

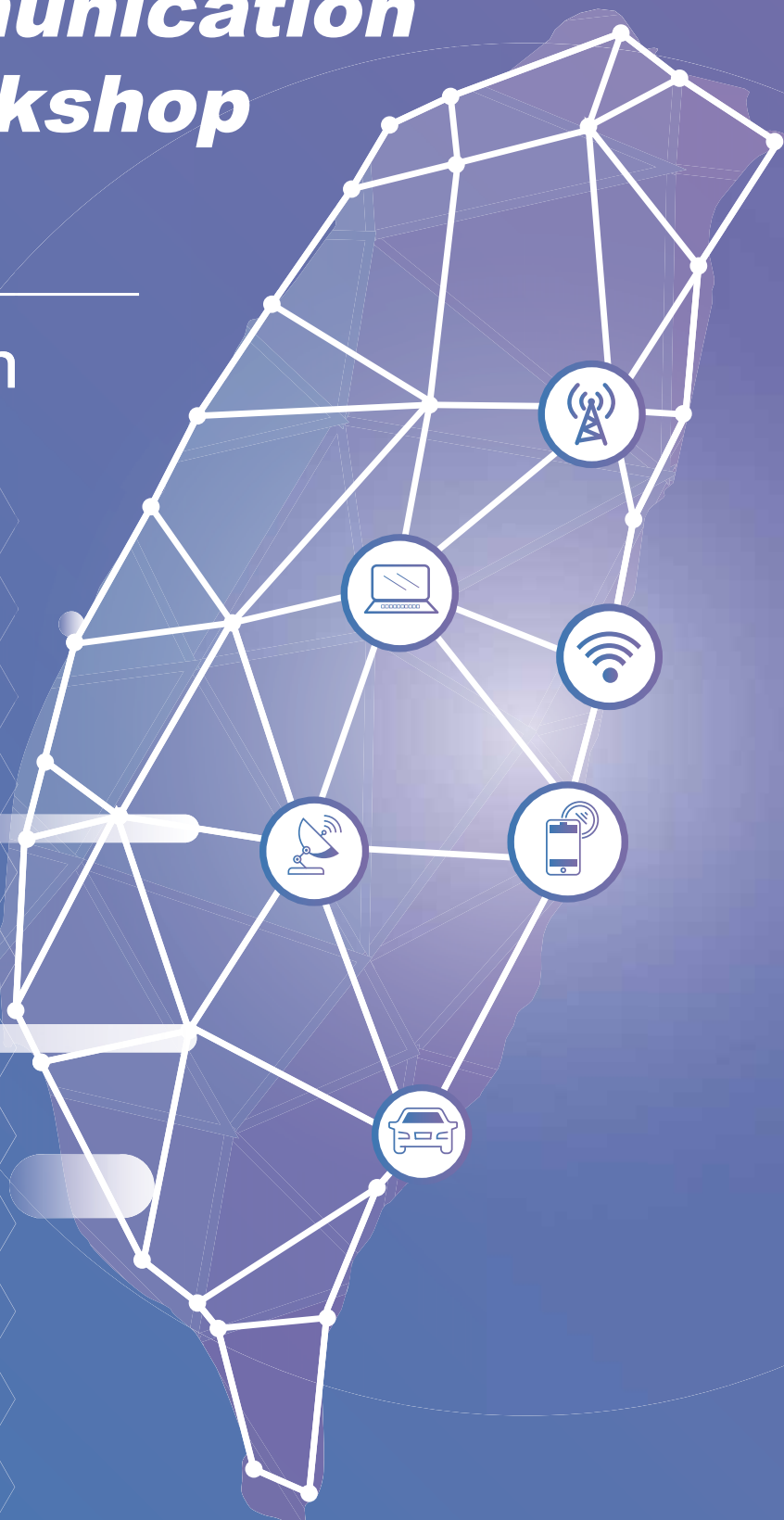
# ***IEEE CTW 2023***

## ***IEEE Communication Theory Workshop***

2-5 July 2023

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Hualien, Taiwan



# PROGRAM-AT-A-GLANCE

JULY 2 Sun.	JULY 3 Mon.	JULY 4 Tue.	JULY 5 Wed.
	<b>Keynote 1</b> 09:00-09:50	<b>Keynote 2</b> 09:00-09:50	<b>Keynote 3</b> 09:00-09:50
	<b>Coffee break</b> 09:50-10:20	<b>Coffee break</b> 09:50-10:20	<b>Coffee break</b> 09:50-10:20
	<b>Session 1</b> 10:20-12:00	<b>Session 2</b> 10:20-12:00	<b>Session 4</b> 10:20-12:00
	<b>Lunch</b> 12:00-13:30	<b>Lunch</b> 12:00-13:30	<b>Closing remarks</b> 12:00-12:15
<b>CTW tour (Optional)</b> 13:30-17:30	<b>Award talks</b> 13:30-14:45	<b>Session 3</b> 13:30-15:35	<b>CTW tour (Optional)</b> 13:30-17:30
	<b>Coffee break</b> 14:45-15:15		
	<b>Panel 1</b> 15:15-16:45	<b>Coffee break</b> 15:35-16:05	
	<b>Poster session</b> 16:45-18:15	<b>Panel 2</b> 16:05-17:35	
<b>Welcome reception</b> 19:00-21:00	<b>Bus to night market</b> (Lobby at 18:30)	<b>Banquet</b> 18:30-21:00	

# CONFERENCE SCHEDULE

## SUNDAY, JULY 2

**13:30-17:30** (Optional) Tour to Taroko National Park 📍 1F Lobby

**19:00-21:00** Welcome Reception 📍 1F Starry Lounge (Outdoor)

## MONDAY, JULY 3

TECHNICAL SESSION 📍 2F

**09:00-09:50** Keynote - Changlong Xu  
(Principal Engineer, Wireless R&D, Qualcomm)  
*Title: 6G – Standard, Requirements, and Technologies*

**09:50-10:20** Coffee Break

**10:20-12:00** Session 1 - Machine Learning for Communications  
**Organizer: Jun Zhang (Hong Kong University of Science and Technology)**  
**Speaker 1 and Early Achievement Award Talk: Walid Saad (Virginia Tech)**  
*Title: Less Data, More Knowledge: Reasoning Foundations of Semantic Communication Networks*  
**Speaker 2: Deniz Gunduz (Imperial College London)**  
*Title: Semantic Communications with Generative Models*  
**Speaker 3: Chia-Han Lee (National Yang Ming Chiao Tung University)**  
*Title: End-to-End Deep Learning for Wireless Systems with Hardware Impairments*  
**Speaker 4: Angela Zhang (Chinese University of Hong Kong)**  
*Title: Task-Oriented Communication via Maximal Coding Rate Reduction*

**12:00-13:30** Lunch 📍 1F Garden Court

**13:30-14:45** Early Achievement Award Talks  
**Speaker 1: Nicolò Michelusi (Arizona State University)**  
*Title: Decentralized Federated Learning via Non-Coherent Over-the-Air Consensus*

**Speaker 2: Harpreet S. Dhillon (Virginia Tech)**  
*Title: Fundamentals of Landmark-Based Geolocation*

Goldsmith Young Scholars Award Talk

**Speaker: Ian Roberts (University of Texas at Austin)**  
*Title: Full-Duplex Millimeter Wave Communication Systems*

**14:45-15:15** Coffee Break

15:15-16:45

## Panel 1 - The Role of Information Theory in 6G

**Moderator:** Elza Erkip (New York University)

**Panelist:** Erik G. Larsson (Linköping University)

**Panelist:** Antonia M. Tulino (Università degli Studi di Napoli Federico II)

**Panelist:** Jinfeng Du (Nokia Bell-Labs)

**Panelist:** Daniela Tuninetti (University of Illinois Chicago)

16:45-18:15

## Poster Session 2F Hallway

**Organizers:** Derrick Wing Kwan Ng (University of New South Wales) and

Jemin Lee (Sungkyunkwan University)

18:30

Bus to Night Market  1F Lobby

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# TUESDAY, JULY 4

TECHNICAL SESSION  2F

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09:00-09:50

## Keynote - Giuseppe Caire (Technische Universität Berlin)

*Title: Integrated Sensing and Communication Toolbox: Information Theory, Communication Theory, and Machine Learning*

09:50-10:20

## Coffee Break

10:20-12:00

## Session 2 - Electromagnetics and Wireless Communications

**Organizer:** Erik G. Larsson (Linköping University)

**Speaker 1:** Massimo Franceschetti (University of California, San Diego)

*Title: (Towards) Electromagnetic Information Theory*

**Speaker 2:** Luca Sanguinetti (Pisa University)

*Title: MIMO Communications with Physically Consistent Models*

**Speaker 3:** Bruno Clerckx (Imperial College London)

*Title: Reconfigurable Intelligent Surfaces 2.0: Beyond Diagonal Phase Shift Matrices*

**Speaker 4:** Kai Kit Wong (University College London)

*Title: On the Merits of Fluid Antenna Multiple Access: A Han-Kobayashi Perspective*

12:00-13:30

## Lunch 1F Garden Court

13:30-15:35

## Session 3 - Massive, Grant-Free and Unsourced Random Access in Wireless Networks

**Organizer:** Giuseppe Caire (Technische Universität Berlin)

**Speaker 1:** Maxime Guillaud (INRIA)

*Title: Multilinear Spreading for Massive Random Access*

**Speaker 2:** Wei Yu (University of Toronto)

*Title: Capacity of Downlink Massive Random Access*

**Speaker 3:** Jean-Francois Chamberland (Texas A&M University)

*Title: Applications of Sparse Regression LDPC Codes*

**Speaker 4:** Alexander Fengler (Massachusetts Institute of Technology)

*Title: Code Design for Asynchronous Unsourced Multiple-Access*

**Speaker 5:** Giuseppe Caire (Technische Universität Berlin)

*Title: A New "Composite" AMP Algorithm, Exact State Evolution Analysis, and Application to uRA/Initial Access in Cell-Free Massive MIMO Networks*

15:35-16:05

Coffee Break

16:05-17:35

Panel 2 - 6G Technologies: What, Why, and How?

**Moderator:** Li-Chun Wang (National Yang Ming Chiao Tung University)

**Panelist:** Geoffrey Li (Imperial College London)

**Panelist:** Ashutosh Sabharwal (Rice University)

**Panelist:** I-Kang Fu (MediaTek)

**Panelist:** Reinaldo Valenzuela (Nokia Bell-Labs)

18:30-21:00

Banquet at Hotel

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## WEDNESDAY, JULY 5

TECHNICAL SESSION  2F

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09:00-09:50

Keynote - Wen Tong (CTO, Huawei Wireless)

*Title: Fast-Slow Machine and Human Modeling for GPT*

09:50-10:20

Coffee Break

10:20-12:00

Session 4 - Integrated Sensing and Communications

**Organizer:** Jinhong Yuan (University of New South Wales)

**Speaker 1:** Sundeep Rangan (New York University)

*Title: Millimeter Wave Sensing for Robot Navigation: Closing the Loop*

**Speaker 2:** Babak Hassibi (California Institute of Technology)

*Title: Occam's Radar: Atomic Norms and Modulating on Conjugate Zeros*

**Speaker 3:** Tsung-Hui Chang (Chinese University of Hong Kong – Shenzhen)

*Title: Information and Sensing Beamforming Optimization for Multi-User*

*Multi-Target MIMO ISAC Systems*

**Speaker 4:** Jinhong Yuan (University of New South Wales)

*Title: Delay-Doppler Multicarrier Modulation: A Promising Signal Waveform for ISAC*

12:00-12:15

Closing Remarks

13:30-17:30

(Optional) Tour to Taroko National Park  1F Lobby

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## Topic: Reconfigurable Intelligent Surface

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- 1** Does a Large Reconfigurable Intelligent Surface Eliminate Channel Correlation?  
Kuang-Hao (Stanley) Liu
- 2** Stochastic Reformulation for Discrete Optimization: RIS-aided Communication System Insights  
Anish Pradhan and Harpreet S. Dhillon
- 3** Intelligent Reflecting Surface Aided Generalized Spatial Modulation Millimeter-wave Massive MIMO System  
Chia-Chang Hu and Tsung-Hsin Hsu
- 4** Quantifying the Available Geometric Information in Signals Reflected by RIS  
Don-Roberts Emenonye, Harpreet S. Dhillon, and R. Michael Buehrer
- 5** LSTM-based Precoding for RIS-assisted MIMO Systems with Implicit CSI  
Po-Heng Chou, Jiun-Jia Wu, Chin-Tang Chen, Wan-Jen Huang, Yu Tsao, and Ronald Y. Chang

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## Topic: Massive MIMO and Connectivity

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- 6** Bayesian Activity Detection for Massive Connectivity in Cell-free IoT Networks  
Hao Zhang, Qingfeng Lin, Yang Li, Lei Cheng, and Yik-Chung Wu
- 7** Sub-band Precoding for Massive MIMO-OFDM Systems  
Kelvin Kuang-Chi Lee and Chiao-En Chen
- 8** Completely-blind Efficient Receiver for Asynchronous Massive Grant-Free NOMA  
Takanori Hara and Koji Ishibashi
- 9** Practical Grant-free NOMA Based on Low-density Structured OFDM  
Kohei Ueda, Takanori Hara, and Koji Ishibashi
- 10** Semantic Queries for Massive IoT  
Anders E. Kalør, Kaibin Huang, and Petar Popovski

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## Topic: Antenna and Receivers

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- 11** Low Complexity MRC Detector for Oversampling OTFS Receiver  
Preety Priya, Emanuele Viterbo, and Yi Hong
- 12** Physical Beam Sharing Systems and Over-the-air Measurements  
Yan-Yin He, Hsiao-Chien (Angie) Chen, and Shang-Ho (Lawrence) Tsai
- 13** Satellite Communications with Hybrid Array Architecture for Beam Squint Compensation  
Heedong Do, Namyoon Lee, Robert W. Heath Jr., and Angel Lozano
- 14** Dual Function Radar Communication and Screaming Channels: a Pre-study  
Maria De Lauretis, Elena Haller, and Mark Dougherty

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## Topic: Localization

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- 15** Localizability in Vision-based Positioning: Point Process Perspective and Connections to Communication Theory  
Haozhou Hu, Harpreet S. Dhillon, and R. Michael Buehrer
  - 16** Enhancing WiFi Access Point Localization with AI-based Filtering  
Wan-Ting Shih, Cheng-Yu Yang, Chao-Kai Wen, and Shang-Ho Tsai
  - 17** Virtual Near-field Signal Estimation for Improved Access Point Localization  
Shang-Ling Shih and Chao-Kai Wen
  - 18** NTN-based 6G Localization: Vision and Role of LEOs  
Harish K. Dureppagari, Chiranjib Saha, Harpreet S. Dhillon, and R. Michael Buehrer
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## Topic: Coding

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- 19** A Modified Syndrome-based Binary BP Decoding for Quantum LDPC Codes  
Tzu-Hsuan Huang and Yeong-Luh Ueng
  - 20** Design of PAC Codes for SCL Decoding  
Mao-Ching Chiu and Yi-Sheng Su
  - 21** Message Passing Decoding for Linear Block Codes  
Po-an Chu and Huang-Chang Lee
  - 22** DL-aided SCLF-2 Decoding for Polar Codes based on Stacked LSTM Model  
Shan Lu, Fu-Siang Liang, Ku Hsuan, and Yeong-Luh Ueng
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## Topic: Communication Theory

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- 23** On the Minimization of CCDF of Cramér–Rao Lower Bound for Hybrid RF/FSO Angle-of-arrival Tracking  
Ming-Cheng Tsai, Muhammad Salman Bashir, and Mohamed-Slim Alouini
- 24** Achievable Information Rates for Channels with In-band Crosstalk  
Chunpo Pan, Zhiping Jiang, Chuandong Li, and Zhuhong Zhang
- 25** Lightweight Decentralized Community Detection Achieving Exact Recovery for Sparse Graphs  
Yu-Cheng Hsiao and I-Hsiang Wang
- 26** Markov Modeling for Licensed and Unlicensed Band Allocation in D2D Networks  
Po-Heng Chou and Wei-Chang Chen



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## Topic: AI-driven Communications

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- 27** Training Design Based on Cross Z-complementary Pair and Its Mate for Generalized Spatial Modulation  
Chen Hu, Zhen-Ming Huang, and Chao-Yu Chen
- 28** Model-driven Neural Network Based MIMO Channel Estimator via Eigenmode Representation  
Carrson C. Fung and Dmytro Ivakhnenkov
- 29** Determinantal Learning for Subset Selection in Cellular Networks  
Xiangliu Tu, Chiranjib Saha, and Harpreet S. Dhillon
- 30** UAV-assisted Over-the-air Federated Learning  
Kai-Chieh Hsu, Ming-Chun Lee, and Y.-W. Peter Hong
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## Topic: Emerging Networks

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- 31** Digital Twin Enabled Management Architecture in 6G Deterministic Networks  
Shih-Fan Chou, Yu-Hsuan Wang, Ying Chen, and Ching-Chih Pan
- 32** Designing a Text-based CAPTCHA to Distinguish Humans from ChatGPT  
Kuo-Yu Liao and Cheng-Shang Chang
- 33** Power-saving Framework for 6G Networks with Integrated Time-frequency Domain Operations  
Kuang-Hsun Lin and Hung-Yu Wei
- 34** On Waveform Design Principle for ISAC  
Hai Lin and Jinhong Yuan
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## Topic: Networking

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- 35** An FPGA-based Second Frequency Moment Estimation Accelerator for 100Gbps High-speed Network Traffic Analysis  
Hsiang-Lun Hua and Yu-Kuen Lai
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## Topic: Surveillance

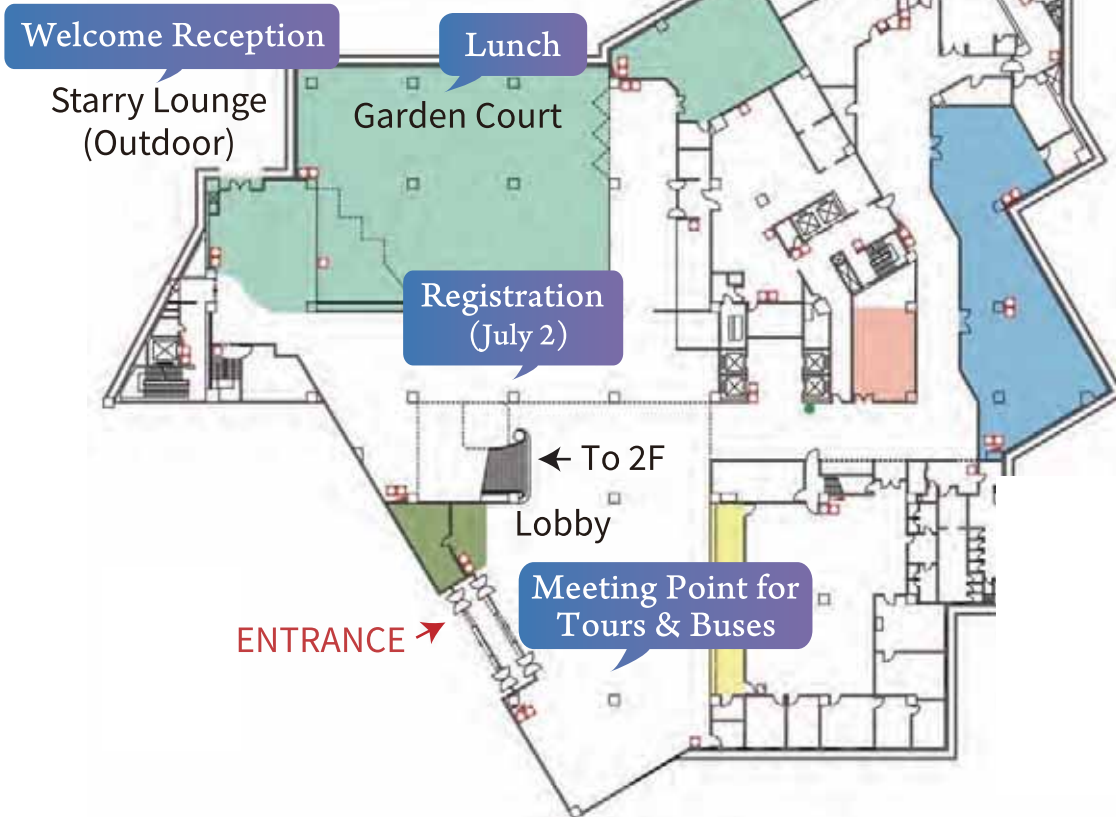
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- 36** On-demand Image Capture and Wireless Delivery Task for Surveillance UAVs  
Nguyen Van Cuong, Y.-W. Peter Hong, and Jang-Ping Sheu
- 37** Illegal Parking Detection Based on Deep Learning for Video Surveillance  
Meng-Wei Lin, Chien-Hao Tseng, Jyh-Horng Wu, and Mei-Ya Chung

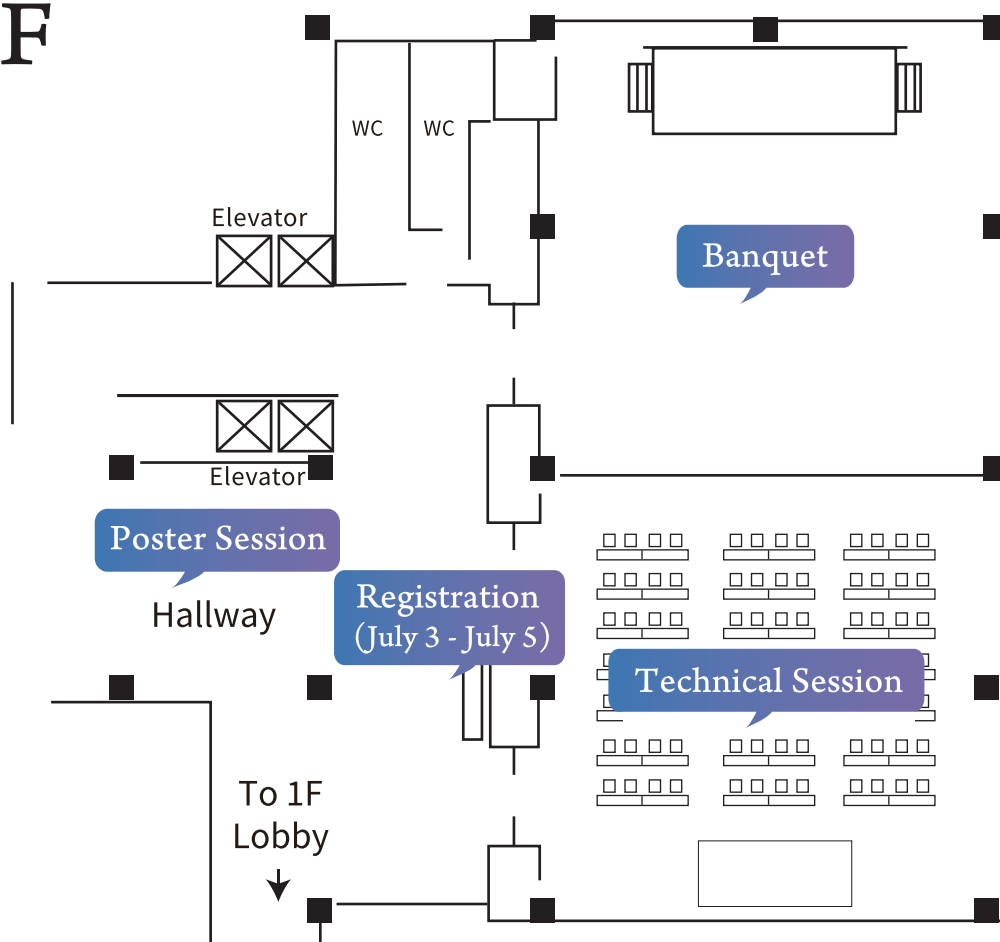


# FLOOR MAP

## 1F



## 2F



**Breakthrough  
innovation  
starts with  
Qualcomm.**



**Qualcomm**



Founded in 1987, Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. We have 207,000 employees and operate in over 170 countries and regions, serving more than three billion people around the world. We are committed to bringing digital to every person, home and organization for a fully connected, intelligent world.

Scientific exploration and technological innovation drive civilization and society forward. Huawei understands the importance of research and innovation and how openness is critical for both. We are ready and willing to work with academia and industry to explore the frontiers of science and technology, push innovation forward, create value for industry and society as a whole, and build a better intelligent world.

We entered into a golden age of 5G applications with industry producing over 20,000 use cases. Huawei created the GUIDE business blueprint and "Lighting up the 5.5G Era" initiative to support this boom in applications. We developed more than 100 scenario-based solutions and multiple business units to focus on specific industries, including the Mine BU, Smart Road, Waterway & Port BU, Government Public Services Digitalization BU, Electric Power Digitalization BU, Digital Finance BU, and Aviation & Rail BU. We launched HarmonyOS 3, significantly expanding Super Device capabilities. Huawei Cloud was deployed in 29 Regions around the world, and is becoming the preferred choice of customers in industries such as finance and manufacturing to migrate to the cloud. Huawei Digital Power helped customers generate 695.1 billion kWh of green power and save 19.5 billion kWh of electricity. These efforts have offset 340 million tons of CO<sub>2</sub> emissions, which is equivalent to planting 470 million trees. The Kunpeng and Ascend ecosystems were joined by more than 5,200 partners and 3.1 million developers and offered more than 14,000 certified solutions. Huawei officially launched the Chaspark Technology Website, which has attracted more than 120,000 authenticated users from across multiple academic fields. The platform presents technical challenges to the public, allowing experts from outside Huawei to propose their own solutions. Huawei's TECH4ALL education projects benefited over 600 schools and more than 220,000 people, including K-12 students and teachers, unemployed youths, and senior citizens. Huawei joined ITU's Partner2Connect digital alliance, promising to connect 120 million people in remote areas across more than 80 countries by 2025.

# COMMITTEE



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Y.-W. Peter Hong (National Tsing Hua University)

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Kaibin Huang (The University of Hong Kong)  
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<https://ctw2023.ieee-ctw.org/>

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