

# WELCOME MESSAGE

## IEEE Consumer Technology Society President



Dear attendees of the 2021 ICCE-Taiwan Conference, On behalf of the IEEE Consumer Technology Society (CTSoc), it is my great pleasure to welcome all of you to the 8th IEEE International Conference on Consumer Electronics- Taiwan 2021 (IEEE 2021 ICCE-Taiwan) which is to be held on 15-17 September 2021 in the outlying island of Taiwan, Penghu.

The IEEE ICCE-Taiwan Conference has become an international forum since 2014, where each year, the conference participants bring the leading-edge consumer technologies, innovative ideas, technology trends, research results, and specific industry skills to the conference, and take away with them the new challenges and shared ideas learned from the conferences.

This year, the Conference theme is “Driving World to 5G and Beyond with Consumer Technology” which reflects two key qualities of the IEEE Consumer Technology Society: (1) The broad scope of the vast influence of modern electronics on consumer technologies; (2) The positive impact of consumer technologies on the society. Thus, I value your attendance of this conference where you will be able to address key issues on specific topics of 5G, and you will have a fruitful discussion, collaboration and exchange of knowledge and ideas.

On behalf of IEEE Consumer Technology Society, I would like to take the opportunity to express many special thanks to the Taiwanese Government for their continuous and valuable support to ICCE-Taiwan Conference, no matter how the conference is held as either a physical event or a hybrid event due to COVID-19.

# IEEE Consumer Technology Society President

I would like also to express my sincere thanks to the IEEE 2021 ICCE-Taiwan Organization Committee for putting all efforts to overcome difficulties and challenges to hold this conference as a hybrid in two consecutive years. I also extend my sincere gratitude to the Honorary General Chairs: Yo-Ping Huang (National Penghu University of Science and Technology, Taiwan) and Chin-Ping Ueng (National Penghu University of Science and Technology, Taiwan), the General Chairs: Ming-Lin Chuang (National Penghu University of Science and Technology, Taiwan), Tsung-Han Tsai (National Central University, Taiwan), and Wen-Chung Kao (National Taiwan Normal University, Taiwan), the Technical Program Chairs: Wen-Huang Cheng (National Yang Ming Chiao Tung University, Taiwan), Ching-Chun Huang (National Yang Ming Chiao Tung University, Taiwan), Shu-Min Tsai (National Penghu University of Science and Technology, Taiwan), and Kiyoshi Ueda (Nihon University, Japan), and all other committee members for their dedication and hard work and selfless contribution in making this IEEE 2021 ICCE-Taiwan Conference a successful event.

I would like also to thank all authors for contributing more than 350 papers and making great effort of sharing their innovative with the conference attendees. Also thanks to all the participants for their loyal support and for attending the conference.

Unfortunately, I could not attend the conference physically, however I believe that with your hard work and abundant contribution will make this conference a great success.

Dr. Wahab Almuhtadi, P.Eng, SMIEEE, EIC Fellow  
President  
IEEE Consumer Technology Society (CTSoc)

## General Chairs

Dear Colleagues and Friends,

On behalf of the organizing committee, it is a great honor to welcome you to Penghu for the IEEE 2021 International Conference on Consumer Electronics-Taiwan (IEEE 2021 ICCE-TW), to be held on September 15-17, 2021.

Since 2014, ICCE-TW has become one of the most significant platforms for delegates all around the world to interact and exchange ideas with one another. Although COVID-19 impacts all aspects of people's lives, we value every opportunity to touch base no matter if it is in person or online. We sincerely thank all of you for your continuous support and invaluable contributions to make this conference successful.

The fifth generation of wireless technology promises more than just a faster network, it will help redefine the network, establishing a new global wireless standard for speed, throughput and bandwidth. A 5G network builds a bridge to the future. Therefore, we set up our main theme as "Driving World to 5G and Beyond with Consumer Technology" for participants to discuss the latest applications regarding consumer electronics technology and innovations.

Other than the sound technical program, we have prepared a special social program, including activities such as a BBQ under the tropical island skies, and a half day tour. We believe that the splendor of Penghu will be an unforgettable experience for all.

Wishing you a fruitful IEEE 2021 ICCE-TW!



**Ming-Lin Chuang**

General Chair,  
IEEE 2021 ICCE-TW

Professor, National  
Penghu University of  
Science and Technology,  
Taiwan



**Tsung-Han Tsai**

General Chair,  
IEEE 2021 ICCE-TW

Professor, National  
Central University,  
Taiwan



**Wen-Chung Kao**

General Chair,  
IEEE 2021 ICCE-TW

Professor, National  
Taiwan Normal  
University, Taiwan

# Technical Program Chairs

Dear Friends,

It is our great privilege to welcome you to the IEEE 2021 International Conference on Consumer Electronics-Taiwan (IEEE 2021 ICCE-TW). This year, over 310 papers were accepted through a meticulous reviewing process. We would like to take this chance to express our appreciation for all of your contributions that has culminated in such a great outcome.

IEEE 2021 ICCE-TW is astutely organized into four keynote speeches, and various paper presentations throughout 46 lecture sessions, five poster sessions, as well as one best paper competition session. Although some of the delegates could not make it to Penghu, we have tried our best to let all the delegates communicate without any hitches. We truly hope that the day will come when all of us can meet up face to face in the very near future.

We personally express our gratitude to the General Chairs of IEEE 2021 ICCE-TW, Prof. Ming-Lin Chuang, Prof. Tsung-Han Tsai, and Prof. Wen-Chung Kao and all the organizing committee members who spent a considerable amount of their precious time and energy to make this conference possible.

Last but not least, we would like to urge you to cherish this opportunity to gain profound knowledge and renew friendships as well as forge new links.

## **Technical Program Chairs, IEEE 2021 ICCE-TW**

### **Wen-Huang Cheng**

Professor, National Yang Ming Chiao Tung University, Taiwan

### **Ching-Chun Huang**

Professor, National Yang Ming Chiao Tung University, Taiwan

### **Shu-Min Tsai**

Professor, National Penghu University of Science and Technology, Taiwan

### **Kiyoshi Ueda**

Professor, Nihon University, Japan