ICETC
International Conference on Emerging Technologies for Communications

November 29-1 December 2022
Hybrid Conference

ICETC 2022

2022 International Conference on Emerging Technologies for Communications

Masaru Ibuka Auditorium, Waseda University, Tokyo, Japan
and Online, November 29-December 1, 2022

Creating New Normal by Communication Technologies

FINAL PROGRAM

https://www.ieice.org/cs/icetc/index.html

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

Communications Society

ICETC
International Conference on Emerging Technologies for Communications

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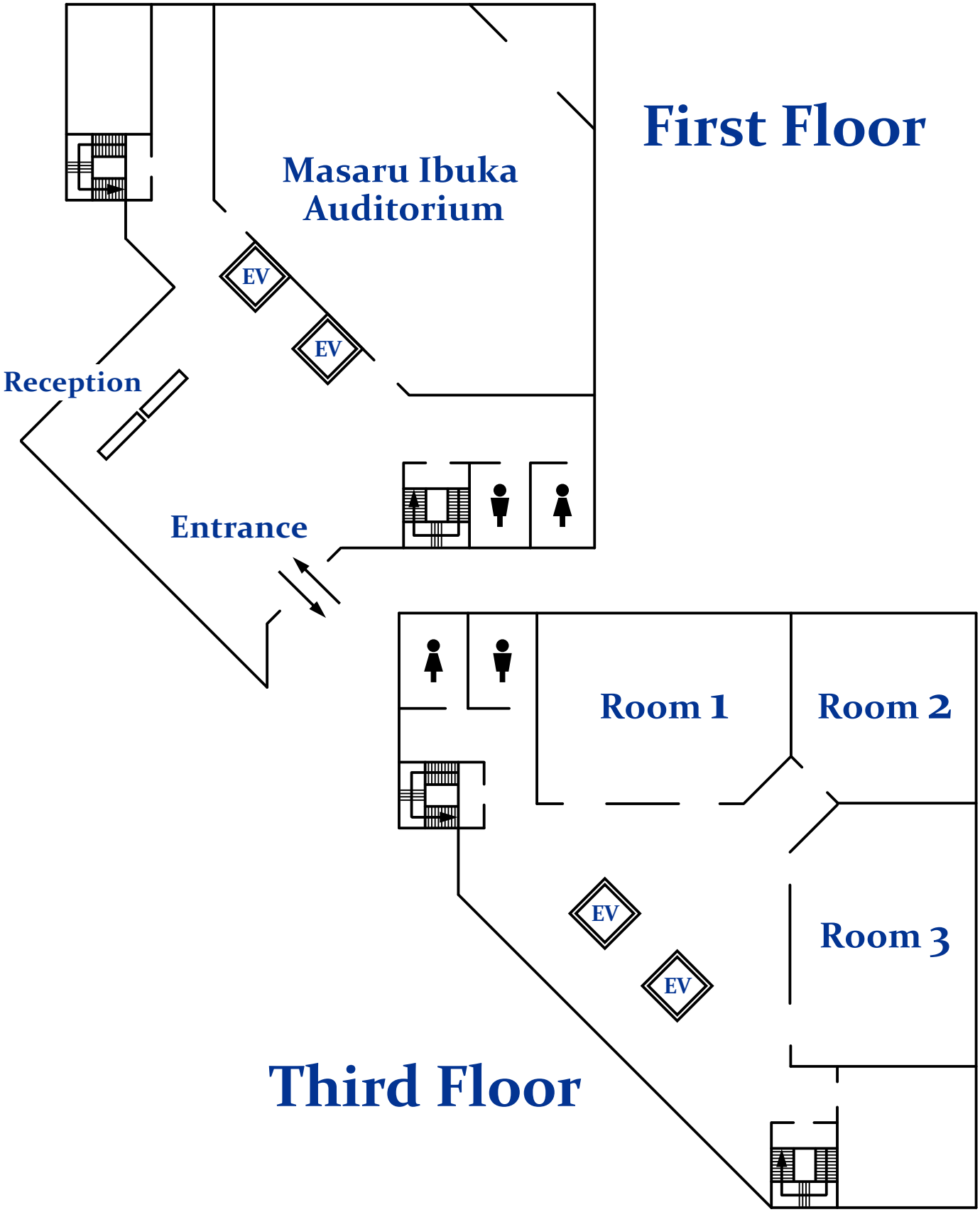
Floor Plans


First Floor
Masaru Ibuka Auditorium
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Information for Online Participants

Passcode for All Rooms

i2c0etzC

Webinar

- **Zoom 1** https://us06web.zoom.us/j/87465057910
  - Keynote 1, 2, 3, 4, 5, 6
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  - Award Ceremony
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- **Zoom 2** https://us06web.zoom.us/j/85299908510
  - Invite Special 1, 2
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  - Invite Special 3
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  - Short 3, 5, 8, 11, 14

Greetings

Hisaya Hadama

Joji Maeda

On behalf of the Steering Committee, it is our great honor and pleasure to welcome you to the 2022 International Conference on Emerging Technologies for Communications (ICETC 2022) is held in a hybrid format utilizing both face-to-face and online from November 29 (Tuesday) through December 1 (Thursday), 2022. This conference is organized by the Communications Society of the Institute of Electronics, Information and Communication Engineers (IEICE).

ICETC 2022 is the third international conference on all the technical fields covered by the IEICE Communications Society. Our objectives are synergistic effects beyond the specialized fields, expansion of research areas, and development of young researchers. This international conference is a place for discussions; preliminary results at the initial research stage are eagerly welcomed. Also, we will appreciate younger researchers and students joining this conference.

The venue of the in-person meeting is Waseda University in Tokyo, the capital of Japan with immense stimuli; we also provide online access to all technical sessions including plenary talks by researchers laureate. We believe you may enjoy the whole conference both on-site and online.

We are looking forward to seeing you at the conference.

General Co-Chairs
Hisaya Hadama (National Defense Academy of Japan)
Joji Maeda (Tokyo University of Science)

Message from the Technical Program Chairs

On behalf of the Technical Program Committee, it is our great pleasure to welcome you to the 2022 International Conference on Emerging Technologies for Communications (ICETC 2022) in Tokyo.

The technical program of ICETC 2022 consists of 4 tracks. The conference also features 6 exciting keynote speakers and 27 invited speakers from academia and industry.

The 4 tracks received 138 paper submissions, including 45 papers for oral sessions and 93 papers for short presentation sessions. Out of them, 30 papers were accepted for the oral sessions, and 105 papers were accepted for the short presentation sessions. All papers underwent a review process – every paper was reviewed by 2 experts.

The accepted papers will be included in the IEICE Proceeding Series as open-access papers. We hope that it would help authors to obtain more readers, more citations, and more collaborators for their work.

We thank all committee members, authors, and participants for their efforts and cooperation to our society. We hope you all enjoy the program.

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Kunio Hato (INTERNET MULTIFEED CO.)

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Short Range Wireless Communications (SRW)
Hanako Noda (Anritsu)

Sensor Network and Mobile Intelligence (SeMI)
Koji Yamamoto (Kyoto University)

Energy Engineering in Electronics and Communications (EE)
Yoshiyasu Nakashima (NTT Electronics Cross Technologies Corporation)

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Optical Fiber Technologies (OFT)
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Minoru Takahata (NTT Docomo)

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Kunimasa Saito (Hokkaido University)

Network Virtualization (NV)
Hiroaki Harai (NICT)

Photonics-applied Electromagnetic Measurement (PEM)
Ai-ichiro Sasaki (Kindai University)

Information-Centric Networking (ICN)
Hidenori Nakazato (Waseda University)

Digital Service Platform (DPF)
Toru Katagiri (Fujitsu Ltd.)

Underwater Technologies (UWT)
Yoshihisa Takayama (Tokai University)

Keynote Speakers

Tuesday, November 29, 2022 • 11:15-12:00 **Room Ibuka**
https://us06web.zoom.us/j/87465057910

Takehiro Nakamura

Chief Technology Architect, NTT DOCOMO, Inc.

5G volution and 6G powered by IOWN

Study, development and standardization for technologies toward the evolution of 5G are ongoing, taking into account issues in early 5G services and emerging market needs. In parallel, research focused on technologies and services for 6G is accelerating throughout the world. NTT DOCOMO is very aggressive for 5G Evolution and 6G. And NTT group is promoting IOWN, Innovative Optical and Wireless Network. Both of 6G and IOWN are targeting common future communication society in 2030s. In this presentation, our vision and latest activities for 5G Evolution and 6G powered by IOWN will be explained.

Tuesday, November 29, 2022 • 12:00-12:45 **Room Ibuka**
https://us06web.zoom.us/j/87465057910

Sun Sumei

Principal Scientist, Deputy Executive Director (Research), and Head of the Communications and Networks Dept at the Institute for Infocomm Research (I2R), Singapore

[Online]

5G to 6G: Driving applications, enabling technologies, research and standardization

The fifth generation (5G) network, promising to provide enhanced mobile broadband (eMBB), mission-critical internet of things (IoT), and massive IoT, aims to be the digital transformation enabler in all industry sectors. Moving to 2030, the physical world, digital world, and human world will be even more seamlessly connected and interacted, creating brand new experiences in work, leisure, learning, study, and social activities, accelerating the digital transformation in processes and practices in all industry sectors and public services. These will form the core driver for 6G innovation. Drive for sustainability, represented by the Sustainable De¬velopment Goals (SDGs) in the United Nations (UN) Agenda 2030 also calls for 6G's contribution. In this talk, we will start with a brief review on a few strategic 5G vertical clusters in Singapore, analyze some of the unaddressed gaps from 5G, and discuss the driving needs for 6G technologies. The 6G vision and research initiatives will then be shared. As examples, we will present some selected research in massive ultra-reliability low-latency communications (M-URLLC), joint sensing and communication (JSAC), intelligent and software-defined agile aggregation of licensed and unlicensed spectrums, artificial intelligence-supported system, network, and radio environment. Finally, we will provide an overview of the 6G standardization frontlines and the roadmap.

Keynote Speakers

Wednesday, November 30, 2022 • 16:45-17:30 **Room Ibuka**
https://us06web.zoom.us/j/87465057910

Jim Kurose

Distinguished University Professor of Computer Science and Associate Chancellor for Partnerships and Innovation
University of Massachusetts Amherst

[Online]

The Software-ization of Networking: Protocols, People, Pedagogy

It has been said that “software is eating the world.” With the arrival of software-defined networking (SDN), software is “eating” networking as well. In this talk, we consider the impact of SDN on the evolution of network protocols, on network management and “people in the loop”, and on how and what we will teach to future generations of networking students.

Wednesday, November 30, 2022 • 17:30-18:15 **Room Ibuka**
https://us06web.zoom.us/j/87465057910

Morio Toyoshima

Director General, Wireless Networks Research Center
National Institute of Information and Communications Technology (NICT)

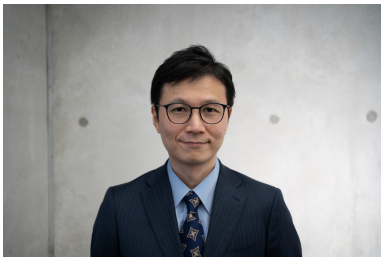
New Frontiers in Space Laser Communications for Beyond 5G/6G

Currently, as discussions on the way how the information and communication technology (ICT) should be in Beyond 5G (B5G) and 6G are accelerating, the space laser communication is becoming more advanced and active in the field of space communications. The satellite quantum key distribution (QKD) also gathers more attention for the future secure network. The realization of the advanced communication network is expected to connect the terrestrial and non-terrestrial networks (NTN) seamlessly. B5G/6G will require further global spatial expansion of the network than the current 5G, which direction is toward not only two-dimensional so far but also three-dimentional expansion for the mobile platforms called NTN in the future. In this talk, the trend and future vision of the space laser communication technology in the B5G/6G era will be introduced.

Keynote Speakers

Thursday, December 1, 2022 • 11:00-11:45 **Room Ibuka**
https://us06web.zoom.us/j/87465057910

Yoshihiro Kawahara



Professor, Graduate School of Engineering
The University of Tokyo

Did Contact Tracing Work? -- Mobile Sensing and Social Design

The time lag between infection and the onset of the disease led to the explosive spread of COVID-19. Finding and isolating infected persons with no symptoms was considered critical, and many measures were taken worldwide. A number of systems were proposed to record human-to-human contact information using a ranging mechanism based on Bluetooth radio on mobile devices. Now, two years after the start of the pandemic, reports are coming in one after another on whether these systems have actually worked. It is clear that the way contact tracking systems are implemented and operated largely reflects the social design within a country or organization. This talk will discuss how mobile sensing is implemented worldwide for contact tracking and its use in society.

Thursday, December 1, 2022 • 11:45-12:30 **Room Ibuka**
https://us06web.zoom.us/j/87465057910

Yutaka Arakawa

Professor, Faculty of Information Science and Electrical Engineering
Kyushu University

ICT-based Behavior Change Support System

Cyber-physical systems (CPS) are becoming a reality. Our human activities and psychological states are already being estimated by data from various sensors in our smartphones and wearables. Interestingly, we already believe the results displayed on our smartphones and make decisions and take actions based on them. This can work in a bad way, such as fake news, but it is also being used in the field of behavior change support. As a matter of fact, an application called Digital Medicine has been used this year to treat lifestyle-related diseases in Japan. This talk introduces the latest research on human activity recognition and behavior change support systems using ICT technology.

Invite Special Session

on IEICE Communications Society Editorial Board

Invited special talk by the 2021 IEICE Best Paper Award winners and 2021 IEICE Communications Society Excellent Paper Award winners

Invite Special 1	**Chair: Daisuke Umehara (Kyoto Institute of Technology)**
Nov. 30 (Wed) 9:00-10:30	
Room Ibuka	https://us06web.zoom.us/j/85299908510

IS1-1

Sophomore Created VHF Wireless Power Exciter for Medium Wave AM Radio Broadcasting Receiver

Yuri Kitagawa and Takashi Ohira (Toyohashi University of Technology)

This talk encourages science-minded teenagers to have fun creating RF power electronics. A Hartley oscillator using a low noise MOSFET 2SK241 generates 40 MHz sinusoidal waves, which is linked by a double series resonant toroidal LC coupler to a power booster stage using twin bipolar transistors SS8050 in parallel. Two pairs of metallized plastic plates work as a capacitive coupling wireless power transfer system. A toroidal inductor compensates in series for the coupling capacitance to enhance the power transfer efficiency. A double current rectifier using twin point contact diodes 1N60 converts the RF power back into DC. A medium wave signal broadcasted from NHK Nagoya radio station is received at Toyohashi located 80 km apart with a ferrite bar antenna 2V59M followed by an RF folded cascode amplifier using complementary bipolar transistors 2SC1815 and 2SA1015. A point contact diode 1N60 is again used for AM detection. A constant current diode E-102 enhances the voltage gain in the audio amplification stage. A double emitter follower diamond buffer using two pairs of complementary transistors finally drive an 8 Ω sound speaker. Audience will enjoy with and learn much of analog RF circuitry from this sophomore's hand made masterpiece.

IS1-2 [Online]

Modern Channel Coding for Synchronization Errors

Ryo Shibata (Tokyo University of Science)

In this talk, I will give an overview of several modern coding schemes for channels with synchronization errors, that have been gradually developed during the last two decades, to realize communication and recording systems affected by uncertainties in timing or time noise. First, I will introduce synchronization errors and a stochastic channel model of these errors. I will then describe two major modern coding schemes for channels with synchronization errors. The first scheme is a concatenated coding scheme that uses an inner synchronization correcting code and an outer random error correcting code The second scheme is a standalone coding scheme without using inner codes. I will also explain a belief propagation algorithm, that both schemes employ, for solving a maximum-a-posteriori (MAP) inference problem in graphical models consisting of channel and code subgraphs. Finally, I will introduce future perspectives.

Invite Special Session

on IEICE Communications Society Editorial Board

IS1-3

Miniaturization and Test Results of Shinkansen Antenna for Overhead Line Voltage Detection and Wireless Communication

Yoshihiro Matsumura, Takeshi Nishiyama, Eishi Sasaki (Central Japan Railway Company), Kengo Nishimoto, Hiroyuki Akutsu (Mitsubishi Electric Corporation), Yukitoshi Sanada (Keio University)

The Shinkansen antenna for overhead line voltage detection and wireless communication antenna has both the function of detecting the overhead line voltage of 60 Hz and the function of wireless communication in the VHF band. The antenna installed on the roof of the leading car on the Tokaido Shinkansen has been unchanged since its opening, despite being one of the sources of noise. In order to reduce noise, it is necessary to shorten the detection rod that detects overhead line voltage. Therefore, we propose a miniaturized antenna configuration that uses a folded monopole structure and a parallel resonant circuit. When the detection rod is shortened, the performance of overhead line voltage detection deteriorates, but the deterioration is minimized by making the antenna substrate area as large as possible within the antenna radome shape that reduces noise. We confirm the effectiveness of the proposed antenna by simulations and measurements. Moreover, we investigate the influence of the snow and rain, and show the results evaluated by running test.

Invite Special 2
Dec. 1 (Thu) 9:00-10:30
Room Ibuka

Chair: Masaki Bandai (Sophia University)

https://us06web.zoom.us/j/85299908510

IS2-1

Resource allocation models for efficient and fault-tolerant software-defined networks

Takehiro Sato (Kyoto University), Seiki Kotachi (Kyoto University), Ryoichi Shinkuma (Shibaura Institute of Technology), Eiji Oki (Kyoto University)

Software-defined networking (SDN) is regarded as a solution to achieve flexible slicing and management of network infrastructure. SDN offers a variety of benefits, including network programmability, traffic engineering, and the reduction of maintenance costs. The basic idea of SDN is to separate the control plane from the data forwarding plane; a logically centralized controller controls SDN switches using a protocol such as OpenFlow. The SDN controller configures a flow table of each SDN switch to determine forwarding rules. Resources available for SDN operations, such as memory for flow tables and computing resources to deploy controllers, are limited. To take full advantage of SDN, it is essential to properly allocate the resources for SDN operations. This presentation introduces two resource allocation models we study for efficient and fault-tolerant software-defined networks. The first one is a multicast routing model to minimize the total number of flow entries stored in SDN switches; the second one is an SDN controller placement model with consideration for controller failures. We demonstrate the effectiveness of our models by comparing them with benchmarks through numerical simulations.

Invite Special Session

on IEICE Communications Society Editorial Board

IS2-2

5G NR features Realizing Ultra-Reliable and Low Latency Communication

Tetsuya Yamamoto (Panasonic Holdings Corporation)

In 3rd Generation Partnership Project (3GPP), New Radio (NR) is specified as one of the radio interfaces for 5th generation mobile communication systems. NR supports two major use cases; enhanced broadband (eMBB) and ultra-reliable and low latency communication (URLLC). This presentation explains the key technologies for realizing the URLLC in 3GPP Release 15 and Release 16. Latency analysis when applying NR framework structure, uplink grant-free transmissions, and repetition techniques are shown.

IS2-3

Beyond 5G Network Architecture and its state-of-the-art Research for Access Network

Naoaki Yamanaka (Keio University)

5G and Beyond 5G is not the generation of mobile access technology. In beyond 5G era, all IoT and M2M devices such as vehicle, camera and robots are connected to network. In-network processing that is Edge and Cloud powerful computing supports connected IoT. That creates new services and more data drive with AI function society. There are 8 features in Beyond 5G network that are :(1) Broadband, (2) Energy Saving, (3) Low Latency, (4) Flexibility, (5) Efficiency, (6) Safety and Reliability, (7) Autonomy, and (8) Deployability. And one of the important applications is real-time service such as autonomous driving vehicle. It needs very low latency and quick interactive control at Edge. In this paper, I describe the-state-of-the-art research for access network. The network can support both high-speed that is 400 Gbps access, and massive-multi-access that is 1:256 connections. New device which is the Hollow-Core Fiber (HCF) will be applied to PON network and optically power supply to connected devices is also applied for IoT access.

Acknowledgements : This research is supported by the ICT priority technology R&D promotion of innovative optical transmission technologies for supporting green society project (JMPI00316) funded by the Ministry of Internal Affairs and Communications Japan.

Invite Special 3	**Chair: Makoto Taromaru (Fukuoka University)**
Dec. 1 (Thu) 9:00-10:30	
Room 1	https://us06web.zoom.us/j/85660892873

IS3-1

Improved monitoring of Flex Ethernet over OTN links

Takafumi Tanaka (NTT)

Flex Ethernet realizes creation of flexible and large-capacity logical links between router and optical transmission equipment by bundling multiple fixed-rate Ethernet links. However, there are some rooms for improvements in terms of monitoring its link states. We report on our efforts to improve the monitoring of Flex Ethernet. First, we describe a method for monitoring link status at the granularity of the clients in the Flex Ethernet. Second, we present a method for detecting degradation conditions and isolating the segments where degradation occurs in medium to long distance links including OTN.

Invite Special Session

on IEICE Communications Society Editorial Board

IS3-2 [Online]

Field Trial of Dynamic Mode Switching for 5G New Radio Sidelink Communications towards Application to Truck Platooning

Manabu Mikami, Kohei Moto, Koichi Serizawa, and Hitoshi Yoshino (Softbank)

This talk presents a field trial of dynamic mode switching for 5G NR-V2X sidelink communications. We built a field trial environment for 5G Vehicle-to-Everything (V2X) communications of truck platooning, with a prototype system employing 5G New Radio (NR) technologies, and performed the first-time trial in the world. It is most distinctive that the prototype system is equipped with V2V Direct communication radio interface (i.e., sidelink), in addition to the traditional radio interfaces between base station (BS) and user equipment (UE), i.e., downlink and uplink. Moreover, it is also distinctive that the sidelink (SL) interface supports a new function of dynamic mode switching between two modes of BS In-Coverage mode and BS Out-of-Coverage mode in order to achieve seamless V2V communications between BS in-coverage area and BS out-of-coverage area. Then, the field trial evaluated the results on over-the-air latency performance on the V2V Direct communication of the prototype using SL dynamic mode switching in a real expressway environment towards application to truck platooning. The results demonstrate that our developed SL dynamic mode switching achieves the seamless V2V Direct communications between in-coverage area and out-of-coverage area.

IS3-3

Wireless Access Technology Based on Factor Analysis of Communication Quality Using Redundant Information

Koji Yamamoto (Kyoto University), Takayuki Nishio (Kyoto University), Akihito Taya (Kyoto University), Mai Ohta (Fukuoka University), Makoto Taromaru (Fukuoka University), Kazuto Yano (ATR), Babatunde Ojetunde (ATR), and Keiichiro Mori (ATR)

In wireless communications, the success or failure can be determined, however, the degradation factors are generally unknown. This talk introduces factor analysis based on transmission/reception periods and channel state information (called redundancy check information) and the development status of access control technology based on the factor analysis.

Invite Session

Invited talk recommended by Technical Committees of IEICE Communications Society and IEICE International Sections

Invite 1
Nov. 29 (Tue) 16:15-17:45
Room Ibuka

Chair: Kazuhiko Kinoshita (Tokushima University)

https://us06web.zoom.us/j/85299908510

I1-1

The switching system of WPT and communication for B5G/6G

Naoki Hasegawa (SoftBank Corp.)

In the next society, we expect IoT and sensors are explosively increased. Wireless power transfer is an important technique for changing the charge way for them. This work proposes the WPT in a 28-GHz mobile frequency band. The switching system of WPT and communication is introduced.

I1-2

Future life in 2030s realized by Beyond 5G

Kentaro Ishizu (NICT)

Our future life in 2030s is expected to overcome various limitations of the human ability and current communication means. Beyond 5G will realize the concept of cyber-physical system (CPS) with advanced cutting-edge technologies. New system platforms are also required to integrate the key systems of Beyond 5G such as mobile systems, optical networks, computer resources, and facilities brought from different companies and individuals. In this talk, a few scenarios depicting future life are introduced based on the Beyond 5G/6G white paper published by NICT and key technologies derived from the scenarios are overviewed. Also, the concept of Beyond 5G architecture is explained as an open platform for the new generation of social infrastructure.

I1-3

Utilization of space communications for evolving 6G system

Eiji Okamoto (Nagoya Institute of Technology)

The fifth generation mobile communications system (5G) standard specifies the use of non-terrestrial networks (NTNs), and the practical application of systems using low earth orbit satellites and high altitude platforms is being considered. The 5G-Advanced standard is expected to include further developments, such as connectivity enhancements of IoT and unmanned aerial vehicle (UAV) terminals. For the sixth generation (6G), systems that take advantage of the wide-area connectivity, stability, and economic efficiency of NTNs will continue to develop. This presentation will discuss the system configuration and technologies that will be used for space communications in 5G and 6G.

Invite Session

Invite 2
Nov. 29 (Tue) 16:15-17:45
Room 1

Chair: Fumihide Kojima (NICT)

https://us06web.zoom.us/j/85660892873

I2-1

Real-time MIMO transmission experiments using FPGA based MIMO DSP

Shohei Beppu (KDDI Research)

The mode-division multiplexed transmission (MDM) systems with multiple-input multiple-output (MIMO) digital signal processing (DSP) for crosstalk cancellation can increase transmission capacity proportional to the number of multiplexed modes in fibers. Although high-capacity long-haul MDM transmission experiments were reported, the MIMO-DSP was performed offline. For practical deployment of MDM transmission systems, hardware implementation of real-time MIMO DSP is essential. It is challenging to implement MIMO DSP in FPGA boards because the required number of DSP slices is proportional to the square of the number of spatial modes and spatial mode dispersion. In this talk, we review recent progress of real-time MIMO DSP implementation. We also show an FPGA implementation of a real-time MIMO DSP prototype for four spatial modes and transoceanic real-time MIMO transmission experiments over coupled-core four-core fibers.

I2-2

Future Challenges for EMC Research in Telecommunication Service aimed Innovative Sustainable Society in 2040

Kimihiro Tajima (NTT Advanced Technology Corporation)

Until target year of 2040, telecommunications networks will achieve to 100[%] carbon neutral by establishing All Photonics Networks (APN), and introducing huge amount of renewable energies. Along with this transformation toward sustainable society, Electromagnetic environment in telecommunication will be significantly changes, and EMC problems occurred in society will also change. This paper describes future challenge on EMC in telecommunications with taking into account transformation of technologies. Focusing on new classification and evaluation methods of Electromagnetic environment, EMC issues surrounded by huge number of sensors, and Electromagnetic Resilience (EMR) against critical system in society, future challenges on EMC in telecommunication field are considered.

I2-3

Optical network nodes for high mode count multi-mode fiber networks

Ruben S. Luis (NICT)

We review the recent work on the development of spatial super channel switching network nodes to support 15-mode fiber networks. We specifically address the use of conventional wavelength selective switches to implement parallel 2x2 wavelength and spatial switching and the impact of multi-mode networking on the system performance.

Invite Session

Invite 3
Nov. 30 (Wed) 9:00-10:45
Room 1

Chair: Takaya Yamazato (Nagoya Univ.)

https://us06web.zoom.us/j/85660892873

I3-1 [Online]

Antennas Measurement for Beyond 5G and 6G Wireless Applications using Radio over Fiber Technologies.

Satoru Kurokawa (National Institute of Advanced Industrial Science and Technology (AIST))

The next-generation mobile communication services will be used for the millimeter wave frequency band such as a high-frequency 5th-generation mobile communication service and a 6th-generation mobile communication service. For developing the next-generation mobile services systems, we have newly developed a millimeter wave measurement system using radio over fiber technology more than 60 GHz. In this talk, we will explain our developed millimeter wave generation system and millimeter wave receiving system using Radio over fiber technology.

I3-2 [Online]

LED lighting considering circadian rhythm by melanopic illuminance control

Akane Aoki, Saeko Oshiba (Kyoto Institute of Technology)

Circadian rhythms are tied to the cycle of day and night and directly influenced by light. When circadian rhythm is thrown off, it means the body's systems don't function optimally such as serious sleeping problems. People's circadian rhythm are adjusted even under constant lighting by controlling the melanopic illuminance of the lighting. Melanopic illuminance is a unit for assessing the amount of melatonin produced by lighting. In this presentation, we introduce a LED lighting that changes the melanopic illuminance according to the time change of the melanopic illuminance of sunlight. Our designed LED lighting consist of 8 LEDs with different wavelengths. The illuminance is constant at 1000 lx and 8 kinds of color temperatures are assumed so that the user could set them accordingly. With a constant 6500 K and 1000 lx, the melanopic illuminance of the LED lighting can be controlled from 395 to 4055 lx by changing the radiant intensity of each of the 8 LEDs. It can be controlled in the range of about 3000 lx in other color temperatures. Finally, it is possible to design LED lighting that can change the melanopic illuminance over time by changing the radiant intensity of each LED despite the constant illuminance and color temperature.

I3-3

Digital Native Infrastructure Implementation based on Internet-by-Design

Hiroshi Esaki (The University of Tokyo)

The Internet is continuing the transformation and innovations with new technologies and components. Especially, "digital native" has been introducing series of transformations in the existing Internet, e.g., Metaverse or Web3. IoT based CPS shall trarnsforming to IoF(Internet of Functions) with Cyber First. Also, while the emerging of new terrisitrial digital infrastructure is comming, non-terristrial infrastructure is emerging to build new global digital communication infrastructure.

Invite Session

I3-4

Wireless communication and its problems in healthcare / hospitals in Japan

Eisuke Hanada (Saga University, Faculty of Science and Engineering)

The results of survey by the Japanese government showed that 90 % of Japanese hospitals have installed wireless LAN. Its usage is not only for communicating between PCs and Hospital Information System (HIS) servers, but also for communication between medical devices and servers, with such wireless communication becoming widespread in Japan. Communication between medical devices and HIS servers enables monitoring of how well the devices are working, exchanging data, and sending directions input by physicians. Wireless communication systems have been used in nurse call systems for decades, usually through the in-house Personal Handy phone System (PHS). However, the public voice communication service of PHS was terminated in 2021. There are a number of candidates for wireless communication systems to be used in nurse call systems, including wireless LAN with VoIP. Problems with the management of these new wireless communication systems can be expected to arise. Here I show the connectivity of medical devices, how nurse call system will change, and comment on possible problems. Also, I show two guidelines for the safe installation and management of wireless communication in Japanese hospitals.

Invite 4
Nov. 30 (Wed) 14:00-15:45
Room Ibuka

Chair: Akihiro Fujihara (Chiba Institute of Technology)

https://us06web.zoom.us/j/85299908510

I4-1

Distillation-based Serverless Federated Learning over Sensor Networks

Akihito Taya (the University of Tokyo)

Federated learning (FL) has attracted many interests as distributed machine learning. Because of its features of high communication efficiency and privacy protection, many extensions have been proposed for various applications. One of the extensions is fully decentralization, i.e., a serverless algorithm. Consensus-based distributed optimization (CDO) is usually applied to fully-decentralized FL. However, CDO does not work well for FL because of the non-convexity of neural networks. This talk provides an algorithm that overcomes the problem by utilizing knowledge distillation, referred to as consensus-based multi-hop federated distillation (CMFD). CMFD performs CDO in a function space instead of a parameter space. CMFD achieves higher accuracy and stability than parameter CDO for weakly connected networks.

I4-2

Hiroshi Takahashi (NTT Corporation)

Distributed acoustic sensing using frequency division multiplexing technique for deployed optical fiber networks

Distributed acoustic sensing (DAS) enables the acquisition of vibration information surrounding the cables of optical fibers. Recently, DAS using optical fiber communication networks has attracted attention as environmental monitoring. Phase-sensitive optical time domain reflectometry (Φ-OTDR) is one of the mainstream of DAS. In Φ–OTDR, an optical phase of Rayleigh backscattered light generated with the propagation of a highly coherent probe pulse along a sensing fiber is measured. We have proposed and demonstrated a DAS using frequency division multiplexing (FDM) technique to improve the measurement performance. In this presentation, we introduce the DAS using FDM-Φ-OTDR for deployed optical fiber networks. In addition, we show the application of distributed acoustic sensing for optical fiber cable networks, and describe the current status and future perspectives.

Invite Session

I4-3

Probabilistic Digital-Twin

Hideyuki Shimonihi (Osaka University)

In order to realize the fusion of the real world and the virtual world (Cyber Physical System) in the Beyond 5G era, it is necessary to realize “Digital Twin”, which is a platform for the fusion of digitized real world and virtual world. The digital twin generates a copy of the real world in real time by using Beyond 5G networks and advanced AI recognition technologies. The digital twins would be used for various applications such as real-world navigation and co-operative robot control. The probabilistic digital twin proposed in this research promotes safe and efficient coexistence and collaboration between humans and robots by representing the digital twin as probabilistic information including error information, thus allowing for uncertainty in AI recognition and errors in localization.

I4-4

Weakly coupled 3-mode 4-core fiber with standard cladding diameter

Yuto Sagae (NTT Access Network Service Systems Laboratories)

Demands for enlarging optical transmission capacity have encouraged investigations of the space division multiplexing (SDM) technology. Multi-core fibers (MCF) with the standard 125-□m cladding diameter are recognized as a feasible candidate of the transmission line for the SDM transmission systems. Although the mode multiplexing is effective to scale the transmission capacity of MCFs, it has been recognized that locating multiple few-mode cores in the 125-□m diameter clad was difficult while suppressing both the inter-core crosstalk (XT) and the confinement loss. In this paper, we show the recently proposed design for weakly coupled 3-mode 4-core fiber (3M-4CF) to overcome the stringent tradeoff between the inter-core XT and the confinement loss within the 125-□m diameter cladding. The effectiveness of our design using a common depressed layer will be shown by comparing with conventional trench-assisted and W-shaped structure. Fabricated fiber achieved low inter-core XT as below 10-4 km-1 and the highest relative core multiplicity factor (RCMF) among MCFs with the standard 125-□m cladding diameter. We will further discuss the remaining problems on the attenuation coefficient and feasible transmission systems for the proposed 3M-4CF.

Invite 5 **Chair: Takeo Fujii (The University of Electro Communications)**
Nov. 30 (Wed) 14:00-15:45
Room 1 https://us06web.zoom.us/j/85660892873

I5-1 [Online]

Arturo Buscarino (University of Catania)

Recycling Smartphone based sensor Networks for Civil Infrastructures Monitoring

Smartdevices are pervasive in every day life. However, they are often substituted by novel generation devices even before their life cycle has been concluded, thus generating an increasing amount of high tech waste. Disposed devices are still working, or at least the sensors and processing units within them can be still exploited. In this communication, a sensor network based on recycled smart devices is presented showing the capabilities in monitoring civil infrastructures providing in suitable time scales reliable information on their status.

Invite Session

I5-2 [Online]

Study of Disaster-Resilient Network-Cloud Ecosystem with Open Disaggregation and Cooperation Technologies

Sugang Xu (NICT)

To accommodate the growing demand for cloud services, the underlying networks and datacenters (DCs) form network-cloud ecosystems physically hosting these services and are continuously evolving. Open and disaggregated optical-networking technologies promise to enhance multi-vendor interoperability thanks to their open interfaces in both data-plane and control/management-plane. In the first part of this report, for a single entity (e.g., carrier) who owns the ecosystem, we introduce, and preliminarily evaluate, a new approach with open and disaggregation technologies for enhancing the disaster resilience of the carriers' optical networks in a network-cloud ecosystem, which is a multi-vendor, multi-domain, multi-sector (i.e., Telecom and DC) heterogeneous environment. For large scale network-cloud systems which involve multiple entities, we observe that cooperation among datacenter providers (DCPs) and network carriers is necessary to provide today's cloud services (and can be extremely helpful especially for disaster resilience), but, such cooperation is challenging as the DCPs and network carriers are diffident entities, that may not accept to disclose confidential information, e.g., detailed resource availability. In the second part of this report, for such multi-entity ecosystems, we introduce, and preliminarily evaluate, another new approach for enhancing the disaster resilience of future optical network-cloud ecosystems with cooperation between network carriers and DCPs.

I5-3

Quantum Optimization

Prabhas Chongstitvatana (Chulalongkorn University)

This talk presents an example of using Quantum computer to perform a standard optimization task. Traveling Salesman Problem is a widely used problem that represents hard problem for optimization. To use Quantum computer for this task, we devise quantum circuits using it in hybrid with traditional computer. We explain how to decompose the problem suitable for quantum computing. We also pointed out the limitation of the current technology.

I5-4

Role of Terahertz Semiconductor Devices for Applications

Kyung Hyun Park (Future & Basic Technology Research Division, ETRI)

The continuously increasing interest on the continuous-wave (CW) terahertz (THz) technologies in recent years is based on their potential in a wide variety of applications such as wireless communications, spectroscopy, sensing, and imaging. Among these, Terahertz (THz) communications, which uses the terahertz waves of which frequencies are in the range of 100 GHz to 1 THz, are regarded to become the core of the next generation of wireless communication technology. In Korea from 2021, government-funded research projects to develop the key technologies of B5G (Beyond fifth-generations) or 6G (sixth-generations) have been launched. The advent of these future communication is expected to make a leap forward in telemedicine, digital twin, and virtual reality and collaboration networks, which would be the practical human-centered digital service implementations. In terms of devices for the THz applications, both of electronics-based and photonics-based THz devices are in some kind of cooperation to become the leading technology. Although there is still a need for improvement in size, price, and performance of THz devices, the applicability of THz-electronics devices in the communication field and the adoption of THz photonics devices in human-centered THz sensing are expected. With a vision of easily-accessible terahertz technologies, we are in pursuit of a realization of the small and cost-effective terahertz technologies. In the meantime, a wide variety of terahertz semiconductor devices and terahertz application systems using the modules have been developed and are expected to be utilized in industrial fields in the near future. In this talk, our various approaches for the realization of terahertz application platforms will be presented.

Oral Session

Oral 1: Wireless Communications — **Chair: Tadao Nakagawa (Tottori University)**
Nov. 29 (Tue) 9:15-10:45
Room Ibuka — https://us06web.zoom.us/j/85299908510

O1-1 **Development of extreme coverage communication system extended by non-terrestrial network: End-to-end route management scheme based on QoS of user equipment**
Munehiro Matsui (NTT corporation), Hisayoshi Kano (NTT corporation), Junichi Abe (NTT corporation), Yuki Hokazono (NTT DOCOMO, Inc.), Atsushi Minokuchi (NTT DOCOMO, Inc.), Yoshihisa Kishiyama (NTT DOCOMO, Inc.), Fumihiro Yamashita (NTT corporation)

O1-2 **Non-Repudiation Broadcast Authentication Methods for C-V2X Communication**
Takaaki Kasai (Tokyo Denki University), Takeshi Ogawa (Tokyo Denki University)

O1-3 **Performance of Multidimensional TCM-QAM Single-carrier Transmission with Nonlinearity**
Hisataka Chonan (Niigata University), Shigenobu Sasaki (Niigata University)

O1-4 **Priority message statistics of disaster and crisis management report sent from quasi-zenith satellite Michibiki**
Satoshi Takahashi (Hiroshima City University)

O1-5 **Detection Probability of PBCH Demodulation Reference Signal Sequence in the Presence of Jamming**
Shun Yoneda (Tokyo City University), Mamoru Sawahashi (Tokyo City University), Satoshi Nagata (NTT DOCOMO INC.)

Oral 2: Machine Learning and IoT — **Chair: Koji Kamakura (Chiba Institute of Technology)**
Nov. 29 (Tue) 14:00-15:30
Room Ibuka — https://us06web.zoom.us/j/85299908510

O2-1 **Reduction methods of the amount of data in blockchain node**
Masaki Obayashi (Tokyo Denki University), Takeshi Ogawa (Tokyo Denki University)

O2-2 **Sleep/Active operation of optical-power-supplied ONU without electricity for rural IoT**
Hiroaki Katsurai (NTT Access Network Service Systems Laboratories), Youichi Fukada (NTT Access Network Service Systems Laboratories), Ryo Miyatake (NTT Access Network Service Systems Laboratories), Haruka Nagoshi (NTT Access Network Service Systems Laboratories), Masayoshi Sekiguchi (NTT Access Network Service Systems Laboratories), Tomoaki Yoshida (NTT Access Network Service Systems Laboratories)

O2-3 **Estimation of the ratio of the number of application users in cell by base station data**
Yukina Takano (NTT), Kei Takeshita (NTT)

O2-4 **LOS/NLOS Classification for Downlink CDL Channel Using Supervised Learning**
Jingyu Liu (Keio University), Mondher BOUAZIZI (Keio University), Tomoaki Ohtsuki (Keio University)

O2-5 **Gradient Descent Direction Random Walk MIMO Detection using Intermediate Search Point**
Naoki Ito (Keio University), Yukitoshi Sanada (Keio University)

Oral Session

Oral 3: Location Estimation **Chair: Shigenobu Sasaki (Niigata University)**
Nov. 29 (Tue) 14:00-15:30
Room 1 https://us06web.zoom.us/j/85660892873

O3-1 **Spatio-temporal model that aggregates information from sensors to estimate and predict states of obstacles for control of moving robots**
Yuichi Ohsita (Osaka University), Shinya Yasuda (NEC), Taichi Kumagai (NEC), Hiroshi Yoshida (NEC), Dai Kanetomo (NEC), Masayuki Murata (Osaka University)

O3-2 **Machine learning method for location estimation at various altitudes using multiple items of sensed information in indoor environment**
Ren Kawamura (Tohoku Institute of Technology), Eisuke Kudoh (Tohoku Institute of Technology)

O3-3 **A fingerprint localization using data from different radio environments**
Ryoga Ozaki (University of Hyogo), Satoru Aikawa (University of Hyogo), Shin-ichiro Yamamoto (University of Hyogo)

O3-4 **CNN Area Estimation using data measured in walking conditions**
Shota Nakayama (University of Hyogo), Satoru Aikawa (University of Hyogo), Shinichiro Yamamoto (University of Hyogo)

O3-5 **GNSS Spoofing Detection using Multiple Sensing Devices and Decision Tree Classifier**
Xin Qi (Waseda University), Toshio Sato (Waseda University), Zheng Wen (Waseda University), Masaru Takeuchi (Japan Datacom Co., Ltd), Yutaka Katsuyama (Waseda University), Kazuhiko Tamesue (Waseda University), Kazue Sako (Waseda University), Jiro Katto (Waseda University), Takuro Sato (Waseda University)

Oral 4: Optical Communications **Chair: Kazuhiko Aikawa (Fujikura Ltd.)**
Nov. 30 (Wed) 11:15-12:45
Room Ibuka https://us06web.zoom.us/j/85299908510

O4-1 **Novel Wavelength-Multiplexed AMCC Insertion and Detection Method with Single Receiver for Protocol-Independent End-to-End User Connections in APN**
Takuya Kanai (NTT Access Network Services System Laboratories), Shin Kaneko (NTT Access Network Services System Laboratories), Jun-ichi Kani (NTT Access Network Services System Laboratories), Tomoaki Yoshida (NTT Access Network Services System Laboratories)

O4-2 **A Proposal of Satellite-based FSO/QKD System for Multiple Wireless Users**
Minh Quang Vu (The University of Aizu), Hoang Doan Le (The University of Aizu), Anh Tuan Pham (The University of Aizu)

O4-3 **48 Gbit/s 256 QAM coherently-linked optical and wireless transmission at 61 GHz band using a small planar antenna for 6G**
Koichi Shirahata (Tohoku University), Taisei Sato (Tohoku University), Keisuke Kasai (Tohoku University), Toshihiko Hirooka (Tohoku University), Masato Yoshida (Tohoku University), Masataka Nakazawa (Tohoku University)

O4-4 **A Study of PDs Arrangement for LED based Underwater Visible Light Communication with Angular Diversity Receiver in shallow water**
Keigo Matsunaga (Ibaraki University), Yusuke Kozawa (Ibaraki University), Hiromasa Habuchi (Ibaraki University)

O4-5 **A Study on Efficient Coding Methods to Suppress Redundancy and ACK Traffic in LT Codes with Feedback**
Maho Ono (OMU), Yosuke Tanigawa (OMU), Yusuke Hirota (NICT), Hideki Tode (OMU)

Oral Session

Oral 5: Analog and Digital Signal Processing for Various Systems	Chair: Satoru Aikawa (University of Hyogo)
Dec. 1 (Thu) 14:00-15:30	Room Ibuka
	https://us06web.zoom.us/j/85299908510

O5-1 An ESL-cancelling circuit for a film capacitor using vertically stacked coupled square loops
Satoshi Yoneda (Mitsubishi Electric Corporation), Akihito Kobayashi (Mitsubishi Electric Corporation), Norihiko Akashi (Mitsubishi Electric Corporation), Eiji Taniguchi (Mitsubishi Electric Corporation)

O5-2 A Study on the Effect of Water on the Characteristic of Antennas for Water Level Gauges
Koichi Yamaguchi (Okayama University), Shuhei Yamamoto, Ryota Ogata (Okayama University), Shigeru Tomisato (Okayama University), Kazuhiro Uehara (Okayama University)

O5-3 Realization of Multi-Point Coordinated Beamforming Over Millimeter-Wave Channels with Random Blockage
Tomoki Sugiura (Kozo Keikaku Engineering Inc), Tetsuya Iye (Kozo Keikaku Engineering Inc), Shohei Takaya (Kozo Keikaku Engineering Inc), Yuki Susukida (Kozo Keikaku Engineering Inc), Yoshimi Fujii (Kozo Keikaku Engineering Inc), Sota Uchimura (University of Electro-Communications), Koji Ishibashi (University of Electro-Communications)

O5-4 Signal Source Position Estimation in Multipath Environment Using PN Correlation Method with 2D-FOCUSS in UWB Wireless System
Kento Kataoka (Tokai Rika Co., Ltd./Nagoya Institute of Technology), Nobuyoshi Kikuma (Nagoya Institute of Technology), Yoshiki Oishi (Tokai Rika Co., Ltd.), Tatsuya Koike (Tokai Rika Co., Ltd.), Kenichi Koga (Tokai Rika Co., Ltd.), Kunio Sakakibara (Nagoya Institute of Technology), Yoshiki Sugimoto (Nagoya Institute of Technology)

O5-5 Position estimation method using recursive MAP estimation for ultrasonic sensor arrays
Masamichi Hattori (Nagoya University), Asuka Tsujii (Nagoya University/NGK SPARK PLUG CO., LTD), Takashi Kasashima (NGK SPARK PLUG CO., LTD), Hiroyuki Hatano (Mie University), Takaya Yamazato (Nagoya University)

Oral 6: Network Systems	Chair: Toshio Tonouchi (RIKEN)
Dec. 1 (Thu) 16:15-17:45	
Room Ibuka	https://us06web.zoom.us/j/85299908510

O6-1 Network Experiment of the 4 x 10 Gbps Layer 4 Payload "0" Replacement Filter
Satoru Okamoto (Keio University), Masaki Murakami (Keio University), Shinya Nakamura (UBiqube), Yusuke Hirota (NICT), Shin'ichi Akahane (Alaxala Networks), Naoaki Yamanaka (Keio University)

O6-2 Short-term traffic prediction based on mobile control information for proactive optical switching to lower congestion delay
Yuka Okamoto (NTT), Hirotaka Ujikawa (NTT), Yoshihito Sakai (NTT), Tatsuya Shimada (NTT), Tomoaki Yoshida (NTT)

O6-3 A demand-adaptive multi-view video delivery method based on meta-information
Saeko Maeda (Keio University), Takashi Kurimoto (Keio University), Satoru Okamoto (Keio University), Naoaki Yamanaka (Keio University)

O6-4 Experiment on repetitive exchanging of heterogeneous routers for router metabolism
Rei Ishioka (Tokai University), Yuya Suga (Tokai University), Junichi Murayama (Tokai University)

O6-5 Experiment on repetitive router exchanging for router metabolism
Yuya Suga (Tokai University), Rei Ishioka (Tokai University), Junichi Murayama (Tokai University)

Short Presentation Session

Short 1: Radio Propagation and Various Communications	**Chair: Naoki Kita (NTT)**
Nov. 29 (Tue) 9:15-10:45	**Room 1**
	https://us06web.zoom.us/j/85660892873

S1-1 Improved Beamforming Design for Full-Duplex Relay-Assisted Cooperative NOMA
Hanlin Liao (Ibaraki University), Teruyuki Miyajima (Ibaraki University)

S1-2 Performance Analysis of Block Beamforming Methods in Two-wave-LOS Multi-User MIMO Communication
Taisei Oe (Nagoya Institute of Technology), Nobuyoshi Kikuma (Nagoya Institute of Technology), Kunio Sakakibara (Nagoya Institute of Technology), Yoshiki Sugimoto (Nagoya Institute of Technology)

S1-3 Performance Degradation due to Crosstalk in Underwater Wireless Optical Communication Systems with a Two-Beam Configuration
Ryoko Yoshino, Keiko Fujii (The Senior High School affiliated with Japan Women's University), Takayuki Yoshino (Tokyo Denki University)

S1-4 Novel Electro-Optic Modulator Using Antenna-Coupled Electrode and MMI coupler for Converting SDM Mobile Wireless Signals to WDM Optical Signals
Mefina Yulias Rofianingrum (Mie University/National Research and Innovation Agency of Indonesia), Yui Otagaki (Mie University), Hiroshi Murata (Mie University)

S1-5 An Result of SNR Difference in Received Antennas in mm-Wave SIMO Radar for A Remote Heart Rate Measurement
Ryota Shigihara (Nihon Univ.), Yaokun Hu (Nihon Univ.), Takeshi Toda (Nihon Univ.)

S1-6 Study of Raytracing using Point Cloud Data for Indoor Area Evaluation
Koshiro Kitao (NTT DOCOMO, INC.), Mitsuki Nakamura (NTT DOCOMO, INC.), Takahiro Tomie (NTT DOCOMO, INC.), Satoshi Suyama (NTT DOCOMO, INC.)

S1-7 Outdoor Experiment Trial of Millimeter-Wave Coverage in 28 GHz and 39 GHz Bands
Kenta Goto (NTT DOCOMO, INC.), Nobuhide Nonaka (NTT DOCOMO, INC.), Takayuki Yamada (NTT DOCOMO, INC.), Satoshi Suyama (NTT DOCOMO, INC.), Shoji Itoh (Ericsson Japan K.K.)

Short 2: Wired Networks	**Chair: Masaki Bandai (Sophia University)**
Nov. 29 (Tue) 9:15-10:45	
Room 2	https://us06web.zoom.us/j/82733816387

S2-1 A Novel Network Configuration Generation Scheme from Network Operator's Intent Described by Natural Language
Masaya Suzuki (Kindai University), Kimihiro Mizutani (Kindai University), Satoru Kobayashi (National Institute of Informatics), Kensuke Fukuda (National Institute of Informatics), Osamu Akashi (National Institute of Informatics)

S2-2 Acquisition Delay Time Evaluation of Cloud-based Load Distribution Model in ICSN
Eishin Nagaoka (Kogakuin University), Ryohei Banno (Kogakuin University), Osamu Mizuno (Kogakuin University)

S2-3 Integrated Quantum Repeater Network System Using Both E2E and HBH Teleportations
Haruna Kimura (University of Fukui), Kazuhisa Matsuzono (NICT), Takaya Miyazawa (NICT), Takuji Tachibana (University of Fukui)

Short Presentation Session

S2-4 **Simplified PON with a dedicated bandwidth for upstream traffic for surveillance services**
Atsuko Yokotani (Shizuoka University), Hiroshi Mineno (Shizuoka University), Tetsuya Yokotani (Kanazawa Institute of Technology)

S2-5 **Performance of Deeply Analyzing Application Switch**
Satoshi Ito (Kogakuin University), Akihiro NAKAO (University of Tokyo), Masato OGUCHI (Ochanomizu University), Saneyasu YAMAGUCHI (Kogakuin University)

S2-6 **Gateway implementation for evaluating jitter reduction packet forwarding control method**
Hikaru Yamaguchi (Keio University), Masaki Murakami (Keio University), Takashi Kurimoto (Keio University), Satoru Okamoto (Keio University), Naoaki Yamanaka (Keio University)

S2-7 **Message Delivery Delay with End-to-End Routing in Complex Networks**
Yu Hatanaka (Kwansei Gakuin University), Hiroyoshi Sawano (Kwansei Gakuin University), Ryotaro Matsuo (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

Short 3: Security	**Chair: Keisuke Ishibashi (International Christian Univ.)**
Nov. 29 (Tue) 9:15-10:45	https://us06web.zoom.us/j/82901492572
Room 3	

S3-1 **Reconfigurable In-network Security Sensor Network with beyond 5G Emerging Technology (REINS network)**
Satoru Okamoto (Keio University), Naoaki Yamanaka (Keio University), Masaki Suzuki (KDDI Research), Atsushi Tagami (KDDI Research), Nobuhito Matsuyama (Alaxala Networks), Takayuki Muranaka (Alaxala Networks)

S3-2 **Agent-Based Simulation Approach to Information Dissemination in Social Networking Service: The Impact of Big Five Personality Traits on User Trust**
Radifan Fitrach Muhammad (Nara Institute of Science and Technology), Shoji Kasahara (Nara Institute of Science and Technology)

S3-3 **A Mathematical Model of Blockchains Considering Dependencies of Fees, Confirmation Latency, and Security**
Takumi Hiraide (Nara Institute of Science and Technology), Shoji Kasahara (Nara Institute of Science and Technology)

S3-4 **Security Level Management of Physical Servers Based on Optimization Problem for Cost-Effective Service Chain Construction**
Daisuke Amaya (University of Fukui), Takuji Tachibana (University of Fukui)

S3-5 **Transaction distributed management using self-organization map in DAG-based blockchain NFT**
Yoshimi Suematsu (Tokyo Metropolitan University), Takashi Nishitsuji (Tokyo Metropolitan University), Takuya Asaka (Tokyo Metropolitan University)

S3-6 **Synthesize Facial Expressions for Authentication Based on Spatiotemporal Information and Actions**
Akira Nishihara (Kindai University), Masateru Tsunoda (Kindai University)

Short Presentation Session

Short 4: Wireless Communications — **Chair: Osamu Takyu (Shinshu University)**
Nov. 29 (Tue) 14:00-15:45
Room 2 — https://us06web.zoom.us/j/82733816387

S4-1 **Time-Variant Channel Emulation via Spatial Interpolation from 2D Sparsely Sampling of Site-Specific Channel**
Nopphon Keerativoranan (Tokyo Institute of Technology), Jun-ichi Takada (Tokyo Institute of Technology)

S4-2 **Evaluation of Antenna Beam Search Algorithm Using Terminal Position Prediction in Frequency Sharing**
Kizuku Kawamura (Shinshu University), Kohei Akimoto (Akita Prefectural University), Osamu Takyu (Shinshu University)

S4-3 **A study of anomaly detection using MCS data in 5G environment**
Toshi Ito (Shinshu University), Riku Yamabe (Shinshu University), Osamu Takyu (Shinshu University)

S4-4 **System Capacity Analysis of Intelligent Reflecting Surface Considering the Effect of Blockage**
Shota Muroki (Waseda University), Shuhei Saito (Waseda University), Fumiaki Maehara (Waseda University)

S4-5 **An Initial Code Acquisition Scheme Using Zadoff-Chu Sequences with Positive and Negative Indices**
Megumi Fukuma (Mitsubishi Electric Corporation), Akinori Nakajima (Mitsubishi Electric Corporation), Masaki Noda (Mitsubishi Electric Corporation)

S4-6 **SINR Improvement by Adaptive Bandwidth Control and Filtering According to Other System Bands in Multi-Band Systems**
Shogo Yasuda (Okayama University), Shigeru Tomisato (Okayama University), Kazuhiro Uehara (Okayama University)

S4-7 **Blind compensation for IQ imbalance in wideband single-carrier MIMO systems in the presence of a carrier frequency offset**
Yuichiro Tamada (Tottori University), Yuta Ueno (Tottori University), Isana Tsubota (Tottori University), Naoto Sasaoka (Tottori University), Tadao Nakagawa (Tottori University)

S4-8 **Evaluation of 100 GHz-Band Transmission with Transmitter and Receiver Hybrid Beamforming in Multiuser Environment**
Atsuya Nakamura (NTT DOCOMO, INC.), Nobuhide Nonaka (NTT DOCOMO, INC.), Tatsuki Okuyama (NTT DOCOMO, INC.), Satoshi Suyama (NTT DOCOMO, INC.), Takayuki Yamada (NTT DOCOMO, INC.)

Short 5: Theory on Networks — **Chair: Ryo Yamamoto (The Univ. of Electro-Communications)**
Nov. 29 (Tue) 14:00-15:45
Room 3 — https://us06web.zoom.us/j/82901492572

S5-1 **A Study on the Message Corruption Detectability in AUTOSAR E2E Profile 2**
Taichi Emi (Kwansei Gakuin University), Han Nay Aung (Kwansei Gakuin University), Yasuhiro Yamasaki (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

S5-2 **A Study on the Exploration Efficiency of (α, k) Random Walk on Unknown Graphs**
Ryo Yoshitsugu (Kwansei Gakuin University), Takeaki Iwata (Kwansei Gakuin University), Ryotaro Matsuo (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

Short Presentation Session

S5-3 **Effect of Laziness of Random Walks on the Efficiency of Graph Exploration in Dynamic Graphs**
Daiki Nakagawa (Kwansei Gakuin University), Takeaki Iwata (Kwansei Gakuin University), Ryotaro Matsuo (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

S5-4 **A Study on Node Centrality Obfuscation in Large-Scale Networks**
Hiroki Kawamura (Kwansei Gakuin University), Takeaki Iwata (Kwansei Gakuin University), Ryotaro Matsuo (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

S5-5 **A Study on a Co-Ranking Algorithm of Layers and Nodes for Multilayer Networks**
Shu Shirakawa (Kwansei Gakuin University), HIroyoshi Sawano (Kwansei Gakuin University), Ryotaro Matsuo (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

S5-6 **An Experimental Study on Modeling Accuracy of Digital Twin for Cloud-Based Remote Vehicle Path Tracking Control**
Masaki Minagawa (National Defense Academy of Japan), Yudai Yoshimoto (National Defense Academy of Japan), Ryohei Nakamura (National Defense Academy of Japan), Hisaya Hadama (National Defense Academy of Japan)

S5-7 **A Study on the Impact of Network Topology on the Efficiency of Distributed Online Kernel Learning**
Kouki Takamori (Kwansei Gakuin University), Taichi Emi (Kwansei Gakuin University), Han Ney Aung (Kwansei Gakuin University), Keita Goto (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

S5-8 **An Implementation of Misconfiguration Prevention System Using Language Model for a Network Automation Tool**
Mamoru Kawaguchi (Kindai University), Kimihiro Mizutani (Kindai University), Nobukazu Iguchi (Kindai University)

Short 6: Advanced Techniques for Antennas and DOA Estimation	**Chair: Ai-ichiro Sasaki (Kindai University)**
Nov. 30 (Wed) 11:15-12:45	**Room 1**
	https://us06web.zoom.us/j/85660892873

S6-1 **Dual band MACKEY Unbalanced Type Inverted F**
Kota Hakamata (Kanazawa Institute of Technology), Keito Yokoe (Kanazawa Institute of Technology), Shigeru Makino (Kanazawa Institute of Technology)

S6-2 **Study of Circularly-Polarized MACKEY with Two-Point Feed**
Michinori Yoneda (Kanazawa Institute of Technology), Keito Yokoe (Kanazawa Institute of Technology), Shigeru Makino (Kanazawa Institute of Technology)

S6-3 **Circularly polarized antennas with degenerate separation**
Koki Iijima (Kanazawa Institute of Technology), Keito Yokoe (Kanazawa Institute of Technology), Shigeru Makino (Kanazawa Institute of Technology)

S6-4 **Measurement results for single-layered reflectarray antenna with Split Rectangular Loop Elements**
Masayoshi Takao (Kanazawa Institute of Technology), Yusuke Kaimori (Kanazawa Institute of Technology), Shigeru Makino (Kanazawa Institute of Technology)

S6-5 **2-D arraying of 28-GHz MACKEY II**
Hajime Suzuki (Kanazawa Institute of Technology), Shigeru Makino (Kanazawa Institute of Technology), Taichi Hamabe (Panasonic Connect Co.)

Short Presentation Session

S6-6 **DOA Estimation of Direct Wave in Multipath Environments Using FFT-FOCUSS with Multiple Thinned Arrays**
Kazuya Ota (Nagoya Institute of Technology), Nobuyoshi Kikuma (Nagoya Institute of Technology), Kunio Sakakibara (Nagoya Institute of Technology), Yoshiki Sugimoto (Nagoya Institute of Technology)

S6-7 **Performance Analysis of Regularized FOCUSS Algorithm in Joint DOD and DOA Estimation Using Bistatic MIMO Radar**
Motoya Ichikawa (Nagoya Institute of Technology), Nobuyoshi Kikuma (Nagoya Institute of Technology), Kunio Sakakibara (Nagoya Institute of Technology), Yoshiki Sugimoto (Nagoya Institute of Technology)

Short 7: IP	**Chair: Shintaro Uno (Aichi University of Technology)**
Nov. 30 (Wed) 11:15-12:45	
Room 2	https://us06web.zoom.us/j/82733816387

S7-1 **Invocation of Expire procedure with Increase in RTT**
Natsuki Katsumata (Kogakuin University), Kohei Ogawa (Kogakuin University), Saneyasu Yamaguchi (Kogakuin University)

S7-2 **Service Identification from IP Traffic and its Accuracy**
Ryo Asaoka (Kogakuin University), Akihiro Nakao (The University of Tokyo), Masato Oguchi (Ochanomizu University), Saneyasu Yamaguchi (Kogakuin University)

S7-3 **Restriction of Expire Procedure on Throughput Fluctuation Relief**
Kohei Ogawa (Kogakuin University), Natsuki Katsumata (Kogakuin University), Saneyasu Yamaguchi (Kogakuin University)

S7-4 **IP Linear Video Delivery System on Dynamic Optical Path Network**
Daiki Fukudome (NHK Science & Technology Research Laboratories), Hiroyuki Kitada (NTT Network Service Systems Laboratories), Takafumi Okuyama (NTT Network Service Systems Laboratories), Xiaotian Zhao (NTT Network Service Systems Laboratories), Satoshi Nishimura (NHK Science & Technology Research Laboratories)

S7-5 **Investigation of CPU Resource Consumption in Android**
Kota Kumakura (Kogakuin University), Takeshi Kamiyama (Nagasaki University), Masato Oguchi (Ochanomizu University), Saneyasu Yamaguchi (Kogakuin University)

S7-6 **A Study on HTTP/3 Throughput and CPU Performance**
Shintarou Kawai (Kogakuin University), Saneyasu Yamaguchi (Kogakuin University)

S7-7 **A Study on the Applicability of TCP Congestion Avoidance Algorithms to Information-Centric Networking**
Han Nay Aung (Kwansei Gakuin University), Keita Goto (Kwansei Gakuin University), Hiroyuki OHSAKI (Kwansei Gakuin University)

Short Presentation Session

Short 8: AI/GA	**Chair: Takuya Asaka (Tokyo Metropolitan University)**
Nov. 30 (Wed) 11:15-12:45	
Room 3	https://us06web.zoom.us/j/82901492572

S8-1 **GA-based Layer Coupling of Power and Transportation Networks for Appropriate Control of Distribution Voltage**
Koga Nakamura (University of Fukui), Ryuto Shigenobu (University of Fukui), Takuji Tachibana (University of Fukui)

S8-2 **Proposal for Auction Mechanism of Federated Learning with Knowledge Distillation**
Yutaka Hatazawa (University of Fukui), Takuji Tachibana (University of Fukui)

S8-3 **Supervised Data Construction Method for Clothing Coordination Support System**
Marina Ooi (Japan Women's University), Haruhisa Hasegawa (Japan Women's University)

S8-4 **English Presentation Evaluation Based on Deep Learning**
Yoshihaya Takahashi (Kogakuin University), Takako Kojima (Tokyo Medical University), Takeshi Kamiyama (Nagasaki University), Masato Oguchi (Ochanomizu University), Saneyasu Yamaguchi (Kogakuin University)

S8-5 **An Implementation of Effective Server Resource Management Scheme Using Deep Reinforcement Learning**
Toshiki Kawakita (Kindai University), Kimihiro Mizutani (Kindai University), Satoru Kobayashi (National Institute of Informatics), Kensuke Fukuda (National Institute of Informatics), Osamu Akashi (National Institute of Informatics)

S8-6 **AIMD Window Flow Control using Reinforcement Learning**
Kento Otani (Kwansei Gakuin University), Shota Inoue (Kwansei Gakuin University), Keita Goto (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

S8-7 **A Study on the Performance Improvement of a Routing Mechanism using Reinforcement Learning for IoT Networks**
Shotaro Takahashi (Kwansei Gakuin University), Shota Inoue (Kwansei Gakuin University), Keita Goto (Kwansei Gakuin University), Hiroyuki Ohsaki (Kwansei Gakuin University)

Short 9: Visible Light, Optical Wireless, and UAV	**Chair: Masaki Bandai (Sophia University)**
Dec. 1 (Thu) 14:00-15:45	**Room 1**
	https://us06web.zoom.us/j/85660892873

S9-1 **A Study of Prediction of Operation Information by LSTM Using Electromyography Signals and Operation Information**
Yutaka Katsuyama (Waseda University), Toshio Sato (Waseda University), Kazuhiko Tamesue (Waseda University), Takuro Sato (Waseda University), Yuichi Nakamura (Kyoto University), Jiro Katto (Waseda University)

S9-2 **Customizable Long-Range UAV Communication System for 4G LTE Networks**
Wen-Hsing Kuo (Yuan Ze University), Chia-Chih Kuo (Yuan Ze University)

S9-3 **Spectrum Efficiency Improvement by Optimal Modulation Selection in LED Visible Light Wireless Communications by Spatially Parallel Signal Transmission**
Sota Hikasa (Okayama University), Shigeru Tomisato (Okayama University), Satoshi Denno (Okayama University), Kazuhiro Uehara (Okayama University)

Short Presentation Session

S9-5 **Influence of Walsh-Hadamard Code Sequency in Visible Light Communication Using an Event Camera**
Daiki Ehara (Nagoya University), Zhengqiang Tang (Nagoya University), Masayuki Kinoshita (Chiba Institute of Technology), Takaya Yamazato (Nagoya University), Hiraku Okada (Nagoya University), Koji Kamakura (Chiba Institute of Technology), Shintaro Arai (Okayama University of Science), Tomohiro Yendo (Nagaoka University of Technology), Toshiaki Fujii (Nagoya University)

S9-6 **Study on Visible Light Communication System Using Low-Speed Camera and Circular Scanning**
Ryosuke Izumi (University of Tsukuba), Tadashi Ebihara (University of Tsukuba), Naoto Wakatsuki (University of Tsukuba), Yuka Maeda (University of Tsukuba), Koichi Mizutani (University of Tsukuba)

S9-7 **Smartphone Camera-Based Indoor Positioning System Utilizing Optical Diffusion Filter**
Reo Okawara (University of Tsukuba), Tadashi Ebihara (University of Tsukuba), Naoto Wakatsuki (University of Tsukuba), Keiichi Zempo (University of Tsukuba), Koichi Mizutani (University of Tsukuba)

S9-8 **Transmission performance improvement using maximum likelihood decision and frequency domain equalization for multi-layer single-carrier optical wireless communications**
Hodaka Suzuki (Tottori University), Tadao Nakagawa (Tottori University)

Short 10: Wireless Networks	**Chair: Eisuke Hanada (Saga University)**
Dec. 1 (Thu) 14:00-15:45	
Room 2	https://us06web.zoom.us/j/82733816387

S10-1 **Future considerations for the management of hospital LANs**
Eisuke Hanada (Saga University), Takato Kudou (Oita University)

S10-2 **Research issues on mobile cloud/edge computing for Internet of Vehicles**
Jinyeong Um (Dongguk University), Seunghyun Chung (Dongguk University)

S10-3 **Development of extreme coverage communication system extended by Non-Terrestrial Network(NTN)-Study of traffic-control method to improve the availability of each user equipment during rainfall-**
Hisayoshi Kano (NTT Corporation), Munehiro Matsui (NTT Corporation), Jun-ichi Abe (NTT Corporation), Yuki Hokazono (NTT DOCOMO, INC), HInata Kohara (NTT DOCOMO, INC), Yoshihisa Kishiyama (NTT DOCOMO, INC), Fumihiro Yamashita (NTT Corporation)

S10-4 **Challenges of SDN-based VANET**
SeungHyun CHUNG (Dongguk University), JinYeong Um (Dongguk University)

S10-5 **Handovers using ring network composed of ring node equipment including lower MAC address memory, and top equipment**
Hideo Tatsuno

S10-6 **A Study on Communication Protocols of Smart Home Devices**
Shoichiro Seno (Tokushima Bunri University), Akinori Furuya (Tokushima Bunri University), Hiroyuki Nakayama (Tokushima Bunri University)

Short Presentation Session

S10-7 **A Proposal of Communication Time Control Technology for Power Saving of Terminals and Base Stations**
Sou Takatani (NTT Access Network Service Systems Laboratories), Toshiro NAKAHIRA (NTT Access Network Service Systems Laboratories), Daisuke MURAYAMA (NTT Access Network Service Systems Laboratories), Takatsune MORIYAMA (NTT Access Network Service Systems Laboratories)

Short 11: Sensing and Application	**Chair: Kenko Ota (Nippon Institute of Technology)**
Dec. 1 (Thu) 14:00-15:45	
Room 3	https://us06web.zoom.us/j/82901492572

S11-1 **A Fuel Cost-less Bus Driver Allocation through Bus IoT Data Analysis**
Riku Miura (Kindai University), Kimihiro Mizutani (Kindai University)

S11-2 **A Green Platform based on Recycled Smartdevices for Monitoring Buildings**
Arturo Buscarino (University of Catania, Italy), Carlo Famoso (University of Catania, Italy), Luigi Fortuna (University of Catania, Italy)

S11-3 **An application for Remote Tracking Heart Rate Measurement Using mm-Wave Radar Module with Stepping Motor**
Joonyoung Lee (Nihon Univ.), Yaokun Hu (Nihon Univ.), Takeshi Toda (Nihon Univ.)

S11-4 **An Effect of Elliptic and Chebyshev II as Bandwidth Limiting Filters in Frequency Selection Method Using Discrete Wavelet Transformation and Machine Learning for Heart Rate Estimation by mm-Wave Radar**
Kosuke Otsu (Nihon University), Yaokun Hu (Nihon University), Takeshi Toda (Nihon University)

S11-5 **Analyzing Situational Stress Using Multiple Wearable Devices**
Taku Yamazaki (Shibaura Institute of Technology), Kotaro Iwama (Shibaura Institute of Technology), Ayumi Takemoto (Shibaura Institute of Technology), Takumi Miyoshi (Shibaura Institute of Technology), Yoshihiro Niitsu (Shibaura Institute of Technology)

S11-6 **A Novel Automatic Checkout System without Relearning Additional Item Information**
Daisuke Hanamitsu (Kindai University), Kimihiro Mizutani (Kindai University)

S11-7 **Designing Synchronization Patterns Based on Euler Graphs for Inaudible Sound Communication Systems**
Naofumi Aoki (Hokkaido University), Kosei Ozeki (Hokkaido University), Kenichi Ikeda (Smart Solution Technology, Inc.), Hiroshi Yasuda (Smart Solution Technology, Inc.), Hiroyuki Namba (Smart Solution Technology, Inc.)

Short 12: High Frequency Devices/Circuits and Sensing	**Chair: Takeshi Toda (Nihon Univ.)**
Dec. 1 (Thu) 16:15-18:00	**Room 1**
	https://us06web.zoom.us/j/85660892873

S12-1 **Analysis of Transmission Characteristics of Microstrip Line Loaded with Noise-Suppression Device Arranged Three-Dimensionally**
Yihang Cheng (Tokai University), Kimitoshi Murano (Tokai University)

S12-2 **Driver's health monitoring with a single MMW sensor**
Ryota Kawasaki (University of Kitakyushu), Akihiro Kajiwara (University of Kitakyushu)

Short Presentation Session

S12-3 **Digital Predistortion for THz RF Power Amplifier with 16-APSK Modulation in Non-Terrestrial-Networks**
San Hlaing Myint (Waseda University), Kazuhiko Tamesue (Waseda University), Kunihisa Jitsuno (Waseda University), Toshio Sato (Waseda University), Takuro Sato (Waseda University), Tetsuya Kawanishi (Waseda University)

S12-4 **Study on electromagnetic shielding material for high power equipment with heat dissipation holes**
Yuji Sakaguchi (University of Hyogo), Shinichiro Yamamoto (University of Hyogo), Satoru Aikawa (University of Hyogo)

S12-5 **Microwave metamaterial EM wave absorber using square metal pattern periodic array structure**
Soma Takeda (University of Hyogo), Shinichiro Yamamoto (University of Hyogo), Satoru Aikawa (University of Hyogo), Teruhiro Kasagi (Sanyo-Onoda City University)

S12-6 **Design of multilayered high-pass space filter using conductive film grid array sheets and dielectric material**
Yuji Taniguchi (University of Hyogo), Shinichiro Yamamoto (University of Hyogo), Satoru Aikawa (University of Hyogo), Shigeki Matsuoka (Zippertubing, Ltd.), Masaki Nagao (Zippertubing, Ltd.)

S12-7 **Reflection characteristic evaluation of millimeter wave EM absorber without metal backing**
Shinnosuke Kagekawa (University of Hyogo), Shinichiro Yamamoto (University of Hyogo), Kenichi Hatakeyama (University of Hyogo), Morimichi Itoh (Osaka Research Institute of Industrial Science and Technology), Hitoshi Togawa (Keeper Co., Ltd)

S12-8 **Deep Learning-based Person Identification using Vital Signs Extracted from Radar Signal**
ZELIN XING (Keio University), Mondher Bouazizi (Keio University), Tomoaki Ohtsuki (Keio University)

Short 13: Optical Communications	**Chair: Masaki Bandai (Sophia Univ.)**
Dec. 1 (Thu) 16:15-18:00	
Room 2	https://us06web.zoom.us/j/82733816387

S13-1 **Comparison of overfitting characteristics of ANN- and VSTF-based nonlinear equalizers for repeated random bit patterns in optical communication systems**
Kai Ikuta (Meiji University), Jinya Nakamura (Meiji University), Daisuke Motai (Meiji University), Moriya Nakamura (Meiji University)

S13-2 **Effect of Chromatic Dispersion on Modulator Distortion in Analogue Radio-over-Fiber System Employing Electrical Pre-Distortion**
Kosuke Fujishima (Tokyo University of Science), Amila Kariyawasam (Kyushu University), Joji Maeda (Tokyo University of Science)

S13-3 **Novel multi-core fiber link embracing its nature of polarity**
Takuya Oda (Fujikura Ltd.), Osamu Kikuchi (Fujikura Ltd.), Katsuhiro Takenaga (Fujikura Ltd.), Kentaro Ichii (Fujikura Ltd.)

S13-4 **A Probabilistic Shaping Scheme Suitable for Direct-Detection Lightwave System Using Kramers-Kronig Relation**
Kansei Daito (Tokyo University of Science), Amila Kariyawasam (Kyushu University), Joji Maeda (Tokyo University of Science)

Short Presentation Session

S13-5 **Local-minimum-trapping problem in training of DNN-based nonlinear equalizer for optical communication systems**
Jinya Nakamura (Meiji University), Kai Ikuta (Meiji University), Moriya Nakamura (Meiji University)

S13-6 **Bundled type fan-in/fan-out device for 4-core multi-core fiber**
Kohei Ozaki (Fujikura Ltd.), Yoshifumi Koike (Fujikura Ltd.), Akito Nishimura (Fujikura Ltd.)

S13-7 **Improved Radio MIMO Transmission in the Presence of Non-flat Response in Fiber-Wireless Feeder**
Tsuyoshi Wakikawa (Nara Institute of Science and Technology), Takeshi Higashino (Nara Institute of Science and Technology), Minoru Okada (Nara Institute of Science and Technology)

S13-8 **A proposal on the management interface in BCOM for bandwidth assignment in cooperation between 5G and PON systems**
Seiji Kozaki (Mitsubishi Electric Corporation/Shizuoka University), Hiroshi Mineno (Shizuoka University), Takeshi Suehiro (Mitsubishi Electric Corporation), Kenichi Nakura (Mitsubishi Electric Corporation), Satoshi Shirai (Mitsubishi Electric Corporation), Yuki Hatanaka (Kanazawa Institute of Technology), Tetsuya Yokotani (Kanazawa Institute of Technology)

Short 14: Related Overall Technologies Chair: Koichiro Amemiya (Fujitsu)
Dec. 1 (Thu) 16:15-18:00
Room 3 https://us06web.zoom.us/j/82901492572

S14-1 **Secrecy Performance of Molecular Communication with an Absorbing Eavesdropper and D-MoSK Modulation**
Zhen Jia (Future University Hakodate, Hakodate), Lisheng Ma (Chuzhou University), Shigen Shen (Shaoxing University), Xiaohong Jiang (Future University Hakodate, Hakodate)

S14-2 **Effective transmission and computation technique for electro-holography based on vector quantization of point clouds parallel to the hologram**
Yizhi Cheng (Tokyo Metropolitan University), Takashi Nishitsuji (Tokyo Metropolitan University), Takuya Asaka (Tokyo Metropolitan University)

S14-3 **Optimal Index Design for Aggregation Accuracy in Packet Level Index Modulation**
Ryuji Miyamoto (Shinshu University), Osamu Takyu (Shinshu University), Hiroshi Fujiwara (Shinshu University), Koichi Adachi (The University of Electro-Communications), Mai Ohta (Fukuoka University), Takeo Fujii (The University of Electro-Communications)

S14-4 **Highly Efficient Information Collection Method by Trend Analysis of Sensor Information Using Event Position Estimation**
Ryuji Miyamoto (Shinshu University), Osamu Takyu (Shinshu University), Hiroshi Fujiwara (Shinshu University), Koichi Adachi (The University of Electro-Communications), Mai Ohta (Fukuoka University), Takeo Fujii (The University of Electro-Communications)

S14-5 **Evaluation of Packet Level Index Modulation in 429MHz LoRa/FSK in Actual Equipment**
Keita Takeda (Shinshu University), Osamu Takyu (Shinshu University)

S14-6 **Interpretability of News Document Classification by BERT**
Atsuki Tamekuri (Kogakuin University), Yoshihaya Takahashi (Kogakuin University), Saneyasu Yamaguchi (Kogakuin University)

Short Presentation Session

S14-7 **Towards Performance Estimation of NAND SSDs in a Random Read/Write Workload**
Daiki Natori (Kogakuin University), Ryousei Takano (National Institute of Advanced Industrial Science and Technology), Takahiro Hirofuchi (National Institute of Advanced Industrial Science and Technology), Saneyasu Yamaguchi (Kogakuin University)

S14-8 **Accuracy Improvement in Quick Screen View Rotation with SVM**
Koga Toriumi (Kogakuin University), Takeshi Kamiyama (Nagasaki University), Masato Oguchi (Ochanomizu University), Saneyasu Yamaguchi (Kogakuin University)

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