpornpakdi and Toshihisa Tanaka
Tokyo University of Agriculture and Technology, Japan

02 Effect of Music Recall on EEG Alpha Power: A Machine Learning Study

Kazuki Matsunaga, Shuma Ito, Ingon Chanpornpakdi, and Toshihisa Tanaka
Tokyo University of Agriculture and Technology, Japan

03 Study of Particle Swarm Optimization Parameter Tuning for Camera Calibration

Kitbodin To.sriwong, Sukritta Paripurana, and Pisit Vanichchanunt
King Mongkut's University of Technology North Bangkok, Thailand

CS16 Circuits and Systems 16

09:00-10:15 Wednesday, June 28, 2023

Room 1

Chair: Kyeong-Sik Min (Kookmin University)

01 Development of flexible and transparent aptamer electrodes for cortisol sensing using graphene and PEDOT:PSS bilayer

Sookyeong Kim, Hyungjun Choi, Jaewon Park, and Dong-Wook Park
University of Seoul, Korea

02 Analysis of Graphene-based Deep Brain Stimulation Electrode: Comparison of Electrochemical Impedance Spectroscopy and Cyclic Voltammetry

Hyungjun Choi and Dong-Wook Park
University of Seoul, Korea

CM7 Communications 7

09:00-10:15 Wednesday, June 28, 2023

Room 2

Chair: Ickhyun Song (Hanyang University)

01 **Analysis Time Delay of SOME/IP Real-time data Exchange Environment**
Si Woo Lee, Sung Bhin Oh, and Jae Wook Jeon
Sungkyunkwan University, Korea

02 **An Optimized Multi-Object Tracking with TensorRT**
Hyeong-Keun Hong and Jae-Wook Jeon
Sungkyunkwan University, Korea

03 **Analysis of SOME/IP-CAN Communication**
Jae Bum Park, Sung Bhin Oh, and Jae Wook Jeon
Sungkyunkwan University, Korea

04 **The Time Synchronization of CAN-FD and Ethernet for Zonal E/E Architecture**
Sung Bhin Oh, Young Soo Do, and Jae Wook Jeon
Sungkyunkwan University, Korea

SP6 Signal Processing 6

09:00-10:15 Wednesday, June 28, 2023

Room 3

Chair: Jingon Joung (Chung-Ang University)

01 **Emotional Intensity-aware Learning for Facial Expression Manipulation**
Seongho Kim and Byung Cheol Song
Inha University, Korea

02 **Deep Learning based Image Enhancement for semiconductor SEM image using paired dataset**
Joonhyeok Yoon[1], Chungseok Oh[1], Jin Her[2], Hyung keun Yoo[2], Sungjae Jung[2], Hwihun Jeong[1], Hayeon Lee[1], and Jongho Lee[1]
[1]Seoul National University, Korea, [2]Samsung Electronics, Korea

CP13 Computers 13

09:00-10:15 Wednesday, June 28, 2023

Room 4 & 5

Chair: Minsuk Koo (Incheon National University)

01 **Adaptive Data Prefetcher with Probability Learning in LLC**
Jusin Kim, Jiwon Lee, and Won Woo Ro
Yonsei University, Korea

02 **EPA ECC: Error-Pattern-Aligned ECC for HBM2E**
Kiheon Kwon, Dongwhee Kim, Soyoung Park, and Jungrae Kim
Sungkyunkwan University, Korea

03 **Why Address Translation Matter?: Analyzing Page Access Patterns in NAND Flash-based SSDs**
Hyungjin Kim[1,2] and Seokin Hong[1]
[1]Sungkyunkwan University, Korea, [2]Samsung Electronics

04 **In-Cache Processing with Power-of-Two Quantization for Fast CNN Inference on CPUs**
Joseph Woo, Seungtae Lee, Seongwook Kim, Gwangeun Byeon, and Seokin Hong
Sungkyunkwan University, Korea

Undergraduate IC track (Korean Language Only)

13:00-17:55 Sunday, June 25, 2023

Room 1+2+3

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

01 **Uart Controller Based on APB Bus**
Eunbae Gil, Sangmin Park, Chan Park, Joonho Chung, and Jaehyuk Cho
Soongsil University, Korea

02 **PWM motor control with UART**
Wonchae Kim, Sua Shin, Naeun PARK, Gahyeon Jang, and Minchae Cha
Soongsil University, Korea

03 **mmwave Transceiver for Beamforming System Applications**
Yejin Kim, Soosung Kim, Chaeyun Kim, Bohyeon Kim, Seungjong Moon, Joonseok Park, and Hojong Lee
Soongsil University, Korea

04 **Advancing Display Performance: Technological Research for Improvement**
KyungBin Cho, KyungMin Choi, and ChangHee Lee
Soongsil University, Korea

05 **10T-SRAM Computing-in-Memory Macros for Binary and Multibit MAC Operation**
JaeSeong Jang, HuiYeong Park, SangHeum Yeon, and SeongYun Jung
SungKyunKwan University, Korea

06 **Recognition of License Plates for Vehicles using CNN**
ChangHun Yeom, SiYeon Kim, YeongMin Kim, and MinJun Kim
SungKyunKwan University, Korea

07 **Computing-In-Memory based on MAV SRAM using Recycling-Layer**
SeongJae Ha, SeokHyun Han, JinWoo Kim, and JaeWoo Heo
SungKyunKwan University, Korea

08 **8T SRAM based Process-In-Memory System with Current Mirror for accurate MAC operation**
JaeMin Lee, GiJun Kwak, and UnSeop Jung
SungKyunKwan University, Korea

09 **Design of Two-Stage CMOS Operational Amplifiers**
Yaeji Moon, Joa Kim, Jiyeon Bae, Yeji Lee, andSubeen Hong
Ewha Womans Unicersity, Korea

10 Analysis on Component Characteristics for Hardware-based Machine Learning: Enabling Next-Generation Personalized Artificial Intelligence
Hyowon Jang, Heeju Jin, Seeun Oh, Jane Chung, and Seongjae Cho
Ewha Womans University, Korea

11 Design of a CMOS Two-Stage OP-AMP with Wide-Swing Current-Mirror Current Source
Dayeon Chung, Minji Kim, Minah Lee, Soobin Jung, and Minjin Cho
Ewha Womans University, Korea

12 Autonomous Serving Robot based on LiDAR-SLAM
Miji Kim, Jiwon Yu, Siyeon Lee, and Geuna Chang
Ewha Womans University, Korea

13 Design of a Column Parallel R-DAC for Low Power Display Systems
Jiin Moon, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

14 Single Channel Current Steering DAC for High Speed Display
Yuchan Yun, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

15 A CMOS Image Sensor with Single Channel ADC
Kyungmin Lee, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

16 A CMOS Image Sensor with Low Power Single-Slope ADC
Kyuhyun Lee, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

17 High Speed Pipelined Flash ADC
Seungjoon Lee, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

18 Design of DAC for Multi-step Ramp Generator
Hyuna Lim, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

19 Design of a low Power Pipelined SAR ADC
Taeeun Jang, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

20 A CMOS Image Sensor with High Speed Single-Slope ADC
Seungmin Heu, Sooyoun Kim, and Minkyu Song
Dongguk University, Korea

21 **Polymeric Ultra Thin Film Deposition by Using iCVD Process**
YeJun Jeong, YooSeong Song, Inkyum Kim, and Min Ju Kim
Dankook University, Korea

22 **Theory and design of ESD protection circuit for IC protection**
HyunBin Ko and NamGyu Kim
Dankook University, Korea

23 **PMIC**
KueHo Sung, HyunJae Jeong, and SukJoo Chang
Dankook University, Korea

24 **Fundamentals of Research for Next-Generation Image Sensor Development**
Sejun Park, Taemin Kim, Taehoon Lee, andJaehak Lee
Dankook University, Korea

25 **Smoking Detection in Non-Smoking Area (AI Image Processing)**
JaeHyun Park, JooYoung Lim, and SangJeong Hwang
Daegu University, Korea

26 **AI Image-based Soft Drink Type Classification System for Low Vision and Blind People**
InHwan Um, ByungHak Yu, InYoung Choi, and YoungJin Hong
Daegu University, Korea

27 **Design of A Quadruped Robot with Balance Control**
SungWon Kim, HoSung Kim, and Hyungyu Lee
Daegu University, Korea

28 **Automobile Pedal Event Data Recorder**
MinJun Kim, MyeongJae Shin, and RaeIk Jang
Daegu University, Korea

29 **Electronic Calculator for Blind People**
Minji Kim and DaYeon Yang
Daegu University, Korea

30 **Gray encoding for reducing metastability and bubbles**
Park Sina, Jang Yeryun, and Cho Sooyoung
Chung-Ang University, Korea

31 **Design and evaluation of 1Mb 6T SRAM layout designs at 6ns access time**
Kim Taejun, Park Byungtak, and Son Dongjun
Chung-Ang University, Korea

32 Flash ADC Design: Comparison between MUX Decoder and XOR Decoder
Kim Hayeon, Ryu Chanhyuk, Park Saeyeon, and Lee Eunwoo
Chung-Ang University, Korea

33 Highly-optimized half VDD precharger for SRAM circuit
Kook Myungjun, Kim Seungjae, and kim Jiwook
Chung-Ang University, Korea

34 Low power sram with NC-sram and low power sense amplifier
Kim Seunghyun, Lee Youngsub, and Jung Hakyung
Chung-Ang University, Korea

35 Compact 6T SRAM Architecture in 0.5um CMOS
Kang Jaehyun, Kim Seungjun, Shin Hyunjae, and Won Seungbin
Chung-Ang University, Korea

36 3-bit Flash ADC with Interpolation
Si Hyun, Oh Seunghyun, and Choi Jiwon
Chung-Ang University, Korea

37 Low power High speed Flash adc design with Strong ARM Comparator
Shin Seokjoong, Yang Jaehyuk, Yoon Sangmin, and Jung Jaeheon
Chung-Ang University, Korea

38 3-bit Flash ADC with StrongARM Latch
Kwon Jaehoon, Kim Junhyuk, and Bae Youngjun
Chung-Ang University, Korea

39 3bit flash adc with strongarm comparator, amplifier, and gray to bcd decoder
Park Junsoo, Park Hoon, and Seo Jeyeon
Chung-Ang University, Korea

40 High speed/Low power 3-bit Flash ADC scheme in 0.5um
Seo Yongseok, Son Dongmin, and Shin Seungbin
Chung-Ang University, Korea

41 A noble structure of compact array multiplier circuit using adder logic
Kang Hyunwoo, Bae Joongil, Lee Donghoon, and Lim Kijun
Chung-Ang University, Korea

42 Low Power High Speed MAC for DSP
Kang Jimin, An Yumi, Cho Wonjung, and Choi Kyubin
Chung-Ang University, Korea

43 Low Voltage SRAM Array
Lee Soomin, Jung Sunhee, and Kang Jaehyun
Chung-Ang University, Korea

44 Design of area efficient 2 bit multiplier
Kim Garam, Kim Changhyun, and Jang Seoeun
Chung-Ang University, Korea

45 Design of Compact Sized 4 x 2 SRAM Array and Column I/O with High Speed Read & Write Operation
Nam Gunwoo, Choi Wonjae, and Choi Jongin
Chung-Ang University, Korea

46 Low power two stage dynamic comparator
Lee Jinkyu, Jung Jiho, and Kwak Changwoo
Chung-Ang University, Korea

47 3-bit Flash ADC with Rail to Rail comparator for High Performances
Kyung Hyewon, ko Jihyun, and Park Sanghyun
Chung-Ang University, Korea

48 High Performance Evaluation of a 100MHz 3-bit Flash ADC
Kim Yongjun, Kim Jaeyoon, and Bae Junghwi
Chung-Ang University, Korea

49 3bit Multiplier with CMOS Full Adder Design
Kim Dongbum, Shin Dongin, and Lee Woongbi
Chung-Ang University, Korea

50 Validating the Versatility of Flash ADCs using Strong ARM Comparator in ETRI CMOS 0.5um
Kim Jaemin, Moon Hanin, and Seo Daeho
Chung-Ang University, Korea

51 The Fundamental layout of 4x2 SRAM array with low power operation
Kim Taekyung, Nam Jaehyun, and Cho Kyuwoong
Chung-Ang University, Korea

52 4x2 SRAM column structure with Latch-type sense amplifier
Kim Jaeha, Yoo Donghoon, and Lee Jinho
Chung-Ang University, Korea

53 Design of SRAM Cell using Robust Sense Amplifier in 3ns operation
Kim Jongwon, Yang Jinyoung, and Kwak Hyunseok
Chung-Ang University, Korea

54 An Efficient Design of 3bit ADC
Kim Seojin, Kim Jaesung, and Choi Sung-A
Chung-Ang University, Korea

55 Design of 3-bit multiplier using mirror adder
Kook Jimin, Park Soomin, and Yoon Sunghyun
Chung-Ang University, Korea

56 Compact & High Speed SRAM design with 1.3um CMOS
Kim Kanghyun, Lee Minhyuk, and Cho Sungho
Chung-Ang University, Korea

57 A design of 3-bit Flash ADC using 10-T latch type comparator in 0.5um CMOS
Kim Jihyuk, Lee hyunju, and Cho Chanhyung
Chung-Ang University, Korea

58 Flash adc with balanced latch output capacitance using NOR-only decoder
Park Hansol, Lee Seunghyun, and Choi Seunghyun
Chung-Ang University, Korea

59 Improvement of Flash ADC Speed
Yoo Hyunseung, Jung Hyunsoo, and Choi Jinwoo
Chung-Ang University, Korea

60 Bootstrapping circuit design (1)
Jimin Kang
Chung-Ang University, Korea

61 Bootstrapping circuit design (2)
jae Hoon Kwon
Chung-Ang University, Korea

62 Bootstrapping circuit design (3)
Kim Dongbum
Chung-Ang University, Korea

63 Bootstrapping circuit design (4)
Kim Seojin
Chung-Ang University, Korea

64 Bootstrapping circuit design (5)
Jun Hyeok Kim
Chung-Ang University, Korea

65 Bootstrapping circuit design (6)
Tae Jun Kim
Chung-Ang University, Korea

66 Bootstrapping circuit design (7)
Joon Soo Park
Chung-Ang University, Korea

67 Bootstrapping circuit design (8)
Bae Youngjun
Chung-Ang University, Korea

68 Bootstrapping circuit design (9)
Dae Ho Seo
Chung-Ang University, Korea

69 Bootstrapping circuit design (10)
Dong Min Son
Chung-Ang University, Korea

70 Bootstrapping circuit design (11)
Si Hyun
Chung-Ang University, Korea

71 Bootstrapping circuit design (12)
Hyun Jae Shin
Chung-Ang University, Korea

72 Bootstrapping circuit design (13)
An Yumi
Chung-Ang University, Korea

73 Bootstrapping circuit design (14)
Jae Hyuk Yang
Chung-Ang University, Korea

74 Bootstrapping circuit design (15)
Woong Bee Lee
Chung-Ang University, Korea

75 Bootstrapping circuit design (16)
Jang Yeryun
Chung-Ang University, Korea

76 Bootstrapping circuit design (17)
Sun Hee Jung
Chung-Ang University, Korea

77 Bootstrapping circuit design (18)
Jae Heon Jung
Chung-Ang University, Korea

78 Bootstrapping circuit design (19)
Soo Young Cho
Chung-Ang University, Korea

79 Bootstrapping circuit design (20)
Kyu Bin Choi
Chung-Ang University, Korea

80 Bootstrapping circuit design (21)
Sung Ah Choi
Chung-Ang University, Korea

Poster Sessions

P1 Poster 1

13:15-14:30 Tuesday, June 27, 2023

Loft Space 2, 3

Chair: Jungwon Lee (Seoul National University)

01 **Fabrication of biocompatible PBTTT organic thin-film transistor using Parylene-C substrate and gate dielectric**
Ah-Hyun Hong, Yu Jung Park, Jung Hwa Seo, and Dong-Wook Park
University of Seoul, Korea

02 **Wireless Speed Sensor Using XBee Pro Module on Arduino Platform**
Nasrin Zulaikha Binti Muda, Syila Izawana Binti Ismail, Mazratul Firdaus Binti Mohd Zin, Rina Abdullah, and Nik Nur Shaadah Nik Dzulkefli.
Universiti Teknologi MARA, Malaysia

03 **A Study on improving reliability of Isolated Asynchronous Communication of High Voltage Battery Monitoring System**
Ah-Rum Hur, Sung-Hoon Bang, Seong-Ho Oh, and Sang-Ho Lee
Hyundai Mobis, Korea

04 **A Gain Boosted Current Mirror with Positive Feedback in 28-nm Technology**
Seungwoo Son and Jaeduk Han
Hanyang University, Korea

05 **A Parameterized 2-to-1 Ratio MUX Layout Generator for Advanced CMOS Technologies**
Taeho Shin and Jaeduk Han
Hanyang University, Korea

06 **A study on reliability test of UVLED module with photocatalyst for reduction of organic compounds in semiconductor process**
Yea Sol Jang[1], Yong-Gon Seo[1], Gyo-Uk Goo[2], Yong-Hoon Kang[2], and Hyung-Do[1]
[1]KETI, Korea, [2]UVER, Korea

07 **A study on the VOC reduction effect according to the TiO2 photocatalyst composition method and UVLED light intensity change**
Yea Sol Jang[1], Yong-Gon Seo[1], Gyo-Uk Goo[2], Yong-Hoon Kang[2], and Hyung-Do[1]
[1]KETI, Korea, [2]UVER, Korea

08 Development of Integrated Smart Leak Detection System applied to Nuclear Power Plant
Sanghoon Bae and Seoryong Koo
Korea Atomic Energy Research Institute, Korea

09 A study on the development of a device for measuring heart rate around the ear based on BLE
Young-Sang Park, Hyunseok Lee, Songho Yang, Gyuil Kim, Eui Sung Jung, and Hoyul Lee
K-MEDI hub, Korea

10 Effect of Pre-charge Voltage on Retention Characteristics and Accuracy in 65 nm 2T0C DRAM based Compute-In-Memory
Seong Hwan Kong and Wonbo Shim
Seoul National University of Science and Technology, Korea

11 A 32-Gb/s Si-based Optical Transmitter for Heterogeneous Wafer-Level Integrated Package
Won-Seok Oh[1], Duho Kim[2], Changkyung Seong[2], and Kangyeob Park[1]
[1]Korea Electronics Technology Institute, Korea, [2]Qualitas Semiconductor, Co., Ltd., Korea

12 A 20-Gbps 12-Lane Optical Receiver IC Array for Active Optical Cables
Kangyeob Park[1], Jong-Kook Moon[2], Chang-Joon Kim[2], and Won-Seok Oh[1]
[1]Korea Electronics Technology Institute, Korea, [2]Ophit, Co., Ltd., Korea

13 Energy Efficient Processing-In Memory Architecture with Voltage Summation-based Analog Vector-Matrix Multiplication
Jung Nam Kim[1], Boram Kim[1], Minsuk Koo[2], and Yoon Kim[1]
[1]University of Seoul, Korea, [2]Incheon National University, Korea

14 A MEMS Microphone ROIC Based on a Dual Cross-Sampling Delta-Sigma ADC
Byunggyu Lee[1], Jun Soo Cho[2], Hyunjoong Lee[1], and Suhwan Kim[1]
[1]Seoul National University, Korea, [2]Gwanak Analog Co., Ltd., Korea

15 The analysis of DCP, NLSB on 3D NAND Flash memory using ferroelectric material
Sunghyun Woo and Myounggon Kang
Korea National University of Transportation, Korea

16 Fabrication of si-based p-type field effect transistor for high temperature operation
Yun-Jae Oh and Il Hwan Cho
Myongji University, Korea

17 Spiking Neural Network with overflow retaining and underflow allowing
Jaesung Kim[1], Minsuk Koo[2], and Yoon Kim[1]
[1]University of Seoul, Korea, [2]Incheon National University, Korea

18 Analysis and Comparison of Electrical Power System Architectures for Satellite
Yu-Kai Chen[1], Chung-En Hsiao[1], Yu-Shan Tai[1], and Pei-Yi Ho[2]
[1]National Formosa University, Taiwan, [2]Taiwan Space Agency, Taiwan

19 **A 28-nm CMOS High PSRR and Stability Low Dropout Regulator Using Feed-Forward with Current Sensing**
Bongsu Kim and Junyoung Song
Incheon National University, Korea

20 **Development of invisible information lighting display "Stego-panel V"**
Tomoki Yamashita, Takumi Hayashi, Syunsuke Inoue, and Takeshi Kumaki
Ritsumeikan University, Japan

21 **Calibration Techniques for Time-Interleaved ADC**
Kiho Seong, Seong-Jun Byun, Yong-Seok Seo, and Kwang-Hyun Baek
Chung-Ang University, Korea

22 **Analysis of the Effect of Feature Denoising from the Perspective of Corruption Robustness**
Hyunha Hwang[1], Se-Hun Kim[1], Mincheol Cha[1], Min-Ho Choi[1], Kyujoong Lee[2], and Hyuk-Jae Lee[1]
[1]Seoul National University, Korea, [2]Sungshin Women's University, Korea

23 **Dynamic Vision Sensor with Unified Pixel Comparator and Event Bit Line Reduction by Event Unified Grouping Logic**
Jinpyo Han, Houk Lee, and Jaehyuk Choi
Sungkyunkwan University, Korea

24 **A SPAD-Based QVGA Photon Counting Image Sensor with nMOS-only Synchronous Pixel and Conditional Reset Scheme for Night Vision**
Jaewook Nam, Houk Lee, and Jaehyuk Choi
Sungkyunkwan University, Korea

P2 Poster 2

14:40-15:55 Tuesday, June 27, 2023

Loft Space 2, 3

Chair: Wookyung Sun (Seoul National University)

01 **Effects of Oxygen Partial Pressure on Electrical Properties and Stabilities of High-Mobility IGTO Thin-Film Transistors**
Jong-Sang Oh, Seung-Hyun Lim, Joon-Young Lee, and Hyuck-In Kwon
Chung-Ang University, Korea

02 **Influence of Oxygen Content on Output Characteristics of IGZO TFTs under High Current Stress Conditions**
Yeong-Gil Kim[1], Chae-Eun Oh[1], Myeong-Ho Kim[2], Kyoung Seok Son[2], Jun-Hyung Lim[2], Sang-Hun Song[1], and Hyuck-In Kwon[1]
[1]Chung-Ang University, Korea, [2]Samsung Display, Korea

03 Channel Layer Thickness Effects on Radiation Stability of Amorphous Oxide TFTs
Hyun-Ah Lee, Hyo-Won Jang, Min-Gyu Shin, and Hyuck-In Kwon
Chung-Ang University, Korea

04 Energy Efficient Mixed-Signal Distance computing for K-Means Clustering Application
Honggu Kim, Yerim An, Gyeongchan Heo, Mincheol Kim, Ryunyeong Kim, Sungyoung Kim, Yong Shim, and Kwang-Hyun Baek
Chung-Ang University, Korea

05 High SFDR Current Steering DAC with Lightweight Dynamic Element Matching Technique
Jae-Soub Han, Jung-Hun Lee, Gyung-Chan Heo, and Kwang-Hyun Baek
Chung-Ang University, Korea

06 Adaptive Conversion and Energy-Saving SAR ADC with PVT Variation Compensation Scheme
Jeetaeck Seo, Dongmin Son, and Kwang-hyun Baek
Chung-Ang University, Korea

07 Design of Low Power High SFDR Direct Digital Frequency Synthesizer based on CMOS logic PACC with dithering Technique
JaeSoub Han, Joohee Lee, YoungKyu Kim, and KwangHyun Baek
Chung-Ang University, Korea

08 A Reference-Sampling Fractional-N PLL using Pipelined Phase-Interpolator for Low Phase Noise
Jong-Hyeon Seo, Min-Ji Kim, and Kwang-Hyun Baek
Chung-Ang University, Korea

09 Proposal of flicker-based QR code with invisible information display lighting device
Shunsuke Inoue, Takumi Hayashi, Tomoki Yamashita, and Takeshi Kumaki
Ritsumeikan University, Japan

10 A 16Gbps Receiver with VCM-controlled Continuous Time Linear Equalizer
Geungbae Kim, Seung-Myeong Yu, Chanbin Hwang, and Junyoung Song
Incheon National University, Korea

11 High Static Performance 12-bit Multi Channel R-R DAC in Display Source Driver
Chung-Hee Jang, Donghyun Shin, Tae-Hyun Kim, and Kwang-Hyun Baek
Chung-Ang University, Korea

12 A 8GHz Phase interpolator based Charge pump with 0.23% Phase Error
Hyunsu Jang, Jongchan An, Gwangmyeong An, Yoonsang Lee, Geungbae Kim, Jinsoo Bae, and Junyoung Song
Incheon National University, Korea

13 Light Intensity-to-Frequency Based Optical Beam Alignment Method for Small Satellites
Dilkashbek Zukhridinov, Su-il Choi, Louey Issaoui, Sang-uk Han, Seonghui Kim, and Seongick Cho
Chonnam National University, Korea

14 A Study on Algorithm Design and Hardware Packet Error Testing for Gateway Fault Diagnosis and Prediction
Seong-min Park[1], Yea Sol Jang[1], Yong-Gon Seo[1], Yu-Hwan Kim[2], Jae-Hoon Shin[2], and Hyung-Do[1]
[1]KETI, Korea, [2]ZERONEX, Korea

15 Enhancing Channel Estimation Accuracy in OTFS Systems via Single-Tone Parameter Inference
Han-Gyeol Lee, Kyubin Kim, Jaehong Kim, and Jingon Joung
Chung-Ang University, Korea

16 Link Quality-Aware Geographic Predictive Routing for V2V Network Based on GPSR
Michiko Harayama and Masahiro Mishioka
Gifu University, Japan

17 Compact mmWave Antenna with Wide Communication Coverage for Connected Autonomous Vehicles (CAV)
Ye-Bon Kim, Woo-Hee Lim, Junhyuk Cho, Seung-Won Oh, and Han Lim Lee
Chung-Ang University, Korea

18 Adaptive decoding of motor cortical neurons using linear Kalman filter
Min-Ki Kim[1], Jeong-woo Sohn[1], and Sung-Phil Kim[2]
[1]Catholic Kwandong University, Korea, [2]Ulsan National Institute of Science and Technology, Korea

19 A Study on Performance Metrics for Trajectory Simplifications
Sunho Baek, Hyeran Hong, and JunSeong Kim
Chung-Ang University, Korea

20 Development of an Automatic Detection System for Natural Disaster Occurrences with Spaceborne SAR Data
Ryuji Kojima, Yuma Kayano, Toshikazu Samura, and Katsumi Tadamura
Yamaguchi University, Japan

21 GPT-Dozen: Quantizing GPT with a 12-bit Floating-Point Precision
Minseok Seo, Hyuk-Jae Lee, and Xuan Truong Nguyen
Seoul National University, Korea

22 Performance Analysis of Criticality-Aware Out-of-Order Cores for Exploiting MLP
Yanghee Lee, Jiwon Lee, and Won Woo Ro
Yonsei University, Korea

23 Proposed Separation Distance for Frequency Sharing between 5G Base Station and Satellite Gateway
Ho-Kyung Son
ETRI, Korea

24 **Development of a Pest Automatic Diagnosis System for Intelligent Agriculture Using Image Recognition**
Chau-Chung Song, Wei-Zhong Chen, Hung-Yu Chen, and Yu-Kai Chen
National Formosa University, Taiwan

P3 Poster 3

16:15-17:30 Tuesday, June 27, 2023

Loft Space 2, 3

Chair: Sung-Tae Lee (Hongik University)

01 **Drone-based Inspection of Broken and Defected Pipes on Metal Roofs**
Abdullah Muhammad, Kiseong Lee, Chaejin Lim, Junhee Hyeon, Zafar Salman, and Dongil Han
Sejong University, Korea

02 **The efficiency of visual search investigated using network engineering**
Yuxuan WANG[1], Taishin NOMURA[2], Akira TSUKADA[3], and Yoshinobu MAEDA[1]
[1]Niigata University, Japan, [2]Osaka University, Japan, [3]Toyama College, Japan

03 **GAN vs Diffusion: Instance-Aware Inpainting on Small Datasets**
Abdullah Muhammad, Kiseong Lee, Chaejin Lim, Junhee Hyeon, Zafar Salman, and Dongil Han
Sejong University, Korea

04 **X-ray image-based flight path planning model of UAVs for non-destructive inspection of wind blades**
Jungi Lee, HyunYong Lee, Nac-Woo Kim, Yu-Min Hwang, and Seok-Kap Ko
ETRI, Korea

05 **Predict Condominium Prices in Bangkok Based on Ensemble Learning Algorithm with various factors**
Thanit Anchaleechamaikorn, Taninnuch Lamjiak, Thagoon Thongpe, Lapis Thiralertpanit, and Jumpol Polvichai
King Mongkut's University of Technology Thonburi, Thailand

06 **Object-Oriented Cutout Data Augmentation for Tiny Object Detection**
Sunhyuk Yim, MyeongAh Cho, and Sangyoun Lee
Yonsei University, Korea

07 **Packet Delivery Measurement between Narrowband Internet of Things Devices and Cloud Platform**
Akkarapong Bunsiri, Tanakorn Inthasuth, and Wasana Boonsong
Rajamangala University of Technology Srivijaya, Thailand

08 A MR-based Self-learning System of Basic Cutting for Vegetables
Miku Kato and Mitsunori Makino
Chuo University, Japan

09 Research on the Sharing and Security of Students' Evaluation Data Through Federated Learning
Sophia Chen, Chi-Ho Lin, and Jae-Won Lee
Semyung University, Korea

10 Analysis of Domestic Building Detection based on the YOLO
A-Ryoung Kim, Ji Hye Lee, Byunghun Han, Woo-geun Lee, Chae-Seok Lee, and Hojong Chang
KAIST, Korea

11 Discrete Wavelet Transform and Kalman Filter-based Autonomous Vehicle Localization Denoise Method
Jaw-Won Lee and Chi-Ho Lin
Semyung University, Korea

12 A VR-based Squat Self-study System with Superimposing Motion on Model and Post-checking Viewing from All Angles
Masahiro Watatani and Mitsunori Makino
Chuo University, Japan

13 Radon Reduction and Real-time Radon Monitoring System for Small Waterworks
Jun-yeong Jang, Su-jeong Yun, and Chi-ho Lin
Semyung University, Korea

14 Hybrid AI system to blurring the car license plate for protection of personal information in life safety protection system
Jeong Young Sic, Kim Yong-Woon, and Yim Jeongil
ETRI, Korea

15 A study on the treatment of children's body awareness
Si-nae Ahn
Cheongju University, Korea

16 Yield Prediction Method Using Manufacturing State Matrix and Stacked LSTM
Dong Yeon Son, Kyung Hwi Kim, Chehwan Lim, Ho Seok Choo, Jae Hyup Kim
LG Innotek Co., Ltd., Korea

17 Security considerations for the fourth data over non-committed 3-valued card-based protocols
Yuji Suga
Internet Initiative Japan Inc., Japan

18 3D Reconstruction Based on Multi-Phase CT for Kidney Cancer Surgery
Kwang-Hyun Uhm, Hong-Kyu Shin, Hyun-Jun Cho, Seung-Won Jung, and Sung-Jea Ko
Korea University, Korea

19 An Efficient Neural Network Design for Image Super-Resolution with Knowledge Distillation
Tuan Nghia Nguyen[1], Xuan Truong Nguyen[1], Kyujoong Lee[2], and Hyuk-Jae Lee[1]
[1]Seoul National University, Korea, [2]Sungshin Women's University, Korea

20 Multi-Scale Attention Based Plant Disease Segmentation Network
Seong-Eui Lee and Jong-Ok Kim
Korea University, Korea

21 Electromyography frequency filter design according to gender
Su-jeong Yun, Jun-young Jang, and Chi-ho Lin
Semyung University, Korea

22 Plant instance segmentation exploiting wavelet knowledge distillation
Ga-Eun Eun, Joo-Yeon Jung, and Jong-Ok Kim
Korea University, Korea

23 Design and Implementation of Novel Single-Stage High Voltage Electrostatic Generator for Agricultural Plant Protection Machine
Yu-Kai Chen, Hung-Yu Chen, Chau-Chung Song, and Wei-Zhong Chen
National Formosa University, Taiwan

24 New Infectious Disease Prevention Technology applied with IT: Baggage Disinfection Device
Ji Hye Lee[1], Chae-Seok Lee[1], Byunghun Han[1], Woo-geun Lee[1], A-Ryoung Kim[1], Jaeho Ko[2], Sakwan Kim[2], and Hojong Chang[1]
[1]KAIST, Korea, [2]SungSan Eng. Co., Ltd., Korea

Graduate System IC track (Poster) (Korean Language Only)

14:25-15:40 Monday, June 26, 2023

Loft Space 3

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

01 **RepSGD: Channel Pruning using Reparameterization for Accelerating Convolutional Neural Networks**
Nam Joon Kim and Hyun Kim
Seoul National University of Science and Technology, Korea

02 **A 21-Gb/s PAM-3 Driver using ZQ Calibration with Middle-Level Calibration to Improve Level Separation Mismatch Ratio**
Byung-Du Choi and Joo-Hyung Chae
Kwangwoon University, Korea

03 **A Context-Aware Readout System for Sparse Touch Sensing Array Using Ultra-low-power Always-on Event Detection**
Hyeri Roh and Woo-Seok Choi
Seoul National University, Korea

04 **High-Performance Integrated Circuits (HPIC) Design**
Min-Seong Choo
Hanyang University, Korea

05 **A Design of Low Power Supply and High-Performance Low Dropout Regulator for IoT Device**
Dong-Ha Kim, Young-Hun Kim, Young-Gun Pu, and Kang-Yoon Lee
Sungkyunkwan University, Korea

06 **A Design of 100-MHz Package Bondwire-Based Fully-Integrated 3-Level Buck Converter with Digital Pulse Width Modulation**
Ju Hyoung Kim, Jeong Seop Lee, Ji Hoon Song, Young Gun Pu, and Kang-Yoon Lee
Sungkyunkwan University, Korea

07 **A Design of Phase Shiftable PLL for Dual Band Beamforming for Wireless Power Transfer**
Jaehyung Jung and Kang-Yoon Lee
Sungkyunkwan University, Korea

08 **A Parameterized 2-to-1 Ratio MUX Layout Generator for Advanced CMOS Technologies**
Taeho Shin and Jaeduk Han
Hanyang University, Korea

09 **Secure Scan Design for Trustworthy IC Testing**
Youngki Moon, Seokjun Jang, and Sungho Kang
Yonsei University, Korea

10 **Accelerator for Vision Transformer**
Dongjin Shin, Insu Choi, and Joon-Sung Yang
Yonsei University, Korea

11 **Virtual Memory Support for PIM with Table-based Management**
Seung Jae Yong and Eui-Young Chung
Yonsei University, Korea

12 **An Ultra-Wideband and Compact Active Quasi-Circulator With Phase Alternated Differential Amplifier**
Dongho Yoo, Jun Hwang, and Byung-Wook Min
Yonsei University, Korea

13 **Double Clock Sampling XBBPFD for Distortion of Input Data Duty Cycle**
Jongmin Park and Jinwook Burm
Sogang University, Korea

14 **Development of Artificial Intelligence Semiconductor for Processing in Memory**
Jung Nam Kim, Ji-Hoon Ahn, Won Joo Lee, and Yoon Kim
University of Seoul, Korea

15 **A Ka-Band Vector Sum Phase Shifter Using Active Balun**
Jimin Lee and Changkun Park
Soongsil University, Korea

16 **Power-Efficient Multi-Sensor Integration for Real-Time Monitoring System**
Hyunjoong Kim, Sanghyeon Cho, Youjang Pyeon, Minseop Song, Yonggi Kim, Euisung Jung, and Jae Joon Kim
UNIST, Korea

17 **A 19.8W/29.6W Hybrid Step-Up/Down DC-DC Converter with 97.2% Peak Efficiency for 1-Cell/2-Cell Battery Charger Applications**
Seongil Yeo[1], Uyong Hyeon[1], Mingyeong Kim[1], Jusung Kim[2], and Kunhee Cho[1]
[1]Kyungpook National University, Korea, [2]Hanbat National University, Korea

18 **Circuit-level Implementation of Ternary Logic Using Depletion-mode and Conventional MOSFETs**
Hyundong Lee and Taigon Song
Kyungpook National University, Korea

19 **A Layout Generator of Capacitive DAC for SAR ADC**
Joonbeom Kweon, Jaehyun Ko, Yaejoon Huh, and Byungsub Kim
POSTECH, Korea

20 **A Speculative Divide-and-Conquer Optimization Method for Large Analog/Mixed-Signal Circuits: A High-Speed FFE SST Transmitter Example**
Hyoseok Song, Kwangmin Kim, and Byungsub Kim
POSTECH, Korea

Venue & Accommodation

Grand Hyatt, Jeju, Korea

Grand Hyatt Jeju is the largest Grand Hyatt in Asia Pacific, opening as part of Jeju Dream Tower. Experience the modern Korean lifestyle at this iconic 38-storey twin-tower with 1,600 rooms and suites, 14 unique restaurants and bars, 2 premium spas, 8 residential-style meeting spaces, Jeju's largest outdoor deck with infinity pool and a HAN Collection fashion retail. Grand Hyatt Jeju is primed to be a leading lifestyle travel destination in Asia Pacific.

▶ http://jeju.grand@hyatt.com / grandhyattjeju.com
▶ Address: 12 Noyeon-ro, Jeju-si, Jeju-do, South Korea, 63082
Tel: +82 64 907 1234 / Fax: +82 64 907 1235

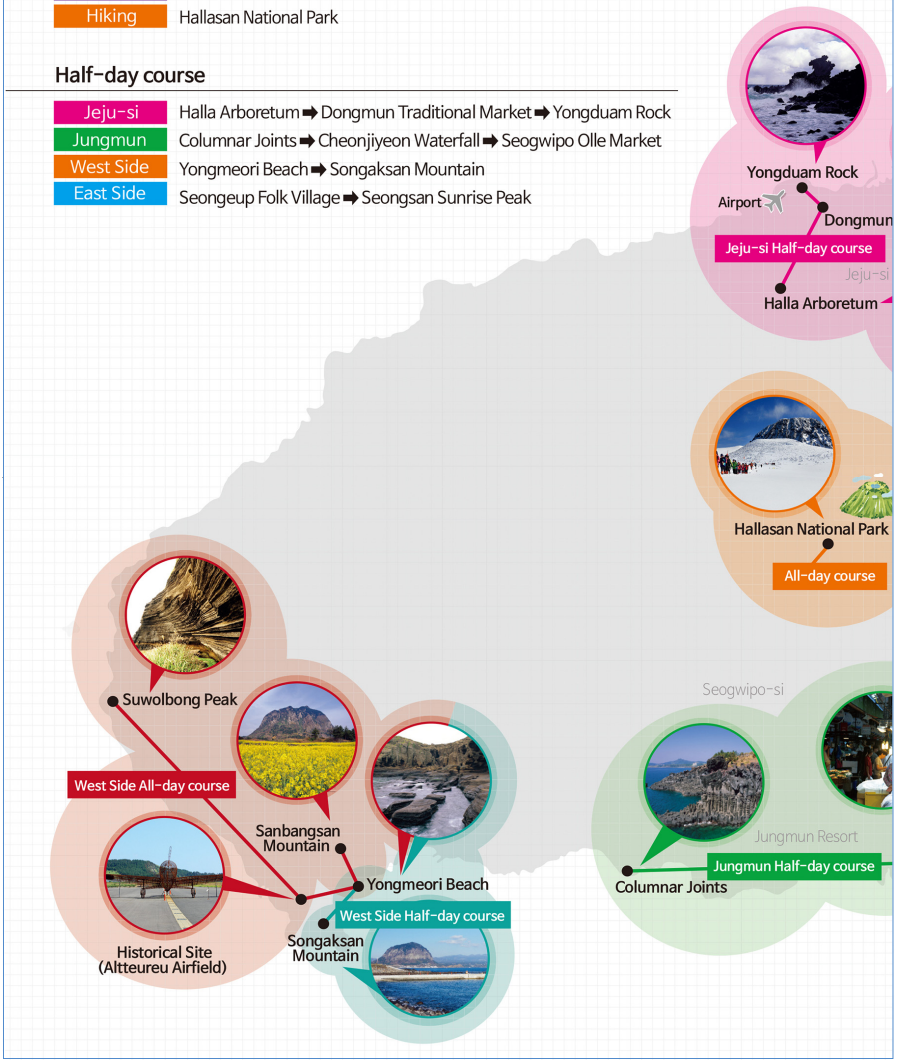
About Jeju

All-day course

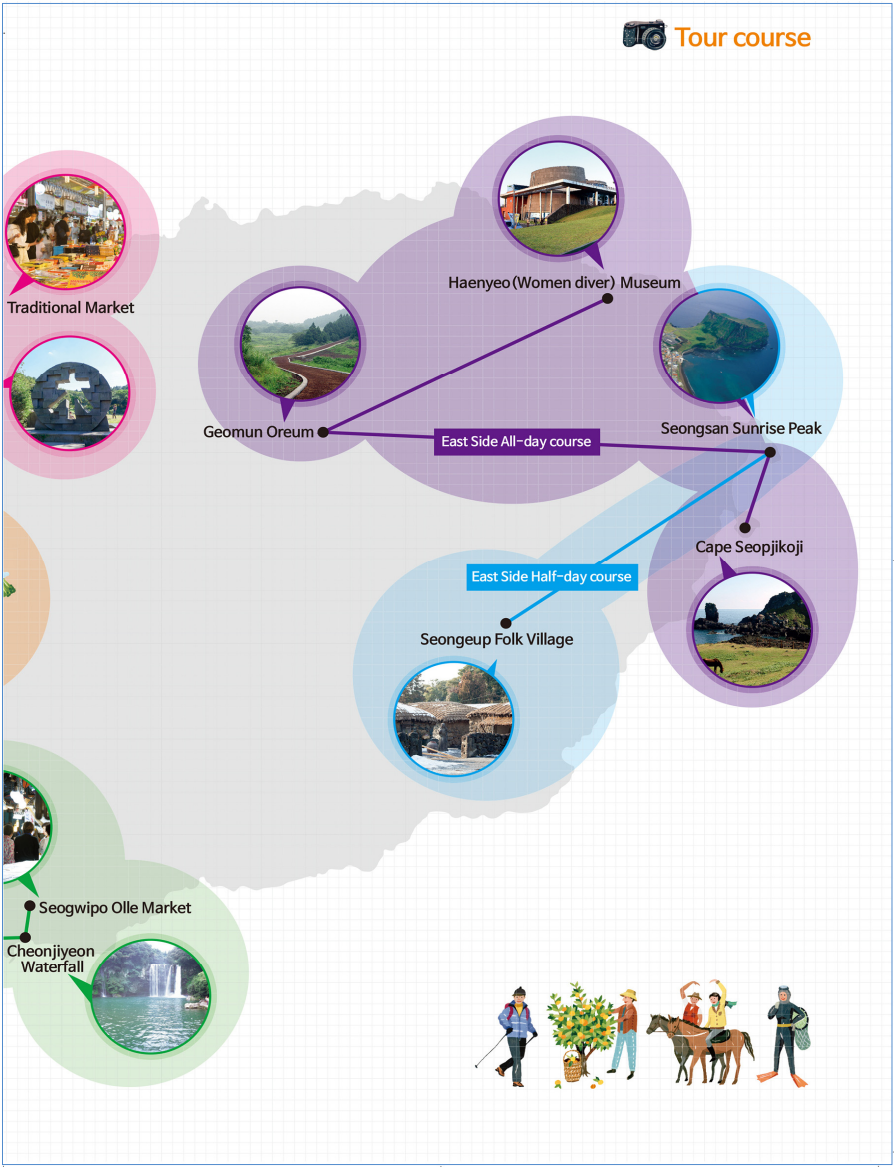
West Side	Sanbangsan Mountain ➡ Yongmeori Beach ➡ Historical Site(Altteureu Airfield) ➡ Suwolbong Peak
East Side	Haenyeo(Women diver) Museum ➡ Geomun Oreum ➡ Seongsan Sunrise Peak ➡ Cape Seopjikoji
Hiking	Hallasan National Park

Half-day course

Jeju-si	Halla Arboretum ➡ Dongmun Traditional Market ➡ Yongduam Rock
Jungmun	Columnar Joints ➡ Cheonjiyeon Waterfall ➡ Seogwipo Olle Market
West Side	Yongmeori Beach ➡ Songaksan Mountain
East Side	Seongeup Folk Village ➡ Seongsan Sunrise Peak



Tour Course

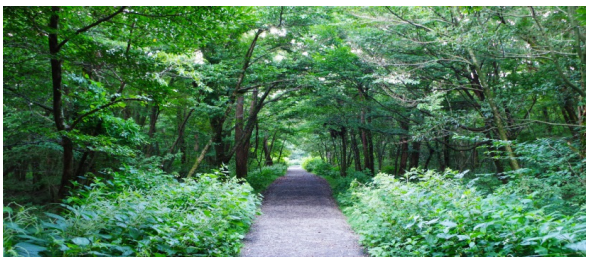

Tour course
Traditional Market
Haenyeo(Women diver) Museum
Geomun Oreum
East Side All-day course
Seongsan Sunrise Peak
Cape Seopjikoji
East Side Half-day course
Seongeup Folk Village
Seogwipo Olle Market
Cheonjiyeon
Waterfall

Udo Maritime Park

At the far east of Jejudo Island, located 3.8km northeast from Seongsanpo Port, is Udo Island, which got its name because it looks like a cow lying down or a cow with its head up. If you see it from Jongdal-ri, Gujwa-eup, Bukjejugun, you can see an island which looks like a cow's body, from head to tail. With its unique shape, you can tell that it is Udo Island at a glance. Udo Island is a blessed tourist site with natural environments such as plain rich soil, diverse fishing grounds, and the 8 Scenic Sights of Udo Island. Above all, you can experience Jejudo Island's unique and traditional culture such as female divers, Stonewall Walkway, and stone tombs, making you feel like you're in a smaller version of Jejudo Island.

Saryeoni Forest Path

Saryeoni Forest Path is a forest walking trail that starts from Bijarim-ro and goes through Mulchat Oreum Volcanic Cone and Saryeoni Oreum Volcanic Cone. Its starting point is located at National Road No. 1112, which is thick with Japanese cedars. A variety of species of trees grow in the forest, such as Konara Oak, Red-Leaved Hornbeam, Japanese Snowbell, Hinoki Cypress, and Japanese cedar and average altitude is 550m. It is one of the hidden 31 views of Jeju-si. It is popular among tourists who love hiking, because the nature of the forest hasn't been tampered with.



Woljeong-ri Beach

Well known for its beautiful scenery, the white sands and emerald waters, Jeju Woljeongri Beach has a road filled with tea houses and coffee shops. A great stopover during your cruise through Jejudo Island, and one of few places to enjoy an exotic view.

Jeju Dongmun Traditional Market

This is Jeju Island's largest and oldest permanent market. A street market, night market, traditional market, and seafood market are all combined in one place, and there are many places where you can eat and shop, so it is popular with tourists.

Jeju Horse Riding Park

Jeju Horse Riding Park is the new premium in horseback riding, sports, and leisure. This membership-based equestrian center is the largest of its kind in Korea, and offers independent horseback riding, trekking, and International Endurance Competitions with Halla horses that have inherited the natural grasslands of Jeju and the essence of Hallasan Mountain. It has the only outdoors nighttime horseback riding course in Korea, and dedicated expert instructors that are willing to treat all who enjoy horseback riding or have a desire to learn with utmost respect. “Enjoy racing along Halla horses, the treasures of Jeju that run with you.”

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차세대 반도체 혁신융합대학 사업단
POLARIS

디지털 혁신융합대학
차세대반도체

차세대반도체 분야를 이끌어 나갈 책임감 있는 미래 인재 양성

서울대 | 강원대 | 대구대 | 숭실대 | 조선이공대 | 중앙대 | 포항공대

전략추진 주요사업

- POLAR edu 커뮤니티 기반 PBL 융합 교과목 개발
- 혁신융합대학 단일 학위/인증 제도 모델개발
- POLAR explorer 프로그램 운영
- 산학이 함께하는 교육 성과 환류 모델 개발
- 동하계 POLARIS 창의 캠퍼스 운영
- POLARIS 반도체 성과확산센터 운영
- 온라인 PBL 교육 모델 개발

산학 밀착형 IoT 반도체 시스템 융합 인력육성 센터

● **개요**

사 업 명	시스템반도체 융합전문인력 육성사업
사업기간	2020년 4월 27일 ~ 2025년 12월 31일 (5년 7개월)
사 업 비	(4차년도) 정부출연금 19억원, 정부외출연금 1억원

● **인력 육성의 목표 및 내용**

센터의 인재상

폭넓은 교양은 물론
특정 분야 전문적인 자질을 갖춘

Generalist + Specialist

T자형 Intelligent BEST인재

다른 분야에 대한 폭넓은 이해

한 분야에 대한 깊이있는 지식

Beyond **미래가치 창조** — 기존의 가치를 뛰어넘는 **창의적 인재 육성**

Entrepreneurship **산업 밀착** — 기업과의 프로젝트, PBL 통한 **밀착형 산학 연구**

Sharing **융합 및 교류** — 융합 교육, 대학 간 학점 교류를 통한 **연구 리더 양성**

Top Class **세계 최고 수준** — 글로벌 네트워크 교육 환경에 기반한 **최고 수준의 인재 양성**

센터의 목표

미래가치를 선도하는 First Mover로서
세계 최고수준의 IoT 반도체 연구를 Leading 할 수 있는
T자형 시스템 반도체 융합 전문인력육성을 목표

6년간 석사 130명, 박사 50명 양성
융합 교과목 60건 개설 및 신규 교재개발 108부

● **참여 기관 기업의 역할**

과학기술정보통신부 Ministry of Science and ICT

ISRC 성균관대학교 컨소시엄
산학 밀착형 IoT 반도체 시스템 융합 인력육성 센터
Corporate Intimated IoT Semiconductor System Fusion Human Resource Research Center

NRF 한국연구재단

반도체 전공트랙 사업

성균관대학교 학부생 대상

산학밀착형 차세대 반도체 융합인력 양성 사업단

목적

반도체 설계 관련 교육 과정을 개설 및 운영하고
산학협력 등을 통한 실무형 우수인재 양성

01 강의 수강

- ❖ 공통 과목 **9학점** | 프로그래밍기초와실습, 일반물리학1·2 등
- ❖ 반도체기초 **6학점** | 신호및시스템, 전자회로1 등
- ❖ 반도체심화 **6학점** | 아날로그디지털혼성집적회로설계, 집적회로 등
- ❖ PBL **6학점** | 종합설계프로젝트, 현장실습1·2·3 등

* 인턴쉽 1회 필수 참여

02 실무적 능력 향상

- ❖ PBL 실무 교과목 신설

*아날로그디지털혼성집적회로설계
*지능형시스템집적회로설계

- ❖ 인턴쉽 기회 제공 & 현장실습 및 산학프로젝트 참여

03 반도체 설계트랙 마이크로디그리 수여

지원 혜택

- 사업단 선정 기준을 통한 **우수학생 장학금 지급**
- 인턴쉽 기회 및 컨소시엄 기업과의 교류를 통한 **취업 정보 제공 및 지원**
- 산학프로젝트를 통한 **실무 능력 향상**
- **해외 학술대회** 참여 기회 제공 및 지원

사업 문의

산학밀착형 차세대 반도체 융합인력 양성 사업단
iclabgroup@skku.edu

❖ 모든 학년의 학부생은 신청 및 마이크로디그리 수여가 가능하지만 지원 혜택의 경우, 해당 사업의 취지에 맞게 3,4학년의 학부생에게만 부여됩니다.

반도체 설계트랙 교육체계도
QR코드

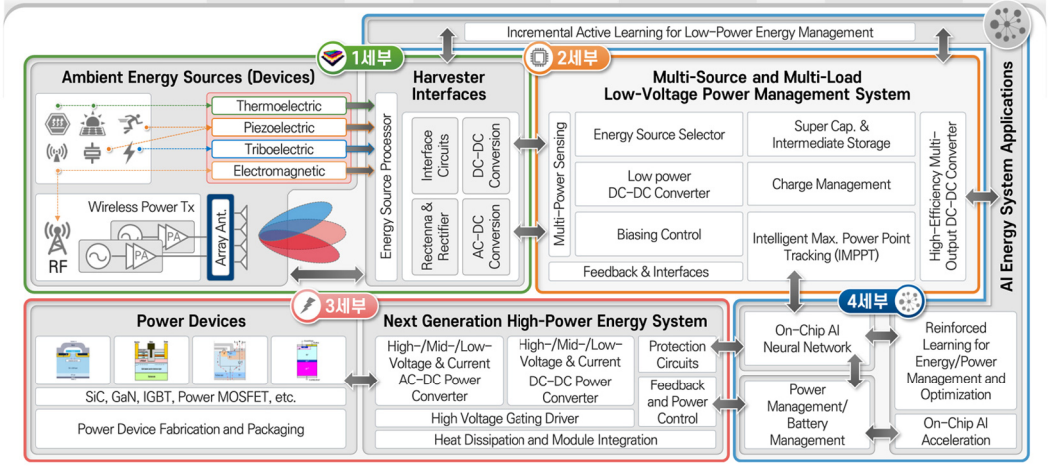
산업통상자원부 | 성균관대학교 SUNGKYUNKWAN UNIVERSITY(SKKU) | KIAT 한국산업기술진흥원 Korea Institute for Advancement of Technology

지능형 사물 에너지 (iEoT) 시스템반도체 융합 다빈치형 인력육성 센터

Intelligent Energy-of-Things (iEoT) System IC Center for Da Vinci-type Convergence Education

에너지 시스템반도체 핵심 기술을 4개의 세부로 나누어 인력양성 추진

① 고효율 에너지 하베스팅	② 저전압 전력관리	③ 차세대 고전력 에너지	④ AI응용 에너지 시스템
Low Power	Low Power	High Power	High & Low Power



학제간 융합 및 PBL을 통한 'T자형' 인재 양성

- 지능형 에너지 반도체의 핵심 기술 분야를 4개 세부 주제로 나누고 6개 학과간의 학제간 융합 교육 및 PBL을 통한 심화연구를 바탕으로 T-자형 융합 전문인력양성

1세부 고효율 에너지 하베스팅

- 압전·마찰전기 에너지 하베스팅
- 광전·열전 에너지 하베스팅
- RF 에너지 하베스팅

2세부 저전압 전력관리

- 다중 에너지원 출력 관리 시스템
- 다중 에너지원 기반 MPPT 알고리즘 회로
- 스위치-커패시터 DC-DC 변환기

PBL

- Training MPW
- Practical MPW
- Chip Design Review (Seminar)

3세부 차세대 고전력 에너지 시스템

- 고전압 파워소자
- 고전력 에너지 시스템 구동 IC
- 고신뢰성 ESD 보호회로

4세부 에너지 시스템 AI기반 응용

- 인공신경망 회로
- 능동적 학습 기반 저전력 에너지 관리
- 강화학습 기반 전력 최적화

과학기술정보통신부 · 중앙대학교 · 단국대학교 · 서강대학교 · 서울시립대학교 · 숭실대학교 · UNIST · NRF 한국연구재단

IEIE

반도체전공트랙사업 합동 성과발표회

| 일 시 | 2023. 06. 25.(일) ~ 06. 27.(화)

| 장 소 | 그랜드 하얏트 제주, ITC-CSCC2023국제학술대회 연계
(https://www.itc-cscc2023.org/2023/)

| 대 상 | 반도체전공트랙사업 참여 학생

개최목적

반도체전공트랙 참여 학생들의 합동 성과발표회를 통한 역량 강화 및 참여 대학 간 교류 활성화

주요일정

06.25.(일) 반도체전공트랙 합동 성과발표회(포스터 형식의 전시 및 발표) 및 튜토리얼 참가

06.26.(월) 기조연설(삼성전자 DS부문 송기환 부사장 외)을 포함한 반도체 세션 참가

06.26.(월) 시스템반도체 융합전문인력 양성센터 워크샵 참석

06.27.(화) 반도체 분야 Job 멘토링 및 초청 강연
(연사 : DB하이텍 이상기 부사장, ETRI 강성원 부원장, KETI 이규복 부원장, 실리콘마이터스 김종환 전무)

성과발표

포스터 포맷은 최대 PPT 8페이지 이내로 작성(포스터 이젤 사이즈는 A1 사이즈)

중앙대학교 CHUNG-ANG UNIVERSITY | 교육부 Ministry of Education | 산업통상자원부 Ministry of Trade, Industry and Energy

단국대학교 DANKOOK UNIVERSITY | 대구대학교 DAEGU UNIVERSITY | 동국대학교 dongguk university | 성균관대학교 SUNGKYUNKWAN UNIVERSITY | 숭실대학교 | 이화여자대학교 EWHA WOMANS UNIVERSITY

회사 소개서

■회사소개

Company	㈜에이티엠아이앤씨	**CEO**	진 덕 수
Homepage	http://www.atminc.co.kr	**Tel / Fax**	02-522-4226 / 02-522-4229
E-mail	atm@atminc.co.kr	**Company Type**	중소기업
Since	2005.10.17	**Business**	도소매, 서비스, 제조
Address	서울시 서초구 반포대로28길 21-12 재영빌딩 3층		
Intro	계측 장비의 최고의 명성과 품질을 가진 Keysight Technologies (구)Agilent Technologies 사의 국내 공인대리점으로 다 년간 축적해 온 계측 장비 분야의 노하우와 해당 분야의 전문 인력으로 조직된 회사입니		

■사업연혁

2005. 10. 30	㈜에이티엠아이앤씨 설립
2008. 11. 30	3년 연속 (구)Agilent 사 한국대리점 품목 판매 1위 (FY06~FY08)
2013. 11. 30	8년 연속 (구)Agilent 사 한국대리점 품목 판매 1위 (FY06~FY12)
2014. 08. 01	Agilent 사 계측기 사업부분 분사, 새 회사명 Keysight Technologies로 출발
2015. 10. 30	10년 연속 Keysight 사 한국대리점 품목 판매 1위 (FY06~FY15)
2017. 10. 30	12년 연속 Keysight 사 한국대리점 품목 판매 1위 (FY06~FY17)
2021. 10. 30	16년 연속 Keysight 사 한국대리점 품목 판매 1위 (FY06~FY21)

■주요 거래 업체

· SAMSUNG, LG, LIG 넥스원, HYUNDAI 등 다수의 대기업 및 중소기업
· KAIST, KIST, KRISS, UNIST, 서울대, 연세대, 고려대 등 교육기관 및 연구기관

■주요 취급 브랜드

KEYSIGHT GW INSTEK ITECH oda TECHNOLOGIES HIOKI FLUKE

■수상내역

2006년

2007년

2008년

2009년

2010년

2011년

2012년


Top sales for
7 Consecutive
Years
(FY06 to FY12)

2013년

2014년

2015년

2016년

2017년

2018년

2019년

2020년

2030 부산세계박람회 유치
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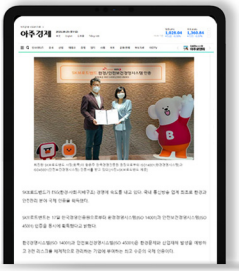
Leads the future

Lead to Standard !



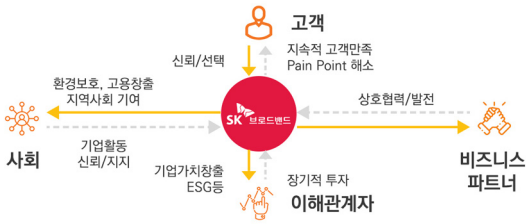
환경문제와 산업재해 발생 예방 및 관련 리스크의 체계적인 관리를 통해
성공적인 사업 수행 보장

ISO 14001
- 모든 산업 분야 및 활동에 적용할 수 있는 환경 경영시스템 국제규격
- 환경측면을 체계적으로 식별, 평가, 관리 및 개선함으로써 환경위험성을 효율적으로 관리

ISO 45001
- 사업장에서 발생할 수 있는 각종 위험을 사전 예측 및 예방하여 궁극적으로 기업의 이윤창출에 기여하고 조직의 안전보건을 체계적으로 관리하기 위한 요구사항을 규정한 국제표준

※ 수여기관 : 한국경영인증원 (2021년 6월 17일)

Lead to ESG !



자회사 직영 정규직 **약 4,600명**

유지보수 자회사 보유 **SK 유일**

Lead to Satisfaction !

대한민국 1등 초고속 인터넷, IPTV **국가고객만족도 12년 연속 1위**

12

2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022년

2022년 초고속인터넷 및 IPTV 부문 — 국가고객 만족도 (12년 연속) "1위" NCSI

2022년 초고속인터넷부문 — 한국서비스품질지수 (6년 연속) "1위" KS-SQI

2022년 초고속인터넷 및 IPTV 부문 — 이용자보호평가 (7년 연속) "매우 우수" 방송통신위원회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