ICCCAS 2023

2023 The 12th International Conference on

Communications, Circuits, and Systems

Singapore | May 5-7, 2023 | GMT+8

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Welcome Address

Dear distinguished scholars,

Warm greetings!

Welcome to attend 2023 The 12th International Conference on Communications, Circuits, and Systems (ICCCAS 2023), which will be held in Singapore and simultaneously via full web platform during May 5-7, 2023. On behalf of the organizing committee, we sincerely appreciate your support to the conference.

To make all of us communicate more conveniently, we're not only holding this conference in Singapore, but also creating a customized "Web Platform" where participants from different parts of the world will be connected together with network. And it's a virtual environment where the attendees can present the papers and can participate in all the sessions and in all the activities that will be organized in a full immersive experience. This conference is a bold step and a new experience for all of us.

We'd like to express our gratitude and appreciation to all the individuals who have contributed to our conferences in various ways. Special thanks are extended to our colleagues in program committee for their thorough review of all the submissions, which is vital to the success of the conference, and also to the members in the organizing committee who had gave their valuable time and efforts in planning, promoting, organizing and helping the conference. The conference will provide opportunities for the different areas delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.

Hope all of you have a wonderful experience and have a good harvest during the conference! Meanwhile, we warmly welcome you to join with us in the next year conference! As always, thank you very much for your constant attention and support.

Best Regards,

ICCCAS Conference Committee Group

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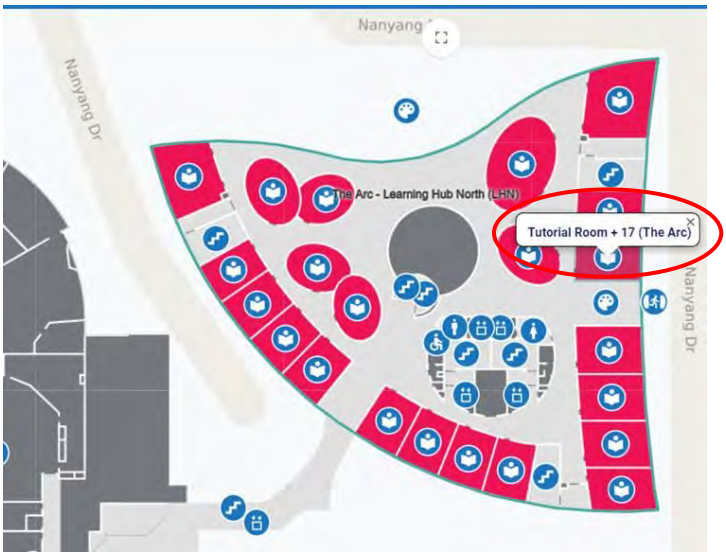
Yuanjin Zheng, Nanyang Technological University, Singapore
Yu Xiaohong, Shandong Management University, China
Zulkifli Husin, Universiti Malaysia Perlis, Malaysia

Conference Venue

Onsite Sign up on May 5

Venue: The Arc-Learning Hub North (LHN), Nanyang Technological University

Address: 63 Nanyang Drive, Singapore 636922

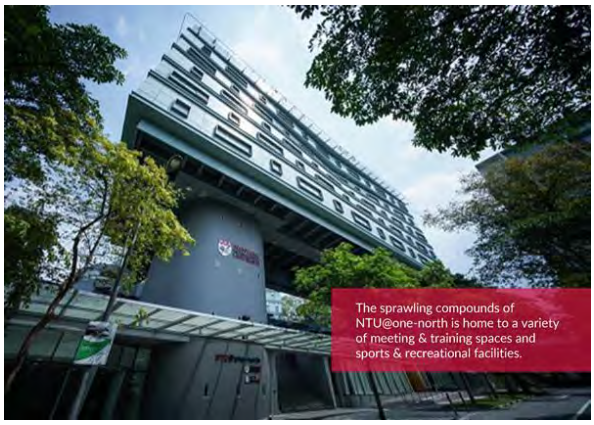


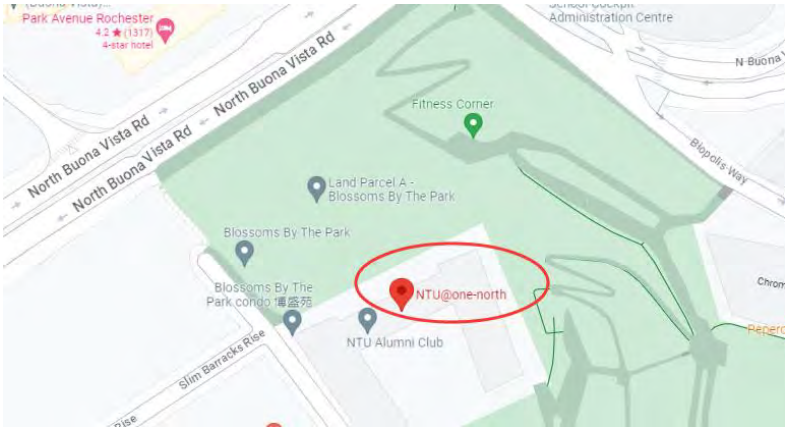
Onsite Sign up, Keynote & Invited Speeches, Parallel Sessions on May 6-7

Venue: NTU@one-north

Address: 11 Slim Barracks Rise, Singapore 138664

Website: https://www.ntu.edu.sg/life-at-ntu/leisure-and-dining/ntu@one-north





May 5, 2023

Sign up: LHN-TR-17, Level 1, B4, The Arc-Learning Hub North (LHN), Nanyang Technological University

Lab Tour: Singapore Centre for 3D Printing, 63 Nanyang Drive, The Arc LHN-B4-10, Singapore 636922

May 6, 2023

Keynote Speeches & Session 1--AUD302, Level 3, Alumni House, NTU@one-north

Session 2 & 4--SR903, Level 9, Executive Centre, NTU@one-north

Session 3 & 5--SR904, Level 9, Executive Centre, NTU@one-north

Dinner-- CALI Park Avenue Rochester, 31 Rochester Dr, #01-01/02, Singapore 138637

May 7, 2023

Session 6, 8 & 10--SR901, Level 9, Executive Centre, NTU@one-north

Session 7, 9 & 11--SR902, Level 9, Executive Centre, NTU@one-north

Conference Venue

Time & Whether

GMT +8

◆ **From Singapore Changi Airport to The Arc-Learning Hub North (LHN) (Sign up Venue, May 5)**

By Taxi

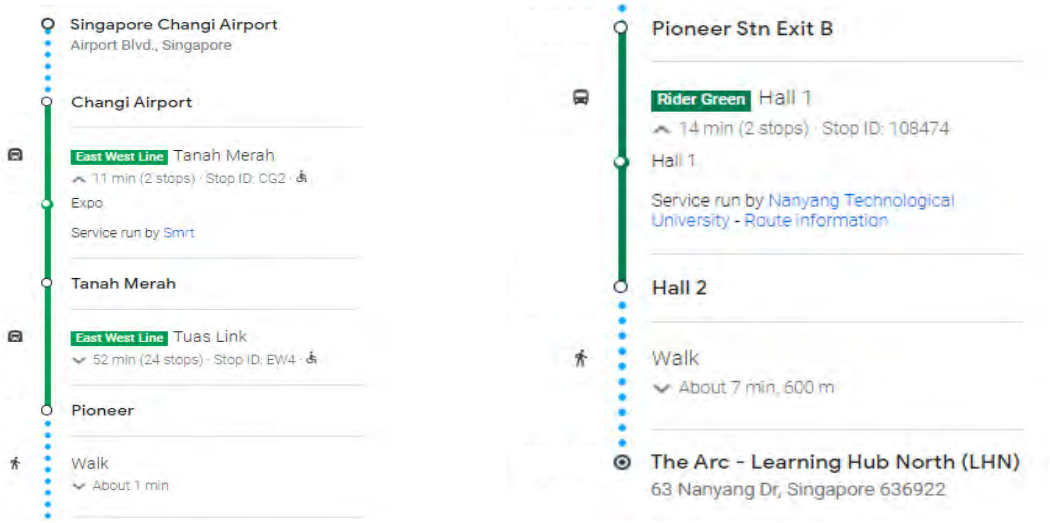
It will take around 40 minutes to get to The Arc-Learning Hub North (LHN)

By Bus

Take **East West Line (CG)** from Changi Airport [CG2] to Tanah Merah [EW4/CG]

Then take **East West Line (EW)（Pasir Ris[EW1]-Tuas Link[EW33]** from Tanah Merah[EW4/CG] to Pioneer

After that, take NTU Campus **Rider – Green** from Pioneer Stn Exit B to Hall 2



◆ **From Singapore Changi Airport to NTU@one-north (Conference Venue, May 6-7)**

By Taxi

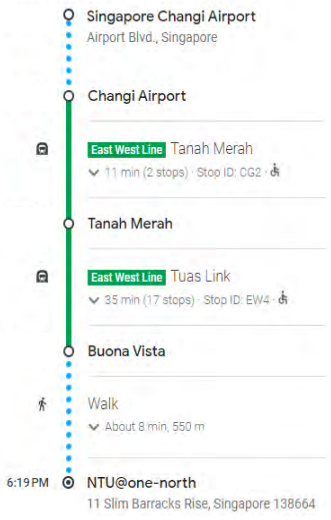
It will take around 30 minutes to get to NTU@one-north

By Bus

Option 1:

Take **East West Line (CG)** from Changi Airport [CG2] to Tanah Merah [EW4/CG]

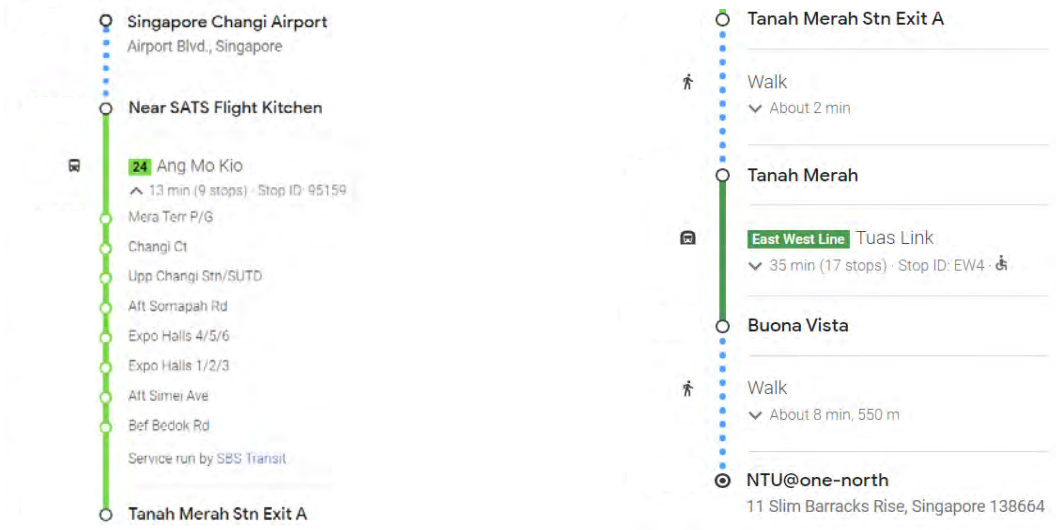
Then take **East West Line (EW)（Pasir Ris[EW1]-Tuas Link[EW33]** from Tanah Merah[EW4/CG] to Buona Vista

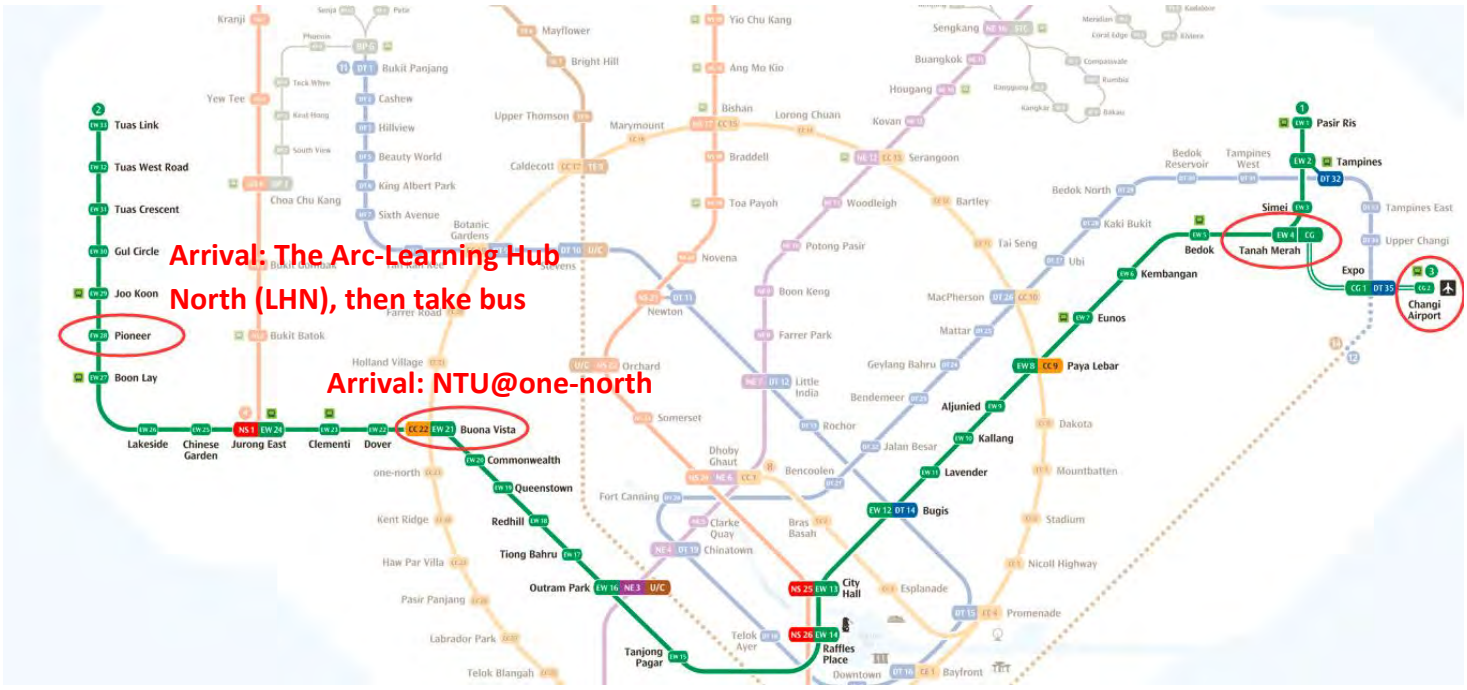


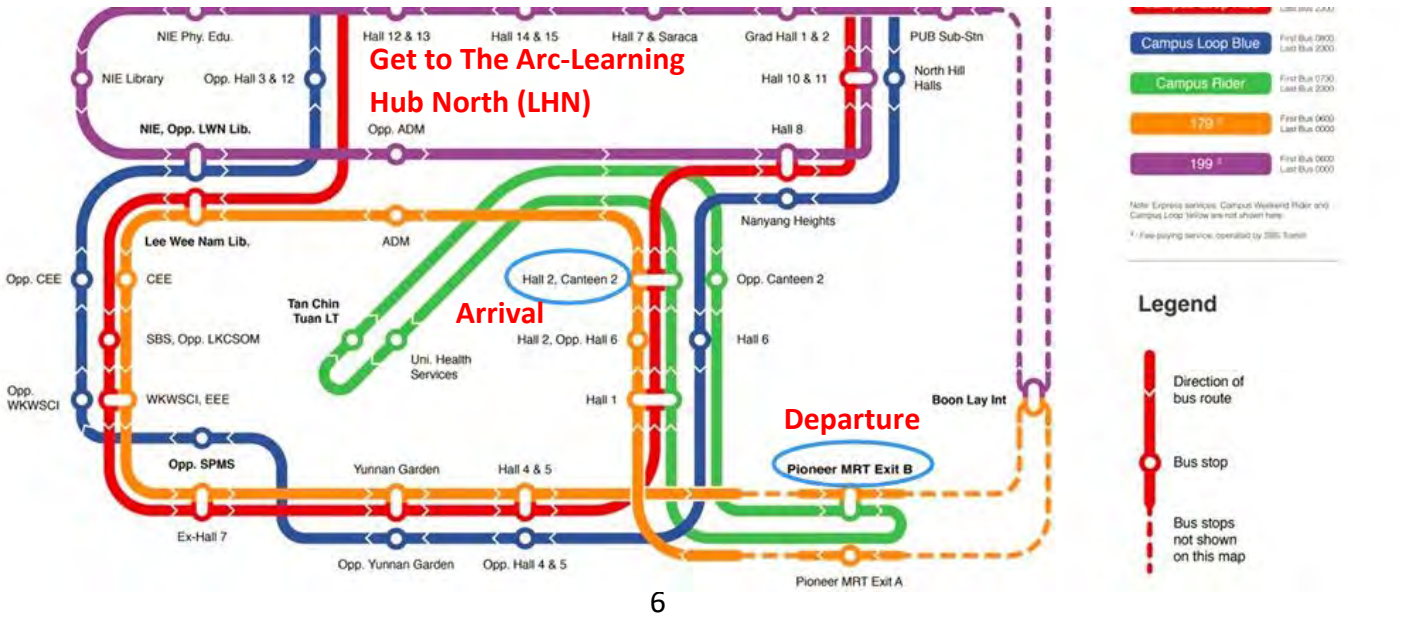
Option 2:

Take **24 Bus** from Near SATS Flight Kitchen to Tanah Merah Stn Exit A

Then take **East West Line (EW)** **（Pasir Ris[EW1]-Tuas Link[EW33]** from Tanah Merah[EW4/CG] to Buona Vista







Warm Tips

1. For your property safe, please take good care of your valuables during the entire conference.

2. The conference organizer does not assume any responsibility for your personal losses.

3. For personal and property safety of delegates, please wear the conference Representative Card when enter and exit the venue. And wear it near the conference venue. Do not lend your card to someone unrelated to the conference. Do not bring unrelated people into the venue.

4. Please do not discard the delegates' card casually.

Presentation Guidelines

Time Zone

Singapore Time (GMT +8)

Attention: The conference will be recorded. We will appreciate your proper behavior.

Software

The instructions about Zoom, please visit: **https://support.zoom.us/hc/en-us/articles/201362033-Getting-Started-on-Windows-and-Mac**

Main Meeting Room ID: **839 7342 5289**; Link: **https://us02web.zoom.us/j/83973425289**

Meeting Room ID: **832 5613 7923**; Link: **https://us02web.zoom.us/j/83256137923**

Meeting Room ID: **883 4887 4889**; Link: **https://us02web.zoom.us/j/88348874889**

How to enter the meeting room: Please click "Join a Meeting", copy the Meeting ID and Rename your name with this format (Paper ID + Name).

May 5, 2023

Online Test: There will be a test session before the formal session to help you master how to use Zoom to make presentation and make the formal sessions goes smoothly. Keynote & Invited speakers' test time is **10 minutes** per one. Regular authors' test time is **5 minutes** per one.

Best Student Paper Competition: It will be online, about **13** minutes for presentation and **2** minutes for Q&A.

Onsite Sign up: The Arc-Learning Hub North (LHN), Nanyang Technological University.

May 6 & 7, 2023 (Onsite & Online)

Onsite Sign up on May 6: NTU@one-north.

For online presenter, to effectively control the time and **avoid some unexpected situations, we advise you to record your presentation in advance as a backup.**

Keynote speech: about **25** minutes for presentation and **5** minutes for Q&A.

Invited speech: about **15** minutes for presentation and **5** minutes for Q&A.

Competition & Regular oral presentation: about **13** minutes for presentation and **2** minutes for Q&A.

We would appreciate if all presenters can adhere strictly to this time limit.

Equipment

A computer with an internet connection (wired connection recommended)

USB plug-in headset with a microphone (recommended for optimal audio quality)

Webcam: built-in or USB plug-in

Record Video Notes

Record a video introduction with your own image, speaking to the camera, introducing your-self: name, affiliation, brief description of scope of your work.

Then please switches to your slides and provides a voice over describing images in each slide. Please send your videos to Conference Secretary in advance.

Instructions for Onsite Oral Presentations

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Before presentation, please open your slide and share it via **Share Screen** function in Zoom firstly so that online participants can see your slide and listen your report as well.

Conference Awards

Onsite & Online Sessions (May 6 - 7): One best oral presentation will be selected from each session. Winners will be announced at the end of each session, certificate will be given at the end of each session by session chair.

Onsite (May 6): Outstanding Young Scholar Award, Best Student Paper Award, Best Reviewer Award will be announced at dinner.

Dress Code

Please wear formal clothes or national representative of clothing.

Conference Agenda

Singapore Time | GMT +8

May 5, 2023 | Friday

Onsite

Time	Arrangement	Room
13:00-17:00	Sign up & Conference Materials Collection	LHN-TR-17
15:00	Gathering for Lab Tour	LHN-TR-17
15:00-16:00	Lab Tour @ Singapore Centre for 3D Printing	

Online

Time	Arrangement	Meeting ID
10:00-12:00	Test Speakers (Keynote & Invited) & Best Student Paper Competition (Online)	839 7342 5289
10:00-12:00	Online Session A, B, C & D	832 5613 7923
13:00-15:15	Best Student Paper Competition	839 7342 5289

May 6, 2023 | Saturday

Time	Arrangement	Room	Meeting ID
9:00-9:05	**Welcome Address (Onsite)** Prof. Massimo Alioto, National University of Singapore, Singapore	AUD302	839 7342 5289
9:05-9:10	**Opening Remarks (Onsite)** Prof. Maode Ma, Qatar University, Qatar		
9:10-9:40	**Keynote Speech 1 (Onsite)** Prof. Massimo Alioto, National University of Singapore, Singapore		
9:40-10:10	**Keynote Speech 2 (Onsite)** Prof. Qiang Li, University of Electronic Science and Technology of China, China		
10:10-10:40	Group Photo & Coffee Break		
10:40-12:00	**Session 1 (Invited Speeches) (Onsite & Online)** Analog/Mixed-Signal Circuit Design and Related Technologies	AUD302	839 7342 5289
12:00-13:30	Lunch		

Conference Agenda

Singapore Time | GMT +8

May 6, 2023 | Saturday

Time	Arrangement	Room	Meeting ID
13:30-14:00	**Keynote Speech 3 (Online)** Prof. Franco Maloberti, Univeristy of Pavia, Italy	SR903	839 7342 5289
14:00-15:40	**Session 2 (Invited Speeches) (Onsite & Online)** Analog/Mixed-Signal Circuit Design and Related Technologies		
13:30-15:50	**Session 3 (Invited Speeches) (Onsite)** Micro/Nano-structure Based Optoelectronics and Photonics Devices	SR904	832 5613 7923
13:30-16:00	**Online Session A (Invited Speeches) (Online)** Wireless Sensing and Positioning	N/A	883 4887 4889
15:50-16:10	Coffee Break		
16:10-18:10	**Session 4 (Invited Speeches & Papers) (Onsite & Online)** Quantum Information Security	SR903	839 7342 5289
16:10-18:10	**Session 5:** Advanced Electronic Device Design and Development	SR904	N/A
16:30-18:00	**Online Session B:** Satellite Communication and Space Communication Technology	N/A	883 4887 4889
18:30	**[Outstanding Young Scholar Award, Best Student Paper Award & Best Reviewer Award]** **Announced by Prof. Char-Dir Chung, National Taiwan University, Taiwan**	CALI Park Avenue Rochester	N/A
18:30	Dinner @ CALI Park Avenue Rochester		

May 7, 2023 | Sunday

Time	Arrangement	Room	Meeting ID
10:00-11:55	**Session 6 (Invited Speeches & Papers) (Onsite & Online)** Quantum Information Security	SR901	839 7342 5289
10:00-11:15	**Session 7:** Analog/Mixed-Signal Circuit Design and Related Technologies	SR902	832 5613 7923
11:45-13:00	Lunch		
13:00-15:00	**Session 8 (Invited Speeches) (Online)** Micro/Nano-structure Based Optoelectronics and Photonics Devices	SR901	839 7342 5289
13:00-14:00	**Session 9 (Invited Speeches) (Online)** Analog/Mixed-Signal Circuit Design and Related Technologies	SR902	832 5613 7923
13:00-14:30	**Online Session C:** Modern Electronic Information System and Control	N/A	883 4887 4889
14:00 -14:20	Coffee Break		

Conference Agenda

Singapore Time | GMT +8

May 7, 2023 | Sunday

Time	Arrangement	Room	Meeting ID
15:10-16:10	**Session 10:** Wireless Communication System and Network	SR901	N/A
14:20-16:35	**Session 11 (Invited Speeches & Papers) (Onsite & Online)** 6G Wireless Communication Networks	SR902	832 5613 7923
15:00-17:00	**Online Session D:** Future Communication Technology and Application	N/A	883 4887 4889

Presentation Overview

Onsite & Online	
Best Paper Competition **Meeting ID: 839 7342 5289**	CS23-1454, CS23-1448, CS23-218, CS23-2044, CS23-1160, CS23-1065, CS23-3075, CS23-4081E, CS23-215
Session 1 AUD302 **Meeting ID: 839 7342 5289**	**Invited Speech (Onsite):** Prof. Haruo Kobayashi, Assoc. Prof. Toru Sai **Invited Speech (Online):** Prof. Ken-ya Hashimoto, Prof. Yoshiaki Daimon Hagiwara
Session 2 SR903 **Meeting ID: 839 7342 5289**	**Invited Speech (Onsite):** Assoc. Prof. Akito Chiba, Mr. Atsushi Motozawa **Invited Speech (Online):** Prof. Hao San, Dr. Hitoshi Aoki, Dr. Kunio Koseki
Session 3 SR904 **Meeting ID: 832 5613 7923**	**Invited Speech (Onsite):** Prof. Qize Zhong, Prof. Jingjing Zhang, Prof. Yuan Dong, Assoc. Prof. Yu Luo, Assoc. Prof. Shaonan Zheng, Asst. Prof. Yu-Cheng Chen, Dr. Guozhen Liang
Online Session A **Meeting ID: 883 4887 4889**	**Invited Speech (Online):** Prof. Zhongliang Zhao, Assoc. Prof. Yongcai Wang, Prof. Zheng Dong, Assoc. Prof. Baoding Zhou **Papers (Online):** CS23-3064, CS23-5082, CS23-5089E, CS23-1588
Session 4 **SR903** **Meeting ID: 839 7342 5289**	**Invited Speech (Onsite):** Prof. Michel Barbeau, Dr. Randy Kuang, Dr. Marc Geitz **Papers (Onsite):** CS23-237, CS23-227, CS23-234 **Paper (Online):** CS23-236
Session 5 **SR904**	CS23-1150, CS23-139-A, CS23-231, CS23-1353, CS23-2056, CS23-3080, CS23-2051, CS23-2074
Online Session B **Meeting ID: 883 4887 4889**	CS23-230, CS23-1361, CS23-1368, CS23-4064E, CS23-221, CS23-2258E
Session 6 **SR901** **Meeting ID: 839 7342 5289**	**Invited Speech (Online):** Dr. Wolfgang Rohde, Mr. Alain Chance **Papers (Onsite):** CS23-228 **Papers (Online):** CS23-222, CS23-242, CS23-214, CS23-1285
Session 7 **SR902** **Meeting ID: 832 5613 7923**	**Onsite:** CS23-210, CS23-232, CS23-255 **Online:** CS23-1347, CS23-1386
Session 8 **SR901** **Meeting ID: 839 7342 5289**	**Invited Speech (Online):** Prof. Fei Gao, Prof. Ting Hu, Assoc. Prof. Qingming Chen, Prof. Xiaohui Li, Asst. Prof. Qinghua Song
Session 9 **SR902** **Meeting ID: 832 5613 7923**	**Invited Speech (Online):** Assoc. Prof. Tadashi Itoh, Dr. Nobuhiko Kikuchi, Dr. Shiro Hara
Online Session C **Meeting ID: 883 4887 4889**	CS23-206, CS23-204, CS23-141, CS23-340, CS23-4059, CS23-226
Session 10 **SR901**	CS23-1246, CS23-1076, CS23-1184, CS23-233
Session 11 **SR902** **Meeting ID: 832 5613 7923**	**Invited Speech (Onsite):** Assoc. Prof. Md. Kafiul Islam, Prof. Upena Dalal **Invited Speech (Online):** Assoc. Prof. Mei Li **Papers (Onsite):** CS23-1166, CS23-3181, CS23-1789 **Papers (Online):** CS23-1469, CS23-216
Online Session D **Meeting ID: 883 4887 4889**	CS23-1570, CS23-205, CS23-219, CS23-201, CS23-220, CS23-225, CS23-1552, CS23-1873

Best Student Paper Competition

Session Chair: Prof. Lin Wang, Xiamen University, China

Time: 13:00-15:15, May 5, 2023	**Onsite Room: N/A**
Meeting ID: 839 7342 5289	**Link: https://us02web.zoom.us/j/83973425289**
13:00-13:15	**CS23-1454**
	A High Speed Post-Quantum Digital Signature At 180 Sig/Sec On ARM Cortex-M4 **Presenter: Mahmoud AbdelHafeez Sayed** Mahmoud Abdelhafeez Sayed and Mostafa Taha Carleton University, Canada
13:15-13:30	**CS23-1448**
	Implementation of High-speed Multi-trit Adders for Balanced and Unbalanced Ternary Logic **Presenter: Guangchao Zhao** Guangchao Zhao, Zhiwei Zeng, Xingli Wang, Philippe Coquet, Mingqiang Huang and Beng Kang Tay Nanyang Technological University, Singapore
13:30-13:45	**CS23-218**
	Iterative Decision-Feedback Hybrid Equalization for CP-OTFS on Time-Varying Multipath Channels **Presenter: Po-Jen Chen** Shuen-Yu Tsai, Po-Jen Chen, Wei-Chang Chen and Char-Dir Chung National Taiwan University, Taiwan
13:45-14:00	**CS23-2044**
	A Satellite Adaptive Modulation Coding Method Based on Deep Reinforcement Learning **Presenter: Xin Zhou** Xin Zhou, Wenfeng Li and Kanglian Zhao Nanjing University, China
14:00-14:15	**CS23-1160**
	Design and Implementation of a Low-Power JESD204B Transmitter with Wideband Fractional-N Ring PLL in 40-nm CMOS Process **Presenter: Chen Hao** Chen Hao, Deng Jun, Liao Peng Fei, Zhao Shan Shan, Wang Qiushi and Tang Fang Chong Qing University, China

14:15-14:30	**CS23-1065**
	Spatial Dynamic Preamble Soft Allocation for mMTC in Massive MIMO Systems **Presenter: Xiao Fu** Xiao Fu, Xiaofeng Liu, Xinrui Gong, Rui Sun, Qingguo Shen and Xiqi Gao Southeast University, China
14:30-14:45	**CS23-3075**
	An Ultra-low Power CMOS Subthreshold Voltage Reference With Temperature Coefficient Compensation **Presenter: Yuxuan Huang** Yuxuan Huang, Ruihuang Wu, Bingjun Xiong, Zhipeng Li, Jia Liu, Yun Zou, Jingjing Liu and Xinghua Sun Sun Yat-Sen University, China
14:45-15:00	**CS23-4081E**
	IRS-assisted Anti-jamming Communication Based on Action Space Smooth Q-learning **Presenter: Yang Liu** Yang Liu, Kui Xu, Nan Ma, Mi Zhang, Chengqian Ma and Yueyue Zhang Army Engineering University of PLA, China
15:00-15:15	**CS23-215**
	A Dual-Mode Split-Based Calibration Technique For Time-Interleaved ADCs **Presenter: Yuguo Xiang** Yuguo Xiang, Danfeng Zhai, Ye Wang and Fan Ye Fudan University, China

Session 1
Analog/Mixed-Signal Circuit Design and Related Technologies

Session Chair: Prof. Haruo Kobayashi, Gunma University, Japan

Time: 10:40-12:00, May 6, 2023	**Onsite Room: AUD302**
Meeting ID: 839 7342 5289	**Link: https://us02web.zoom.us/j/83973425289**
10:40-11:00	**Invited Speech (Online)**
	Radio Frequency Acoustic Wave Devices in RF Front-End in Mobile Communications --- Why Unavoidable? **Prof. Ken-ya Hashimoto** University of Electronic Science and Technology of China
11:00-11:20	**Invited Speech (Online)**
	Artificial Intelligent Partner System (AIPS) with Pinned Photodiode Used for Robot Vision and Solar Panel **Prof. Yoshiaki Daimon Hagiwara** Sojo University, Japan
11:20-11:40	**Invited Speech (Onsite)**
	Revisit to RC Linear Circuit Theory **Prof. Haruo Kobayashi** Gunma University, Japan
11:40-12:00	**Invited Speech (Onsite)**
	Power Conversion Circuits for Distributed PV Systems **Assoc. Prof. Toru Sai** Tokyo Polytechnic University, Japan

Session 2
Analog/Mixed-Signal Circuit Design and Related Technologies

Session Chair: Prof. Haruo Kobayashi, Gunma University, Japan

Time: 14:00-15:40, May 6, 2023 **Onsite Room: SR903**

Meeting ID: 839 7342 5289 **Link: https://us02web.zoom.us/j/83973425289**

14:00-14:20	**Invited Speech (Onsite)**
	RF Parameter Estimation Using Lightwave Modulation **Assoc. Prof. Akito Chiba** Gunma University, Japan
14:20-14:40	**Invited Speech (Onsite)**
	An Attachable Fractional Divider Transforming an Integer-N PLL Into a Fractional-N PLL with SSC Capability **Mr. Atsushi Motozawa** Renesas Electronics Corp., Japan
14:40-15:00	**Invited Speech (Online)**
	Low-supply-voltage High-linearity ADC with Dynamic Analog Components **Prof. Hao San** Tokyo City University, Japan
15:00-15:20	**Invited Speech (Online)**
	A Unified Model of MIS and Ridge HEMTs for Fast and High-Power Switching Applications **Dr. Hitoshi Aoki** Rohm Semiconductor, Japan
15:20-15:40	**Invited Speech (Online)**
	Recent Progress in High-Voltage SiC Devices and its Application Development **Dr. Kunio Koseki** National Institute of Advanced Industrial Science and Technology, Japan

Session 3
Micro/Nano-structure Based Optoelectronics and Photonics Devices

Session Chair: Assoc. Prof. Zhengji Xu, Sun Yat-sen University, China

Time: 13:30-15:50, May 6, 2023 **Onsite Room: SR904**

Meeting ID: 832 5613 7923 **Link: https://us02web.zoom.us/j/83256137923**

13:30-13:50	**Invited Speech (Onsite)**
	Applications of Metasurfaces for on-chip Couplers **Prof. Qize Zhong** Shanghai University, China
13:50-14:10	**Invited Speech (Onsite)**
	Active and Reconfigurable Spoof Plasmonic Devices for Interchip Communications **Prof. Jingjing Zhang** Southeast University, China
14:10-14:30	**Invited Speech (Onsite)**
	Recent Progress in Wafer-level Thin-film Lithium Niobate Photonics **Prof. Yuan Dong** Shanghai University, China
14:30-14:50	**Invited Speech (Onsite)**
	Quantum Metamaterials for Subwavelength Control of Light **Assoc. Prof. Yu Luo** Nanyang Technological University, Singapore
14:50-15:10	**Invited Speech (Onsite)**
	Computational Microspectrometer Based on Metasurfaces with Diverse Spectral Responses **Assoc. Prof. Shaonan Zheng** Shanghai University, China
15:10-15:30	**Invited Speech (Onsite)**
	Transforming Tiny Lasers into Cellular-Scale Sensors and Healthcare Devices **Asst. Prof. Yu-Cheng Chen** Nanyang Technological University, Singapore
15:30-15:50	**Invited Speech (Onsite)**
	Robust Miniature Efficient Phase Modulators in the Visible **Dr. Guozhen Liang** KLA-Tencor (Singapore) Pte Ltd, Singapore

Online Session A
Wireless Sensing and Positioning

Session Chair: Assoc. Prof. Zan Li, Jilin University, China

Time: 13:30-16:00, May 6, 2023	**Onsite Room: N/A**
Meeting ID: 883 4887 4889	**Link: https://us02web.zoom.us/j/88348874889**
13:30-13:50	**Invited Speech (Online)**
	Space-air-ground Integrated Information Network for Transportation Infrastructure Operation and Maintenance **Prof. Zhongliang Zhao** Beihang University, China
13:50-14:10	**Invited Speech (Online)**
	Theory and Algorithms for Relative Location Estimation in UAV Networks **Assoc. Prof. Yongcai Wang** Renmin University of China, China
14:10-14:30	**Invited Speech (Online)**
	A RIS Aided User Localization Design in Wireless Communication Systems **Prof. Zheng Dong** Shandong University, China
14:30-14:50	**Invited Speech (Online)**
	Indoor Localization Based on Wi-Fi RTT and MEMS-IMU **Presenter: Assoc. Prof. Baoding Zhou** Shenzhen University, China
15:00-15:15	**CS23-3064**
	Multi-scale Specific Emitter Identification via Self-attention-based Feature Pyramid Network **Presenter: Yurui Zhao** Yurui Zhao, Xiang Wang and Zhitao Huang National University of Defense Technology, China
15:15-15:30	**CS23-5082**
	An Indoor Positioning System Based on Visible Light and Multi-Sensor Fusion **Presenter: Tianqi Tan** Tianqi Tan, Jinxin Guo, Xiaomeng Zhao, Kai Zhang, Yuhui Jiao and Zan Li Jilin University, China

15:30-15:45	**CS23-5089E**
	Direction Finding Based on Spatial Sparsity of Cumulative Slicing for Circular Array in Correlated Noise and Multipath **Presenter: Ying Xiao** Ying Xiao, Zhen Huang and Dingli Xue Tsinghua University, China
15:45-16:00	**CS23-1588**
	Frequency Choices and the Improvement of Signal using Reassigned Joint Time-Frequency Analysis **Presenter: Thipparat Pinyatanabat** Thipparat Pinyatanabat and Charoen Vongchumyen King Mongkut's Institute Technology of Ladkrabang, Thailand

Session 4
Quantum Information Security

Session Chair: Dr. Randy Kuang, Quantropi Inc., Ottawa, Canada & Prof. Michel Barbeau, Carleton University, Canada

Time: 16:10-18:10, May 6, 2023 **Onsite Room: SR903**

Meeting ID: 839 7342 5289 **Link: https://us02web.zoom.us/j/83973425289**

16:10-16:30	**Invited Speech (Onsite)**
	Confidential Underwater Communications Using Quantum Permutation Pad in Counter Mode **Prof. Michel Barbeau** Carleton University, Canada
16:30-16:50	**Invited Speech (Onsite)**
	Generalized Uncertainty Principles for Quantum Cryptography **Dr. Randy Kuang** Co-Founder and Chief Scientist Quantropi Inc., Ottawa, Canada
16:50-17:10	**Invited Speech (Onsite)**
	Quantum (Secure) Communication at DT **Dr. Marc Geitz** Deutsche Telekom, Germany
17:10-17:25	**CS23-237**
	Quantum Encryption in Phase Space using Displacement Operator for QPSK Data Modulation **Presenter: Randy Kuang** Randy Kuang and Adrian Chan Quantropi Inc., Ottawa, Canada
17:25-17:40	**CS23-227**
	Post-Quantum Cryptography Key Exchange to Extend a High-security QKD Platform into the Mobile 5G/6G Networks **Presenter: Ronny Döring** Ronny Döring, Marc Geitz and Ralf-Peter Braun Deutsche Telekom AG, Germany
17:40-17:55	**CS23-236**
	FIPS Compliant Quantum Secure Communication using Quantum Permutation Pad **Presenter: Maria Perepechaenko** Alex He, Dafu Lou, Eric She, Shangjie Guo, Hareesh Watson, Sibyl Weng, Maria Perepechaenko and Randy Kuang Quantropi Inc., Ottawa, Canada

17:55-18:10	**CS23-234**
	Berlin OpenQKD Testbed Evaluating Quantum Key Distribution in Provider Networks **Presenter: Ronny Döring** Ralf-Peter Braun, Marc Geitz, Ronny Döring and Michaela Ritter Deutsche Telekom, Germany

Session 5
Advanced Electronic Device Design and Development

Session Chair: Prof. Char-Dir Chung, National Taiwan University, Taiwan

Time: 16:10-18:10, May 6, 2023	**Onsite Room: SR904**
Meeting ID: N/A	**Link: N/A**

16:10-16:25	**CS23-1150**
	A Study on the Application of Ultrasonic Measurement Technology in Reducing Traffic Safety Accidents **Presenter: Huang Yu-Che** Huang Yu-Che, Huang Ping-Hsien and Yu Xiaohong Chaoyang University of Technology, Taiwan
16:25-16:40	**CS23-139-A**
	On the Design of Robust LQRs for Systems Affected by Structured Uncertainties **Presenter: Graziano Chesi** Graziano Chesi The University of Hong Kong, China
16:40-16:55	**CS23-231**
	Dual-edge triggered Reset Synchronizer for I2C Protocol **Presenter: Myint-Wai PHYU** Myint-Wai PHYU, Joscel Ann Agabao IGNACIO, Richard OEY STMicroelectronics, Singapore
16:55-17:10	**CS23-1353**
	Ultrasonic Wavefront Computing Architecture on CMOS for Fourier Transform Computation **Presenter: Yu-Shun Wang** Y. S. Wang, K. T. C. Chai, D. S. H. Chen, E. L. C. Wai, J. Sharma, B. V. Phuong and C. E. Png Institute of Microelectronics A*STAR, Singapore
17:10-17:25	**CS23-2056**
	Automated Chilli Pesticide Residues Detection Using Odour Gas Sensors (OGS) And Deep Learning (DL) Algorithm **Presenter: Wei Keong Tan** Wei Keong Tan, Zulkifli Husin, Muhammad Amir Hakim Ismail and Muhammad Luqman Yasruddin Universiti Malaysia Perlis, Malaysia

17:25-17:40	**CS23-3080**
	Machine Learning Based Depression Screening Among Young Adults using Wireless EEG **Presenter: Tasnuva Faruk** Nazmus Sakib, Md. Kafiul Islam, and Tasnuva Faruk Independent University, Bangladesh
17:40-17:55	**CS23-2051**
	A 0.89 to 2.1 GHz Tunable Power Amplifier for Multi-band Transmitter **Presenter: Sapawi. R** Sapawi. R, Kipli. K, Julai. N, Hong Ping. K, Zainol Murad. S. A, Awg Salleh and D. N. S Universiti Malaysia Sarawak, Malaysia
17:55-18:10	**CS23-2074**
	Effect of Artifact Removal on EEG based Motor Imagery BCI Applications **Presenter: Md Kafiul Islam** Maisha Anjum, Nazmus Sakib and Md Kafiul Islam Independent University, Bangladesh

Online Session B
Satellite Communication and Space Communication Technology

Session Chair: Prof. Yoshiaki Daimon Hagiwara, Sojo University, Japan

Time: 16:30-18:00, May 6, 2023 **Onsite Room: N/A**

Meeting ID: 883 4887 4889 **Link: https://us02web.zoom.us/j/88348874889**

16:30-16:45	**CS23-230**
	A Link Switching and Traffic Scheduling Method for Satellite-ground Uninterrupted Communication **Presenter: Yiqiu Zhou** Yiqiu Zhou, Kanglian Zhao, Wenfeng Li and Yuan Fang Nanjing University, China
16:45-17:00	**CS23-1361**
	Double Walsh-Hadamard Transform for Improved Efficiency in OFDM-IM **Presenter: Yuhao Lian** Yuhao Lian and Yuhua Wang Chongqing University of Posts and Telecommunications, China
17:00-17:15	**CS23-1368**
	Topology Planning of Space Deterministic Networks **Presenter: Mengying Li** Mengying Li, Qian Tan, Ze Li, Kanglian Zhao, Wenfeng Li and Yuan Fang Nanjing University, China
17:15-17:30	**CS23-4064E**
	Overview of Embedded Soft PLC Based on Codesys and Communication System Design **Presenter: Yuanshuang Fu** Hao Song, Yuanshuang Fu and Mengmeng Liu North China University of Technology, China
17:30-17:45	**CS23-221**
	An OLSR-based Multipath Routing Algorithm for LEO Satellite Network **Presenter: Kaiyang Li** Kaiyang Li, Ze Li, Hao Wang, Kanglian Zhao, Wenfeng Li, Yuan Fang Nanjing University, China

17:45-18:00	**CS23-2258E**
	Modeling and Impedance Matching of Bonding Wires in Multi-Chip Interconnection of Electric Sensor **Presenter: Shaojing Wang** Kai Gao, Lei Yi, Shaojing Wang, Chuang Bi, Peng Xu and Feng Xue University of Electronic Science and Technology of China, China

Session 6
Quantum Information Security

Session Chair: Dr. Randy Kuang, Quantropi Inc., Ottawa, Canada & Prof. Michel Barbeau, Carleton University, Canada

Time: 10:00-11:55, May 7, 2023 **Onsite Room: SR901**

Meeting ID: 839 7342 5289 **Link: https://us02web.zoom.us/j/83973425289**

10:00-10:20	**Invited Speech (Online)**
	Quantum-secure Autonomous Factories Based on Hybrid TLS - The Business Case for Investing in Post Quantum Security now **Dr. Wolfgang Rohde** Managing Director Innovation, Strategy & Research Siemens, USA
10:20-10:40	**Invited Speech (Online)**
	Quantum Permutation Pad with Qiskit Runtime **Mr. Alain Chance** Founder & CEO Alainquant LLC, USA
10:40-10:55	**CS23-222**
	Efficient QSDC with Identity Authentication **Presenter: Zheng Xing** Zheng Xing, Chan-Tong Lam and Penousal Machado Macau Polytechnic University, China
10:55-11:10	**CS23-242**
	Quantum-secure Autonomous Factories: Hybrid TLS 1.3 for Inter- and Intra-Plant Communication **Presenter: Maria Perepechaenko** Wolfgang Rohde, Maria Perepechaenko and Randy Kuang Quantropi Inc., Canada
11:10-11:25	**CS23-214**
	ARMOS 2.0: An Ultra-secure Commercial QKD Product against PNS Attacks. **Presenter: Shashank Gupta** Shashank Gupta, Rajesh Kumar Krishnan, Vijayalaxmi Mogiligidda, Roopak T, Manasa Hegde, Sairam Rajamani and Dilip Singh QuNu Labs Pvt. Ltd., India
11:25-11:40	**CS23-1285**
	On the Application of Inexact Computation for Low Power SHA-256 **Presenter: Ahmed Shaaban Ismail** Ahmed Shaaban, Ahmed Shalaby and Mohamed Fathy Abu-Elyazeed Faculty of Engineering – Cairo University Cairo, Egypt

11:40-11:55	**CS23-228**
	Hybrid QKD & PQC Protocols Implemented in the Berlin OpenQKD Testbed **Presenter: Marc Geitz** Marc Geitz, Ronny Döring and Ralf-Peter Braun Deutsche Telekom, Germany

Session 7
Analog/Mixed-Signal Circuit Design and Related Technologies

Session Chair: Prof. Haruo Kobayashi, Gunma University, Japan

Time: 10:00-11:15, May 7, 2023	**Onsite Room: SR902**
Meeting ID: 832 5613 7923	**Link: https://us02web.zoom.us/j/83256137923**

10:00-10:15	**CS23-210**
	A 0.4V 21.6nW Duty Cycle Generator Based on Compact Pulsed Modulator for MEMs Sensing Interface **Presenter: Xi Sung Loo** Xi Sung Loo, Wang Ling Goh and Yuan Gao Nanyang Technological University, Singapore
10:15-10:30	**CS23-232**
	Single OTRA Based Universal Third Order Butterworth Filter and Its Performance Study **Presenter: Mourina Ghosh** Subhasish Banerjee, Mourina Ghosh and Pulak Mondal Indian Institute of Information Technology, India
10:30-10:45	**CS23-255**
	Design of High Quality Factor Fully Differential CMOS Active Inductor With Cascode Current Mirror for 2-5 GHz Frequency Ranges **Presenter: Sohiful Anuar Zainol Murad** Hussein Anes Abdulqader Aishaikh Ali, Sohiful Anuar Zainol Murad, Faizah Abu Bakar, Ahmad Fariz Hasan and Jamilah Karim Universiti Malaysia Perlis, Malaysia
10:45-11:00	**CS23-1347**
	Low Power-Delay-Product Ternary Adder with Optimized Ternary Cycling Gates **Presenter: Zhiwei Zeng** Zhiwei Zeng, Guangchao Zhao, Xingli Wang, Beng Kang Tay and Mingqiang Huang Chinese Academy of Sciences, China
11:00-11:15	**CS23-1386**
	Design Step for Op Amp based CMOS Feedback Amplifiers **Presenter: Suriya Adirek** Suriya Adirek, Chaiyan Chanapromma and Jirayuth Mahattanakul Nakhon Sawan Rajabhat University, Thailand

Session 8
Micro/Nano-structure Based Optoelectronics and Photonics Devices

Session Chair: Assoc. Prof. Zhengji Xu, Sun Yat-sen University, China

Time: 13:00-15:00, May 7, 2023	**Onsite Room: SR901**
Meeting ID: 839 7342 5289	**Link: https://us02web.zoom.us/j/83973425289**

13:00-13:20	**Invited Speech (Online)**
	Hidden Anti-Parity-Time symmetry in Hermitian Valley Photonic Crystals **Prof. Fei Gao** Zhejiang University, China
13:20-13:40	**Invited Speech (Online)**
	Polarization-insensitive Optical Filters Based on Silicon-on-insulator Platform **Prof. Ting Hu** Shanghai University, China
13:40-14:00	**Invited Speech (Online)**
	Electrically Tunable Optofluidic Lenses for In-plane Light Manipulation **Assoc. Prof. Qingming Chen** Sun Yat-sen University, China
14:00-14:20	**Invited Speech (Online)**
	Sub-hundred Femtosecond Pulsed Fiber Laser Generations and Related Progress **Prof. Xiaohui Li** Shaanxi Normal University, China
14:20-14:40	**Invited Speech (Online)**
	Electro-optic Devices Based on Ferroelectric Thin Films **Prof. Minmin Zhu** Fuzhou University, China
14:40-15:00	**Invited Speech (Online)**
	Topological Metasurfaces and Its Applications **Asst. Prof. Qinghua Song** Tsinghua Shenzhen International Graduate School, China

Session 9
Analog/Mixed-Signal Circuit Design and Related Technologies

Session Chair: Prof. Haruo Kobayashi, Gunma University, Japan

Time: 13:00-14:00, May 7, 2023	**Onsite Room: SR902**
Meeting ID: 832 5613 7923	**Link: https://us02web.zoom.us/j/83256137923**
13:00-13:20	**Invited Speech (Online)**
	Principle and Application of Electrical Impedance Tomography **Assoc. Prof. Tadashi Itoh** Gunma University, Japan
13:20-13:40	**Invited Speech (Online)**
	Ultra-low Power Multi-Point Remote Sensing Technology Using Opticlal Fiber Power Supply for Sewage Systems **Dr. Nobuhiko Kikuchi** R&D Group, Hitachi Ltd., Japan
13:40-14:00	**Invited Speech (Online)**
	Minimal Fab Using Half-inch Wafers for Low-volume Device Markets **Dr. Shiro Hara** National Institute of Advanced Industrial Science and Technology, Japan

Online Session C
Modern Electronic Information System and Control

Session Chair: Assoc. Prof. Swati Sharma, Presidency University, India

Time: 13:00-14:30, May 7, 2023	**Onsite Room: N/A**
Meeting ID: 883 4887 4889	**Link: https://us02web.zoom.us/j/88348874889**

13:00-13:15	**CS23-206**
	Impedance Compensation for Interconnection Structure with Large Inductance on PCB using Capacitors **Presenter: Ziren Wang** Ziren Wang, Congzhe Zhang, Shilong Yang, Ting Gao, Shaogeng An, Qiuyan Jin and Zekun Wang China Academy of Information and Communications Technology, China
13:15-13:30	**CS23-204**
	A Push-Pull FVF LDO with Full-Spectrum PSR and Fast Transient Response **Presenter: Heng Zheng** Heng Zheng and Bo Zhou Beijing Institute of Technology, China
13:30-13:45	**CS23-141**
	A High-Utilization Reconfigurable Digital Computing-in-Memory SRAM Macro Using Dynamic Logic for Edge Neural Network Applications **Presenter: Chuanghao Zhang** Chuanghao Zhang, Mingyu Wang, Yangzhan Mai, Xiaojie Li, Baiqing Zhong and Zhiyi Yu Sun Yat-sen University, China
13:45-14:00	**CS23-340**
	A Fully Integrated Capacitor-Less Ultra-Low Noise Low-Dropout Regulator Inherited Combined with Bandgap Reference **Presenter: Xiao Chen** Min Lin, Xiao Chen and Lei Zhang Shanghai University, China
14:00-14:15	**CS23-4059**
	A Liquid Crystal Phase Shifter Based on Artificial Surface Plasmon **Presenter: Xiaoke Su** Xiaoke Su, Yin Jin, Tianliang Zhang, Wanpeng Hou, Yiheng Zhang and Shuqi Jing University of Electronic Science and Technology of China Chengdu, China

14:15-14:30	**CS23-226**
	Anti-Overturning Mechanism and Control Strategy In High-Speed Die Peeling-off Process
	Presenter: Yang Xue
	Yang Xue and Tao Wu
	Shantou University, China

Session 10
Wireless Communication System and Network

Session Chair: Prof. Alkiviadis Hatzopoulos, Aristotle University of Thessaloniki, Greece

Time: 15:10-16:10, May 7, 2023	**Onsite Room: SR901**
Meeting ID: N/A	**Link: N/A**
15:10-15:25	**CS23-1246**
	A Self-tuning LNA Scheme with On-Line Gain Adjustment for 5G Communication Systems **Presenter: Alkis Hatzopoulos** Athanasios Stefanou, Vasilios Pavlidis and Alkiviadis Hatzopoulos Aristotle University of Thessaloniki, Greece
15:25-15:40	**CS23-1076**
	Underwater Wireless Sensor Network Node Deployment Topologies and Localization Performances **Presenter: Yashwanth N** Yogeshwary B H, Bhaskar Awadhiya, Anu H, Aravind B N, Sivakumar V and Yashwanth N Manipal Institute of Technology, India
15:40-15:55	**CS23-1184**
	Seamless Handover in Hybrid VLC and WiFi network: a Testbed Scenario **Presenter: Kien Trung Ngo** Kien Trung Ngo, Fabrizio Giuliano, Stefano Mangione, Tim Farnham and Ilenia Tinnirello University of Palermo, Italy
15:55-16:10	**CS23-233**
	Hybrid Control of Channel Selection and Transmission Power for Low Power Wireless Sensor Network **Presenter: Tzu-Hui Lee** Chung-Wen Hung and Tzu-Hui Lee National Yunlin University of Science and Technology, Taiwan

Session 11
6G Wireless Communication Networks

Session Chair: Assoc. Prof. Jie Huang, Southeast University, China

Time: 14:20-16:35, May 7, 2023	**Onsite Room: SR902**
Meeting ID: 832 5613 7923	**Link: https://us02web.zoom.us/j/83256137923**
14:20-14:40	**Invited Speech (Onsite)**
	Prospects and Challenges of an EOG-based Human Machine Interface (HMI) for Physically Challenged People **Assoc. Prof. Md. Kafiul Islam** Independent University, Bangladesh
14:40-15:00	**Invited Speech (Onsite)**
	A Dual Phase Genetic Algorithm with Aggregated Search for Fast Initial Access in 5G Millimeter Wave Communication **Prof. Upena Dalal** Sardar Vallabhbhai National Institute of Technology, Surat, India
15:00-15:20	**Invited Speech (Online)**
	Design Approach for Broadband Antennas with Customized Tilted-Beam Based on Index-Modulated Patches **Assoc. Prof. Mei Li** Chongqing University, China
15:20-15:35	**CS23-1166**
	Modified Loss Function Considering Outage Capacity for Deep Learning-Based OFDMA NOMA Video Transmission Resource Management **Presenter: Shu-Ming Tseng** Shu-Ming Tseng, Peng-Hao Wang and Yueh-Teng Hsu National Taipei University of Technology, Taiwan
15:35-15:50	**CS23-3181**
	RISNet: A DL-based High Accuracy CSI Feedback Approach for RIS-Aided FDD Systems **Presenter: Xinyi Tang** Xinyi Tang, Limin Xiao, Zhiqiang Tan, Ming Zhao, Yan Zhang and Yunzhou Li Tsinghua University, China
15:50-16:05	**CS23-1789**
	Perspectives of Digital Twin-Empowered Distributed Artificial Intelligence for Edge Computing **Presenter: Hoa Tran-Dang** Hoa Tran-Dang and Dong-Seong Kim Kumoh National Institute of Technology, South Korea

16:05-16:20	**CS23-1469**
	Generative Diffusion Model Based RIS-Aided Massive MIMO Channel Estimation **Presenter: Xiaofeng Liu** Xiaofeng Liu, Xiao Fu, Xinrui Gong, Jiyuan Yang and Xiqi Gao Southeast University, China
16:20-16:35	**CS23-216**
	A Novel Multi-Satellite Tracking Algorithm for the LEO Satellite Communications **Presenter: Mengyue Liu** Mengyue Liu, Haotian Chen, Zixian Ma, Bing Lan, Chunyi Song and Zhiwei Xu Zhejiang University, China

Online Session D
Future Communication Technology and Application

Session Chair: Assoc. Prof. Dr. Ankan Bhattacharya, Hooghly Engineering & Technology College, India

Time: 15:00-17:00, May 7, 2023 **Onsite Room: N/A**

Meeting ID: 883 4887 4889 **Link: https://us02web.zoom.us/j/88348874889**

15:00-15:15	**CS23-1570**
	A Strategy of Joint Service Placement and Request Dispatching for LEO Satellite MEC Networks **Presenter: Mengying Li** Qian Tan, Mengying Li, Hao Wang, Kanglian Zhao, Wenfeng Li and Yuan Fang Nanjing University, China
15:15-15:30	**CS23-205**
	ADMM for 1-bit DACs Quantization Precoding in Antenna Selection-Assisted Massive MU- MIMO **Presenter: Guodong Xue** Guodong Xue, Hui Li and Rui Liang Northwestern Polytechnical University, China
15:30-15:45	**CS23-219**
	A Policy based Deep Reinforcement Learning for Task Offloading and Resource Allocation in Satellite Terrestrial Integrated Internet of Things **Presenter: Hao Wang** Hao Wang , Zhibo Yan, Qian Tan, Kaiyang Li, Kanglian Zhao , Wenfeng Li, Yuan Fang Nanjing University, China
15:45-16:00	**CS23-201**
	Connectivity Probability Analysis for Freeway with Entrance/Exit Scenarios in Vehicular Ad Hoc Networks **Presenter: Weiyi Ni** Weiyi Ni, Qiuyu Zhang and Hailin Xiao Changchun University of Science and Technology, China
16:00-16:15	**CS23-220**
	An Efficient LTP Transport Protocol Implementation and Testing **Presenter: Yuehao Tang** Tang Yuehao, Liu Hantong, Yang Zhenfa, Fang Yuan, Li Wenfeng and Zhao Kanglian Nanjing University, China

16:15-16:30	**CS23-225**
	SWCNT Based on-body Patch Antenna for Lung Cancer Detection **Presenter: Raja Rashidul Hasan** Raja Rashidul Hasan, Sumit Hassan Eshan, Asif Iqbal, Sm Aliuzzaman, Shamim Forhad, Khondoker Farhan Elahi, Md Mofakhkharul Islam Khan and Md Oli Ullah American International University-Bangladesh (AIUB), Bangladesh
16:30-16:45	**CS23-1552**
	Design and Implementation of Industrial Internet Emulation Platform Based on Virtualization Technology **Presenter: Mingxin Lu** Shuai Wang, Wei Li, Wan Bao, Yang Zhao and Mingxin Lu Jiangsu Jinling Sci&Tech Group Co., Ltd, China
16:45-17:00	**CS23-1873**
	Blockchain Based Security Trust Mechanism for Food Supply Chain Management in Smart City Environment **Presenter: Manojkumar V** Manojkumar Vivekanandan, Praveen Kumar Premkamal, Johnpaul C.I., Solleti Krishna Chaitanya Subhash, Yogesh D and Kumar Sashank Ganta SRM University-AP, India

Conference Chair

Prof. Maode Ma

Qatar University, Qatar

Time:	9:05-9:10, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Bio: Prof. Maode Ma, a Fellow of *IET*, received his Ph.D. degree from Department of Computer Science in Hong Kong University of Science and Technology in 1999. Now, Dr. Ma is a Research Professor in the College of Engineering at Qatar University in Qatar. Before join Qatar University, he has been a faculty member at Nanyang Technological University in Singapore for over 20 years. He has extensive research interests including network security and wireless networking. He has led 25 research projects funded by government, industry, military and universities in various countries. He has supervised over 20 research students to get their Ph. D degree. He has been a conference chair, technical symposium chair, tutorial chair, publication chair, publicity chair and session chair for over 100 international conferences. He has been a member of the technical program committees for more than 200 international conferences. Dr. Ma has about 450 international academic publications including more than 220 journal papers and over 230 conference papers. He has edited a few technical books and produced over 25 book chapters. His publication has received over 6700 citations in Google Scholar. He has delivered over 80 keynote speeches and 10 tutorials at various international conferences. He currently serves as the Editor-in-Chief of *International Journal of Computer and Communication Engineering* and *Journal of Communications.* He also serves as a Senior Editor for *IEEE Communications Surveys and Tutorials*, and an Associate Editor for International Journal of *Wireless Communications and Mobile Computing* and *International Journal of Communication Systems.* Dr. Ma is a senior member of *IEEE Communication Society* and a member of *ACM.* He is now the Education Chair of the *IEEE* Singapore Section and the Chair of the *ACM*, Singapore Chapter.

Award Chair

Prof. Char-Dir Chung

National Taiwan University, Taiwan

Time:	18:30, May 6, 2023	**Onsite Room:**	CALI Park Avenue Rochester
Zoom ID:	N/A	**Zoom Link:**	N/A

Bio: Char-Dir Chung received the B.S. degree in electrical engineering from the National Taiwan University (NTU), Taipei, in 1983, and the M.S. and Ph.D. degrees in electrical engineering from the University of Southern California, Los Angeles, in 1986 and 1989, respectively.

From 1989 to 1992, Dr. Chung was with the LinCom Corporation, Los Angeles, where he worked on analytical and simulation modeling of scientific and military satellite communication systems. From 1992 to 2005, he joined the faculty of the National Central University (NCU) in Taiwan. At NCU, he founded the Advanced Communication Laboratory in 1998, the Graduate Institute of Communication Engineering in 2000 and the Communication Engineering Department in 2003, and was the founding heads of these organizations. Since 2005, he has been on the faculty of the National Taiwan University, where he is now a Distinguished Professor of the Electrical Engineering Department and the Graduate Institute of Communication Engineering. Prof. Chung was endowed with the SiS Technology Chair for the 2009 academic year at NTU. His current research interests include digital modulation theory, wireless communications, spread spectrum communications and statistical signal processing. He has published more than 80 journal and conference papers and holds 6 patent rights in these areas.

Dr. Chung received the Group Achievement Award from the National Aeronautics and Space Administration, USA, in 1991; the Young Scientists Award from the International Union of Radio Science in 1993; the annual Research Award from the National Science Council, ROC, in 1992 and from 1994 to 2001, the Kentucky Colonel grade from the Commonwealth of Kentucky, USA, in 2003, and the FORMOSAT-2 Satellite Project Award from the National Space Center, ROC, in 2005. In 2005, Dr. Chung was ranked as the first-grade project investigator by the National Science Council, ROC. He served as the Chairman of IEEE Information Theory Society, Taipei Chapter, from 1997 to 1999, and the Secretary of Taipei Section from 2007 to 2008. He was an editor for the Journal of the Chinese Institute of Electrical Engineering from 2000 to 2004 and an editor for the Magazine of the same organization from 2003 to 2008. He was a guest co-editor for the IEEE Transactions on Vehicular Technology (Special Issue on Intelligent Transportation Systems and Telematics Applications) in 2008. Dr. Chung is a Fellow of the IEEE.

Dr. Chung has been very active in industrial development and government services in Taiwan. From 2004 to 2008, he served as the Chairman of the Wireless System Group of the National Science and Technology Program for Telecommunications, and the founding Chairman of the Taiwan Broadband Wireless Communications Industry Alliance. Since 2001, Dr. Chung joined several Technology Review Boards of the Ministry of Economic Affairs, and acted as the Chairman of the Board of Computer, Consumer Electronics, Communications, Optoelectronics, and Semiconductor Electronics from 2005 to 2008 and the Board of the Technologies and Applications from 2012 to 2013. Dr. Chung acted as Deputy Executive Secretary of the Science and Technology Advisory Group and of the National Information and Communication Security Taskforce during 2008-2011, Executive Secretary of the Digital Convergence Taskforce during 2011-2012 and of the National Information and Communication Initiative Committee during 2014-2016, Member and Executive Secretary of the Board of Science and Technology during 2014-2016, and Minister without Portfolio

in 2016, all under the Executive Yuan (the Cabinet), and was involved in cross-ministry national policy making and coordination in a variety of science and technology areas including information and communications, digital content, digital convergence, electronics, technological innovation, biotechnology, agrobiology, talent cultivation, etc. Dr. Chung was awarded Merit Medal by Executive Yuan in 2016 to honor his contribution in reviewing national programs and making national policies in science and technology.

Speaker Introduction

Prof. Massimo Alioto

National University of Singapore, Singapore

Time:	9:10-9:40, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Aggressive Design Reuse for Ubiquitous and Hardware-Patchable Secure Chips – From Physical Design to On-Chip Machine Learning

Abstract: Divide-and-conquer design methodologies facilitate building block design, but conflict with basic security requirements, while also precluding opportunities for efficient system integration and inexpensive embedment of security features. At the same time, the insertion of security primitives as standalone blocks is inherently additive in terms of area, power, design effort and integration effort, limiting their embeddability in low-cost devices (i.e., the vast majority of the upcoming trillion chips for the Internet of Things). As further limitation of conventional approaches to security enforcement in silicon chips (e.g., against side-channel attacks), the discovery of hardware vulnerabilities cannot be followed by later hardware fixes as we are used to do with software systems.

In this keynote, the road towards ubiquitous hardware security is pursued from a primitive design perspective, designing PUFs and TRNGs that are inherently immersed in existing memory arrays and logic fabrics, and breaking the boundaries of traditional system partitioning. The new concept of hardware patching is also discussed, where circuit flexibility is introduced to make silicon chips able to evolve over time and counteract newly discovered vulnerabilities through learning-based physical protection mechanisms.

Bio: Massimo Alioto is a Professor at the ECE Department of the National University of Singapore, where he leads the Green IC group, the Integrated Circuits and Embedded Systems area, and the FD-fAbrICS center on intelligent&connected systems. Previously, he held positions at the University of Siena, Intel Labs – CRL (2013), University of Michigan - Ann Arbor (2011-2012), University of California – Berkeley (2009-2011), EPFL - Lausanne.

He is (co)author of 300+ publications on journals and conference proceedings, and four books with Springer. His primary research interests include ultra-low power and self-powered systems, green computing, circuits for machine intelligence, hardware security, and emerging technologies.

He is the Editor in Chief of the IEEE Transactions on VLSI Systems, Distinguished Lecturer for the IEEE Solid-State Circuits Society, and was Deputy Editor in Chief of the IEEE Journal on Emerging and Selected Topics in Circuits and Systems. Previously, Prof. Alioto was the Chair of the “VLSI Systems and Applications” Technical Committee of the IEEE Circuits and Systems Society (2010-2012), Distinguished Lecturer (2009-2010) and member of the Board of Governors (2015-2020). He served as Guest Editor of numerous journal special issues, Technical Program Chair of several IEEE conferences (ISCAS 2023, SOCC, PRIME, ICECS), and TPC member (ISSCC, ASSCC). Prof. Alioto is an IEEE Fellow.

Prof. Qiang Li

University of Electronic Science and Technology of China, China

Time:	9:40-10:10, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

TBA

Abstract:

Bio: Qiang Li received the B.Eng. in Electrical Engineering from the Huazhong University of Science and Technology (HUST), Wuhan, China and the Ph.D. in Electronic Engineering from the Nanyang Technological University (NTU), Singapore, in 2001 and 2007, respectively. He has been working on analog/RF and mixed-signal circuits in both academia and industry, holding positions of Engineer, Project Leader & Technical Consultant in Singapore. He has been an Associate Professor at the Aarhus University, Denmark during 2011-2014, and the Vice Dean of the School of Microelectronics and Solid-State Electronics, UESTC during 2014-2018. He is currently a full Professor at the University of Electronic Science and Technology of China (UESTC), heading the analog group. His research interests include low-voltage and low-power analog/RF circuits, data converters, and mixed-mode circuits for biomedical and sensor interfaces.

He has founded and is currently heading the UESTC Institute of Integrated Circuits and Systems. In January 2018, The Institute is accredited as an international collaboration platform (111 Project) co-supported by the Chinese Ministry of Education and SAFEA.

Prof. Li serves as the Distinguished Lecturer of the IEEE Solid-State Circuits Society (SSCS), a member of the Technical Program Committee of IEEE Custom Integrated Circuits Conference (CICC), a member of the Technical Program Committee of European Solid-State Circuits Conference (ESSCIRC), and a member of the Technical Program Committee of IEEE Asian Solid-State Circuits Conference (ASSCC). He was a member of the Student Research Preview (SRP) committee of the International Solid-State Circuits Conference (ISSCC) and the TPC Chair of 2018 IEEE Asia Pacific Conference on Circuits and Systems (APCCAS). He served/serves as a Guest Editor of IEEE Transactions on Circuits and Systems I: Regular Papers (TCAS-I) and an Associate Editor of IEEE Open Journal of Circuits and Systems (OJCAS). He is the Founding Chair of IEEE Chengdu SSCS/CASS Joint Chapter.

Prof. Ken-ya Hashimoto

University of Electronic Science and Technology of China, China

Time:	10:40-11:00, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Radio Frequency Acoustic Wave Devices in RF Front-End in Mobile Communications --- Why Unavoidable?

Abstract: Several tens of radio frequency devices based on surface and bulk acoustic wave technologies are installed in each smartphone as filters, duplexers, and multiplexers. The number is still growing and expected to be more than one hundred near future. IC industires attemped to realize most of all functionalities on Si. It is also true for high speed communications. Nevertheless, why are acoustic wave devices still used? The biggest obstacle is non-linearity. RF filters must be quite linear to avoid unnecessary signal generation equivalent to noise. Although acoustic wave devices are quite linear, further linearity improvement is strongly requested. This is due to introduction of the inter-band carrier aggregation and recent trend of inreasing the transmit power. Self-mixing of transmit signals may be cancelled in some extent by circuit design and/or digital signal processing. However, they are not usable for mixture including out-coming jummer signals. To replace acoustic wave devices with those based on another technology, they must fullfil varius tough specifications given to current acoustic wave devices in addition to the linearity: low insertion loss in the passband, good out-of-band rejection, narrow transition bandwidth, small passband ripples, temperature stability, power durability, small size, and low price. This paper reviews current status of RF SAW/BAW devices used in high-speed mobile communications. Typical device performances are presented, and discussions are given on why such tough specifications are enforced. Nonlinearity in RF frontend and its impact to high-speed communications are detailed.

Bio: Ken-ya Hashimoto was born in Fukushima, Japan, in March 2, 1956.He received the B.S. and M.S. degrees in electrical engineering from ChibaUniversity, Chiba, Japan, in 1978 and 1980, respectively, and the D.Eng. degreefrom the Tokyo Institute of Technology, Tokyo, Japan, in 1989.He joinedChiba University as a Research Associate in 1980 and retired there as aProfessor Emeritus in 2021. From 2013 to 2015, he was the Director of theCenter for the Frontier Science with Chiba University. Right after retirement,he moved to the University of Electronic Science and Technology of China(UESTC), Chengdu, China, as a Professor. He had Visiting Professor/Researcherpositions in various institutions, such as the Helsinki University ofTechnology, Espoo, Finland, in 1998, the Laboratoire de Physique et Metrologiedes Oscillateurs, CNRS, Besancon, France, in 1998/1999, Johannes KeplerUniversity, Linz, Austria, in 1999 and 2001, the Institute of Acoustics,Chinese Academy of Science, Beijing, China, from 2005 to 2006, UESTC from 2009to 2012, and the Shanghai Jiao Tong University, Shanghai, China, in 2015.He servedas a Guest Coeditor of the IEEE Transactions on Microwave Theory and TechniquesSpecial Issue on Microwave Acoustic Wave Devices for Wireless Communications in2001, and a Publicity Cochair of the 2002, 2015 and 2021 IEEE InternationalUltrasonics Symposia, an International Distinguished Lecturer of the IEEEUltrasonics, Ferroelectrics, and Frequency Control (UFFC) Society from 2005 to2006, an Administrative Committee Member of the IEEE UFFC Society from 2007 to2009 and from 2014 to 2016, a Distinguished Lecturer of the IEEE ElectronDevices Society from 2007 to 2009, and a General Cochair of the 2011 and 2018IEEE International Ultrasonics Symposia.Hereceived IEEE Fellow in 2005 (now IEEE Life Fellow), the Ichimura IndustrialAward from the New Technology Development Foundation for Development of OptimalSubstrate 42-LT for Radio Frequency Surface Acoustic Wave Devices in 2015, TheCommendation for Science and Technology by the Minister of Education, Culture,Sports, Science

and Technology for Research on High Performance Radio FrequencySurface Acoustic Wave Devices in 2018, and the Distinguished Service Award fromthe IEEE UFFC Society in 2019.His current researchinterests include simulation and design of various high-performance surface andbulk acoustic wave devices, acoustic wave sensors and actuators, piezoelectricmaterials, and RF circuit design.

Prof. Yoshiaki Daimon Hagiwara

Sojo University, Japan

Time:	11:00-11:20, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Artificial Intelligent Partner System (AIPS) with Pinned Photodiode used for Robot Vision and Solar Panel

Abstract: The future of real-time computing will include massive assemblies of parallel processors over mesh-connected wireless networks to execute the vast amounts of computation with vast number of sensors of all types in order to change the way humans and computers interact in order to meet our human needs. This paper explains the details of the artificial intelligent partner system (AIPS) which was originally introduced in 2008 by Sony, using Play Station III Cell Processor and the intelligent image sensor real-time system, using the Sony Original Pinned Photodiode used for future robot vision and solar panels with the excellent short-wave blue light sensitivity and the electronic and global shutter function capabilities for fast action pictures.

Bio: Yoshiaki Daimon Hagiwara graduated California Institute of Technology (Caltech) in Pasadena California USA with BS71 with honor, MS1972 and PhD1975. While working at Sony in Japan during 1975 till 2008, he was engaged in the early developments of image sensor and the digital camera chip set including the ADC, DRAM and high-speed Cache SRAM buffer memory chips and digital processor chips used for the AIBO, PS2 and PS3 cells. He was invited to talk at IEEE sponsored CCD'79, ECS1980, ESSCIRC2001, ESSCIRC2008 and ISSCC2013 conferences for his works at Sony.

In 1992, he also served as a member of JEDEC memory standardization committee and also as the IEC TC47 technical committee chair of the international standard committee (IEC). He also served as the international program chair and an operational committee member in IEEE EDS sponsored ICMTS conferences since 1991 till 2008, IEEE ISSCC conferences for which he served as the ISSCC Asian Committee chair and also as the ISSCC international technical program (ITC) chair in series. He was also a member of the PC and OC since 1991 and now an advisory committee member of IEEE Cool Chips conferences.

In 2008 he founded and worked as the president in the artificial intelligent partner system laboratory (AIPLAB consortium), a nonprofit research organization (NPO) registered by Kanagawa prefecture government in Japan.

Since 1998 till 1999, he served as a visiting professor at Prof. C. A. Mead Lab of the electrical department at Caltech and also at Prof. T.C. McGill Lab of the applied physics department at Caltech. Since 2003 till 2006, he served also as a visiting professor at Prof. H. Kobayashi Lab in the electronic engineering department at Gunma University in Japan.

Since 2009 till 2017, he taught graduate and undergraduate students as a full professor of the information science department at Sojo University in Kumamoto city Japan. Currently he is serving as a specially appointed professor at the president office in Sojo University and also as a member of the educational committee in Society of Semiconductor Industry Specialists (SSIS) in Japan. He is a Caltech Distinguished Alumni and an IEEE Life Fellow.

Prof. Haruo Kobayashi

Gunma University, Japan

Time:	11:20-11:40, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Revisit to RC Linear Circuit Theory

Abstract: This paper discusses two RC linear circuits. (i) The first one is the spatial and temporal response of spatially shift-variant (non-uniform) networks with positive and negative resistors. Response of general spatially shift-variant networks whose resistor components are different from each other is investigated. This study is motivated by the vision chip in [1] whose network consists of positive and negative resistors with parasitic capacitors; we previously found there that when the negative resistance effect becomes large, the resistor network becomes unstable [2]. We also showed that both spatial and temporal network behaviors have some relationships even for the shift-variant network [3]. In this paper, we have further investigated their relationships and obtained the following conjecture from extensive simulations: "The network is temporally unstable if there is a node where the input current is injected and its node voltage as the spatial impulse response is negative. However even if there is NOT such a node, there are some networks which are temporally unstable". (ii) The second one is a relaxation digital-to-analog converter (ReDAC) configuration with positive and negative polarity output with a simple RC high pass filter (HPF) [4]. Its digital input is provided in two's complement format, to which the proposed ReDAC configuration directly matches. The proposed ReDAC with HPF is an extension of the conventional ReDAC using a simple RC low-pass filter (LPF) which generates an analog output with only positive polarity. We remark that the RC linear circuit theory is considered as a mature research area, but still there are challenging problems.

Bio: Haruo Kobayashi received the B.S. and M.S. degrees in information physics from University of Tokyo in 1980 and 1982 respectively, the M.S. degree in electrical engineering from University of California, Los Angeles (UCLA) in 1989, and the Ph. D. degree in electrical engineering from Waseda University in 1995. He joined Yokogawa Electric Corp. Tokyo, Japan in 1982, and was engaged in research and development related to measuring instruments and mini-supercomputer. In 1997, he joined Gunma University and presently is a Professor in Division of Electronics and Informatics there. His research interests include mixed-signal integrated circuit design & testing, and signal processing algorithms. He has published more than 120 journal papers and 450 international conference papers. Also he has supervised 16 Ph. D. students and 150 M. S. Students. He received the Yokoyama Award in Science and Technology in 2003. He is a Senior Member of IEEE.

Assoc. Prof. Toru Sai

Tokyo Polytechnic University, Japan

Time:	11:40-12:00, May 6, 2023	**Onsite Room:**	AUD302
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Power Conversion Circuits for Distributed PV Systems

Abstract: There are two types of distributed Photovoltaic (PV) systems, AC module type and DC module type. In AC module type, the key component is the Step-up DC-DC converter which boosts the output voltage of a PV panel to Grid. In this presentation new High Step-up DC-DC converter is introduced which is based on Quasi-Z-source network. The proposed converter futures low voltage ripple at output voltage, low voltage stress and free from the high side driver. On the other hand, in DC module type the obstacle of it is the partial shadow problem because of the series connection of PV panels. We introduced the new configuration for DC module type based on Buck-only converter with Current Source Inverter (CSI). The proposed configuration provides simple Module Integrated Converter (MIC) and high reliability. To confirm the validity of the proposals the measurement results of both are shown.

Bio: Toru Sai (Member, IEEE) received the B.S., M.E., and the Dr. Eng. degree in electrical engineering from Chuo University, Tokyo, Japan, in 1986, 1988, and 2012, respectively. In 1988, he joined the research and development center of Yokogawa Electric Company, Tokyo, Japan. From 2016 to 2020, he was a Project Research Associate with The University of Tokyo, Tokyo, Japan. Currently, he is an Associate Professor at Tokyo Polytechnic University and a Research Fellow at the Institute of Industrial Science, the University of Tokyo. His current research interests include DC-DC converters, Gate drivers, and A/D converters. He received the Best Paper Award in 2019 IEEE International Future Energy Electronics Conference.

Prof. Franco Maloberti

Univeristy of Pavia, Italy

Time:	13:30-14:00, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

The Role of Communications Circuits and Systems in Human Development

Abstract: Scientific knowledge is essential for human development, especially in communication, circuits, and systems. Until a century ago, mechanics was the leading actor as machines relieved physical fatigue. In the recent past electrical disciplines have replaced mechanics as the prevailing factor. Until now, the unrestricted use of energy has supported development, but the economic and social growth of an increasing number of people leads to new energy challenges. They are not only social and political but also engineering.

A second essential aspect concerns "brain fatigue." It must not be alleviated but supported if we do not want to become slaves of the now increasingly "intelligent" machines. Also, the role of communication, circuits, and systems is and will be vital for this aspect.

Bio: Franco Maloberti received the Laurea degree in physics (summa cum laude) from the University of Parma, Parma, Italy, in 1968, and the Dr. Honoris Causa Ph.D. in electronics from the Instituto Nacional de Astrofisica, Optica y Electronica (Inaoe), Puebla, Mexico, in 1996.

He is Emeritus Professor, University of Pavia, Italy and Visiting Chair Professor, University of Macau, China SAR. In 1993, he was a Visiting Professor at The Swiss Federal Institute of Technology (ETH-PEL), Zurich, Switzerland and in 2004 Visiting Professor at EPFL, Lausanne, Switzerland. From 2000 to 2002 he was the TI/J.Kilby Analog Engineering Chair Professor at the Texas A&M University and from 2002 to 2004 the Distinguished Microelectronic Chair Professor at the University of Texas at Dallas.

His professional expertise is in the design, analysis, and characterization of integrated circuits and analog digital applications, mainly in the areas of switched-capacitor circuits, data converters, interfaces for telecommunication, sensor systems, portable power management, and CAD for analog and mixed A/D design. He has written about 600 published papers, seven books and holds 36 patents.

He is Director of the Division I of IEEE. He was President of the IEEE CAS Society, VP Region 8 of IEEE CAS (1995-1997), Associate Editor of IEEE-TCAS-II, President of the IEEE Sensor Council (2002-2003), IEEE CAS BoG member (2003-2005), VP Publications IEEE CAS (2007-2008). He was DL IEEE SSC Society (2009-2010) and DL IEEE CAS Society (2006-2007; 2012-2013). He received the 1999 IEEE CAS Society Meritorious Service Award, the 2000 CAS Society Golden Jubilee Medal, and the IEEE Millenium Medal. He received the 1996 IEE Fleming Premium, the ESSCIRC 2007 Best Paper Award and the IEEJ Workshop 2007 and 2010 Best Paper Award. He received the IEEE CAS Society 2013 Mac Van Valkenburg Award.

Assoc. Prof. Akito Chiba

Gunma University, Japan

Time:	14:00-14:20, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

RF Parameter Estimation Using Lightwave Modulation

Abstract: RF signal processing via lightwave and its technique is known as "microwave- and millimeter-wave photonics (MWP)". This approach possesses some advantages such as avoidance from electromagnetic noises, and wide-bandwidth operation originating from the frequency range of lightwave higher than that of an RF signal with the degree of 4-5 orders. Now various functions have been demonstrated by adopting MWP: RF signal generation in high-frequency region, frequency upconversion and ultra-narrowband RF notch filters.

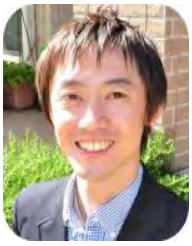
In this invited talk, we introduce an RF signal measurement based on MWP [1]. This scheme utilizes a beat signal between two lightwaves whose phases are independently modulated by a reference RF signal and the RF signal under the test. Into the beat signal, parameters of the RF signal under the test are reflected so that these parameters such as its amplitude and phase can be estimated. Since the frequency of the beat signal becomes into kHz-order one, broadband frequency response is not required in the electronic circuit for the RF parameter estimation.

First, we investigated the case where the frequency of the reference RF signal is the same as that of the RF signal under the test, and found that the beat signal has been expressed using these parameters. Based on the expression derived from model analysis, RF parameter estimation was conducted from the experimentally-obtained beat signal. The phases of the 10-GHz RF signal has been successfully obtained from the beat signal acquired by the experiment via offline processing. For the parameter estimation a prototype has been also designed and implemented as an electronic circuit.

We also extended this scheme by adopting higher-order optical sidebands due to modulation by a reference RF signal, in order to decrease reference RF signal frequency required for RF parameter estimation [2]. This extended approach will be presented from the view of both model analysis and experimental verification.

Bio: Akito Chiba received his B.E. degree in electric and precision engineering, and his M.E. and Ph.D. degrees in the field of electronics and information engineering from Hokkaido University, Sapporo, Japan, in 2000, 2002, and 2005, respectively. From 2005-2010, he worked with the Lightwave Devices Project of the New-Generation Network Research Center, National Institute of Information and Communications Technology (NICT), Koganei, Tokyo, Japan, where he engaged with Lithium Niobate electrooptic devices and their applications to optical communication. From 2010-2011, he joined the Faculty of Engineering, Shizuoka University, Hamamatsu, Shizuoka, Japan, where he served as a Postdoctoral Fellow for CREST Project of Japan Science and Technology Agency, and he was involved in the development of a cathodoluminescent thin film for electron-beam-assisted high-resolution optical imaging. From 2011 he has been with Gunma University, Kiryu, Gunma, Japan, and now he serves as an associate professor in the Division of Electronics and Informatics, Faculty of Science and Technology of the University. In 2018 he was also a visiting scholar at the Department of Electrical and Computer Engineering, Henry Samueli School of Engineering and Applied Science, University of California, Los Angeles. His current research interests include the field of applied optics, fiber optics, and RF photonics, utilizing modulation and demodulations for optical communication, measurement, and RF signal processing. Dr. Chiba is a member of Optica (formerly the Optical Society (OSA)),

IEEE Photonics Society (IEEE-PS), the Japan Society of Applied Physics (JSAP), the optical society of Japan (OSJ), and the Institute of Electronics, Information, and Communication Engineering of Japan (IEICE).



Mr. Atsushi Motozawa

Renesas Electronics Corp., Japan

Time:	14:20-14:40, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

An Attachable Fractional Divider Transforming an Integer-N PLL Into a Fractional-N PLL with SSC Capability

Abstract: PLLs are utilized in SoCs for automotive industry. In the industry, the system handles with satellite signals which are weak radio waves coming from space. Therefore, the output frequency of PLLs is carefully designed to avoid EMI. Recently, Global Navigation Satellite System (GNSS) is becoming more common and available frequency bands for clocks are getting narrow. That leads, in many products, replacement integer-N PLLs with fractional-N PLLs is needed to obtain smaller output frequency steps than reference frequency. The attachable fractional divider introduced in this talk transforms an integer-N PLL into a fractional-N PLL with only 0.35 psrms of integrated RMS jitter degradation.

Bio: Atsushi Motozawa received B.S. and M.S. degrees in electrical engineering from Gunma University, Gunma, Japan, in 2006 and 2008, respectively. He joined Renesas Technology Corp., Takasaki, Japan, in 2008, where he was engaged in development of an RX analog front end for NFC LSIs. From 2010 to 2014, he was with Renesas Electronics Corp., Kawasaki, Japan, where he was engaged in designing sensors and a low power BGR for industrial ICs, and PLLs for automotive ICs. From 2014, he was with Renesas System Design, Co., Ltd. Since 2017, he has been with Renesas Electronics Corp., Kodaira, Japan. He is engaged in designing PLLs for SoCs.

Prof. Hao San

Tokyo City University, Japan

Time:	14:40-15:00, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Low-supply-voltage High-linearity ADC with Dynamic Analog Components

Abstract: This paper presents high-linearity analog-to-digital converter (ADC) techniques with dynamic analog components at supply voltages below 1V. To reduce the complexity of the circuit configuration and minimize the active area of multi-bit ADC for high-resolution, the cyclic ADC consist of a simple analog conversion stage and backend logic circuits is applied. The 1bit/step conversion method is utilized, where each conversion step employs the same conversion stage circuit for analog signal processing, resulting in minimal parameter variation between steps. A non-binary method is also proposed for cyclic ADC, which utilizes the redundancy of non-binary AD conversion to tolerate the analog errors caused by circuit element mismatch and non-ideal characteristics of the amplifier and/or comparator in the analog conversion stage, and thus guarantee the linearity of ADC. The body-voltage-control technique is utilized to decrease the threshold voltage of SOTB CMOS, thereby facilitating the low-voltage operation of the ADC circuit. Dynamic analog components such as amplifiers and comparators are utilized for low-voltage operation, while circuit techniques are developed to improve the DC gain and bandwidth of the amplifier. These improvements further enhance the linearity and speed of the ADC at low-supply-voltage. The experimental results of the proposed non-binary cyclic ADCs show that 14-bit linearity can be achieved at Vdd = 0.9V, demonstrating the feasibility and effectiveness of the proposed circuit techniques for high-linearity ADCs at supply voltages below 1V.

Bio: Hao San received M.S. and Dr. Eng. degrees in electronic engineering from Gunma University, Japan, in 2000 and 2004, respectively. From 2000 to 2001, he worked with Kawasaki Microelectronics, Inc. He joined Gunma University as an assistant professor in the Department of Electronic Engineering in 2004. In 2009, he joined Tokyo City University, and is presently a professor in Department of Electrical, Electronics and Communication Engineering there. His research interests include analog and mixed-signal integrated circuits. Dr. San has been an Associate Editor of IEICE Transactions on Electronics from 2010 to 2016. He was the treasurer of the IEEE Circuits and Systems Society Japan Chapter from 2011 to 2012. He is a member of the IEEE, IEICE and IEEJ.

Dr. Hitoshi Aoki

Rohm Semiconductor, Japan

Time:	15:00-15:20, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

A Unified Model of MIS and Ridge HEMTs for Fast and High-Power Switching Applications

Abstract: A verilog-A based compact model of AlN/GaN based MIS (Metal Insulator Semiconductor) -HEMT (High Electron Mobility Transistor)s and ridge (Gate Injection Transistor) HEMTs has been developed for embedded-source-field-plate (ESFP) structures. Characteristic differences in these two structures are theoretically and experimentally analyzed with measurements of fabricated devices. For ridge HEMTs, hole injection current and leakage current are focused on, whereas the MIS-HEMTs use a MOSFET gate modeling approach. Also, the parasitic transistor model caused by the ESFP is developed. For high frequency operations, S-parameter characterizations with G-S-G pads structures for both types of HEMTs are fabricated. Because the simulation results show good agreements with the measurements, one model can be applied to both MIS and ridge HEMTs to design switching power supply circuits.

Bio: Dr. Hitoshi Aoki is a technical adviser at Rohm Co. ltd. He had been a professor at Teikyo Heisei University and Gunma University in Japan. He has over 35 years of device modeling experience in electronic industries. Prior to his carrier with Universities, Dr. Aoki founded a modeling company, MoDeCH Inc. in 2002, where he is now an Executive Advisor Consultant. Previously, he had been working at some leading companies of electronics in both the U.S.A. and Japan including the ULSI Research Laboratory of Hewlett-Packard Laboratories U.S.A, Agilent Technology, and Hewlett-Packard Japan. He authored and coauthored two books related to compact modeling and more than 130 technical papers. Dr. Aoki is a senior member of IEEE.

Dr. Kunio Koseki

National Institute of Advanced Industrial Science and Technology, Japan

Time:	15:20-15:40, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Recent Progress in High-Voltage SiC Devices and its Application Development

Abstract: The development of high-voltage power devices using silicon carbide, a next-generation semiconductor material, is progressing. Devices with a rated voltage of up to 3.3 kV have been put into practical use. In recent years, the development of devices with higher withstand voltages up to 13 kV have been developed at the laboratory. In addition, evaluation of the conduction and the switching characteristics have been carried out. Applications development such as inverter circuits have also been studied. In the presentation, we report on the development status of these high-voltage SiC devices and its application.

Bio: Kunio Koseki received the B.S. and M.S. degrees in physics from the University of Tsukuba, Tsukuba, Japan, in 1998 and 2000, respectively, and the Ph.D. degree in engineering from the Graduate University for Advanced Studies, Hayama, Japan, in 2005.

He was working for the research and development of various power supplies with the High Energy Accelerator Research Organization for accelerators and particle physics experiments from 2005 to 2015.

In 2015, he joined the Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan, as a Senior Research Scientist. His current research interests include various power systems with high-voltage SiC power devices.

Prof. Qize Zhong
Shanghai University, China

Time:	13:30-13:50, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Applications of Metasurfaces for on-chip Couplers

Abstract: Monolithically integrating light sources on the silicon photonics platform is challenging, and therefore, efficient coupling of external sources into photonic devices is becoming desirable. Edge couplers and grating couplers are the two primary techniques for implementing optical coupling to in-plane photonic devices. At the conference, the speaker will present research that combines metasurfaces to propose compact edge couplers with large-mode cleaved fibers and grating couplers directly integrated with VCSELs. The study focuses on an operating wavelength of 2 μm.

Bio: Qize Zhong received his B.S. and Ph.D degrees from Huazhong University of Science of Technology, Wuhan, China in 2011 and 2016, respectively. He joined as a scientist in Temasek Laboratories at Nanyang Technological University, Singapore in 2015, where he was engaged in the research of optoelectronics devices and systems. In 2017, he joined Institute of Microelectronics (IME), A*star as a scientist, where he was mainly engaged in the development of flat optics and advanced semiconductor processes. He worked as a core member of the AOP team to develop the first 12-inch manufacturing process platform for the mass production of metasurface. This achievement has attracted the attention of top universities in European and American countries, also including several internationally renowned high-tech companies. Since 2021, he has been with School of Microelectronics, Shanghai University as a professor. Dr. Zhong has published over 60 peer-reviewed journal and conference papers in Metasurface, Silicon Photonics and Energy-Harvester fields. Some of these papers were published in Energy & Environmental Science, Advanced Materials, Advanced Functional Materials, ACS Nano, and Nano Energy, Nanophotonics, OFC, CLEO etc. Google scholar shows his citations are over 3000 and H-index is 27. Parts of his researching works have been reported by Nature Nanotechnology, Scientific American, Chemical & Engineering, News, Nano Werk as highlights. Now his interests include Wearable Optoelectronics and Photonics Devices (e.g. Silicon Photonics, Flat Lens).

Prof. Jingjing Zhang

Southeast University, China

Time:	13:50-14:10, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Active and Reconfigurable Spoof Plasmonic Devices for Interchip Communications

Abstract: Surface plasmon polaritons (SPPs) can confine electromagnetic fields in a deep subwavelength volume, resulting in numerous applications at optical frequencies. Transplanting the concept of SPPs from optical to RF/microwave frequencies based on the metamaterial technology enables new applications in inter-chip communications. Such designer (or spoof) plasmonic interconnects embrace the advantages of both electrical and optical ones as they can be made ultra-small and at the same time operate at an ultra-fast speed. The unique feature of spoof surface plasmons that the dispersion property can be engineered by the geometrical parameters of the structure offers great flexibility in the device design. However, in some complicated application scenarios, passive devices can no longer meet the requirements such as dynamic tuning of the device functions or multi-frequency operations. Further development of the spoof plasmonic concept to circuit applications requires the design of active, reconfigurable, and nonlinear devices for the efficient generation and guidance, dynamic modulation, and amplification of spoof surface plasmonic signals in an ultra-compact platform.

Here, we report our recent work on active and reconfigurable spoof plasmonic devices. By incorporating active elements or materials in the spoof plasmonic structure, such as varactor diodes, active chips, graphene, etc, the dispersion properties of the structure can be dynamically manipulated, giving rise to various peculiar properties. We have demonstrated experimentally a nonlinear spoof plasmonic metawaveguide, which can realize the distinct tunability from the forward to backward phase matching, allowing for switchable forward and backward second harmonic generations in the same frequency band with high conversion efficiencies. This flexibility in designing the dispersion relation also allows us to achieve parametric amplification of spoof surface plasmon signals. Up to day, the direct amplification of spoof SPPs without phase distortion still remains difficult. We tackle such a challenge by proposing a reconfigurable plasmonic parametric amplifier which can achieve a high signal gain within a short distance. Moreover, our experimental measurement confirms that the plasmonic parametric amplifier has a stable phase response and negligible signal distortion, irrespective of the operating frequencies. Based on the parametric amplification technique, we further demonstrated magnetic-free spoof surface plasmonic isolator and circulator, which not only inherit the advantages of conformal spoof surface plasmons including compactness, high integration, and low cost, but also has remarkable isolating performance in suppressing the transmission of backward-propagating noise. Our work has opened up the possibility for the applications of spoof plasmonic devices in future development of high data rate communication systems.

Bio: Jingjing Zhang received her Ph.D degree from Zhejiang University, China in 2009. She has been an H. C. Ørsted Postdoctoral Fellow and assistant professor at Technical University of Denmark, Denmark, a Newton International Fellow at King's College London, UK, and a senior research fellow at Nanyang Technological University, Singapore. Currently, she is a professor at State Key Laboratory of Millimeter Waves, Southeast University, China. Her research interests include metamaterials, nanoplasmonics, and designer surface plasmons.

Prof. Yuan Dong

Shanghai University, China

Time:	14:10-14:30, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Recent Progress in Wafer-level Thin-film Lithium Niobate Photonics

Abstract: Thin-film lithium niobite (TFLN) has been considered as a promising platform for integrated photonic devices, e.g. high performance electro-optical modulators. In this talk, the progress in TFLN photonic devices fabricated in wafer-scale is reviewed. In addition, a recent demonstration of TFLN passive devices fabricated on 8-inch Si substrates in a commercial semiconductor foundry is reported. A waveguide propagation loss of 0.47±0.09 dB/cm is achieved at 1550 nm wavelength.

Bio: DONG Yuan is currently a professor at the School of Microelectronics, Shanghai University. He received a PhD degree from the National University of Singapore, where he continued to work as a postdoctoral research fellow. After that, he joined the Institute of Microelectronics (IME, A*STAR) as a Scientist. His research interests include integrated photonics, metasurface-based flat optics, CMOS fabrication process etc. He has authored or co-authored more than 70 papers in the peer-reviewed journals and international conferences.

Assoc. Prof. Yu Luo

Nanyang Technological University, Singapore

Time:	14:30-14:50, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Quantum Metamaterials for Subwavelength Control of Light

Abstract: Metamaterials and transformation optics provide a new toolset to control the flow of light. Transformation optics establishes a general methodology and design tool for manipulating electromagnetic waves in a prescribed manner on both macroscopic and subwavelength scale, while metamaterials and metasurfaces provide a platform for the practical implementation of these ideas. This talk will cover 3 topics: 1) a general approach to design metamaterial and metasurface devices for subwavelength control of light; 2) a highly efficient quantum model to harness quantum effects in mesoscopic plasmonic systems; 3) active, tunable and nonlinear metasurfaces for imaging and sensing applications.

Bio: Dr Yu Luo is an associate professor in the School of Electrical and Electronic Engineering at Nanyang Technological University (NTU). He received his Ph.D in Physics from Imperial College London in 2012 and joined NTU as an assistant professor in 2015, where he was promoted to an associate professor in 2021. Prof. Luo's research interests focus on the design of metamaterials and plasmonics from fundamental aspects to various practical applications. His recent work has results in a number of high-impact journal publications in Science, Nature Physics, PNAS and PRL and has been highlighted by many scientific magazines and public media, including Nature Photonics, Nature Physics, Physics World, Phys.org, BBC News, Guardian, etc.

Assoc. Prof. Shaonan Zheng

Shanghai University, China

Time:	14:50-15:10, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Computational Microspectrometer Based on Metasurfaces with Diverse Spectral Responses

Abstract: A computational microspectrometer is proposed to resolve the trade-off between resolution and bandwidth in methods based on dispersive components or narrow-band filters. The filters here present diverse spectral responses and are used to sample the input spectrum. The spectrum is reconstructed using a reconstruction algorithm. The filters are based on metasurfaces combing with multilayer thin films to generate spectral response with low correlation. Compressive sensing is applied to reconstruct the input spectrum. The proposed method shows 2-nm resolution over 401 to 600 nm spectral range. To further improve the spectral diversity of the filters, free-form metasurafaces are proposed and designed with a binary-image generation method.

Bio: Shaonan Zheng received the Ph.D. degree from Nanyang Technological University, Singapore in 2019 and received the B.S. degree from Xi'an Jiaotong University, China in 2014. She worked as a research scientist in Institute of Microelectronics, Singapore from 2019 to 2021, focusing on MIR photonics devices and sensors. She is currently an associate professor at School of Microelectronics, Shanghai University. Her work focuses mainly on micro-nano optoelectronic devices, integrated photonics and mid-infrared photonic devices. She authored and coauthored papers in related research fields published in Nature Communications, Photonics Research, IEEE Photonics Journal, etc. She was selected into the Shanghai Overseas High-level Talent Introduction Program in 2021.

Asst. Prof. Yu-Cheng Chen

Nanyang Technological University, Singapore

Time:	15:10-15:30, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Transforming Tiny Lasers into Cellular-Scale Sensors and Healthcare Devices

Abstract: Have you imagined of carrying a laser in your cell or body? Lasers are ubiquitous in our daily lives from industry, communication to medicine. The scale of lasers has also shrunk down to micron and nanoscales. As the scale of laser become smaller, the functions of lasers have also been redefined by transforming living biologicals into micro- and nanoscale lasers, so called living lasers. Such tiny lasers could therefore be used to detect or monitor critical chemical or physical signals in living cells or human body with distinctive sensitivity and intensity. In this talk, I will introduce the recent development of biological lasers and showcase how this interdisciplinary technology bridges laser physics and biology to tackle biomedical problems. In the first part, the talk will be focused on its application in detecting cancer and neurological diseases. In the second part, I will introduce how tiny lasers can be transformed with intelligent functions for information encoding and healthcare. This will cover applications including sensing at multiscale of biology, imaging in tissues, tracking and monitoring, as well as biomedical devices. Finally, discussion and outlook will be made on the strategies to pioneer novel on-chip and wearable laser devices for future medical diagnosis and bio-intelligent technology.

Bio: Dr. Yu-Cheng Chen received M.S in Optoelectronics from National Taiwan University in 2012. From 2012-2015, he worked as a research associate at the Molecular Imaging Center at NTU Hospital, Taipei. He then received a PhD degree in Biomedical Engineering from the University of Michigan, Ann Arbor in 2017 and became the first student to accomplish PhD degree within two years in the school history. Later he joined Nanyang Technological University, Singapore upon receiving the prestigious Nanyang Assistant Professorship Award in 2018, being as one of the youngest faculty in the college. His research focused mainly on the development of novel bio-lasers, from molecular, cellular, to tissue level for next generation biomedical applications. Since 2012 he has already published more than 60 top journals and proceedings, including Nature Biomedical Engineering, ACS Nano, Advanced Science, Optica. His research was reported by more than 200 media and news worldwide, including "Nature Reviews", “The New Scientists”, “RSC-Chemistry World”, “Daily Mail”, “BioOptics World”, “Phys.Org.”, etc. Being as the pioneer in the field of Biolasers, he has achieved several breakthroughs, including several types of biolasers at the tissue level, which pointed out future direction using lasing emission for on-chip disease diagnosis and cancer detection. He invented the first laser-emission microscopy, a novel imaging modality that can be widely applied to bio-devices, cancer immunodiagnostics, and neuro-analysis. These breakthroughs represent a critical milestone to implement biolasers in biomedical imaging, which opens a door to a plethora of applications in translation research of laser-emission microscopy, precision medicine and fundamental biology. Currently, he is a Nanyang Assistant Professor at NTU in Singapore. He is affiliated with EEE/SCBE.

Prof. Chen Yu-Cheng is currently a Nanyang Assistant Professor at School of EEE and CCEB. He received a Ph.D degree in Biomedical Engineering from the University of Michigan, Ann Arbor, being as the first student to receive PhD degree in 2 years throughout the school’s history. He is the leading pioneer in the field of biological laser sensors, where his group focuses on the development of novel tiny lasers with programmable and intelligent functions for on-chip disease diagnosis, neural analysis, and healthcare applications. He is the recipient of MIT Under 35 Innovators Award (2021), Thought Leaders by AZO Technology (2022), and Winner

of Young Faculty Research Award in CoE, NTU (2022). Since he joined NTU, his pioneer research has been reported by more than 300 news outlets worldwide.

Dr. Guozhen Liang

KLA-Tencor (Singapore) Pte Ltd, Singapore

Time:	15:30-15:50, May 6, 2023	**Onsite Room:**	SR904
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Robust Miniature Efficient Phase Modulators in the Visible

Abstract: Optical phase modulators are essential to large-scale integrated photonic systems at visible wavelengths and are promising for many emerging applications. However, current technologies require large device footprints and either high power consumption or high drive voltages, limiting the number of active elements in a visible-spectrum integrated photonic circuit. Here, we demonstrate visible-spectrum silicon nitride thermo-optic phase modulators based on adiabatic micro-ring resonators that offer at least a one-order-of-magnitude reduction in both the device footprint and power consumption compared with waveguide phase modulators. Designed to operate in the strongly over-coupled regime, the micro-resonators provide 1.6π phase modulation with minimal amplitude variations, corresponding to modulation losses as small as 0.61 dB. By delocalizing the resonant mode, the adiabatic micro-rings exhibit improved robustness against fabrication variations: compared with regular micro-rings, less than one-third of the power is needed to thermo-optically align the resonances of the adiabatic micro-rings across the chip to the laser frequency.

Bio: Guozhen Liang received his B.S. and Ph.D degrees from University of Science and Technology of China (USTC) in 2010 and Nanyang Technological University (NTU) in 2015, respectively. He was a Postdoc Research Fellow in NTU from 2015 to 2017. After that, he worked in Columbia University (New York) as a Postdoc Research Scientist until end of 2019. Since then, he has been with the CTO department of KLA Corporation (Singapore). He has published over 20 peer-reviewed journal papers, 1 book chapter, and 4 U.S. patents in the fields of Quantum Cascade Lasers, Metasurface, and Silicon Photonics. Some of his papers were published in Nature Photonics, Materials Today, ACS photonics, etc. And, some of his research works were highlighted by Nature Photonics, Laser Focus World, EurekAlert!, Photonics media, etc.

Prof. Zhongliang Zhao

Beihang University, China

Time:	13:30-13:50, May 6, 2023	**Onsite Room:**	N/A
Zoom ID:	883 4887 4889	**Zoom Link:**	https://us02web.zoom.us/j/88348874889

Space-air-ground Integrated Information Network for Transportation Infrastructure Operation and Maintenance

Abstract: This talk will cover the latest development of space-air-ground integrated information network, and its possible applications to operate and maintain transportation infrastructures in an efficient way. We will present the comprehensive challenges and requirements of transportation infrastructure applications, benefits of space-air-ground integrated network and how it can be applied to improve the efficiency of transportation infrastructures maintenance.

Bio: Zhongliang Zhao is a Professor at Beihang University (BUAA), China. He got his Ph.D. degree in Computer Science from the University of Bern, Switzerland in 2014. His current research interests include machine learning, ad-hoc networks, intelligent unmanned system, and space-terrestrial integrated networks.

Assoc. Prof. Yongcai Wang

Renmin University of China, China

Time:	13:50-14:10, May 6, 2023	**Onsite Room:**	N/A
Zoom ID:	883 4887 4889	**Zoom Link:**	https://us02web.zoom.us/j/88348874889

Theory and Algorithms for Relative Location Estimation in UAV Networks

Abstract: Relative localization plays a critical role in UAV network formation control and other applications. Regarding the different types of sensors equipped on the UAVs, UAV relative localization can be carried out by UWB-based, Range-Only Relative Localization (RORL) or by Vision-UWB cooperated, 6-DOF Relative State Estimation (VRSE). Because the UAV network is generally sparse, localizability problem and accurate localization algorithms are both important. In this talk, I will introduce our recent research progress on the localizability theories and relative localization algorithms for both RORL and VRSE problems. In RORL problem, we present efficient algorithm to detect the localizable components in sparse UAV networks and efficient component-stitching based algorithm for RORL. In VRSE, we present the relative state estimation model and efficient localization algorithm.

Bio: Yongcai Wang received his BS and PhD degrees from department of automation sciences and engineering, Tsinghua University in 2001 and 2006 respectively. He worked as associated researcher at NEC Labs. China from 2007-2009. He was a research scientist in Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University from 2009-2015. He was a visiting scholar at Cornell University in 2015. He is currently an associate professor at Department of Computer Sciences, Renmin University of China. He has published more than 80 papers on famous international conferences and journals, including TMC, TON, JSAC, Infocom, TCS etc. He won the First Prize of Technical Invention of China Navigation Society in 2021. His research interests include network localization, network algorithms, cooperative localization and mapping algorithms.

Prof. Zheng Dong

Shandong University, China

Time:	14:10-14:30, May 6, 2023	**Onsite Room:**	N/A
Zoom ID:	883 4887 4889	**Zoom Link:**	https://us02web.zoom.us/j/88348874889

A RIS Aided User Localization Design in Wireless Communication Systems

Abstract: Target localization can be applied to many fields such as intelligent transportation and navigation. In recent years, re-configurable intelligent surface (RIS) which can redirect the user's signal to the base station (BS), increase the communication link between the user and BS, and realize signal enhancement, has received increasing research attention for its unique merits. In this report, towards addressing the problem of target localization in RIS-assisted wireless communication systems, we propose a localization scheme design based on orthogonal projection methods. By performing two orthogonal projections and applying the classical MUSIC algorithm, the direction of arrival (DoA) of two communication links can be estimated simultaneously, so as to obtain the localization results in one time slot.

Bio: Zheng Dong (M' 18) received the B.Sc. and M.Eng. degrees from the School of Information Science and Engineering, Shandong University, Jinan, China, in 2009 and 2012, respectively, and the Ph.D. degree from the Department of Electrical and Computer Engineering, McMaster University, Canada, in 2016. He was a Postdoc Research Fellow in the School of Electrical and Information Engineering, The University of Sydney, Australia. He is currently a Research Professor in the School of Information Science and Engineering, Shandong University, China. His research interests include the Industrial Internet of Things and ultra-reliable low-latency communications.

Assoc. Prof. Baoding Zhou

Shenzhen University, China

Time:	14:30-14:50, May 6, 2023	**Onsite Room:**	N/A
Zoom ID:	883 4887 4889	**Zoom Link:**	https://us02web.zoom.us/j/88348874889

Indoor Localization Based on Wi-Fi RTT and MEMS-IMU

Abstract:

Bio: Baoding Zhou is an Associate Professor in in College of Civil and Transportation Engineering of Shenzhen University, China. He received his Ph.D degree in Photogrammetry and Remote Sensing from Wuhan University. His research interests include indoor localization, indoor mapping, crowdsensing, and robot navigation. He has published more than 60 academic papers and authorized more than 20 patents. He serves as an Associate Editor for the IEEE Sensors Journal and co-chairs of multiple international conferences. He has won the first prize of Science and Technology Progress Award in Surveying and Mapping of China and first prize of Guangdong Provincial Technology Invention Award.

Prof. Michel Barbeau

Carleton University, Canada

Time:	16:10-16:30, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Confidential Underwater Communications Using Quantum Permutation Pad in Counter Mode

Abstract: Due to small packet sizes, classical data protection schemes are unsuitable for underwater communications. To solve this problem, we leverage the flexible Quantum Permutation Pad (QPP) symmetric key block cipher. To adapt QPP to the short underwater protocol data units, we combine it with the block cipher counter mode and a random number generator seeded with a shared secret. We introduce an encryption and decryption algorithm pair building on QPP in counter mode. The scheme achieves perfect indistinguishability, a very strong security property. However, it requires storing a very large number of secret permutations. We relax this requirement and introduce another encryption and decryption algorithm pair building on QPP in pseudo-counter mode, which does not achieve perfect indistinguishability but has a very low collision probability. The schemes are generic and adaptable. We develop specific schemes for two underwater protocols, JANUS and UWSPR. We also discuss key sizes and key generation with the challenges specific to the underwater environment.

Bio: Dr. Barbeau received both his Master's and Ph.D. from Universite de Montreal. He then returned to Universite de Sherbrooke, where he had completed his undergraduate degree in Computer Science in 1985, to join the faculty as a professor. Teaching at Universite de Sherbrooke from 1991 to 1999, Dr. Barbeau spent his last academic year as a visiting researcher at the University of Aizu, Japan. He joined the School of Computer Science at Carleton University in 2000.

Dr. Randy Kuang

Co-Founder and Chief Scientist Quantropi Inc., Ottawa, Canada

Time:	16:30-16:50, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Generalized Uncertainty Principles for Quantum Cryptography

Abstract: We know the classical public cryptographic algorithms are based on certain NP-hard problems such as the integer factoring in RSA and the discrete logarithm in Diffie-Hellman. They are going to be vulnerable with fault-tolerant quantum computers. We also know that the uncertainty principle for quantum bits or qubits such as quantum key distribution or QKD based on the quantum uncertainty principle offers the information theoretical security. The interesting implication with the paradigm shifts from classical computing to quantum computing is that the NP-hardness used for classical cryptography may shift to the uncertainty principles for quantum cryptography including quantum symmetric encryption, post-quantum cryptography, as well as quantum encryption in phase space for coherent optical communications. This paper would like to explore those so-called generalized uncertainty principles and explain what their implications are for quantum security. We identified three generalized uncertainty principles offering quantum security: non-commutability between permutation gates, non-commutability between the displacement and phase shift operators for coherent states, and the modular Diophantine Equation Problem in general linear algebra for post-quantum cryptography.

Bio: Randy holds a doctorate in quantum physics. His research findings have been published in top international journals and named “Kuang’s semi-classical formalism” by NASA in 2012. With a career spanning IT, including with Nortel as senior network researcher & developer, he co-founded inBay Technologies in 2009, serving as CTO of the cybersecurity platform and co-founded Quantropi Inc.in 2018, serving as Chief Scientist. As the first recipient of a patent for two-level authentication (2011), Randy is a prolific inventor, with 30+ U.S. patents in broad technology fields, such as WiMAX, optical networks, multi-factor identity authentication, quantum cryptography, and post-quantum cryptography.

As the founding root of Quantropi, Randy proposed the universal quantum safe cryptography using Quantum Permutation Pad or QPP applied to both classical computing and quantum computing systems. The typical classical implementation has been achieved digital Quantum Key distribution over internet benchmarked by Deutsche Telekom. By randomizing and derandomizing the reference phase space of coherent communications, Randy invented coherent-based CTF-QKD and further extends it for quantum secure QXD for infrastructure. He recently invented new quantum safe public key cryptographic algorithms for key exchange and digital signature.

Dr. Marc Geitz

Deutsche Telekom, Germany

Time:	16:50-17:10, May 6, 2023	**Onsite Room:**	SR903
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Quantum (Secure) Communication at DT

Abstract: Telecommunication providers, being major disseminators of quantum secure communication technologies, closely observe the technology development of Quantum Key Distribution, Post-Quantum Cryptography and Physical Layer Encoding. This talk gives an overview about quantum secure technology from the customer's point of view and presents technology demonstrators set up by T-Labs, the applied research and development organization of Deutsche Telekom, to obtain hands-on experience.

Bio: RWTH Aachen and received his PhD at the University of Hamburg in 1999 after working several years at CERN and DESY. In 2001 he joined Deutsche Telekom AG and worked in the area of mobile communications, enterprise IT, cloud and network infrastructure. He has more than 15 years of experience in the telecommunication industry with international background and strong focus on business solutions. Ramping up a QKD demonstrator in 2018 and building a QKD testbed from 2019 to 2022 raised his interest in quantum technology and its appliances on telecommunication's industry. The application of quantum computers for solving industry optimization and machine learning use cases has added to this interest. Currently he participates in the QR.X research program to build a quantum repeater.

At Telekom Innovation Laboratories (T-Labs), the passion for innovation and technology drives 300+ international experts and scientists to work together on e.g. blockchain technology, smart city concepts, artificial intelligence and new media experiences. T-Labs is the R&D unit of Deutsche Telekom and is in a close partnership with the Technische Universität Berlin. At its sites in Berlin, Darmstadt, Beer Sheva, Budapest and Vienna, T-Labs sits amongst a world-class host of universities, startups, investors, research institutes and corporate innovation hubs to jointly shape the future of communication services.

Dr. Wolfgang Rohde

Managing Director Innovation, Strategy & Research Siemens, USA

Time:	10:00-10:20, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Quantum-secure Autonomous Factories Based on Hybrid TLS - The Business Case for Investing in Post Quantum Security Now

Abstract: The global IT infrastructure is made of approximately 13.15 billion IoT devices connected to each other in multiple ways. Give or take a few million. Imaging to make all devices post-quantum secure. An almost impossible task for the next decades. Therefore, it is vital to understand how the IT infrastructure is designed and identify potential critical vulnerabilities.

The single most important success factor to enable today's PKI to be ready for post-quantum security is the ease of rolling out quantum-ready infrastructure. The proposed approach of a hybrid TLS infrastructure provides promise because almost no hardware needs to be touched at critical security injunctions to upgrade.

This presentation provides an overview and some key insights into the supply chain world, the backbone of today's civilization. The technical aspects will be presented in the talk Quantum-secure Autonomous Factories: Hybrid TLS 1.3 for Inter- and Intra-Plant Communication .

Bio: Wolfgang is currently heading the Siemens research group centered around supply chain management since 2015. Previously, he held positions with IBM and Ciber Global. Wolfgang supported C-level management in advancing enterprise strategies for service-oriented architectures and Cloud transformation. He received his doctorate degree in Nuclear Physics from Johannes Gutenberg University, Mainz, Germany. Since heading the Siemens research group, he has focused mainly on bringing new innovations to industries by maximizing resiliency and sustainability through planning and managing of manufacturing and logistics. His mantra is based on the trinity of seamless integration, grassroots democratization, and relentless security.

Mr. Alain Chance

Founder & CEO Alainquant LLC, USA

Time:	10:20-10:40, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Quantum Permutation Pad with Qiskit Runtime

Abstract: We demonstrate an efficient implementation of the Kuang and Barbeau's Quantum Permutation pad (QPP) symmetric cryptographic algorithm with Qiskit Runtime, a new architecture offered by IBM Quantum that streamlines quantum computations. We have implemented a Python class QPP and template Jupyter notebooks with Qiskit code for encrypting and decrypting with n-qubit QPP any text file in UTF-16 format or any image file in .png format. We offer the option of running either a quantum circuit with n qubits, or an alternate one with 2n qubits which only uses swap gates and has a circuit depth of O(n). It is inherently extremely fast and could be run efficiently on currently available noisy quantum computers. Our implementation leverages the new Qiskit Sampler primitive in localized mode which dramatically improves performance. We offer a highly efficient classical implementation which performs permutation gate matrix multiplication with information state vectors. We illustrate the use with two agents Alice and Bob who exchange a text file and an image file using 2-qubit QPP and 4-qubit QPP.

Bio: Alain Chance is the Founder and CEO Quantalain SASU and Alainquant LLC, business management consulting startups which offer consulting and training services in the field of quantum computing. He is Co-founder and Chief Business Officer Molket, a startup which offers designing new smart solutions leveraging quantum technologies and quantum chemistry. He is co-author of a recently released book titled: "Quantum Chemistry and Computing for the Curious: Illustrated with Python and Qiskit® code". He is a speaker and he has given a talk "My Quantum Computing Journey + My book" at the Girls in quantum seminar on October 15, 2022. He is a Qiskit® Advocate and an IBM Certified Associate Developer - Quantum Computation using Qiskit®v0.2X since 2021. He has completed several quantum computing challenges since 2018. His registration to the IBM Quantum Awards: Open Science Prize 2022 has been confirmed. He has attended ID Quantique (IDQ)'s 11th Winter School Quantum Cybersecurity in the Real World in 2019. He is a member of the American Chemical Society (ACS), the IEEE group Cyber Security for Next Generation Connectivity Systems, IEEE Quantum Community, and La French Tech Paris-Saclay. He has over 30 years of experience in major enterprise transformation projects with a focus on data management and governance gained in major management consulting firms. He has a diploma Ingénieur civil des Mines from École des Mines de Saint-Étienne in France (1981).

Prof. Fei Gao

Zhejiang University, China

Time:	13:00-13:20, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Hidden Anti-Parity-Time symmetry in Hermitian Valley Photonic Crystals

Abstract: Non-Hermicity and topology are two powerful tools for manipulating light in different manners. Motivated by merging their light-manipulation capabilities, arising interests are attracted to combine non-Hermicity and topology in a single system and have brought fruitful results. Generally, such combinations share the same paradigm, i.e., establishing energy exchange channels between Hermitian photonic topological systems and the environment. Here, we reveal that anti-parity-time (APT) symmetry, i.e., a non-Hermitian mechanism, inherently exists in coupled topological valley waveguides resulted from opposite bulk Chern numbers, without using active/dissipative components. Two APT phases are observed during frequency-controlled spontaneous symmetry breaking, giving two exotic topological superstates. By further combining the two APT phases with topological robustness, we realize a photonic topological bi-functional device that functions as a delay line and an on-chip near-perfect absorber in different frequencies. These above are experimentally demonstrated on a silicon-on-insulator platform at telecommunication frequencies. Our results may open an avenue for unusual light manipulation and integrated device applications.

Prof. Ting Hu

Shanghai University, China

Time:	13:20-13:40, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Polarization-insensitive Optical Filters Based on Silicon-on-insulator Platform

Abstract: We report a polarization-insensitive optical filter (PIOF) based on silicon-on-insulator (SOI) platform using CMOS-compatible processes. The device features a polarization diversity-assisted optical filter, with connected bi-layer tapers and asymmetrically tapered directional couplers (ATDC) functioning as the polarization rotator-splitter (PRS) to manipulate light polarizations. Also, micro ring resonators (MRRs) and Bragg gratings are incorporated to serve as the filtering component working at C band. Experimental results show that the filtering spectra of the device are insensitive to both TE- and TM- polarization inputs.

Assoc. Prof. Qingming Chen

Sun Yat-sen University, China

Time:	13:40-14:00, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Electrically Tunable Optofluidic Lenses for In-plane Light Manipulation

Abstract: Optofluidics incorporates optics and microfluidics together to construct novel devices for microsystems, providing flexible reconfigurability and high compatibility. Among many novel devices, a prominent one is the in-plane optofluidic lens. It manipulates the light in the plane of the substrate, upon which the liquid sample is held. We will present electrically reconfigurable optofluidic lens with two air–liquid (silicone oil) interfaces actuated by dielectrophoretic (DEP) force. By applying an external filed, the DEP force deforms the air–liquid interfaces from biconcave to biconvex, tuning the focal length from -0.5 mm to infinite to +0.5 mm. Some asymmetric working states, such as concave–convex and plano-convex lenses, have also been demonstrated. To eliminate the aberration, we proposed to use two arrays of electrode strips to symmetrically control the two air/liquid interfaces by the dielectrophoretic effect. The strips work together to define the global shape of the lens interface and thus the focal length, whereas each strip regulates the local curvature of the interface to focus the paraxial and peripheral arrays on the same point. It is the first time that local curvature regulation is used to compensate for the aberration within one in-plane liquid lens.

Prof. Xiaohui Li

Shaanxi Normal University, China

Time:	14:00-14:20, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Sub-hundred Femtosecond Pulsed Fiber Laser Generations and Related Progress

Abstract: Fiber lasers have become the focus of current research in the field of laser due to their low pumping threshold power, high conversion efficiency, good heat dissipation, wide tunable range, high coupling efficiency (fully compatible with existing optical fiber communication systems and optical fiber sensing systems), and compact structure. The advantages and disadvantages of fiber lasers are mainly measured by their various properties including repetition frequency, pulse width and line width. In this report, how to further optimize the characteristics of the pulsed output beam and long-term working stability will be discussed, and the latest experimental progress will be reported. Through the regulation and suppression of intra-cavity dispersion and various nonlinear effects, the NPR-based 89 fs ultrashort pulse laser, the short-cavity high repetition rate laser with a repetition frequency of nearly 200 MHz, and a narrow linewidth laser with a spectral width smaller than 0.05 nm were realized.

Prof. Minmin Zhu

Fuzhou University, China

Time:	14:20-14:40, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Electro-optic Devices Based on Ferroelectric Thin Films

Abstract: High-performance electro-optics such as lithium niobate (LiNbO3) benefit modulators and switches in a variety of optoelectronic and photonic applications. Design of these electro-optic (EO) materials with tunable linear Pockels effect and reliable perovskite structure, however, remains a long-standing challenge for exploring multifunctional materials. Taking the typical ferroelectric thin films such as PZT and BaTiO3 as the example, we have systematically investigated the influences of crystal phase, growth orientation, and strain on their EO performances. Additionally, some optoelectronic devices are be demonstrated, as well as their temperature- and frequency-dependent characteristics. Our study gives an insight into the EO effects of transparent ferroelectric thin films beyond LiNbO3, making them of interest for high speed, low-driving-voltage, and power efficient photonic devices and multifunctional integrated circuits.

Asst. Prof. Qinghua Song

Tsinghua Shenzhen International Graduate School, China

Time:	14:40-15:00, May 7, 2023	**Onsite Room:**	SR901
Zoom ID:	839 7342 5289	**Zoom Link:**	https://us02web.zoom.us/j/83973425289

Topological Metasurfaces and Its Applications

Abstract: In this talk, we will present some recent progresses on the topological metasurfaces based on exceptional points (EPs) and bound states in the continuum (BICs). We introduce an additional degree of freedom to address optical phase engineering by exploiting the topological features of non-Hermitian matrices operating near their singular points. Choosing metasurface building blocks to encircle a singularity following an arbitrarily closed trajectory in parameter space, we engineered a topologically protected full 2pi-phase on a specific reflected polarization channel. Furthermore, we show that the topological features are also observed in optical forces within the vicinity of BIC, around which the force vectors wind in the momentum space. Finally, we demonstrate that arbitrary polarized BIC can be realized with a bilayer twisted metasurface. Our findings may open up new avenues for applications in structured light, quantum optics and twistronics for photons.

Bio: Qinghua Song is an assistant professor in Tsinghua Shenzhen International Graduate School, Tsinghua University since 2021. He received his B.Sc. and Ph.D. degrees from Xi'an Jiaotong University and Université Paris-Est in 2013 and 2017, respectively. Later he worked as a postdoc in Nanyang Technological University in Singapore in 2017 and CNRS-CRHEA, France in 2019. His research interests include metasurfaces, photonic crystals, meta-hologram, etc. Dr. Song has published a number of high-impact papers as first/corresponding author in Science, Science Advances, Nature Communications, Light: Science & Applications, etc.

Assoc. Prof. Tadashi Itoh

Gunma University, Japan

Time:	13:00-13:20, May 7, 2023	**Onsite Room:**	SR902
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Principle and Application of Electrical Impedance Tomography

Abstract: It is well known that the electrical resistance R between cross sections of a columnar conductor of length d and cross-sectional area S can be expressed as R=ρd/S where the proportional constant ρ is the resistivity. Its reciprocal, σ=1/ρ, is called conductivity and expresses how readily electricity flows. Conductivity is a material constant that is independent of the shape and size of the conductor and varies with the type and state of the material (temperature, pressure, water content, etc.). Therefore, by measuring the conductivity, information about the type and state of the substance can be obtained.

Electrical Impedance Tomography (EIT) is a measurement technology in which a large number of electrodes are placed in contact with the surface of the object under measurement, weak currents are applied from the electrodes, and the distribution of electrical conductivity inside the object is estimated and imaged from the measured electrode potential data.

In this talk, the history and current status of EIT will be summarized with a focus on its application to medical imaging, followed by an explanation of its principle in the following order: formulation of the forward problem, finite element method for discretizing and treating continuously distributed potentials and currents in the object, electrode model as an interface to measurement, and algorithm for reconstructing conductivity distribution.

An application to the measurement of body fat distribution, which we are currently developing, will also be introduced.

Bio: Tadashi Ito was born in Tokyo, Japan in 1961. He received the degrees of B.Sc. and M.Sc. in Mathematical Engineering and Information Physics from the University of Tokyo, Tokyo, Japan in 1984 and 1986, respectively. From 1986 to 1990, he was employed at Yokogawa Electric Corp., Tokyo, Japan. From 1990 to 1995, he was a research associate at the University of Tokyo. He received the D. Eng. degree from the University of Tokyo in 1995. In 1995, he joined Gunma University as a lecturer in the Department of Electronic Engineering, and has been an associate professor from 2010. He has been engaged in research and development of various measurement systems such as electrical impedance tomography, application of image analysis, automation of visual inspection and self-localization for autonomous vehicle.

Dr. Nobuhiko Kikuchi
R&D Group, Hitachi Ltd., Japan

Time:	13:20-13:40, May 7, 2023	**Onsite Room:**	SR902
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Ultra-low Power Multi-Point Remote Sensing Technology Using Opticlal Fiber Power Supply for Sewage Systems

Abstract: Recent change of climate and growth of environmental awareness encourages the need for close control of sewage systems in metropolitan area, and its sensing and visualization becomes ever important to reduce the risk of its flooding, pollution, odor issues and so on. However, remote sensing of actual underground sewage systems faces many difficulties such as the lack of reliable communication and power feeding media, the risk of submergence, the generation of corrosive and explosive gasses, and so on. To over come it, we have developed an ultra low-power multi-point sensing system utilizing a single strand of optical fiber as power supply and communication media. It enables reliable and fast real-time monitoring and surveillance of various quantities in under-ground sewage systems utilizing diverse sensors and cameras, such as water-height, water quality, gas concentration, surface status of sewage water and its overflow. One of the key challenges of its realization is significant reduction of power consumption, since available power from the optical power supply is tightly limited to less than several milli-watts due to fiber loss, branch loss and power conversion efficiency. This paper will report its concept, circuit design for optical power supply and multi-point bidirectional communication, implementation of low-power sensors and camera, and their performances.

Bio: Nobuhiko Kikuchi received the B.E. and M.E. degrees in precision machinery engineering from Tokyo University, Japan, in 1988, 1990, and the D.E. degree in electrical engineering from Tokyo University, Japan, in 2010. In 1990, he joined Central Research Laboratory, Hitachi Ltd. where he has been working on the research and development of high-speed optical fiber communication covering multilevel coding and non-linear impairments, and low-power environmental sensing systems. His interests span from analogue and digital circuit design, digital signal processing, embedded MPU systems, and system integrations. He has published more than 100 patents and 50 international conference papers as the main author. Dr. Kikuchi is a member of the Institute of Electrical and Electronics Engineers, Inc. (IEEE), and Institute of Electronics, Information, and Communication Engineers (IEICE) of Japan.

Dr. Shiro Hara

National Institute of Advanced Industrial Science and Technology, Japan

Time:	13:40-14:00, May 7, 2023	**Onsite Room:**	SR902
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Minimal Fab Using Half-inch Wafers for Low-Volume Device Markets

Abstract: Minimal Fab which is a cleanroom-less compact device fabrication system using half-inch wafer and a localized clean wafer transfer system was developed. The investment costs of Minimal Fab are 1/100 at present and 1/1,000 in the future, compared to the cost of a conventional mega fab using 300 mm wafers. The production targets of Minimal Fab are device markets with wide-variety and low-volume. Another targets are research, development, and prototyping of devices. A prototyping fabrication speed of Minimal Fab is around 20 processes for 8 hours, which is one order faster than a mega fab. This is owing to almost zero waiting time before processes because of a single wafer transfer system, a fast wafer loading into a vacuum chamber within 15 seconds because of a very small air-lock chamber of ~ 1 cm3, full-automatic tool operation, and a small wafer size to decrease process times for scanning type processes, easy user maintenances for cartridge-type material sources and wastes, and a unified user operational interface for all the Minimal Fab tools, etc. This paper overviews the concept, features of Minimal Fab, and fabrication of devices.

Bio: Shiro Hara was born in Tokyo, Japan in 1961. He received his Ph.D in engineering from Waseda University in Japan. In 1989, he joined Waseda Univ. where he was an Assistant Professor. He was a special researcher, basic science program in Riken Institute since 1990. In 1993, he became a researcher of Electrotechnical Laboratory, MITI. He developed a localized clean research system to find elemental cause of variations of electronic device characteristics. In 2007, he proposed the Minimal Fab concept to reduce an investment cost of a semiconductor factory into 1/1000. He apply the localized clean technology to the minimal wafer transfer system. Using this transfer system as the core technology of the minimal fab, he has been developing the minimal fab with around 50 makers. During FY2012-2014, he promoted the national project on the development of Minimal Fab system as the project director. He is a Principal Research Scientist in AIST, METI. Also, he is the representative of Fab System Research Consortium of Minimal Fab Promoting Organization. In 2022, he established a company "Hundred Semiconductors, Inc." focusing only to Minimal Fab businesses and he is CTO of the company.

Assoc. Prof. Md. Kafiul Islam
Independent University, Bangladesh

Time:	14:20-14:40, May 7, 2023	**Onsite Room:**	SR902
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

Prospects and Challenges of an EOG-based Human Machine Interface (HMI) for Physically Challenged People

Abstract: EOG knows as Electrooculography is a technique for measuring the corneo-retinal standing potential that exists between the front and the back of the human eye. The existing EOG recording devices are expensive and raw data can't be accessed without purchasing licenses. In addition, they are not suitable for interfacing with machines. We plan to design and develop a portable EOG recording device by low-cost and interface it with an external machine to control it through EOG signals that will be converted to commands. Through this project, we hope that a physically challenged person who has difficulty in using traditional mouse cursor and keyboard or difficulty in controlling wheelchair or controlling any external machines/appliances, will be able to control the movement of mouse cursor/wheelchair/robotic arm using his/her eye movements and eye blinks. The proposed system is being designed, developed, and implemented at the lab of EEE Dept. of IUB with locally available resources and with relatively lower cost compared to the commercially available HMI systems.

The objectives of the proposed system are as follows:

- To be able to control the mouse cursor of a PC/Laptop by intentional eye blink and eye-ball movements (i.e. EOG signals) for people who are unable to use a traditional mouse.
- To be able to control the electric wheelchair by intentional eye blink and eye-ball movements (i.e. EOG signals) for people suffering from Quadriplegia or Quadriparesis.
- To be able to control any robotic arm by intentional eye blink and eye-ball movements (i.e. EOG signals) for physically challenged people (who lost their (functionality of) arms in accident or due to diseases).

The proposed system has been tested on subjects for controlling wheelchair and mouse cursor and achieved an acceptable accuracy, however, the challenges and limitations are also required to be addressed in the future work to make it an easy-to-use and with more degree of freedom.

Bio: Dr. Md Kafiul Islam has received his B.Sc. in EEE from Islamic University of Technology (IUT), Gazipur, Bangladesh in 2008 and completed his PhD from Dept. of ECE, NUS, Singapore in the area of Neural Signal Processing back in 2015. Currently he is serving as an Associate Professor and Course Coordinator in the Dept. of Electrical and Electronic Engineering of Independent University, Bangladesh. His research interests include biomedical instrumentation and signal processing, neural signal processing, brain-computer interface (BCI), etc. He is actively involved as a TPC member of several international conferences, and he reviews Journal articles frequently. He is also involved as a member of the Editorial Board of several journals. He is an Associate Editor of IEEE Access, Guest Associate Editor of Special issue in Frontiers in Computational Neuroscience. He has served as TPC Chair of ICAEE 2019, TPC Secretary of ICAEE 2017, Publication Chair of IEEE SPICSCON 2019, Track Co-Chair and Session Chair of IEEE TENSYMP 2020, Track Co-Chair of ICAICT 2020. He is a Senior Member of IEEE, IEEE EMBS and IEEE SPS Society. He is the Branch Counselor of IEEE IUB Student Branch since 2020 and won the Best branch counselor award from IEEE BD Section in 2020. He is an active Professional Volunteer of IEEE Bangladesh Section. He is a Publons/WoS Academy Mentor and winner

of Publons/WoS Top Reviewer in the Multidisciplinary area in 2017. He has published more than 50 (in total) peer reviewed journal articles, conference papers and book chapters with Google Scholar Citations of 1145+ and impact factor contribution of around 40+. Dr. Islam has won several best paper/presentation awards in IEEE conferences such as ICCIT 2018 at UIU, Dhaka, ICDPR 2020 at NTU, Singapore, ETCCE 2020 at UIU, Dhaka, ICCCAS 2022 in Singapore, and Best Abstract in IEEE CS BDS Summer Symposium 2022. His research has also been recognized by IUB during Employee Recognition Awards in 2020 where he has won Publication Excellence in all three categories: journal articles, conference proceedings and book chapters.

Prof. Upena Dalal

Sardar Vallabhbhai National Institute of Technology, Surat, India

Time:	14:40-15:00, May 7, 2023	**Onsite Room:**	SR902
Zoom ID:	832 5613 7923	**Zoom Link:**	https://us02web.zoom.us/j/83256137923

A Dual Phase Genetic Algorithm with Aggregated Search for Fast Initial Access in 5G Millimeter Wave Communication

Abstract: 5G Millimeter Wave (mmWave) Communication between the base station (BS) and the user equipment (UE) involves a Multiple-Input Multiple-Output (MIMO) system where both BS and UE have many antennas. Initial Access (IA) in this context is the problem of establishing a directional link between the BS and UE, but finding the optimal beams can be prohibitively expensive in terms of delay and computation. Genetic Algorithms (GAs) can solve complex problems effectively, and in this case, they can be used to iteratively search for the optimal beams. We propose a dual phase GA that splits the GA process into two successive phases that uses different operations in each phase. It also navigates the search space in a smart manner, increasing the convergence rate to the optimal beamformer per iteration. We have analyzed the effect of this approach in terms of Capacity achieved vs number of transmit and receive antennas at BS and UE, total transmitted power, and number of iterations. It shows improved performance in terms of maximum Capacity achieved, reduced power consumption, and especially reduced IA delay.

Bio: Dr Upena Dalal is Professor and Ex-Head, Department of Electronics Engineering, SVNIT, Surat. She started working as a teaching faculty since August 1991, and having teaching experience of 31 years and also, having research experience of 15+ years. Apart from this she handled many Institute level portfolios as Associate Dean (Faculty Welfare), Chairperson of Women Cell, Media-cell of the Institute and Dean Academic of IIIT Surat. Her area of expertise is in Communication Engineering, Wireless Communication and Networking, Wireless Systems and Networks, Fiber Optic Communication, Signal Processing etc. She has more than 200 publications in National and International reputed journals and conferences.

She organized 17 Conferences and Seminars till now. She edited Proceedings of National conference AWS2008—Excel Publications and IEEE International conference ET2ECN2012. She delivered nearly 60 Expert Lectures. She is a senior member of IEEE. She is the author of three books— 1. Wireless Communication, OUP (2009), 2. Wireless communication and Networks, OUP (2015), 3. Wireless and Mobile Communication, OUP with Dr Manoj Shukla (Co-author) (2017). One edited open access book WiMax New Developments, Inteh Publication, Vienna, Austria is on her name with more than 40000 downloads. She wrote 6 book chapters. She is honoured by 9 different national and international awards. She supervised 22 Ph D. She reviewed many thesis and is also reviewer of reputed journals. She did MoU with ISRO-Ahmedabad, Indian Navy, and TCS-Mumbai, and did lot of collaborative work on NaVIC- Indian navigation system with ISRO, collaborations with Keysight Technologies (for Wireless Systems Lab), Indian Railway (for employee training) and SCMxpert, USA (for development of Supply Chain system based on IoT). She developed course on Optical Communication under IITKGP pedagogy project.

Assoc. Prof. Mei Li
Chongqing University, China

Time:	15:00-15:20, May 7, 2023	**Onsite Room:**	SR902
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Design Approach for Broadband Antennas with Customized Tilted-Beam Based on Index-Modulated Patches

Abstract: With modern wireless communications systems developing toward 5G and beyond, there is an increasing demand on the control of the antenna beam behavior, such as, high-gain pencil-beam radiation to expand the communication distance, and specific tilted-beam radiation to cover the required local service area. The conventional method to accomplish this task is to utilize antenna arrays in the types of parallel- or series-fed arrays. Nevertheless, since extra feeding network would inevitably increase the antenna design complicity, overall dimensions, and insertion losses. It is therefore highly desired to developed new antenna types and design methods to fulfill this task without relying on any complex feeding networks. In this talk, we will introduce design methods to conveniently and efficiently control the beam behavior by using index-modulated patches.

Bio: Mei Li received the Ph.D. degree in radio physics from the University of Electronic Science and Technology of China, Chengdu, in 2016. From 2014 to 2016, she was with the Applied Electromagnetics Research Group, University of California at San Diego, San Diego, CA, USA, as a Visiting Graduate. She is currently an Associate Professor in the School of Microelectronics and Communication Engineering, Chongqing University, China. She was the recipient of the Young Scientist Award Scheme of the 2019 International Applied Computational Electromagnetics Society (ACES) Symposium in China, held in Nanjing, China. She has published over 60 journal publications and conference proceedings. Her research interests include metasurface-based electromagnetic devices, antennas and arrays.