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# Report on the 15<sup>th</sup> International Conference on Space, Aeronautical and Navigational Electronics 2019 (ICSANE 2019)

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## 1. Introduction

The 15<sup>th</sup> International Conference on Space, Aeronautical and Navigational Electronics (ICSANE 2019) was held at Ara convention hall, Jeju National University, Korea on October 30<sup>th</sup> – 31<sup>st</sup>, 2019. This conference was organized by the Technical Group on Space, Aeronautical and Navigational Electronics (SANE) of the Institute of Electronics, Information and Communication Engineers (IEICE) and the Korean Association of Geographic Information Studies (KAGIS), with the support of IEEE AESS Japan Chapter, IEEE GRSS Japan Chapter, Japan Aerospace Exploration Agency (JAXA), and Electronic Navigation Research Institute (ENRI). The international, peer-reviewed open access journal in MDPI, Electronics, became a media partner of the conference. In this report, we provide the objective and summary of ICSANE 2019.

## 2. Objective of Conference

The first ICSANE (former name is Workshop on Space, Aeronautical and Navigational Electronics (WSANE)) was held in Daejeon, Korea, 2005. After that, ICSANE takes place every year in Asia-Pacific region. ICSANE aims at providing an opportunity for system engineers and researchers to discuss new and viable technical topics of electronics system in spacecraft, aircraft, ships and ground facilities. The ICSANE 2019 covered the following topics:

- (1) Satellite and space-station systems
- (2) Remote sensing and scientific observation technology
- (3) Radar systems and applications
- (4) Navigational and communication systems

## 3. Organizing Committee

The steering committee of ICSANE 2019 was strongly led by General Chair and General Co-Chairs, with the support of Co-Chairs of Organizing Committee. The other organization is technical program committee. These main committee members are listed as the followings.

### ● Steering Committee:

General Chair:

Chang-Hwan Kim (Kangwon Nat'l Univ., Korea)

General Co-Chair:

Tae-Kyung Baek (Dong-Eui Univ., Korea)

Akitsugu Nadai (NICT, Japan)

Yong-Bok Choi (Kangwon Nat'l Univ., Korea)

### ● Organizing Committee:

Co-Chairs:

Sun-Hak Bae (Kangwon Nat'l Univ., Korea)

Makoto Tanaka (Tokai Univ., Japan)

Sun-Yurp Park (Pusan Nat'l Univ., Korea)

### ● Technical Committee:

Co-Chairs:

Chan-Su Yang (KIOST., Korea)

Hiroyoshi Yamada (Niigata Univ., Japan)

Dong-Ha Lee (Kangwon Nat'l Univ., Korea)

## 4. Program and Activities

At the opening ceremony of ICSANE 2019, Prof. Chang-Hwan Kim, President of KAGIS, delivered his warm welcome address and expressed the importance of international academic exchange for understanding and making progress in the areas of the aerospace, aviation and remote sensing. The photos of his opening address are shown in Fig. 1. Next, Prof. Hiroyoshi Yamada, Vice chair of SANE, IEICE, expressed his thanks and talked about SANE and ICSANE history.



Fig. 1 Welcome address by Prof. C. H. Kim.

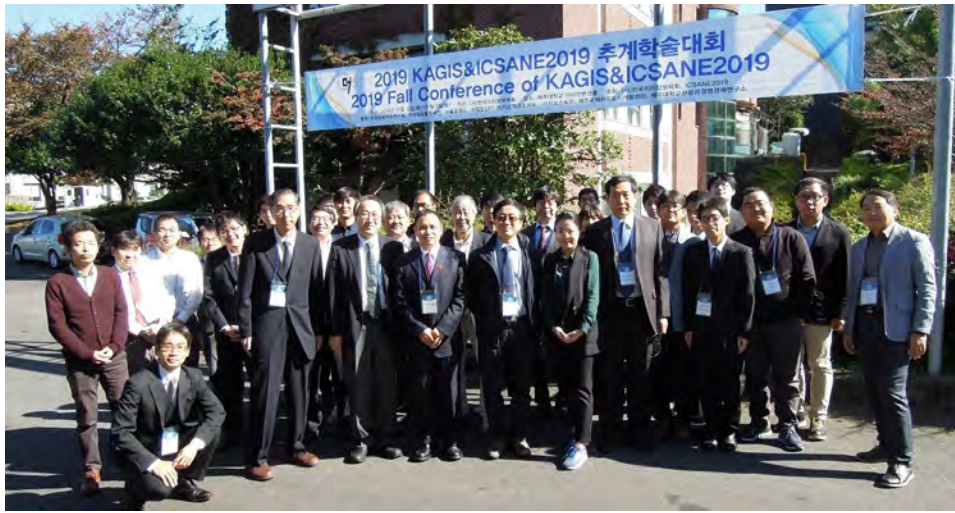


Fig. 2 Group photo of ICSANE 2019.

The technical program of ICSANE 2019 consisted of 8 oral sessions. The 22 papers in regular sessions were presented. The papers covered the variety technologies which are satellite, aircraft navigation, radar signal processing, Synthetic Aperture Radar (SAR), remote sensing, etc. Total number of participants reached around 60 from 4 countries: Korea, Japan, China, and USA. Figure 2 is the group photo of ICSANE 2019.

**5. Award Ceremony**

The ceremony of Young Scientist Award was held at the closing. Prof. Hiroyoshi Yamada, TPC Co-chair, presented a testimonial to each award recipient (Fig. 3). The winners are as follows:

Winners of Young Scientist Award:

- Mr. Takuya Hashimoto (Niigata University, Japan), “Experimental Study on Grasping Seasonal Change in Paddy Rice Growth Using Quad-Polarimetric SAR Data”
- Mr. Ho-Kun Jeon (KIOST, Korea), “Coastal Activity Risk Assessment using Aviation Images and Hyperspectral Images”
- Ms. Ying Yang (GLUT, China), “Depolarization of Scattering From a Spatially Anisotropic Rough Surface With Inhomogeneous Dielectric Profile”

In addition, the SANE committee offered the letters of appreciation to Prof. Chang-Hwan Kim (President of KAGIS, Kangwon Nat’l Univ., Korea) and Prof. Chan-Su Yang (KIOST., Korea) for outstanding contributions to ICSANE 2019.

**6. Conclusions**

ICSANE 2019 was successfully held in Jeju, Korea. We hope that all the participants in this conference enjoyed the presentation and discussions on the future trends and the latest advances of research and development on Space, Aeronautical and Navigational Electronics. Next ICSANE, ICSANE 2020 will be held in Guilin, China. Call for paper of ICSANE 2020 will

be provided in next spring. We look forward to seeing you in Guilin.



(a) YSA award winner: Mr. Takuya Hashimoto (Right)



(b) YSA award winner: Mr. Ho-Kun Jeon (Right)



(c) YSA award winner: Ms. Yin Yang (Right)

Fig. 3 Young scientist award-winners.

# Report on the 2019 NS English Session Awards and Award Ceremony

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 Akihiro Nakao<sup>††</sup>, The University of Tokyo  
 Yosuke Tanigawa<sup>†††</sup>, Osaka Prefecture University  
 Shiro Mizuno<sup>†††</sup>, NTT Corp.  
 Shinya Kawano<sup>††††</sup>, NTT Corp.



<sup>†</sup>Chair, <sup>††</sup>Vice Chair, <sup>†††</sup>Secretary, <sup>††††</sup>Assistant Secretary

## 1. Introduction

In the 2019 IEICE General Conference that was held on 19-22 March 2019, the IEICE Technical Committee on Network Systems (NS) provided the complete English Symposium Session entitled “Compositive Information Communication Technologies and Applications for Future Network Systems”. In this session, 44 papers were presented at a single track and many attendees participated during whole of the 4-days conference period [1].

The NS committee selected recipients of NS English Session Award among the 44 papers. The recipients won the award at an award ceremony and presented the progress of their awarded papers as an invited lecture at the NS technical meeting in October 2019.

## 2. Award Ceremony

The award ceremony was held in the NS technical meeting at Nagoya city, Aichi prefecture on 10 October 2019, and 27 participants attended the ceremony. Three distinguished papers won the NS English Session Award, and all the recipients received an award certificate and a plaque from NS technical committee chair (Fig. 1).

(For the past recipients, please see our English home page. URL: <http://www.ieice.org/cs/ns/eng/index.html>)

## 3. English Session Awards 2019

The abstracts of the three papers that won the 2019 NS English Session Award are as follows.

### “Buffer Aided Receiver for Diffusive DNA Based Molecular Communication” [2]

The networks of Bio-Nano-machines, namely a kind of Nanonetworks, can be enabled by Molecular Communication (MC). The MC is a novel communication paradigm that overcomes both the diffraction at the Nano-scale and the in-body-environmental quick attenuation problems of the electromagnetic wave-based wireless communication techniques.

Aiming at improving the transmission efficiency, a diffusive DNA based MC has been proposed in our previous work. It applies the different nucleobase pairs



Fig. 1 English session award recipients (Prof. Sezaki: Top left [2], Mr. Settawatcharawanit: Top right [3], and Mr. Hirai: Bottom left [4]), with chair (Okazaki) and secretary (Tanigawa): Bottom right.

to represent different binary bits so that one single molecule can be used as a data packet. Thus, comparing with conventional diffusion-based MC, the information that can be transmitted with one molecule is significantly increased.

On the other hand, as a kind of macromolecule, DNA has a relatively smaller diffusion coefficient, leading to the consequence that the diffusion speed is slow. Moreover, the diffusion coefficient is influenced by the size of the DNA molecules, namely how many nucleobase pairs compose the molecule. Therefore, this phenomenon adds more uncertainty in the successful arrival of the transmitted DNA molecules. And consequently, there is a higher packet error rate which influences the effective transmission rate.

Aiming at this problem, we propose a duplicated packets and buffer-aided receiver mechanism. In this mechanism, the first improvement is that the transmitting DNA packets are duplicated as several copies and transmitted at the same time in a slot. As a consequence, the successful arrival probability of correct data packets is increased. Besides, a buffer and a comparator are introduced to the receiver. The buffer is used to temporarily store the received DNA

molecules for a period of a slot width. Then the comparator compares the number of each type of packets in the buffer. Finally, the packet of the largest number is decoded. As a result, the probability of decoding an error packet is dramatically reduced.

#### **“Segment Routed Traffic Engineering using Randomized Sampling with Bounded Stretch” [3]**

Traffic Engineering is an essential application for network operators to manage network resources. Recently, Segment Routed Traffic Engineering has been adopted widely among network operators as an essential tool for Traffic Engineering. By using Segment Routing Traffic Engineering, the control plane of Traffic Engineering application can be simplified without the need to use resource reservation protocol or manually configure link weights.

Generally, a traffic engineering program must be fast and efficient in order to facilitate the network operator's demands. These two characteristics are vital since network operators usually deploy a traffic engineering program to optimize network resources, and repeatedly execute the program in short intervals (e.g., 5 minutes). However, the existing approaches have shortcomings since they require a substantial amount of time to find a solution, or they must sacrifice a considerable amount of link utilization.

To address these issues, we propose to limit the number of candidate intermediate nodes by using a bounded stretch constraint relative to shortest paths size of the source-destination pair. This helps reduce the problem size significantly, which allows us to execute the Traffic Engineering program in short intervals. In this work, we formulate a Segment Routed Traffic Engineering problem with bounded stretch to minimize the maximum link utilization. This variant of Traffic Engineering is widely used among network operators to minimize network congestion.

Our results show that our proposed approach helps reduce the computation time significantly while a near-optimal link performance can be achieved.

#### **“Performance Evaluation on MAC Layer Protocol in Crash Warning Application using PC5-based Cellular-V2X mode4” [4]**

This paper presents performance characteristics of MAC layer protocol of PC5-based Cellular-V2X mode 4 (called mode 4) for Crash Warning Application. Mode 4 is an infrastructure-less protocol. Instead of the negotiations with infrastructure such as base stations for transmission resource allocations, in other words, central slot management as in mode 3, mode 4 uses a new random access protocol called Sensing-based Semi-Persistent Scheduling (SPS). Sensing-based SPS has two features compared with CSMA/CA protocol. The first feature is that each node, such as a terminal of a vehicle or a pedestrian, successively uses a selected slot in specific times. The second feature is that each node tries to select a transmission slot of low interference based on past interference patterns yielded by the first step. To select a slot with low interference,

individual node estimates future interference from the patterns by the following two estimation mechanisms.

In congestion, a node may, unfortunately, select a bad slot for its transmissions due to the negative side of the estimation mechanisms of Sensing-based SPS. As the number of nodes increases, frame collision errors frequently occur and interference patterns sharply vary time by time. These events may cause the estimation mechanisms to infer the interference of slots incorrectly. As a result, individual node frequently selects a bad slot.

To verify these negative impacts in congestion, we analyze the behaviors of the two estimation mechanisms and then reveal performance characteristics. We evaluated performance characteristics for the number of nodes by a simple model with computer simulations. The simulation results demonstrated that one of the estimation mechanisms was not effective to improve performance, compared to a random selection without the estimation mechanisms in the model. Additionally, the evaluation results showed that the current Sensing-based SPS outperforms the random selection by 32%.

#### **4. Future Plans**

In the 2020 IEICE General Conference at Hiroshima University, the English Session entitled “In-Network Intelligence for Design, Management, and Control of Future Networks and Services” will be held on 17-20 March. Many interesting studies on “network” and “service” including “wireless” and “optical” will be presented. Please attend the IEICE General Conference and enjoy the NS English session during the four days.

#### **5. Acknowledgement**

We would like to give special thanks to Prof. Yoshiaki Tanaka due to his great contributions.

#### **6. References**

- [1] T. Yamazaki, Y. Tanigawa, K. Kashibuchi, K. Matsui, A. Nakao, and Y. Okazaki: “Report on NS English Session at 2019 IEICE General Conference -BS-4 Composite Information Communication Technologies and Applications for Future Network Systems-,” *IEICE Global NewsLetter*, vol. 43, no. 2, p. 17, June 2019.
- [2] Y. Sun, M. Ito, and K. Sezaki: “Buffer Aided Receiver for Diffusive DNA Based Molecular Communication,” *IEICE General Conference*, BS-4-16, March 2019.
- [3] T. Settawatcharawanit and Y. Ji: “Segment Routed Traffic Engineering using Randomized Sampling with Bounded Stretch,” *IEICE General Conference*, BS-4-25, March 2019.
- [4] T. Hirai and T. Murase: “Performance Evaluation on MAC Layer Protocol in Crash Warning Application using PC5-based Cellular-V2X mode4,” *IEICE General Conference*, BS-4-29, March 2019.

# Summary Report on the 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019)

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<sup>†††††††</sup>University of Fukui



## 1. Introduction

The 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019) was held in Fukutake Hall and Engineering Building 2 in the Hongo campus of the University of Tokyo from November 26<sup>th</sup> to 27<sup>th</sup>, 2019 [1]. RISING 2019 was held to provide an opportunity to discuss future communication network technologies for realizing “Super-Intelligent Networking” among distinguished researchers. A large number of researchers and students participated in RISING 2019 as shown in Fig. 1. Moreover, over 100 posters were presented as shown in Fig. 2.

This conference was cosponsored by 19 technical committees on the following research area of the Institute of Electronics, Information and Communication Engineers (IEICE) in Japan [2].

- Communication Quality (CQ)
- Communication Systems (CS)
- Energy Engineering in Electronics and Communications (EE)
- Internet Architecture (IA)
- Information and Communication Management (ICM)
- Information Networks (IN)
- Healthcare and Medical Information Communication Technology (MICT)
- Network Systems (NS)
- Optical Communication Systems (OCS)
- Photonic Network (PN)
- Radio Communication Systems (RCS)
- Satellite Telecommunications (SAT)
- Sensor Network and Mobile Intelligence (SeMI)
- Smart Radio (SR)
- Wireless Power Transmission (WPT)
- Wideband System (WBS)



Fig. 1 A large number of participants in Fukutake Hall.



Fig. 2 Poster session in foyer of Fukutake Hall.

- Extremely advanced Optical Transmission (EXAT)
- Network Virtualization (NV)
- Multiple Innovative Kenkyu-kai Association for wireless communications (MIKA)

## 2. Conference Program

Figure 3 shows the conference program of RISING 2019. During two days, the following sessions were held (see Figs. 4 and 5).



November 26th (Tue)		November 27th (Wed)	
8:00 – 8:45		8:00 – 9:00	
8:45 – 9:00	Opening		
9:00 – 9:20	Keynote		
9:20 – 10:30	Collaborative session with Study group of "Thinking network" 1	9:00 – 11:40	Tutorial Case study session
10:30– 11:20	Poster session 1 (Coffee Break)		
11:20 – 12:20	Collaborative session with study group of "Thinking network" 2	11:40 – 12:30	Lunch
12:20 – 13:10	Lunch	12:30 – 13:55	Collaborative session with The Japan Society of Mechanical Engineers
13:10-14:10	Invited talk	13:55-14:45	Poster session 3 (Coffee Break)
14:10-15:00	Poster session 2 (Coffee Break)	14:45-15:50	Panel with technical committees (co-sponsors) 1
15:00-16:00	Distinguished expert panel	15:50-16:00	Break
16:00-16:45	Break	16:00-17:00	Panel with technical committees (co-sponsors) 2
16:45 – 19:00	Banquet	17:00-17:10	Break
		17:10-17:40	Panel with technical committees (co-sponsors) 3
		17:40-17:45	Photo session
		17:45-18:00	Award ceremony

Fig. 3 Conference program.

- Opening remark
  - Prof. Akihiro Nakao (The University of Tokyo)
- Invited talk
  - Prof. Yutaka Matsuo (The University of Tokyo)
- Keynote
  - Mr. Yuji Nakamura (Ministry of Internal Affairs and Communications)
- Collaborative session with study group of "Thinking network"
  - Prof. Akihiro Nakao (The University of Tokyo)
  - Dr. Tomohiro Otani (KDDI Corp.)
  - Dr. Taro Ogawa (Hitachi, Ltd.)
  - Dr. Hideyuki Shimonishi (NEC Corp.)
  - Dr. Hiroaki Harai (National Institute of Information and Communications Technology)
- Distinguished expert panel
  - Prof. Akihiro Nakao (The University of Tokyo)
  - Dr. Tomohiro Otani (KDDI Corp.)
  - Dr. Taro Ogawa (Hitachi, Ltd.)
  - Dr. Hideyuki Shimonishi (NEC Corp.)
  - Dr. Hiroaki Harai (National Institute of Information and Communications Technology)
- Tutorial
  - Prof. Masayuki Ohzeki (Tohoku University)
- Case study session
  - Mr. Hu Bo (NTT Corp.)
  - Mr. Yuji Komatsuzaki (Mitsubishi Electric Corp.)



Fig. 4 Invited talk by Prof. Matsuo.



Fig. 5 Panel with technical committees.

- Mr. Hiroshi Tomonaga (Fujitsu Laboratories Ltd.)
- Mr. Hikotoshi Nakazato (NTT Corp.)
- Mr. Masaaki Tanio (NEC Corp.)
- Collaborative session with the Japan Society of Mechanical Engineers (JSME)
  - Dr. Yuji Kubota (JSME)
  - Dr. Hirokatsu Kataoka (National Institute of Advanced Industrial Science and Technology)
  - Mr. Kazunori Maruyama (Fujitsu Laboratories Ltd.)
  - Dr. Kenjiro Yamamoto (Hitachi, Ltd.)
- Panel with IEICE Technical Committee
  - Prof. Miki Yamamoto (Kansai University)
  - Dr. Masayuki Ariyoshi (SR)
  - Prof. Yuichi Ohshita (IN)
  - Prof. Tomoaki Ohtsuki (RCS)
  - Dr. Yoshikatsu Okazaki (NS)
  - Prof. Minoru Okada (WBS)
  - Prof. Nobuyoshi Kikuma (MIKA)
  - Dr. Yoichi Sato (ICM)
  - Prof. Kohei Shiimoto (PN)
  - Dr. Hideyuki Shimonishi (CQ)
  - Prof. Chika Sugimoto (MICT)

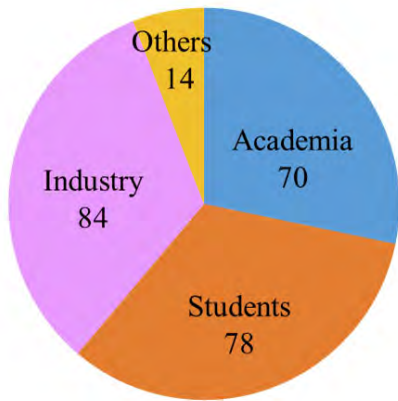


Fig. 6 Number of registrations from each category.

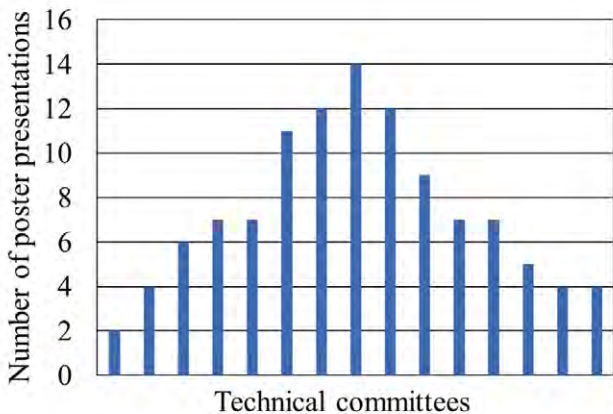


Fig. 7 Number of poster presentations from each technical committee.

- Prof. Hidenori Nakazato (CS)
- Dr. Tadatoshi Babazaki (EE)
- Dr. Hiroaki Harai (NV)
- Prof. Joji Maeda (OCS)
- Prof. Koji Yamamoto (SeMI)
- Poster
- 94 poster presentations
- 17 invited poster presentations

**3. Statistical Information**

In RISING 2019, 246 people registered and most people participated as audiences and/or presenters. Figure 6 shows the statistical information on the number of registrations from each category that is Academia, Industry, Students, or Others. As shown in this figure, students and researchers participated in a balanced manner from each category.

Figure 7 shows the statistical information on the number of poster presentations from each technical committee. Note that the name of each technical committee is not included in this figure. This figure shows that poster presentations were submitted in a balanced manner from each technical committee.

From these figures, we believe that RISING 2019 could realize a cross-field research activity.



Fig. 8 Award ceremony.

**4. Best Poster Presentation Award**

The award ceremony was held in the closing session (see Fig. 8). In RISING 2019, 15 distinguished poster presentations were awarded as best poster presentation award among 94 poster presentations. The categories of awardees are shown in Table 1.

Table 1 Categories of awardees.

Category	Number of awardees
Academia	2
Industry	4
Students	9

**5. Special Section about “Super-Intelligent Networking” on The IEICE Transactions on Communications (Japanese edition)**

In the banquet, Prof. Fujii, who is a vice co-chair of RISING 2019, announced that a special section about “Super-Intelligent Networking” will be published on The IEICE Transactions on Communications (Japanese edition) in March 2021 [3]. He also introduced that the submission due date is May 15<sup>th</sup>, 2020 (JST) and this special section is strongly related to RISING 2019, but not limited to the presenters and authors of RISING 2019.

**6. Conclusion and Next Conference**

We believe that RISING 2019 ended in a big success with many attendees. In 2020, the RISING 2020 will be held. We look forward to meeting many researchers in next RISING.

**7. References**

- [1] The 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019) conference page (Japanese edition), <https://www.ieice.org/~rising/jpn/>
- [2] List of Technical Committees page, <https://www.ieice.org/cs/techg/list.html>
- [3] Call for paper of special section on The IEICE Transactions on Communications (Japanese edition), <https://www.ieice.org/cs/rising/jpn/JB-special/rising2019-cfp.pdf>

# Participation Report for the 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019)

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## 1. Introduction

The 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019) was held at Hongo Campus, the University of Tokyo from November 26<sup>th</sup> to 27<sup>th</sup>, 2019. The purpose of the conference is to provide an opportunity to introduce, discuss and share the state-of-the-art AI networking research efforts. In addition, the RISING 2019 aims at promoting the future research themes in terms integration of AI, communication, and networking technologies toward realizing “Super-Intelligent Networking.” It should be noted that this conference is cosponsored by 19 technical committees of the Institute of Electronics, Information and Communication Engineers (IEICE) in Japan and one of successful show cases of domestic conference covered cross research fields: AI, communication, and networking.

During the conference, almost 16 sessions, including keynote speech, invited talks, tutorial, panel discussions, and poster presentations were held, and over 140 presenters introduced and discussed their recent research activities in terms of machine learning, wired and wireless communications, networking and application. This report briefly introduces the activities of RISING 2019.

## 2. Morning Sessions of the First Conference Day (November 26<sup>th</sup>)

In the morning sessions of the first conference day, there were five sessions: opening, keynote speech, special session and poster session. In the opening (see Fig. 1), Prof. Nakao from the University of Tokyo who is an organizing committee chair of this conference gave an opening talk and presented the motivation and objective of RISING 2019. In the next keynote speech, the organizing committee invited Mr. Nakamura from Ministry of Internal Affairs and Communications (MIC) and he provided the keynote speech on the current national research projects in terms of AI networking, in



Fig. 1 Opening session of RISING 2019. Prof. Nakao from the University of Tokyo (right person) gave an opening talk.

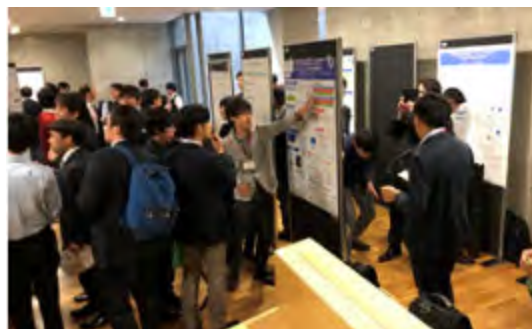


Fig. 2 Poster session in the morning session of the first conference day.

particular “Research and development for innovative AI network integrated infrastructure technologies.” In the special session, related to “Research and development for innovative AI network integrated infrastructure technologies,” the committee invited four top researchers from KDDI, NICT, Hitachi, and NEC, and they presented their state-of-the-art AI networking technologies. Furthermore, in order to discuss related technologies more deeply, the first poster session (there were totally four poster session during the conference) were held, and the 37 poster presenters, including young academic and industry researchers, introduced their

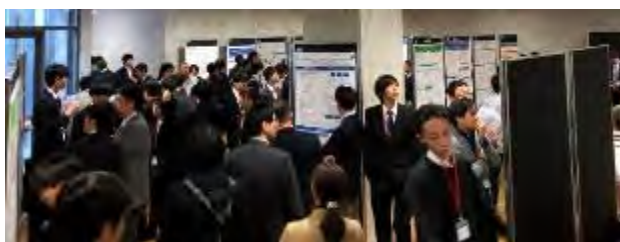


Fig. 3 Poster session in the afternoon session of the first conference day.



Fig. 5 Banquet.



Fig. 4 Panel discussion.

recent research activities in terms of machine learning, wired and wireless communications, networking and application (see Fig. 2).

**3. Afternoon Sessions of the First Conference Day (November 26<sup>th</sup>)**

The afternoon sessions of the first conference day consisted of an invited talk, a poster session, and a panel discussion session. The invited talk was given by Prof. Matsuo from the University of Tokyo. He gave a presentation on super-intelligence enabled by artificial intelligence.

The poster session was the second one of the three poster sessions in the conference, where 37 poster presentations were given by industry and universities (see Fig. 3). The last session of the first day was the panel discussion hosted by Prof. Nakao, where four panelists stated their opinions on several topics such as feasibility, challenges, and future (see Fig. 4).

After the session, a banquet was held at Toh-Ten-Koh Ueno Flagship Shop. The participants enjoyed conversation taking Chinese food (see Fig. 5).

**4. Morning Sessions of the Second Conference Day: Part 1 (November 27<sup>th</sup>)**

In the morning sessions of the second conference day, there were two parallel sessions.

The case study session had five speakers, and they talked about company’s case study on AI and machine learning techniques for communication technologies (see Fig. 6). The first speaker was Mr. Hu from NTT. The title of his talk was “When Network Met AI.” He talked about botnet detection techniques with machine learning. The proposed method named “Alchemy” solves an unbalance between the number of benign and



Fig. 6 Case study session by five presenters.

malicious data effectively by resampling several subsets of data.

The second speaker was Dr. Komatsuzaki from Mitsubishi Electric Corporation. The title of his talk was “Ultra-Wideband Digitally Controlled Gallium Nitride (GaN) Amplifier for Mobile Base Stations.” The proposed circuit supports several frequency bands used in 3G, 4G, and 5G. By digitally controlling input signals with an AI technique, high power efficiency of amplifier in mobile base stations is realized.

The third speaker was Mr. Tomonaga from Fujitsu Laboratories Ltd. He talked about the efforts of Fujitsu to improve operational efficiency by utilizing data obtained from networks. He described a traffic anomaly detection technique and an answer recommendation system for network maintenance centers. He also mentioned challenges that have emerged from internal practices of AI techniques in Fujitsu.

The fourth speaker was Mr. Nakazato from NTT. His talk was about examples of machine learning applications in the field of communication, especially on MaaS. In that use case, it is assumed that specific vehicles are detected automatically on a highway by video cameras. And they always capture the target vehicle while switching recording cameras around the vehicle. He showed a demonstration video, where video cameras autonomously track a target car-type robot.



Fig. 7 Tutorial session on machine learning by Prof. Ohzeki.

The final speaker was Mr. Tanio from NEC Corporation. In his talk on signal processing techniques using machine learning, Digital Pre-Distortion (DPD) for wireless signals and nonlinear compensation for optical signals with machine learning techniques were presented. He showed the reduction in the size of the neural network (pruning) using an L1 norm can greatly decrease computation cost for neural network learning without large sacrifice in the distortion compensation efficiency.

### 5. Morning Sessions of the Second Conference Day: Part 2 (November 27<sup>th</sup>)

In another morning session, Prof. Ohzeki held a tutorial session titled “An introduction to machine learning with Python” (see Fig. 7). The tutorial consisted of a lecture and a hands-on session.

During the lecture, he introduced deep learning models from a simple model. He first introduced a linear model composed of nonlinear transformations and an inner product of vectors. By applying them repeatedly, a deep learning model was introduced. After this introduction, he explained step-by-step how the deep learning model works and is formulated. This helped us understand that deep learning is the natural extension of a linear model.

During the hands-on session, he explained the latest deep learning methods for speedup and accuracy improvement and how to implement them. He first introduced Google Colaboratory, which is an environment to implement and test machine learning methods. By using this environment, he explained the methods with his live coding. We were also able to implement and test the explained methods immediately. This cycle helped us understand the effect of the latest deep learning methods intuitively. We implemented some deep learning models to solve problems such as iris clustering, handwritten character recognition, and face recognition. All the code from this session is publicly available.

This tutorial played an important role in encouraging participants to apply machine learning methods to their research areas such as networking. More than 100 participants listened to the tutorial, had lively discussions and tried coding.



Fig. 8 Panel discussion. Prof. Yamamoto, a vice-chair of SeMI, talked research field of SeMI.

### 6. Afternoon Sessions of the Second Conference Day (November 27<sup>th</sup>)

After enjoying lunchtime, we had a JSME-IEICE collaboration session, a third poster session, special panel sessions, and an award and closing ceremony. The conference was full of the audiences in every session.

In the JSME-IEICE collaboration session, there were four presenters. Dr. Kubota talked about collaboration between JSME and IEICE. The remaining three presenters presented their works which applied machine learning in traffic safety, manufacturing, and robotics.

In the third poster session, there were 37 posters. The presenters and audiences discussed actively, and the session was filled with excitement. I presented my work in the session and obtained lots of insightful comments from the audiences, that's great.

In the panel sessions over almost three hours, chairs and vice-chairs of 16 technical committees talked about cross-field research toward super-intelligent networking (see Fig. 8). The panelists talked their visions; how we leverage AI in telecommunications and how we collaboratively accelerate our research fields with AI.

Fifteen poster presenters won the prizes in RISING 2019. Congratulations! The conference ended in a big success.

### 7. Conclusion

The 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019) was greatly successful. We enjoyed all sessions and social events. We would like to attend the next Cross-Field Research Association of Super-Intelligent Networking (RISING 2020) again.

### 8. Reference

- [1] The 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019) conference page (Japanese), <https://www.ieice.org/~rising/jpn/>

# Young Researchers' Participation Report for the 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019)

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## 1. Introduction

In the 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019), many young researchers were participated and made poster presentations (see Fig. 1). In the following, four young researchers report the experience of RISING 2019.



Fig. 1 Many participants in RISING 2019.

## 2. Report on Poster Presentation and Invited Talk

This program consists of a keynote speech, poster sessions, an invited session, distinguished expert panel sessions, and so on. In the second poster session, I made a presentation about the traffic information distribution scheme to lead users' selfish routing into social optimum traffic conditions in road networks. Through the discussion with participants, I could get a useful point of view for this work.

The invited talk was given by Prof. Yutaka Matsuo from the University of Tokyo (see Fig. 2). He introduced an overview of deep learning and a future vision of artificial intelligence. His presentation showed us the possibility that our human beings have been faced with the cognitive limitation on high-dimensional models, which can be modeled by deep neural networks. This perspective gives us an opportunity to discuss the future directions of artificial intelligence. It was a meaningful session with many people participating.

(Takanori Hara)

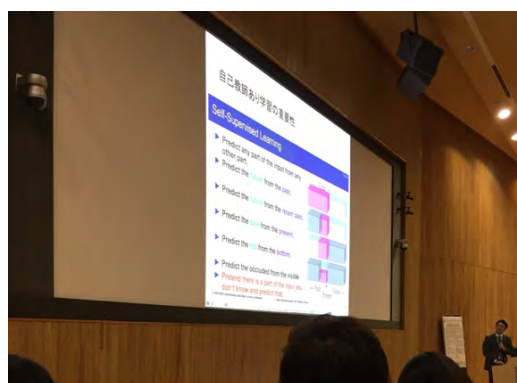


Fig. 2 Invited talk by Prof. Matsuo.

## 3. Broadening My Interests via Cross-Field Research

On the first day in the conference, I presented my study. My research topic is dynamic, smart and intelligent spectrum sharing in the wireless communication field. The spectrum sharing is one of important technologies for solving the spectrum scarcity problem. The spectrum sharing composes of the radio environment awareness and the exploitation of the spectrum efficiently. Thus, I think that artificial intelligence (AI) including machine learning techniques and big data technology is also of importance to make the spectrum sharing smarter and more intelligent. To this end, I have applied the machine learning to the radio environment awareness. That means the modeling of the radio spectrum usage exploiting data from spectrum measurement. Thus, it is important to develop the spectrum measurement system to apply the machine learning to the modeling, but there are little practical spectrum measurement systems at the moment. Moreover, the value of machine learning may be reduced if the quality of the data is deteriorated. Therefore, I have devoted to developing highly accurate spectrum measurement system. More specifically, I have developed several digital signal processing algorithms for the spectrum measurement to collect highly valuable data to machine learning and the spectrum sharing.

I hope that our measurement system will become valuable for the future spectrum sharing. Through the conference, I have interested in many different research fields. Lastly, I would like to thank all members of the RISING organization committee for giving me this kind of opportunity.

(Hiroki Iwata)

#### 4. Impressions of Talks and My Presentation

In this workshop, under the theme of “Super-Intelligent Networking”, various researches were presented. In particular, two presentations revolutions of deep learning presented by Prof. Yutaka Matsuo (Univ. of Tokyo) and applications of deep learning for robotics presented by Mr. Kenjiro Yamamoto (Hitachi, Ltd.) were very impressive. Prof. Matsuo explained that the revolutions of deep learning bring the realizations of recognition, motion learning, and understanding of the meanings of words, in this order. Moreover, he mentioned that “intelligence” is an ability to drive a motor system by a symbolic system as if we imagine a fiction (and do it). Mr. Yamamoto presented the robot control using deep learning in the collaboration session with the Japan Society of Mechanical Engineers (JSME). He showed a video of a robot. The robot autonomously opened and passed through a door by recognizing the image from the camera and learning the motion from the remote control by a human. The behaviour is computed from deep learning. The robot seems to imagine a scene in which the robot itself opens the door.

In the poster session, I presented a poster entitled “Physarum-based Path Diversification for Wireless Multi-hop Networks” (see Fig. 3). The slime molds make us feel that they have intelligence, such as adjusting the robustness and transport efficiency of the path based on the environmental effects, and acquiring the toxic substances based on the experience. It was pointed out that we could be clarified the applicability of the behaviour model to actual wireless networks. The comments are very helpful for thinking about the future work, and therefore, we would like to progress our research and to show another aspect of slime’s intelligence in RISING 2020.

(Hiroshi Katada)

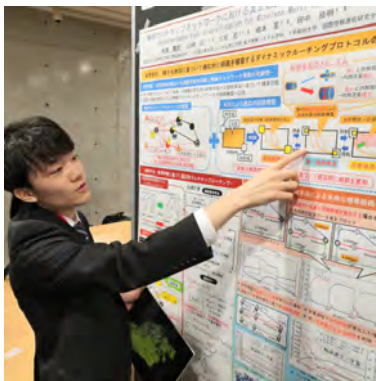


Fig. 3 My poster presentation.

#### 5. Hoping for Cross-Field Research

Attending the panel discussions on the second day, I was impressed that the panelists and audience agreed that research communities should collaborate with one another by sharing their own data, mathematical tools, or infrastructure devices. I would appreciate and keep in mind this discussion for a long time.

The reason why I highlight this event may come from my personal experience. I have been studying a millimeter wave (mmWave) wireless communication system enhanced by camera images. In examining the proposed system, experimental data of mmWave received powers was required, and I measured the received powers by myself. This experience helped to gain my knowledge and skills regarding the propagation measurement a lot. Meanwhile, I thought that if I collaborated with other experts in the field of propagation measurements, I could perform a more comprehensive examination of the proposed systems. This panel discussion reminded me of this experience and motivated me to think of cross-filed collaborations among other research communities.

By the way, it is an honor that my poster presentation titled “Handover Control for mmWave Networks with Proactive Performance Prediction Using Depth Images and Deep Reinforcement Learning” received the Best Poster Presentation Award (see Fig. 4). Thank you very much!

(Yusuke Koda)



Fig. 4 Award ceremony.

#### 6. Conclusion

In this participant report, the four distinguished young researchers expressed their impressions of RISING 2019. RISING 2020 will be held in the coming fiscal year. The authors recommend that many young researchers participate and make a presentation in RISING 2020.

#### 7. Reference

- [1] The 2019 Cross-Field Research Association of Super-Intelligent Networking (RISING 2019) conference page, <https://www.ieice.org/~rising/jpn/>

# Report on the 33<sup>rd</sup> Optical Communication Systems Symposium “Optical Communication: Perspective of Reiwa Period”

Takuya Ohara<sup>†</sup> and Masanori Takahashi<sup>‡</sup>  
<sup>†</sup>NTT, <sup>‡</sup>Furukawa Electric Co., Ltd.



## 1. Introduction

The 33<sup>rd</sup> Optical Communication Systems (OCS) Symposium “Optical Communication: Perspective of Reiwa Period.” was held on Dec. 17–18, 2019 at the Toray Human Resources Development Center in Mishima City, Shizuoka, Japan. It was organized by the IEICE Technical Committee on OCS, in cooperation with the IEEE Photonics Society Japan Chapter, the Photonic Internet Forum (PIF), and the IEICE Technical Committee on Extremely Advanced Optical Transmission Technologies (EXAT). On the occasion of an imperial era change in Japan, this year’s symposium, with 186 attendees and 25 exhibitors, was placed as an opportunity to look back technological progress in optical communication during 30 years of the Heisei period and to look ahead future directions in the Reiwa period.

## 2. Technical Sessions

On Day 1 (Dec. 17), following the welcome address by Prof. Joji Maeda, the IEICE OCS committee chair, the symposium started with a workshop entitled “Technologies in Reiwa: from a system’s perspective.” It was contributed by the following four invited speakers (Fig. 1): Prof. Hiroshi Hasegawa (Nagoya University) presenting photonic networking architectures focusing on design and optimization issues, Mr. Kosuke Komaki (Fujitsu) describing challenges toward > 800 Gbit/s transmission, Dr. Hidenori Takahashi (KDDI Research) providing recent progress on optical submarine cable systems including space division multiplexing, and Prof. Akihiro Nakao (University of Tokyo) proposing innovations in optical and wireless networking from a viewpoint of deployability. They delivered excellent opportunities for all the participants to develop the modern outlook of optical communication technologies from various



Fig. 1 Presenters of Workshop 1: from left, Prof. H. Hasegawa, Mr. K. Komaki, Dr. H. Takahashi, and Prof. A. Nakao.

angle. The workshop was followed by a poster session (Fig. 2), in which 19 posters were presented by young researchers and the award winners listed later.

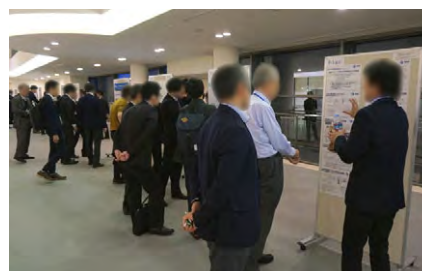


Fig. 2 Snapshot at poster session.

In the evening of Day 1, a keynote speech was given by Prof. Kazuro Kikuchi (National Institution of Academic Degrees and Quality Enhancement of Higher Education) entitled “Progress and future challenges in optical fiber communication technologies: creation of disruptive technologies and extension with sustainable technologies” (Fig. 3). His talk covered historical technologies on optical fiber communications, which illustrated how the transmission capacity increased by 1000-fold in the Heisei period. He then presented recent challenges, such as eigenvalue modulation and space-division multiplexing. At the end, he remarked that only coherent optical communications transformed from “Phantomics” to “Photonics” during the Heisei period, referring to words from Dr. Tingye Li and concluded his talk with expectations of researchers to make other “Phantomics” to “Photonics” transformations in the Reiwa period.



Fig. 3 Keynote speech by Prof. K. Kikuchi.

Day 2 (Dec. 18) started with an invited lecture (Fig. 4), organized by IEEE Photonics Society Japan Chapter, which was given by Dr. Shinji Matsuo (NTT, an IEEE Distinguished Lecturer). His lecture, entitled “Advanced semiconductor lasers: Ultra-low operating



energy and heterogeneous integration with Si photonics devices,” covered the basic principle of semiconductor lasers as well as their recent advances including the reduction of power consumption down to  $\sim$ fJ/bit and ultra-compact directly modulated lasers up to 100 GHz. The rest of the morning session was devoted to the following three invited talks (Fig. 4). The first talk was presented by Mr. Hideki Nishizawa (NTT) on “Activities toward open optical transport in Telecom Infra Project.” He described the trend in open networking initiated from data centers including whitebox switches and how this trend is entering optical and packet transport systems. The second talk was given by Dr. Kazutaka Kanno (Saitama University) and entitled “Progress in reservoir computing using complex optical dynamics.” He introduced the fundamental concept of reservoir computing and how it can be implemented using photonics with the aim of realizing large-scale machine learning with low power consumption. Finally, as a special invited talk, Emeritus Prof. Kenichi Sato (Nagoya University / AIST) gave a lecture entitled “Together with communication technology progress: architectural viewpoint and network research and development.” He first described his early works on ATM, photonic network, and optical nodes with a special focus on architectural viewpoint. Based on these experiences and achievements, he brought us convincing insights into future directions toward optical networking in data center.



Fig. 4 Invited lecturers: from left, Dr. S. Matsuo, Mr. H. Nishizawa, Dr. K. Kanno, and Emeritus Prof. K. Sato.

In the afternoon session, we had another workshop entitled “Technologies in Reiwa: exploring the future,” focusing on devices and subsystems (Fig. 5). Invited talks were given by Dr. Tetsuya Hayashi (Sumitomo Electric) on fibers and cables for space division multiplexing, Dr. Shinsuke Tanaka (Fujitsu) on silicon modulators and transmitters, Dr. Takuo Tanemura (University of Tokyo) on a coherent Stokes vector transmitter and receiver, and Mr. Masanori Nakamura (NTT) on digital coherent signal generation beyond 100 Gbaud. The workshop covered exciting challenges



Fig. 5 Presenters of Workshop 2: from left, Dr. T. Hayashi, Dr. S. Tanaka, Dr. T. Tanemura, and Mr. M. Nakamura.

ongoing toward the Reiwa age and left strong promising messages to the participants for sustainable growth of this field.

### 3. Rump Session

In the evening of Day 1, we had a rump session with a topic of “Let’s attract junior and senior high school students to optical communication!”, hosted by Prof. Hiroyuki Uenohara (Tokyo Institute of Technology). In order to initiate the discussion, Mr. Shohei Beppu (KDDI Research) and Prof. Shojiro Kawakami (Photonic Lattice) first gave a short presentation on how to stimulate young students into this field. The attendees explored their previous experiences and discussed what is the most impressive way to introduce optical communications to the youth of today. It reminded the attendees about themselves why they are interested in this research field.

### 4. Award Ceremony

During the technical sessions, we celebrated this year’s OCS award winners at the award ceremony (Fig. 6). The OCS Technical Committee presented the awards to the following winners:

- OCS Best Paper Award: “Real-time MIMO optical receiver in weakly-coupled ten-mode fiber transmission,” by Dr. Koji Igarashi (Osaka University) et al.
- OCS Young Researchers Award: Mr. Naoya Takefushi (Tohoku University) for “GAWBS noise influence for digital coherent transmission and its fiber dependence”
- OCS Young Researchers Award: Mr. Hiroki Taniguchi (NTT) for “255-Gb/s PAM-8 O-band transmission using MLSE based on nonlinear channel estimation with 20-GHz bandwidth limitation”



Fig. 6 OCS award-winners: from left, Mr. H. Taniguchi, Dr. T. Tsuritani, Mr. N. Takefushi, Mr. Y. Saito, Prof. J. Maeda (presenter), Mr. D. Soma, Mr. S. Beppu, Mr. M. Kikuta, and Dr. K. Igarashi.

### 5. Conclusion

We hope that the participants received a lot of invaluable stimulation and inspiration from the presentations and discussions during the two-day symposium. Finally, the OCS technical committee would like to express gratitude to all the speakers, exhibitors, and participants, for their contributions to the successful symposium.

# Report on the Japan-Korea Joint Conference on Satellite Communications (JC-SAT 2019)

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<sup>†††</sup>KDDI Research, <sup>††††</sup>NICT



## 1. Overview

This article reports on the Japan-Korea Joint Conference on Satellite Communications (JC-SAT) that was held in JR Hakata City, Fukuoka, Japan, on October 10<sup>th</sup> and 11<sup>th</sup>, 2019.

This conference was jointly organized by Technical Committee on Satellite Communications of IEICE in Japan and the Korean Society of Space Technology (KOSST) in South Korea. The conference was sponsored by the IEEE VTS Japan Chapter and funded by the Support Center for Advanced Telecommunications Technology Research (SCAT).

The JC-SAT intends to provide a forum for researchers in the field of satellite communications and applications to discuss the current status, technical challenges, standards, fundamental issues, and future services (Fig. 1).



Fig. 1 Audience at JC-SAT 2019.

## 2. Report on Sessions

The technical program of the JC-SAT 2019 consisted of 8 sessions, during which 23 general papers and 5 special papers were presented. The total number of registered participants reached 39: 26 from Japan and 13 from Korea. The presented papers covered a wide range of unique and novel technical topics on satellite communication.

On the first day, 2 general and 1 special sessions were held. Dr. Fumihiko Yamashita, a general chairperson of the JC-SAT 2019, gave a welcome speech (Fig. 2), and Dr. Ki-kuen Kim, a general co-chairperson of the JC-SAT 2019, presented a congratulatory address (Fig. 3) in the opening ceremony. During the special session, Dr. Morio Toyoshima reported on the “Research and Development of Satellite Communication Technologies at the National Institute and Communications Technology and Future Prospects”. Dr. Ki-kuen Kim also presented the “Overview of Korean Government Satcom for Special Mission”, and Dr. Mitsugu Okawa presented the “R & D Activity of Flexible Payload Technologies for Next Generation High Throughput Satellite by the Engineering Test Satellite 9 Project”.

On the second day, 4 general and 1 special sessions were held. During the special session, Dr. Byoung Sun presented the “ETRI satellite R & D activities”, and Mr. Osamu Yoshida presented the “Overview of OneWeb Satellite Constellation Project”.



Fig. 2 Welcome speech by Dr. Fumihiko Yamashita, organizing committee chair of JC-SAT 2019.



Fig. 3 Congratulatory address by Dr. Ki-kuen Kim, organizing committee co-chair of JC-SAT 2019.

### 3. JC-SAT Award Ceremony

At the end of the second day, the technical committee of the JC-SAT 2019 announced the winners of the outstanding research paper award (JC-SAT Award) among all submitted general papers (Fig. 4).

Both IEICE and KOSST technical members profoundly reviewed all the papers and discussed the review results of award candidate papers, which is a mandatory condition for award authorization.

Through the above procedure, the following two papers were honored with the JC-SAT Award.

1. Kohei Ueno, Eiji Okamoto, Hiroyuki Tsuji, and Amane Miura, “Performance Improvement of UAV-assisted Data Gathering System for Distributed IoT Terminals”
2. Taeyeoun Kim, Woncheol Cho, and Jihwan Choi, “User-Customized Profit Optimization for LEO Satellite Network Slices”

During the JC-SAT Award ceremony on the second day, Dr. Ki-kuen Kim handed the award certificate to the winner from IEICE (Fig. 5), and Dr. Fumihiko Yamashita did it to the winner from KOSST (Fig. 6).



Fig. 4 Announcement of JC-SAT Award.



Fig. 5 JC-SAT Award winner selected from the IEICE general papers.



Fig. 6 JC-SAT Award winner selected from the KOSST general papers.

#### 4. Conclusions

Mr. Hisashi Sujikai, a chairperson of the technical committee of the JC-SAT 2019, delivered a closing speech, reporting that the JC-SAT 2019 concluded with a great success (Fig. 7). The technical committee members held a pre-meeting on the day before the first day of the JC-SAT 2019. At the pre-meeting, it was tentatively decided that the next JC-SAT would be held in Korea on October 7<sup>th</sup> and 8<sup>th</sup>, 2020.



Fig. 7 Participants of JC-SAT 2019.

# Report on 2019 Asian Wireless Power Transfer Workshop (AWPT 2019)

Long Li<sup>1,\*</sup>, Yan Shi<sup>2,\*</sup>, Qiaowei Yuan<sup>3,\*\*</sup>

<sup>1</sup> General Co-chair, <sup>2</sup> TPC Co-chair,

<sup>3</sup> Local Arrangement Co-chair of AWPT 2019

\* Xidian University, China,

\*\* National Institute of Technology, Sendai College, Japan



## 1. Introduction

The 2019 Asia Wireless Power Transfer Workshop (AWPT 2019) was successfully held at South Campus of Xidian University, Xi'an, China from Oct. 31 to Nov. 2, 2019. The AWPT 2019 is organized by Xidian University and technically co-sponsored by IEICE communication society, IEEE Xi'an Section, Qian Xuesen Space Technology Laboratory, and China Promotion Committee for Space Solar Power Station (SSPS), and financially supported by Key Laboratory of High-Speed Circuit Design and EMC, Ministry of Education, Wireless Power Transfer Consortium for Practical Applications (WiPoT), Division of International Cooperation & Exchanges of Xidian University, Shanghai Laitian Technology Co., Ltd., Guangdong Shenglu Telecommunication Technology Co., Ltd., and GD Midea Small Domestic Appliances Division.

## 2. AWPT Histories

The 2019 Asian Wireless Power Transfer Workshop (AWPT 2019) in Xi'an is the fifth of the consecutive series inaugurated in Taiwan, in 2015 and held in Chengdu, China in 2016 and in Singapore in 2017 and Sendai, Japan in 2018. AWPT 2019 will offer a rich scientific program of the highest quality with keynote and invited speakers from all over the world and provide a broad forum of exchange for the progress and advancements of wireless power technologies in consumable, biomedical and industrial applications.

## 3. Committee Members

Prof. Long Li with Xidian University and Prof. Masaharu Takahashi with Chiba University served as general co-chairs of the AWPT 2019. Prof. Yan Shi with Xidian University, Prof. Takafumi Fujimoto with Nagasaki University, Prof. Guoqiang Li with South China University of Technology, Prof. Kenjiro Nishikawa with Kagoshima University, and Prof. Xinbin Hou with Qian Xuesen Laboratory served as technical program committee co-chairs. Prof. Raj Mittra with University of Central Florida, Prof. Qiang Chen with Tohoku University, Prof. Naoki Shinohara with Kyoto University, Prof. Ke Wu with University of

Montreal, Prof. Yongxin Guo with National University of Singapore, Prof. Yi Huang with University of Liverpool, Prof. Zhizhang Chen with Fuzhou University and Dalhousie University, and Prof. Shuxi Gong with Xidian University served as international advisory committee co-chairs. Prof. Huiqing Zhai with Xidian University and Prof. Akio Wakejima with Nagoya Institute of Technology served as award committee co-chairs. Prof. Jincheng Zhang with Xidian University, Prof. Wen Jiang with Xidian University, Mr. Binpeng Li with Xidian University, and Prof. Tsunayuki Yamamoto with Yamaguchi University served as finance committee co-chairs. Dr. Haixia Liu with Xidian University, Prof. Nozomi Haga with Gunma University and Dr. Osamu Kagaya with AGC Inc. served as website and publicity co-chairs. Prof. Jin Huang with Xidian University, Prof. Xiaowei Shi with Xidian University, Prof. Qiaowei Yuan with National Institute of Technology, Sendai College, Prof. Lixin Guo with Xidian University, Prof. Zhangming Zhu with Xidian University, and Dr. Shiwei Dong with CAST served as local arrangement co-chairs.

## 4. Workshop Overview

The AWPT 2019 focused on various wireless power transfer related technical areas including wireless power transfer and energy harvesting, wireless power transmitters and receivers, integrated circuits and systems, and applications of wireless power transfer, and other device, system or application topics. The IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology (J-ERM), will publish a Special Issue devoted to the AWPT 2019. Finally, 76 papers including 3 keynote talks, 24 invited talks, and 49 poster presentations were accepted, and more than 120 attendees. 3 keynote talks are as follows:

- Baoyan Duan (Academician of Chinese Academy of Engineering), "The updated SSPS-OMEGA design project and the latest development of China".
- Ke Wu (Fellow of the Canadian Academy of Engineering (CAE) and the Royal Society of Canada), "Ambient energy harvesting for wireless internet of things and smart environment".

- Naoki Shinohara (IEEE MTT-S Technical Committee 26 chair), “Recent standardization of microwave power transfer”.

#### [WiPot Award & Best Student Award]

- Bo Yang, Tomohiko Mitani, Naoki Shinohara, “A 5.8GHz magnetron phased array system”.

#### [Best Student Award]

- Chen Xu, Yuan Zhuang, Ye Wang, Le Fang, Yi Huang, Jiafeng Zhou, “Electric field energy harvesting on electrical cables and its applications in voltage measurement”.
- Pei Zhang, Hao Yi, Xuanming Zhang, and Long Li, “A dual-band broadband back-to-back microstrip antenna for wide-angle RF energy harvesting and wireless power transfer”.

#### [Student Award]

- Zhongqi He, Pengde Wu, Changjun Liu, “Microwave rectifying based on schottky diodes with enhanced dynamic ranges”.
- Akika Yoshie, Keita Sakakibara, Takashi Hikage, “Numerical estimation of indoor propagation characteristics considering human-body shadowing for beam-type wireless power transfer”.
- Mingyang Chen, Bingcheng Ji, Katsuhiro Hata, Takehiro Imura, Hiroshi Fujimoto, Yoichi Hori, Sayuri Honda, Shuhei Shimada, Osamu Kawasaki, “Pareto optimization of power and efficiency for lunar rover wireless power transfer system with multi-layer insulation”.
- Jie Yang, Yan Shi, “A wireless power transfer system with frequency conversion characteristic”.
- Jiaxu Li, Sen Yang, Kedi Zhang, Huiqing Zhai, “Study on the wireless power transfer in multi-reflection environment based on time reversal”.
- Yuxin Zhang, Danyu Yang, Menghan Sun, Huapeng Zhao, Jiafeng Zhou, “Design of multiple antiparallel rectangular coils for range stable wireless power transfer”.
- Nobuyuki Takabayashi, Naoki Shinohara, Tomohiko Mitani, Minoru Furukawa, “Study on the practical use of microwave power transfer to mini-drones using flattopped beams at 5.74 GHz”.
- Hikaru Kitaoka, Shinji Abe, Satoshi Tsukamoto, Takashi Ohira, “Minimum size design of capacitive coupler for wireless power transfer to achieve specified power efficiency”.

## 5. Conclusion

On behalf of the organizing committee of AWPT 2019, we deeply appreciate to all invited speakers, attendees, and student volunteers of the workshop. We believe that the AWPT 2019 was a successful workshop.



Fig. 1 Attendees of AWPT 2019.



Fig. 2 General co-chairs of AWPT 2019.



Fig. 3 Keynote speakers of AWPT 2019.

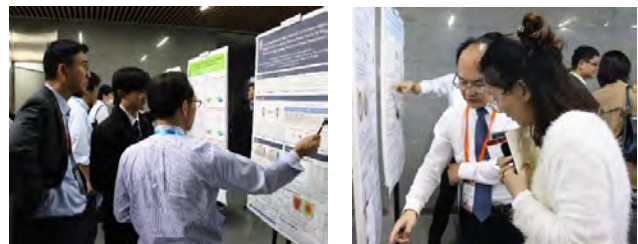


Fig. 4 Poster presentation of AWPT 2019.



Fig. 5 Oral presentation and Banquet of AWPT 2019.

# Report on the 9<sup>th</sup> International Symposium on Network Virtualization

Takeshi Kinoshita\* and Yutaka Takita\*\*  
\*NTT Corporation \*\*Fujitsu Laboratories Ltd.



## 1. Introduction

The 9<sup>th</sup> International Symposium on Network Virtualization was held on November 25, 2019, at the University of Tokyo (U-Tokyo), Japan. The symposium has been held annually since 2011 to promote research and development of network virtualization through international collaboration of researchers, aiming at realizing new communications infrastructure using the technology.

## 2. Overview

The theme of this year's symposium was "Network Softwarization in-progress: Advanced test beds and field trials." Latest research activities and technological issues on network softwarization were discussed with the focus on large-scale experimental works for infrastructure deployment as well as software and hardware progresses that support them.

The symposium was co-hosted by IEICE Technical Committee on Network Virtualization; JSPS ITRC Network Virtualization Working Group; Network Architecture Committee, Fifth Generation Mobile Communication Promotion Forum (5GMF); National Institute of Information and Communications Technology (NICT); and Interfaculty Initiative in Information Studies, U-Tokyo. Dr. Takashi Shimizu of NTT Corporation led the Program Committee.

About 50 researchers and engineers from both industry and academia joined the conference. As in the past, there were student attendees as well. A social gathering was held after the symposium to facilitate the international interaction.

## 3. Session Program

The symposium started with the greeting by Dr. Takashi Shimizu, chair of this year's symposium, followed by two opening speeches by Dr. Mizuhiko Hosokawa of NICT and Dr. Kiyohide Nakauchi of ITRC. In the following talk sessions, each of the four invited speakers made a presentation for a 40-minute time slot.

The first speaker was Dr. Abhimanyu Gosain of Northeastern University, who is Technical Program Director of Platforms for Advanced Wireless Research (PAWR) Project Office. The presentation title was "A survey of USA National Wireless Mid Scale Research Infrastructure for Research and Experimentation." He had been a speaker in the previous two years' symposiums, in each of which he introduced the newest



Fig. 1 Greeting by Dr. Takashi Shimizu (Chair).



Fig. 2 Opening Speech by Dr. Kiyohide Nakauchi.

activities of PAWR, a joint project by National Science Foundation (NSF) and an industry consortium on wireless technologies. This year, he explained advancements on two projects that were selected as the PAWR awardees in 2018 (Round I): Platform for Open Wireless Data-driven Experimental Research (POWDER) and Cloud Enhanced Open Software Defined Mobile Wireless Testbed for City-Scale Deployment (COSMOS). He also introduced the newest project, Aerial Experimentation and Research Platform for Advanced Wireless (AERPAW), which is the 2019 (Round II) awardee. According to him, the next round (Round III) will focus on innovative technologies applicable to rural and other low-density geographic areas.

The next speaker, Dr. Dan Kilper of the University of Arizona, Tucson, made a presentation about “COSMOS as a Testbed for Virtualized Networks from Fiber to the Mobile Edge Cloud.” As mentioned above, COSMOS is a project funded in the framework of PAWR. It provides a testbed consisting mainly of software defined radio (SDR), software defined networking (SDN) based optical networks, and edge clouds, and has been deployed in New York. In the project, not only emerging networking technologies but also applications, such as cloud assisted autonomous vehicles, are being tested intensively.

The third speaker was Dr. Raymond Knopp of EURECOM. In his presentation titled “An Overview of OpenAirInterface and EURECOM’s 5G Experimental Facility,” he first summarized various developments of OpenAirInterface (OAI) with their scopes and objectives. OAI provides software suites that are compliant with 3GPP specifications and can be used on commodity computers. Its contributors include large vendors. It now supports 5G radio systems, and there are some commercial products using it. In the presentation, he also introduced a number of experiments using OAI that are being conducted in European sites.

The final speaker, Dr. Toshiyuki Miyachi of NICT, talked about “StarBED as a network and IoT emulator.” StarBED is a large scale emulation facility that works as a testbed for different types of emulators. Since the project of StarBED was initiated in 2002, it has enhanced the objectives. The latest version, called StarBED 4, provides environments for evaluating IoT small devices as well as human and physical field behaviors. He explained technical challenges realizing an integrated environment while presenting some case studies to use the emulators.



Fig. 3 Presentation by Dr. Toshiyuki Miyachi.

Following the talk session, there was a one-hour panel session, which was chaired by Dr. Akihiro Nakao of U-Tokyo. With the above four speakers as panelists, the panel discussed challenges towards the 5G era. One of the issues was how to democratize 5G, which was quite interesting as well as realistic. Unlike when 4G

started, there are a number of highly useful open source software and hardware products available now, such as OAI, even though commercial 5G services have yet to be realized on a large scale. Community activities on product developments and/or experiments have also been active across the world in recent years, increasing their role in driving innovations. These trends are not limited to 5G but can be seen in other fields like optical networks, which traditionally consist of closed systems. This year’s panelists, who are strongly involved in these trends and pushing them forward, exchanged opinions about related issues, such as how to foster international collaborations, how academia can or should contribute to bringing about innovations, and so on. The discussion was very lively and identified a number of interesting issues as homework for the next year.

Additional information about the program is available at the symposium website [1].



Fig. 4 Panel Session.

#### 4. Conclusion

Network softwarization technologies have been steadily penetrating into both fixed and wireless networks, a move occurring along with developments of various open source products. Community activities, such as test beds and field trials conducted by industry-academia collaborations, play a key role in the move. This year’s symposium introduced the latest activities of both industry and academia, showing they were making concrete progresses in laboratories, field trials, or projects.

#### 5. Reference

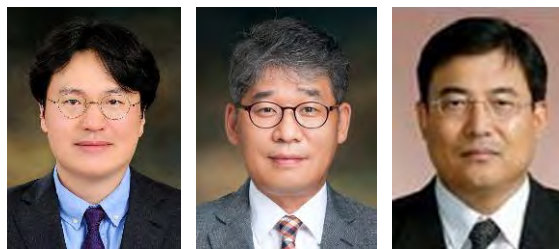
[1] <http://www.ieice.org/~nv/english/symposium1>



# Report on the 10<sup>th</sup> International Conference on ICT Convergence (ICTC 2019)

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## 1. Introduction

The 10<sup>th</sup> International Conference on Information and Communication Technology Convergence (ICTC 2019) was held in Ramada Plaza Hotel, Jeju Island, Korea from October 16 to 18, 2019. ICTC is a leading, flagship international conference hosted by the Ministry of Science and ICT (MSIT) of Korean government, organized by the Korean Institute of Communications and Information Sciences (KICS) and technically co-sponsored by IEICE-CS and IEEE Communications Society. ICTC 2019 features an extremely rich program with the main theme of “ICT Convergence Leading the Autonomous Future.” The conference addresses numerous challenges of ICT convergence over various industrial sectors, including wireless and mobile communication systems and infrastructure, future networks, services and applications, smart devices and consumer appliances, cloud computing, green communication, healthcare and bio-informatics, and Internet of Things (IoT).

## 2. Conference Program

The conference program includes plenary sessions, invited industrial sessions, technical paper sessions, and special sessions.

In two plenary sessions (Fig. 1), we had 4 keynote speeches. The Plenary Session 1 started with the opening address by Prof. Yeong Min Jang, (President of KICS), and a congratulatory address by Dr. Youngsam Kim (President of Korea Electronics Technology Institute (KETI), Korea). Then, Dr. Jaeho Jeon (Head of R&D, Networks Business, Samsung Electronics Co., Ltd, Korea) delivered a keynote speech on “Commencing the Journey of 5G Commercialization” which was followed by another keynote speech on “Realizing 5G vision” by Mr. Hakan Cervell (CEO of Ericsson-LG). Plenary Session II consists of 2 keynote speeches. Dr. Myungjoon Kim (President of Electronics and Telecommunications Research Institute (ETRI), Korea) delivered a keynote speech on “Artificial Intelligence and Its Application to ICT” and Prof. Khaled B. Letaief (President, IEEE Communications Society) delivered a keynote speech on “Artificial Intelligence for Wireless Network Optimization.”

Each of two industrial sessions (Fig. 2) consists of 3 invited talks from industries. The theme of Industrial Session I was Industrie 4.0, AI Connected Healthcare



Fig. 1 Plenary Session.

Platform, and Convergence of ICT and Mobility. Mr. Han Tiong Law (APJC Manufacturing Industry Lead, Industry Solution Group, Cisco Systems, USA), Dr. Sambit Sahu (Manager and Research Scientist, IBM T.J. Watson Research, USA), and Dr. Chang “Charles” Choo (Technical Consultant, Mando Innovations Silicon Valley, USA) gave excellent talks on the theme. In Industrial Session II, Dr. Jong-Min Lee (Vice President, SK telecom, Korea), Mr. Andy Park (Sr. Manager, Government Affairs, Qualcomm Korea) and Dr. Hyuckchul Jung (Vice President, Morgan Stanley, USA) gave interesting talks on 5G era, mmWave breakthrough, and AI-enabled Business Chatbot Applications.

Regarding technical paper sessions (Fig. 3), 802 papers were submitted to the conference. After thorough review process, the technical program committee (TPC) accepted 361 papers, which were organized into 24 oral sessions and 2 poster sessions. The overall acceptance ratio was about 45%. The topics of technical paper sessions covered wireless and mobile



Fig. 2 Industrial Session.



Fig. 3 Technical Session.

communications, information and communication theory, future internet, smart media and broadcasting, green communication technologies, smart grid, u-healthcare and bio-informatics, IoT, Machine-to-Machine (M2M), and encryption and security. In addition, 15 workshop sessions were provided and 6 special sessions were organized with 19 invited talks from academia and industries.

### 3. Social Events

At the first night, the welcome reception was held at the convention hall of hotel. The participants enjoyed the beverage and cookies talking together.

The conference banquet (Fig. 4) was held at the second night. The banquet began with a welcome address and introduction of OC members by Dr. Jaebum Seok (President of Institute of Information & communications Technology Planning & Evaluation (IITP), Korea). The 10<sup>th</sup> anniversary ceremony was also held. Prof. Myungsik Yoo (TPC Chair) made a TPC report, including paper statistics and Best/Excellent Paper Award selection procedure. Then, a Symposia Program Committee (SPC) report was made by Dr. Jaedoo Huh (SPC Chair). 2 Best Paper Awards and 4 Excellent Paper Awards were presented to the authors of six selected papers (Fig. 5). All participants enjoyed the banquet with nice Korean food and an exciting performance.



Fig. 4 Conference Banquet.



Fig. 5 Best/Excellent Paper Award.

### 4. Conclusion

Since 2010, ICTC has been the unique global premier event for researchers, industry professionals, and academics interested in the latest developments in the emerging industrial convergence centered on the ICT technologies. On behalf of OC and TPC, we would like to thank all the participants and sponsors who made ICTC 2019 a big success. It is our great pleasure to announce that the next event, ICTC 2020, will be held in Ramada Plaza Hotel, Jeju Island, Korea, during October 21-23, 2020 [1]. ICTC 2020 invites the submission of original research works in all areas of infrastructure, services, technologies, and application of ICT convergence.

### 5. Reference

- [1] <http://ictc.org/>

# Report on 2019 International Symposium on Antennas and Propagation (ISAP2019)

Toru Takahashi  
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## 1. ISAP2019

2019 International Symposium on Antennas and Propagation (ISAP2019) was held at Xi'an Paradise Resort, Xi'an, China, from October 27<sup>th</sup> to 30<sup>th</sup>, 2019. This was the 12<sup>th</sup> ISAP outside Japan since the symposium started to be held in Asia-Pacific region every year. ISAP2019 was co-organized by Xidian University, Southeast University, and South China University of Technology, and was in cooperation with a lot of academic institutes not only in Asia-Pacific region, but also in USA and Europe. The IEICE Communications Society (IEICE-CS) was also one of the technical co-sponsors for the symposium.

Prof. S. Gong (XDU), Prof. W. Hong (SEU), and Prof. Q. Chu (SCUT) served as General Co-Chairs, and Prof. Y. Liu (XDU, China), Prof. Z. Hao (SEU, China), Prof. J. Hirokawa (TIT, Japan), and Prof. X. Zhang (SCUT, China) served as Technical Program Committee (TPC) Co-Chairs.

The statistics for paper submission and acceptance are summarized in Table 1. Papers were submitted from a lot of countries/regions not only in Asia-Pacific, but also all over the world. Table 2 shows the top five countries/regions for the number of the accepted papers. A lot of reviewers including TPC members, who were nominated by international review system, contributed energetically multiple-review work in a limited time and supported TPC.

On the first day, October 27<sup>th</sup>, two technical workshops were presented. After that, participants were hosted at the welcome reception.

On the second day, October 28<sup>th</sup>, the opening ceremony were held (Fig. 1), and four keynote speeches were presented (Fig. 2). These keynote speeches focused on future challenges of antennas, propagation, and related systems such as 5G communication and beyond, and are listed below.

- Prof. Claude Oestges (UCLouvain, Louvain-la-Neuve, Belgium), "Radio Propagation Modeling for 5G and Beyond".
- Prof. Zhang Yueping (Nanyang Technological University, Singapore), "Antenna-in-Package (AiP) Technology : From Academic Curiosity to Industrial Reality".
- Prof. Hiroyuki Arai (Yokohama National University, Japan), "Optical antenna systems for beyond 5G".

Table 1 Statistics of papers

Submitted Papers	638
Accepted Papers	540 (84.6%)

Table 2 Top five for accepted papers

China	341
Japan	101
Korea	24
Malaysia	12
Taiwan	12



(a) Greeting from General Co-Chair, Prof. W. Hong.



(b) Greeting from IEICE-CS President-Elect, Prof. N. Kikuma.

Fig. 1 Opening Ceremony.



Fig. 2 Keynote speech by Prof. H. Arai.

- Dr. Zhipeng Zhou (Science and Technology on Antenna and Microwave Laboratory), “Research of the Next-generation Phased Array Antenna Technology”.

After the opening ceremony, 60 technical oral sessions, 4 poster sessions were presented during three days from October 28<sup>th</sup> to 30<sup>th</sup>.

Participants were hosted at the comfortable Banquet in the evening on October 29<sup>th</sup>, and enjoyed a musical stage in regard to Tang Dynasty China (Fig. 3).

## 2. ISAP International Steering Committee Meeting

The ISAP International Steering Committee (ISC) Meeting was held at the symposium venue in the evening on October 28<sup>th</sup>.

The ISAP-ISC was established at ISAP2006 by members from 9 countries/regions. The mission of the committee is planning future ISAP and establishing operation rules to steer the symposia smoothly using international cooperation. Now, the committee members are from 12 countries/regions; Australia, China, Hong Kong, India, Japan, Korea, Macau, Malaysia, Singapore, Taiwan, Thailand, and Indonesia.

The operation and venue for future ISAP were discussed in this meeting. After the discussion, it has been decided that the venue of ISAP2022 will be Sydney, Australia. Incidentally, the venues up to 2021 have been decided to be Osaka, Japan in 2020, and Taipei, Taiwan in 2021.

Figure 4 shows photo of the ISC Member.

## 3. ISAP Archives

ISAP-ISC also set up ISAP Archives recording the papers presented at the past ISAP, as shown in Fig. 5. To this day, all the papers from the first ISAP in 1971 to ISAP2018 except for ISAP2017 have been digitized and online. Anybody in the world AP community can access ISAP papers with free of charge. The archive is updated every year. This service will respond to expectations of AP specialists in the world and enhance motivations especially for Asian people to submit papers.

The papers of the latest ISAP will be archived almost a half year later after the ISAP. The papers of ISAP2019 will appear in the ISAP Archives soon. In addition to the ISAP Archives, the papers of recent ISAPs have also been included in IEEE Xplore.

## 4. Conclusion

ISAP2019 provided to contributors and participants an academic and friendship atmosphere for exchanging advances in AP research and strengthening relationship. Many young students also had a chance to discuss with the experts in their fields. The upcoming ISAP2020 are organized by IEICE-CS and will be held in Osaka, Japan, from October 26<sup>th</sup> to 30<sup>th</sup>, 2020. Important Dates of ISAP2020 are listed below. For more details, please visit the ISAP2020 Web site shown in Fig.6 (<http://www.isap2020.org/>).



Fig. 3 One Scene in the Banquet.



Fig. 4 ISC Member.

ISAP Archives		
International Symposium on Antennas and Propagation (ISAP)		
2019	2018	2017
2016	2015	2014
2013	2012	2011

Fig. 5 ISAP Archives Web site.

([http://www.ieice.org/cs/isap/ISAP\\_Archives/](http://www.ieice.org/cs/isap/ISAP_Archives/)).

Fig. 6 ISAP2020 Web site.

(<http://www.isap2020.org/>).

### Important Dates of ISAP2020

Deadline for Student Design Contest Application;  
March 27, 2020.

Deadline for paper submission;  
April 24, 2020

# Report on the 37<sup>th</sup> International Communications Satellite Systems Conference (ICSSC2019)

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(NICT)



## 1. Introduction

ICSSC stands for International Communications Satellite Systems Conference, and it is considered one of the most influential technical conferences on satellite communications systems. The conference is centered mainly on the headquarters of the United States. It was started in 1966 and has been held in the United States until the sixteenth conference in 1997, but it was first held in Japan (Yokohama) for the first time in 1998, and it has been held in Asia once every 4 years since then. This year was the fourth time in Japan for the first time in 8 years.

## 2. Overview of ICSSC2019

The meeting was held for 4 days from October 29 to November 1, 2019, and the venue was the Okinawa Municipal Autonomous Center in Naha City.

The participants were about 150 people, and 15 countries participated in the conference, mainly Japan, the United States, the United Kingdom, Germany, Canada, Australia, and Luxembourg.

The theme of the 2018 joint conference (36<sup>th</sup> ICSSC and 24<sup>th</sup> Ka Conference) was space based communications, applications and technologies in the 5G Era. The 37<sup>th</sup> ICSSC addressed challenges, looking forward to the employment of new technologies, architectures and system solutions for migration, harmonization and integration to make 5G networks more attractive, effective and advanced. The theme of the 37<sup>th</sup> ICSSC was “Ensuring a Realistic Migration, Harmonization and Integration of Space Based Communications Facilities Within the 5G Network”. In addition, satellite communication industries in Asia-Pacific region and the activities were expected to be introduced during the 37<sup>th</sup> ICSSC. The colloquium and Plenary Panels introduced various activities for satellite communications usage in 5G networks, including introduction of optical technologies and massive impact of introducing 5G to space industries.

## 3. Highlights of the 37<sup>th</sup> ICSSC

The first day, Tuesday, October 29<sup>th</sup>, was dedicated to the Colloquium which explored the current state of the art in all of these optical areas and projected forward to explore the impact of these technologies on future systems and applications.

The conference consisted of 16 sessions, and there were about 70 presentations. In addition, there were 1 keynote speech, 1 special talk, and 4 panel discussions,

respectively. The panel discussions treated the topics of satellite industries and related activities in Asia-Pacific Region, Smart mobility and GNSS, satcom in 5G & digital disruption era, respectively. As for the special talk, Mr. Miyakawa, President of the HAPS Mobile Inc., spoke about the development situation of the stratospheric platform communications system (HAPS).

## 4. Conclusions

ICSSC2019 was successful in providing ample discussion opportunities and exchanging views on the latest satellite technologies. The next Joint 26<sup>th</sup> Ka and Broadband Communications Conference & 38<sup>th</sup> ICSSC will be jointly held in Arlington, Virginia, USA, from October 13 through October 16, 2020. The web site is as follows:

<https://www.kaconf.org/>



Fig. 1 Dr. Naoto Kadowaki, General Co-Chair of ICSSC 2019, gave opening address.



Fig. 2 Special talk by Mr. Junichi Miyakawa, President & CEO, HAPS MOBILE Inc.

# Report on the 8<sup>th</sup> IEEE International Conference on Renewable Energy Research and Applications (ICRERA2019)

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Fukuoka University



## 1. Introduction

The 8<sup>th</sup> IEEE International Conference on Renewable Energy Research and Applications (ICRERA2019) was held on 3-6 November 2019 in Brasov, Romania. Brasov is in the central part of the country and is 166 km north of Bucharest. ICRERA is the annual world-class technical forum presenting the latest research topics in the renewable energy technologies and their applications.

The main sponsor of ICRERA2019 was the International Journal of Renewable Energy (IJRER). IEEE Industry Applications Society (IAS); IEEE Industrial Electronics Society (IES); and the Institute of Electronics, Information and Communication Engineers (IEICE) support the conference as a technical co-sponsor. It was also supported by Transilvania University of Brasov, Romania; Nagasaki University and Nagasaki Institute of Applied Science, Japan; Gazi University and Nisantasi University, Turkey.

## 2. Conference Overview and Tutorials

The conference program consisted of 5 keynote speeches, 2 industrial talk 30 technical sessions, and 3 tutorials. On the first day, 3 tutorials were carried out about following topics: 1) Big Data Analytics for Smart Grid Systems, 2) Li-Ion Batteries and Smart Battery Solutions, and 3) Applications of Renewable Energy and Other Energy Saving Technologies to Railway Stations and Traction Power Supply System.

## 3. Opening Ceremony and Keynote Speeches

The opening ceremony was held by the general chair, Prof. Carmen Gerigan, and co-chairs, Prof. Ilhami Colak and Prof. Fujio Kurokawa in the morning on the second day. After that, 3 of 5 keynote speeches were presented. The first speaker, Prof. Atsuo Kawamura, talked about Challenge to 99.9% Efficiency Electric Power Conversion and the Applications. Next, the topic about Modular Multilevel Converters – A New Technology was presented by Prof. Remus Teodorescu. Further, Mr. Hidehiko Kikuchi (the vice president of TEMIC Co., Japan) and Mr. Tatsuaki Ambo (the senior fellow of TEMIC Co., Japan) talked about Utility Scale PV/ESS Inverter System and the Basic Technology. In the morning on the third day, the rest of keynote speeches were given. Prof. Dan M. Ionel presented about Recent Technology Developments for Utility-Scale and Distributed Battery Energy Storage Systems and Prof. Carlo Cecati talked about Some emerging

issues related to modern power converters. After the keynote speeches, the industrial talks about The History of Electric Energy Utilization in Japanese Railway and Future Prospects of Renewable Energy Applications was presented by Dr. Hitoshi Hayashiya (East Japan Railway Company, Japan). Also, High-Efficiency Energy Conversion from Solar to Hydrogen was presented by Mr. Yoshiyasu Nakashima (Fujitsu Advanced Technologies Limited, Japan).

## 4. Technical Program

Total 296 papers were submitted to ICRERA2019 from 38 countries all over the world. 178 papers were accepted (the acceptance rate was 60%) through the careful peer review. There were 28 oral and 2 poster sessions including 138 and 40 presentations, respectively. These sessions ran in parallel of 3-4.

## 5. Conclusions

ICRERA2019 has been finished during the success. Accepted papers were almost presented at the conference (176 of 178 were presented). The participants discussed about the interesting subjects, advances and developments about the topic of the conference. This conference promoted the research collaboration in renewable energy technologies.

The next 9<sup>th</sup> IEEE ICRERA2020 will be held in Glasgow, UK on 27-30 September 2020.



Fig. 1. Opening ceremony.



Fig. 2. Romanian traditional dance with attendees at gala dinner.

# Report on 25<sup>th</sup> IEEE Asia-Pacific Conference on Communications (APCC 2019) “Enabling Technologies for Smart Cities”

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Posts and Telecommunications Institute of Technology (PTIT),  
Vietnam



## 1. Introduction

The Asia-Pacific Conference on Communications (APCC), which is an international forum focusing on communications and information technology, has been hosted in 9 Asia-Pacific (AP) countries since 1993, i.e. Korea (1993, 2000, 2006, 2012), Japan (1995, 2001, 2008, 2015), China (1999, 2004, 2009, 2018), Australia (1997, 2005, 2017), Indonesia (2002, 2013, 2016), Malaysia (2003, 2011), Thailand (2007, 2014), Singapore (1998), and New Zealand (2010). This year, the 25<sup>th</sup> APCC is coming to Vietnam for the first time, thanks to the great effort and strong support from the Posts and Telecommunications Institute of Technology (PTIT) in Vietnam. The primary purpose of the APCC conference is to provide researchers and engineers in the AP region with an opportunity to discuss topics related to advanced communication technologies and services while opening the door to the world. This report briefly presents conference activities such as keynotes, technical sessions, cultural and academic exchanges among scientists in the APCC 2019 days, November 6-8, 2019. Through interactive face-to-face discussions, APCC, as a regular international conference in the AP region, can effectively stimulate research collaborations and development activities in future communication technologies. This year, 25<sup>th</sup> APCC was held in Ho Chi Minh City (HCM), which is the biggest city and technology hub of Vietnam.

**Local information:** Ho Chi Minh City is the largest city in Vietnam, one of the biggest cities in the whole South East Asia Region. It is also known as Saigon - a national hub of commerce, technology science research and culture. The cuisine of Vietnam is well known as one of the most delicious and healthy foods in the world. The Vietnamese culture and local attractions in Ho Chi Minh city are very unique and deserving your further exploration and experience. The climate in Ho Chi Minh City is tropical wet and dry, divided into two distinct seasons. The rainy season is from May to October and the dry season runs from December to April. Ho Chi Minh City is a harmonious combination of historical, beautiful, and modern landscapes, and friendly residents. In the city, visitors can discover

many famous historical sites (e.g., Reunification Palace, War Remnants Museum, City Hall, Museum of Vietnamese History, Ho-Chi-Minh Museum, etc.), architectural attractions (e.g., Saigon Opera House), and enjoy the “Streets of Foreigners” such as Bui Vien, De Tham and Pham Ngu Lao streets, a very busy Saigon night market with many interesting activities in District 1.

**APCC 2019 technical messages:** In the APCC 2019 conference, all accepted regular papers have successfully passed rigorous review rounds. Technical program co-chairs reported that 172 submissions were received, of which 99 have been included in APCC 2019 program at an acceptance rate of about 57.55%. This evidently indicates that APCC has been and is proving to be an important international forum for scientific and technical exchange among worldwide scientists, engineers in the fields of signal processing, wireless communications, electronics, and related areas. Needless to mention, APCC 2019 has achieved its aim of integrating Vietnamese researchers with leading experts overseas, which helps improve wireless communication research from the local community.

## 2. Conference Committee

The committee members of APCC 2019 are listed as follows.

### **Honorary Co-chairs:**

Masahiro Umehira (Ibaraki University, Japan)  
Daehyoung Hong (Sogang University, Korea)

### **Steering Co-chairs:**

San Vu Van (PTIT, Vietnam)  
Yang Yang (ShanghaiTech University, P.R. China)

### **General Co-chairs:**

Tan Hanh (PTIT, Vietnam)  
Xuan Nam Tran (IEEE Comsoc-Vietnam Chapter)  
Khoa N Le (Western Sydney University, Australia)

### **Financial Co-Chair:**

Pham Minh Quang (PTIT, Vietnam)

### **Local Arrangement Co-Chairs:**

Nguyen Thi Yen Linh (PTIT, Vietnam)  
Huynh Hoa (PTIT, Vietnam)

**Publication Co-Chairs:**

Tran Trung Duy (PTIT, Vietnam)

Thien Thanh Tran (Ho Chi Minh City University of Transport, Vietnam)

**Technical Program Co-chairs:**

Vo Nguyen Quoc Bao (PTIT, Vietnam)

Ha H. Kha (HCM University of Technology, VNU-HCM, Vietnam)

Duy T. Ngo (The University of Newcastle, Australia)

Duy H. N. Nguyen (San Diego State University, USA)

**3. Conference Program**

The APCC 2019 solicits original research contributions in four main tracks [1]: (i) Wireless Communications, (ii) Signal Processing for Communications, (iii) Wireless Networks, (iv) Emerging Technologies, Applications and Services. APCC 2019 received 172 papers in total from 24 countries across all regions of the world. The top four country contributors are Korea Republic, China, Japan and Vietnam. Each submission was rigorously and independently reviewed by at least two anonymous reviewers. Over the three days of the conference, the technical program is organized to include 2 keynotes, one invited talk, 19 regular sessions, and 3 special sessions on (i) Physical Layer Security and Integrity for IoT and Space Communications, (ii) Information and Coding Theory, (iii) Emerging Technologies for 5G and beyond networks.

**Keynote talk #1:** “*The Intersection of Feedback Control and Telecommunications*” given by Prof. R. H. Middleton, School of Electrical Engineering and Computing, The University of Newcastle, Australia

**Abstract:** Feedback Control and Telecommunications had for many years been disjoint technical fields. More recently, both have recognised the need to understand the other. In feedback control, classical assumptions of perfect, error free, delay free, secure measurements are increasingly unrealistic and must be relaxed. Conversely, in Telecommunication Systems there is increasingly a recognition of the need to consider Feedback Control applications over communications channels (e.g. 5G New Radio standards for Ultra Reliable Low Latency Control (URLLC) and the related critical Machine To Machine (cMTC) communications). In this talk, I will discuss these issues, together with some use cases, and implications for 5G deployment of URLLC systems.

**Keynote talk #2:** “*6G wireless: Wireless Networks Empowered by Reconfigurable Intelligent Surfaces*” by Dr. Marco Di Renzo from the Laboratory of Signals and Systems (L2S) of Paris-Saclay University – CNRS, CentraleSupélec, Univ Paris Sud, Paris, France.

**Abstract:** Future wireless networks are expected be



Fig. 1. Group photo at the APCC 2019 opening ceremony.



Fig. 2. Prof. Vu Van San (PTIT), the APCC Steering Co-chair was delivering conference opening remarks.

more than allowing people, mobile devices, and objects to communicate with each other. Future wireless networks will constitute a distributed intelligent communications, sensing, and computing platform. Small cells, Massive MIMO, millimeter-wave communications are three fundamental approaches to meet the requirements of 5G wireless networks. Their advantages are undeniable. The question is, however, whether these technologies will be sufficient to meet the requirements of future wireless networks that integrate communications, sensing, and computing in a single platform. Wireless networks, in addition, are rapidly evolving towards a software-defined design paradigm, where every part of the network can be configured and controlled via software. In this optimization process, however, the wireless environment remains an uncontrollable factor: It remains unaware of the communication process undergoing within it. Apart from being uncontrollable, the environment has a negative effect on the communication efficiency: signal attenuation limits the network connectivity, multi-path propagation results in fading phenomena, reflections and refractions from objects are a source of uncontrollable interference. In the recent period, a brand-new technology, which is



referred to as Reconfigurable Intelligent Surfaces (RISs), was brought to the attention of the wireless community. The wireless future that can be envisioned by using this technology consists of coating every environmental object with man-made reconfigurable surfaces of electromagnetic material (software-defined reconfigurable metasurfaces) that are electronically controlled with integrated electronics and wireless communications. In contrast to any other technology currently being used in wireless networks, the distinctive characteristic of the RISs consists of making the environment fully controllable by the telecommunication operators, by allowing them to shape and control the electromagnetic response of the objects distributed throughout the network. The RISs are a promising but little understood technology that has the potential of fundamentally changing how wireless networks are designed today. In this talk, we will discuss the potential of RIS in 6G wireless networks.

**Invited Talk:** “Software Defined Wireless Sensor Network and Cyber Physical Intelligence” given by Prof. Adnan Al-Anbuky, Director of SeNSE Research Laboratory, Professor of Electrical and Electronic Engineering, Auckland University of Technology, Auckland - New Zealand.

**Abstract:** The progress made in the field of Internet of Things (IoT) and Wireless Sensor Networks (WSN) are leading into the more comprehensive and integrated organization of the Cyber Physical Systems (CPS). Both the Cloud and Fog (or Edge-computing) plays important role in extending the capability of wireless sensor networks. This, in effect, enables the virtualization and support intelligence around the various services that the wireless sensor network can offer. Ultimately the goal of transparent coordination between the virtual and physical organizations could be achieved through the two ways communication between the information technology layer (IT layer) at the cloud and the operational technology layer (OT layer) at the physical environment. Timing and synchronization among the system components are of vital importance in coordinating the controlled actions with the events managed by a highly complex and distributed system. The field is directly associated with wide range of applications such as transportation, farming, horticulture, health, manufacturing, to name few. The talk will discuss the generic conceptual architecture for IoT based WSN system with emphasis on the degree of freedom offered by softwarization, edge computing and network functions virtualization. This will lead into discussing examples on conceptual use-cases relevant to shared spaces, precision health and vehicular networks.

#### 4. Special Sessions

Besides regular technical sessions, APCC 2019 features three special sessions as follows.

- Special session #1: Physical Layer Security and Integrity for IoT and Space Communications.
- Special session #2: Information and Coding Theory.
- Special session #3: Emerging Technologies for 5G and beyond networks.



Fig. 3. Keynote and invited speakers received presents from the host of APCC 2019.

#### 5. Best Paper Awards

In the APCC 2019 Gala dinner, three best paper awards have been rewarded to three authors groups, two of them from Japan and one from USA.

- “*A Study on UE Clustering and Antenna Selection for Distributed MIMO Cooperative Transmission using Multi-user MMSE-SVD*”; Fumiya Adachi (Tohoku University, Japan), Yuta Seki (Panasonic Corporation & Core Element Technology Development Center, Japan); Tomoyuki Saito (Tohoku University, Japan).
- “*Channel ranking based Spread Code Optimization for Visible Light Communications OFDM-IDMA Systems*”; Kazushi Shimada, Mitsuki Takahashi, Kazuki Maruta and Chang-Jun Ahn (Chiba University, Japan).
- “*Bias allocation and Precoding for Tricolor Visible Light Communications with Signal-dependent Noise*”; Qian Gao (Texas A&M University, USA); Sabit Ekin (Oklahoma State University, USA); Khalid A. Qaraqe (Texas A&M University at Qatar, USA); Erchin Serpedin (Texas A&M University, USA).

#### 6. Conclusions and Future Plans

APCC 2019 was finished with great success, and excellent ideas and opinions were shared among scientists involved in the conference.

The 26<sup>th</sup> APCC (APCC 2020) will be organized in Kuala Lumpur city, Malaysia. Prof. Borhanuddin Mohd Ali had a short introduction about the organization plan of APCC 2020 in the conference banquet. Regarding this plan, APCC 2020 will be held at Pullman Hotel, which is a 4-star hotel with a 5-minute walk to Petronas Twin Tower [2].

**APCC 2020 important dates:**

- Full paper submission: May 31, 2020
- Acceptance notification: June 30, 2020
- Camera ready & registration: July 31, 2020
- Conference dates: October 12-14, 2020

**7. Acknowledgement**

The achievement of APCC 2019 has been also contributed by kind and strong support from many technical sponsors and volunteers. Warmest thanks and regards to conference patrons and generous sponsors, who have been willingly fostering research so that the conference can reach higher and dream further.

Technical sponsors of APCC 2019:

- The China Institute of communications (CIC) [3].
- The Korea Institute of Communications and Information Sciences (KICS) [4].
- IEICE Communications Society (IEICE-CS) [5].
- The Radio and Electronics Association of Vietnam (REV) [6].
- IEEE Vietnam Section.
- IEEE COMSOC Vietnam Chapter [7].

**8. References**

- [1] APCC 2019 website: <http://apcc-conf.org/>
- [2] APCC 2020 website: <http://apcc2020.comvt.org>
- [3] CIC website: <http://english.cast.org.cn/>
- [4] KICS website: <https://eng.kics.or.kr/html/>
- [5] IEICE-CS website: <https://www.ieice.org/cs/>
- [6] REV website: <https://rev.org.vn/en/>
- [7] IEEE COMSOC Vietnam chapter website: <http://ewh.ieee.org/r10/vietnam/com/>



Fig. 4. Vietnamese traditional music was performed in Gala dinner.

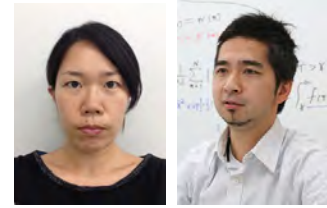
# Report on IEEE WCNC 2019 5<sup>th</sup> International Workshop on Smart Spectrum (IWSS 2019)

Mai Ohta<sup>1</sup>, Kenta Umebayashi<sup>2</sup>, and Takeo Fujii<sup>3</sup>

<sup>1</sup>Fukuoka University,

<sup>2</sup>Tokyo University of Agriculture and Technology,

<sup>3</sup>The University of Electro-communications



## 1. Introduction

International Workshop on Smart Spectrum (IWSS) is annual workshop in conjunction with IEEE Wireless Communications and Networking Conference (WCNC) targeting smart spectrum sharing, dynamic spectrum access and smart spectrum management with spectrum measurement and spectrum modeling.

The first IWSS was held at New Orleans, The United States of America on March 9, 2015 in conjunction with IEEE WCNC 2015. The second IWSS was organized in conjunction with IEEE WCNC 2016 at Doha, Qatar on April 3 2016. The third IWSS was held on March 19 2017 in conjunction with WCNC2017 at San Francisco, CA, USA. The fourth IWSS was held on April 16 2018 in conjunction with WCNC 2018 at Barcelona, Spain.

Finally, the fifth IWSS was held at Marrakech, Morocco on April 15 2019 in conjunction with WCNC 2019.

## 2. Interesting Topics of IWSS and Purpose

IWSS focuses on wireless network technology based on spectrum measurement, spectrum utilization modeling, and their applications for dynamic spectrum access. One part of topics is the follows, but are not limited to:

- Spectrum measurement techniques (wideband, long-term, and wide area measurements)
- Spectrum measurement campaign and system prototyping
- Multidimensional spectrum utilization models
- Statistical modeling of radio environment
- Radio propagation modeling for spectrum sharing
- Cognitive radio networks and dynamic spectrum access
- Spectrum sensing techniques based on statistical modeling
- MAC layer access protocol design based in statistical modeling
- The purpose of IWSS is to find new spectrum world for future mobile communications!

## 3. Summary of IWSS

In IWSS, 12 papers for oral sessions were accepted from submitted 27 papers. IWSS consists of one Keynote speech and one Panel.

## 4. Keynote

Prof. Mohamed-Slim Alouini had a keynote speech in the workshop. The title was “Addressing spectrum scarcity through hybrid optical and radio-frequency wireless networks” and he introduced his works to resolve the problem of the radio-frequency spectrum exhaustion. Specifically, optical wireless (OW) communication systems and some important challenges for OW have been introduced. The talk suggests two recent studies illustrating how supplementing OW networks with RF backup access points increases these networks reliability and coverage while maintaining their high capacity.

## 5. Panel

We also have panel discussion in terms of Smart Spectrum Exploitation in Current and Future Wireless Communication Systems. The panelists are Dr. Valerio Frascolla, (Intel Deutschland GmbH, Germany), Prof. Takeo Fujii, (The University of Electro-Communications, Japan), Dr. Amir Ghasemi, (Communications Research Centre, Canada), Dr. Kim Haesik, (VTT Technical Research Centre, Finland), and Prof. Nizar Zorba, (Qatar University, Qatar). The moderator was Prof. Miguel López-Benítez, (University of Liverpool, UK). They have discussed about technical and regulation issues in terms of current spectrum scarcity problem, and possible solution, such as smart spectrum technologies. In addition, they have introduced current situations in Europe, Asia and US.

## 6. Best Paper Awards

IWSS awarded one paper with the best paper award and two papers with the best student paper award as follows:

- Best paper award: Raouia Masmoudi Ghodhbane (Safran Tech, Safran Sensing Systems, France) “A Relevant Energy-Efficient Metric in OFDM for Opportunistic Users”
- Best student paper award: Yiding Yu Soung Chang Liew and Taotao Wang (The Chinese University of Hong Kong, Hong Kong) “Carrier-Sense Multiple Access for Heterogeneous Wireless Networks Using Deep Reinforcement Learning”
- Best student paper award: Raphael Amorim (Aalborg University, Denmark), István Z. Kovács (Nokia Bell Labs & Aalborg, Denmark), Jeroen Wigard (Nokia, Denmark), Troels B. Sørensen and Preben Mogensen (Aalborg University, Denmark) “Forecasting Spectrum Demand for UAVs Served by Dedicated Allocation in Cellular Networks”



Fig. 1 Best paper award  
(Prof. Miguel López-Benítez [left] and  
Mr. Raouia Masmoudi Ghodhbane [right]).

## 7. Aspect of Marrakech

Marrakech is very aggressive and very exotic city, which is an ancient capital Kingdom of Morocco. The Jemaa el-Fnaa square is one of the best-known squares in Africa shown in Fig. 2. There are many shops and restraint in this square. Marrakech has the large market called Souks with many shops concentrated with narrow passages like maze. Many sightseeing places are located like city walls, gates, gardens (Fig. 3 Majorelle garden), and palaces.

Conference hotel shown in Fig. 4 is located at the southern part of Marrakesh 10 min by car. Many attendants enjoy Morocco style foods and hospitality with some unexpected experience we cannot feel in the western countries.



Fig. 2 Jemaa el-Fnaa square.



Fig. 3 Majorelle garden.



Fig. 4 Conference hotel.

## 8. Reference

- [1] <https://smartspectrum2019.wordpress.com>

## IEICE-CS Related Conferences Calendar

Date	Conference Name	Location	Note
26 Oct. – 30 Oct. 2020	2020 International Symposium on Antennas and Propagation ( <b>ISAP2020</b> )	Osaka, Japan	Submission due: 24 Apr. 2020
18 Oct. – 21 Oct. 2020	The 23 <sup>rd</sup> International Symposium on Wireless Personal Multimedia Communications ( <b>WPMC2020</b> )	Okayama, Japan	Submission due: 11 May 2020
12 Oct. – 14 Oct. 2020	The 26 <sup>th</sup> Asia-Pacific Conference on Communications ( <b>APCC2020</b> )	Kuala Lumpur, Malaysia	Submission due: 30 Apr. 2020
22 Sep. – 24 Sep. 2020	International Telecom Congress ITC 32 ( <b>ITC32</b> )	Osaka, Japan	Submission due: 20 Mar. 2020
13 Jul. – 15 Jul. 2020	2020 IEEE Photonics Society Summer Topicals Meeting Series ( <b>IEEE Summer Topicals 2020</b> )	Cabo San Lucas, Mexico	Submission deadline Closed
5 Jul. – 9 Jul. 2020	2020 Opto-Electronics and Communications Conference ( <b>OECC2020</b> )	Taipei, Taiwan	Submission deadline Closed
30 Jun. – 3 Jul. 2020	The 12 <sup>th</sup> International Conference on Ubiquitous and Future Networks ( <b>ICUFN2020</b> )	Porto, Portugal	Submission deadline Closed
7 Jun. – 11 Jun. 2020	IEEE ICC Workshop on Information-Centric Networking Solutions for Real-world Applications ( <b>ICN-SRA</b> )	Dublin, Ireland	Submission deadline Closed
25 May 2020	Technology Trials and Proof-of-Concept Activities for 5G Evolution & Beyond 5G 2020 ( <b>TPoC5GE 2020</b> )	Antwerp, Belgium	To be held soon
20 May – 22 May 2020	The 14 <sup>th</sup> International Symposium on Medical Information and Communication Technology ( <b>ISMICT 2020</b> )	Nara, Japan	To be held soon
19 Feb. – 21 Feb. 2020	2020 International Conference on Artificial Intelligence in Information and Communication ( <b>ICAIIIC 2020</b> )	Fukuoka, Japan	Done
7 Jan. – 10 Jan. 2020	The 34 <sup>th</sup> International Conference on Information Networking ( <b>ICOIN 2020</b> )	Barcelona, Spain	Done
15 Dec. – 16 Dec. 2019	International Japan-Africa Conference on Electronics, Communications and Computations 2019 ( <b>JAC-ECC2019</b> )	Alexandria, Egypt	Done
9 Dec. – 11 Dec. 2019	7 <sup>th</sup> International Conference on Smart Grid ( <b>icSmartGrid 2019</b> )	Newcastle, Australia	Done
6 Nov. – 8 Nov. 2019	The 25 <sup>th</sup> Asia-Pacific Conference on Communications ( <b>APCC2019</b> )	Ho Chi Minh, Vietnam	<b>Reported</b> on this issue
3 Nov. – 6 Nov. 2019	International Conference on Renewable Energy Research and Applications ( <b>ICRERA2019</b> )	Brasov, Romania	<b>Reported</b> on this issue
29 Oct. – 1 Nov. 2019	The 37 <sup>th</sup> International Communications Satellite Systems Conference ( <b>37<sup>th</sup> ICSSC</b> ),	Okinawa, Japan	<b>Reported</b> on this issue

Date	Conference Name	Location	Note
27 Oct. – 30 Oct. 2019	2019 International Symposium on Antennas and Propagation ( <b>ISAP2019</b> )	Xi'an, China	<b>Reported</b> on this issue
16 Oct. – 18 Oct. 2019	International Conference on Information and Communication Technology Convergence 2019 ( <b>ICTC2019</b> )	Jeju Island, Korea	<b>Reported</b> on this issue
8 Apr. – 15 Apr. 2019	The 5 <sup>th</sup> International Workshop on Smart Spectrum ( <b>IWSS2019</b> )	Marrakech, Morocco	<b>Reported</b> on this issue

Please confirm with the following IEICE-CS web site for the latest information.

<http://www.ieice.org/cs/conf/calendar.html>



## CALL FOR PAPERS International Teletraffic Conference ITC 32

[https:// itc32.org/](https://itc32.org/)

September 22-24, 2020 – Osaka, Japan

The INTERNATIONAL TELETRAFFIC CONGRESS ITC 32, to be held September 22-24, 2020 at Osaka University, Japan, is the 32nd edition of this international flagship congress in the field of networking science and practice. ITC was founded back in 1955 by enthusiastic scientists and engineers who were willing to deploy networks in a holistic way. Since then, it has established a multi-decade tradition as the primary forum for presenting and discussing the latest technical advances in the broad areas of teletraffic models, network systems, and measurements. For ITC 32, cutting-edge papers spanning both theory and experimentation are solicited in all areas of networking, ranging from traffic engineering and control with application also to emerging softwarized/virtualized network paradigms, up to innovative wireless scenarios brought about by the emergence of 5G and IoT systems. We especially encourage original contributions which bridge the gap between performance modeling and real-life operational aspects, including works which leverage measurement data to provide a better understanding of the wired and wireless networks' operation under realistic conditions.

ITC 32 is specifically organized into four (partially overlapping) areas (for a more detailed track description please refer to the conference website):

- Performance Evaluation, Control and Optimization
- Network Measurements and Big Data
- Networking Architectures and Paradigms
- Wireless and Cellular Networks

Besides the general submissions ITC32 encourages submissions for the **Ph.D. workshop** and special sessions.

A **special session on "Modeling Challenges in the Internet Era"** is organized by Phuoc Tran-Gia (University of Würzburg, Germany).

ITC 32 will offer a number of **student travel grants** that will be available to support full-time students for attending.

### **Important Dates**

March 20, 2020: Submission deadline

June 15, 2020: Notification date

July 15, 2020: Camera-ready copy deadline

July 15, 2020: Author registration deadline

September 22-24, 2020: Conference date

For detailed information and deadlines check the website frequently. For any questions do not hesitate to contact the conference organization under [itc32@lists.i-teletraffic.org](mailto:itc32@lists.i-teletraffic.org).

### **ITC32 Committee**

General Chairs: Masayuki Murata (Osaka University, JPN), Kohei Shiomoto (Tokyo City University, JPN)

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# ISAP2020

## Call for Papers

### 2020 INTERNATIONAL SYMPOSIUM ON ANTENNAS AND PROPAGATION October 26-30, 2020, Osaka, JAPAN

The 2020 International Symposium on Antennas and Propagation (ISAP2020) will be held at Knowledge Capital Congrès Convention Center in Osaka, Japan, from October 26 (Monday) through 30 (Friday), 2020. This Symposium, the 25th ISAP, is sponsored and organized by the Communications Society of the Institute of Electronics, Information and Communication Engineers (IEICE), and is expected to be technically co-sponsored by the Antenna Measurement Techniques Association (AMTA), the Antennas and Propagation Society of the Institute of Electrical and Electronics Engineers (IEEE/AP-S), the Antennas Society of the Chinese Institute of Electronics (AS-CIE), the Electrical Engineering/Electronics, Computer, Communications, Information Technology Association of Thailand (ECTI), the European Association on Antennas and Propagation (EurAAP), the Institute of Antenna Engineers of Taiwan, the Korean Institute of Electromagnetic Engineering and Science (KIEES), and the Taiwan Microwave Association.

#### VENUE

Osaka is located on the main island of Honshu, roughly in the center of Japan. Once known as the Nation's Kitchen, Osaka still holds the title of Food Capital of Japan. Osaka provides a lot of shopping sites with an irresistible experience. The historical capital city of Kyoto, and Nara, an ancient city with numerous World Heritage sites, are all accessible in less than 40 minutes from Osaka.

Knowledge Capital Congrès Convention Center is directly linked via a connecting walkway to JR Osaka Station, the hub of the Kansai rail network.



#### OBJECTIVE

ISAP2020 is intended to provide an international forum for the exchange of information on the progress of research and development in antennas, propagation, electromagnetic-wave theory, and related fields as shown in the SCOPE. It is also an important objective of this meeting to promote mutual interaction among participants.

#### SCOPE

This symposium will treat a wide range of subjects on antennas, propagation and electromagnetic-wave theory as suggested below. Papers concerned with other aspects of these subjects will also be considered. In addition, special topics treating emerging technologies heralding a new era in wireless communications and applications are invited for consideration.

#### A. Antennas

- A1. Small Antennas and RF Sensors
- A2. Antennas for Mobile and V2X Applications
- A3. Broadband and Multi-band Antennas
- A4. Active, Adaptive, On-Chip and Smart Antennas
- A5. Tunable and Reconfigurable Antennas
- A6. Planar/Printed Antennas and Arrays
- A7. Antenna Theory and Design
- A8. Antenna Measurements
- A9. Millimeter-wave, Terahertz and Optical Antennas
- A10. Metamaterials and Metasurfaces for Antennas

#### B. Propagation

- B1. Indoor and Mobile Propagation
- B2. Millimeter-wave, THz and Optical Propagation
- B3. Propagation for V2X and IoT
- B4. Channel Sounding and Channel Estimation
- B5. Radar, DOA, localization and Sensing
- B6. Remote Sensing
- B7. Terrestrial, Earth-Space and Ionospheric Propagation
- B8. Propagation Fundamentals
- B9. Propagation Measurement Techniques

#### C. Electromagnetic-wave Theory

- C1. Computational Electromagnetics
- C2. Time-Domain Techniques
- C3. Scattering, Diffraction and RCS
- C4. Inverse and Imaging Techniques
- C5. Optimization Methods in EM Problems
- C6. Passive and Active Components
- C7. Frequency Selective Surfaces and Filters
- C8. EBG, Metamaterials and Periodic Structures
- C9. Multiscale and Multiphysics Techniques

#### D. AP-related Topics

- D1. Antenna Systems for Mobile Communications
- D2. MIMO and Array Signal Processing
- D3. AP Related Topics for 5G and Beyond
- D4. Wireless Power Transfer Technologies
- D5. Wearable Device Networks and Medical Applications
- D6. OAM and Near Field Communications
- D7. RFID and Its Applications
- D8. EMC/EMI Technologies

#### IMPORTANT DATES

Deadline for paper submission: April 24, 2020  
 Notification of accepted papers: June 26, 2020  
 Deadline for early registration: August 31, 2020



## PREPARATION OF PAPERS

Original papers are solicited that have not been presented previously and that describe new contributions in the area suggested in the SCOPE. Each author is requested to prepare a 2-page camera-ready paper in 2-column format written in English, including all text, references, figures and photographs. The authors are requested to refer to the ISAP2020 Web page (<http://www.isap2020.org/>) for the detailed paper preparation instructions and the IEICE Copyright Transfer Form.

## SUBMISSION OF PAPERS

Authors are requested to send their papers in IEEE Xplore-compliant PDF format electronically. Presented papers of ISAP2020 are planned to be included in ISAP Archives and IEEE Xplore.

## WORKSHOP

Several workshops are scheduled to be held on October 26 (Monday), 2020.

## AWARDS

Several outstanding papers will be awarded for ISAP2020 Paper Awards. ISAP2020 also hosts Student Paper Awards in order to foster activities of students toward highly qualified researchers.

## STUDENT DESIGN CONTEST

Student Design Contest (SDC) will be held for the first time in the history of ISAPs during the ISAP2020. The aim of ISAP SDC is to promote student innovation and creative activities in antennas, propagation, and the related research fields. The following three contest categories are prepared; A. Antenna Design, B. Localization of RF Sources, and C. EM Analysis and Observation Competition. Excellent designs will be awarded at the buffet party of the ISAP2020 and will receive cash awards! Detailed information will be announced at the ISAP2020 SDC Web page: <http://www.isap2020.org/sdc.html>

## SPECIAL SECTION ON IEICE TRANS.

The Special Section on ISAP2020 will be planned in the IEICE Transactions on Communications.

## ISAP ARCHIVES

ISAP Archives currently opens as a trial service. You can search and read the conference papers from the ISAP1971 to 2016 at the ISAP Archives Web page: [http://www.ieice.org/cs/isap/ISAP\\_Archives/index.html](http://www.ieice.org/cs/isap/ISAP_Archives/index.html)

## EXHIBITION

Spaces for demonstration of software, books and products are also available with charge.

## WIE (WOMEN IN ENGINEERING)

It is our pleasure to inform that ISAP2020 will launch WIE. WIE is providing opportunities to make global networks and collaboration for ALL ISAP2020 PARTICIPANTS through special sessions and lunchtime events. The detailed information of ISAP2020 WIE will announce in the next CFP and Web site. Our understanding and cooperation will develop AP technologies and community!

## STEERING COMMITTEE

Chairperson	H. Arai (Yokohama National Univ.)
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Contact E-mail: [ap\\_ac-isap2020@mail.ieice.org](mailto:ap_ac-isap2020@mail.ieice.org)

Sponsored and organized by:

The Communications Society of the Institute of Electronics, Information and Communication Engineers (IEICE)

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Further information can be found on the Website ► ISAP2020 Web Page : <http://www.isap2020.org>



The 26th Asia-Pacific Conference on Communications (APCC) will be held in Kuala Lumpur, Malaysia (12 - 14 October 2020). Since 1993, APCC has been a forum for researchers and engineers to present and discuss topics related to advanced information and communication technologies and services, while at the same time opening the door to the world of industry and users. The conference program will run for three days with the regular tracks, special sessions, tutorials and workshops. Prospective authors are invited to submit original technical papers for presentation at the conference and publication in the conference proceedings.

#### Submission and Policies

All papers are subject to a blind reviewed process handled by an international technical program committee. An author of an accepted paper must register at full rate (member or non-member of the IEEE) prior to uploading the camera-ready version. The maximum length of the camera-ready version is 6 pages without incurring additional page charges (maximum 1 additional page with over length page charge of USD 100 if accepted). Conference proceedings that meet IEEE quality review standards may be eligible for inclusion in the IEEE Xplore Digital Library. The IEEE reserves the right to exclude a paper from distribution after the conference (e.g., removal from IEEE Xplore) if the paper is not presented at the conference. Further information on paper submission is available on our website <https://apcc2020.org>

#### Scope and Topics of Interest:

- \* AI /ML in Communications
- \* Communication and Information Systems Security
- \* Communication Software, Services and Multimedia Applications
- \* Wireless Communications and Systems
- \* Next Generation Technologies, Applications, Services and Multimedia Applications
- \* Optical Networks and Systems
- \* Mobile and Wireless Networks

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Publicity Chair :	Khairil Anuar
Publication Chair :	Fazirulhisyam Hashim
Students Volunteer Chair :	Mohd. Yusoff Alias
Tutorial Chair :	Khaizuran Abdullah

#### Important Dates

Full Paper Submission :	<b>30 April 2020</b>
Acceptance Notification :	<b>30 June 2020</b>
Camera Ready & Registration :	<b>31 July 2020</b>
Conference Date :	<b>12 - 14 October 2020</b>

#### Further Information

 [info@apcc2020.org](mailto:info@apcc2020.org)  
 [apcc2020.org](http://apcc2020.org)

#### Technically Sponsored by



## Special Section Calendar of IEICE Transactions on Communications

Issue	Special Section	Note
Jul. 2021	No special section this issue	
Jun. 2021	No special section this issue	
May 2021	No special section this issue	
Apr. 2021	No special section this issue	
Mar. 2021	Network Virtualization/Softwarization and Artificial Intelligence towards Beyond-5G Innovative IoT Services	Submission due: 12 April 2020
Feb. 2021	No special section this issue	
Jan. 2021	No special section this issue	
Dec. 2020	IoT Sensor Networks and Mobile Intelligence	To be issued
Nov. 2020	Opto-electronics and Communications for Future Optical Network	To be issued
Oct. 2020	New Era of Satellite Communication / Broadcasting / Application Technologies	To be issued
Sep. 2020	Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019	To be issued
Aug. 2020	No special section this issue	
Jul. 2020	No special section this issue	
Jun. 2020	Information and Communication Technology for IoT/CPS in Medicine and Healthcare	To be issued
May 2020	No special section this issue	
Apr. 2020	Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure	To be issued
Mar. 2020	No special section this issue	
Feb. 2020	No special section this issue	
Jan. 2020	Internet Architecture, Applications and Operation Technologies for a Cyber-Physical System	Vol. E103-B, No. 1

Please confirm with the following IEICE web site for the latest CALL FOR PAPERS  
<http://www.ieice.org/event/ronbun-e.php?society=cs>

## Call for Papers

# ----- Special Section on Fusion of Network Virtualization/Softwarization and Artificial Intelligence towards Beyond-5G Innovative IoT Services -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Fusion of Network virtualization/Softwarization and Artificial Intelligence towards Beyond-5G Innovative IoT Services" in **March 2021**.

5G is reaching the stage of realization and ultra-high speed mobile broadband, ultra-low latency in communications, and accommodation of massive IoT devices lay the groundwork for innovative IoT services. On the other hand, towards Beyond-5G era, requirements for more reliable, flexible, and robust ICT (Information and Communication Technologies) systems are emerging and pose new challenges.

Advanced technologies for network virtualization and softwarization are expected to provide flexibility to satisfy a wide variety of customer demands, scalability to expand in accordance with the increase of demands, efficiency in resource usage even under scarce and heterogeneous environment, and sustainability to involve new functionalities and technologies in an incremental manner for service continuity. However, rapid progress needs to be made to tackle such new challenges. In particular, fusion with AI (Artificial Intelligence) attracts great attention.

We thus call for publications (scheduled to appear in the March 2021 issue) for promoting discussion and development of network virtualization and softwarization based on the fusion with Artificial Intelligence towards Beyond-5G innovative IoT services, especially on architectural examination, resource management and control approaches, mobile and wireless network virtualization, edge computing, open-source software, and so forth.

## 1. Scope

This special section aims at timely dissemination of research in these areas. Possible topics include, but are not limited to:

- AI-based network management and control in network virtualization
- Mobile and wireless network virtualization and its related mobility technologies
- Edge computing for Beyond 5G services
- Photonic network virtualization
- Management of massive IoT devices
- Security for network virtualization and secure services
- Innovative applications based on network virtualization
- Network softwarization and open-source software
- Testbeds for above technologies and experimental results

## 2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Manuscripts should be prepared according to the guideline in the "Information for Authors". The latest version is available at the web site, [https://www.ieice.org/eng/shiori/mokuji\\_cs.html](https://www.ieice.org/eng/shiori/mokuji_cs.html). The period for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biography) via the IEICE Web site [https://review.ieice.org/regist/regist\\_baseinfo\\_e.aspx](https://review.ieice.org/regist/regist_baseinfo_e.aspx) by **April 12th, 2020 (JST)**. Authors should choose the Fusion of Network virtualization/Softwarization and Artificial Intelligence towards Beyond-5G Innovative IoT Services as a "Journal/Section" on the online screen. Do not choose [Regular-EB].

### Contact point:

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## 3. Special Section Editorial Committee

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\*At least one of the authors must be an IEICE member when the manuscript is submitted for review. Invited papers are an exception. We recommend that authors unaffiliated with IEICE apply for membership. For membership applications, please visit the web-page, <https://www.ieice.org/eng/join/member.html>.

\*The accepted papers will be published online soon after notification of acceptance on the web site of Transactions Online. For detailed information, please visit [http://www.ieice.org/eng/shiori/page2\\_cs.html#8](http://www.ieice.org/eng/shiori/page2_cs.html#8)

## From Editor's Desk

### ●Season's greetings

IEICE General Conference will be held at Hiroshima University, Higashi-Hiroshima-city, from 17<sup>th</sup> to 20<sup>th</sup> March 2020. Complete English sessions are also scheduled in the conference to promote globalizations of IEICE's academic activities. The Welcome Party will be also held on 17<sup>th</sup> March 2020, the first day of IEICE General Conference.

Various students and business persons will get together and enjoy drinking and eating some foods. Please check out the latest conference information on the IEICE web site at:

<https://www.ieice-taikai.jp/2020general/en/index.html>

IEICE-CS GLOBAL NEWSLETTER Editorial Staff

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# The Institute of Electronics, Information and Communication Engineers (IEICE) Communications Society

## About Communications Society

IEICE Communications Society shall endeavor to facilitate research and investigation activities in the field of communications, and to contribute to research activities through cooperation with other societies, in order to promote the development of science and technology in this field.

### ◆ Technical Committees

Twenty regular technical committees and six ad hoc technical committees carry out research activities. The following is a list of the technical committees.

#### Regular Technical Committees

- Antennas and Propagation (AP)
- Internet Architecture (IA)
- Space, Aeronautical and Navigational Electronics (SANE)
- Satellite Telecommunications (SAT)
- Electromagnetic Compatibility (EMCJ)
- Communication Quality (CQ)
- Information and Communication Management (ICM)
- Information Networks (IN)
- Smart Radio (SR)
- Short Range Wireless Communications (SRW)
- Communication Systems (CS)
- Energy Engineering in Electronics and Communications (EE)
- Network Systems (NS)
- Optical Communication Systems (OCS)
- Optical Fiber Technology (OFT)
- Photonic Network (PN)
- Healthcare and Medical Information Communication Technology (MICT)

- Radio Communication Systems (RCS)
- Wireless Power Transmission (WPT)
- Sensor Network and Mobile Intelligence (SeMI) (Joint committees of ASN/MoNA)

#### Ad Hoc Technical Committees

- Standardization & Innovation in ICT Technologies (SIIT)
- Extremely Advanced Optical Transmission (EXAT)
- Network Virtualization (NV)
- Photonics-applied Electromagnetic Measurement (PEM)
- Information-Centric Networking (ICN)
- Networked Digital Service Platform (DPF)

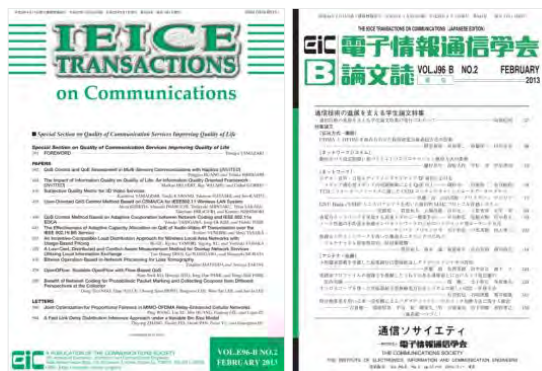
### ◆ Publications

#### IEICE Transactions on Communication

The IEICE Transactions on Communications (English and Japanese editions) are published monthly.

The impact factor of IEICE Transactions on Communications (English edition) was 1.09 in 2017.

<http://www.ieice.org/cs/jpn/EB/index.html>



## IEICE Communications Express (ComEX)

IEICE Communications Express (ComEX) is an online letter journal, where researchers can exchange new topics easily and in a timely manner.

You can download PDF files from the ComEX site.

<http://www.comex.ieice.org/>



## Magazines

### ➤ GLOBAL NEWSLETTER (GNL)

GLOBAL NEWSLETTER (GNL) exchanges information on global activity between overseas/foreign members and other members in IEICE-CS.

GNL is published every March, June, September, and December.

[http://www.ieice.org/cs/pub/global\\_news.html](http://www.ieice.org/cs/pub/global_news.html)



### ➤ Communications Society Magazine "B-plus"

The Communications Society Magazine (Japanese edition only) "B-plus" provides technical reviews, surveys, practical topics, etc. "B-plus" is published quarterly in Japanese. The electronic version has been accessible free of charge since March 2015.

<http://www.ieice.org/~cs-edit/magazine/>



## ◆ Membership Services

### Technical Report Archives

Technical Report Archives is an archive of all the technical reports of IEICE-CS published more than one month ago. It is part of the IEICE Technical Report Online System.

### Email News

We call for papers of transactions and international conferences, as well as technical workshops from CS members by email.

## ◆ Sister Societies

Communications Society has sister-society agreements with the following six overseas societies.

- IEEE Communications Society (ComSoc)
- Informationstechnische Gesellschaft within The Verband Der Elektrotechnik Elektronik Informationstechnik (VDE/ITG)
- Korean Institute of Electromagnetic Engineering and Science (KIEES)
- The Korean Institute of Communications and Information Sciences (KICS)
- China Institute of Communications (CIC)
- IEEE Electromagnetic Compatibility Society (EMCS)

*To Probe Further and Keep Up-to-date with Communication Technologies*

# **IEICE Communications Society**



## **IEICE General Conference 2020**

**17-20 March 2020**

**Hiroshima University, Higashi Hiroshima Campus**

Every spring, each Society organizes a General Conference to provide a forum where members can present their study results and exchange views. At present, four of the Societies -- the Engineering Sciences Society, the NOLTA Society, the Communications Society, and the Electronics Society -- hold their Society Conferences as a joint event. The Communications Society Conference includes English-language sessions in addition to the Japanese-language sessions.

<https://www.ieice-taikai.jp/2020general/en/index.html>

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