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Web site below:*

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

# A New Online Journal: IEICE Communications Express (ComEX)

Nobuyoshi Kikuma  
Editor-in-Chief, IEICE Communications Express



## 1. Introduction

In the Transactions on Communications of the Institute of Electronics, Information and Communication Engineers (IEICE), a number of letters have been submitted and published. It is considered that the main objective of authors who contribute to the letters is to rapidly publish their research results and to ensure their priority. In order to respond to their demands, IEICE Communications Society decided to launch a new online English letter journal, the IEICE Communications Express (ComEX), the first edition of which was published on June 1, 2012. Accordingly, the Communications Society discontinues the letter category of the IEICE Transactions on Communications. That is why ComEX covers the entire field of communications as a unified letter journal of the Communications Society. Although ComEX cooperatively has the same infrastructure as the IEICE Electronics Express (ELEX) of Electronics Society, ComEX is independent and makes its way to the globally competitive journal.

ComEX publishes concise technical papers on outstanding inventions, innovation, and findings that have influential importance to communications engineers. Therefore, ComEX is a medium where researchers provide and exchange new topics easily and in a timely manner.

Materials contained in the first several years will be available at no charge for anyone to read, download, or print from the journal web site. In addition, 50% discount of article charge is available for letters submitted by the end of May 2013.

ComEX has the following features.

- Papers are DOI (digital object identifier) attached and accessible through the Internet from all over the world.
- Papers with multimedia files such as movie files can be published.
- Papers (up to 1,500 words) belong to the letter category and are rapidly published in a short time after acceptance.

## 2. Scope

ComEX publishes original, peer-reviewed papers that embrace the entire field of communications, including:

- Fundamental Theories for Communications
- Energy in Electronics Communications



Fig. 1 Current top page of the ComEX website (<http://www.comex.ieice.org/>)



Fig. 2 Letter sample of the ComEX

- Transmission Systems and Transmission Equipment for Communications
- Optical Fiber for Communications
- Fiber-Optic Transmission for Communication
- Network System
- Network
- Internet
- Network Management/Operation
- Antennas and Propagation
- Electromagnetic Compatibility (EMC)
- Wireless Communication Technologies
- Terrestrial Wireless Communication/Broadcasting Technologies
- Satellite Communications
- Sensing
- Navigation, Guidance and Control Systems
- Space Utilization Systems for Communications
- Multimedia Systems for Communications

### 3. Review policy

As denoted in the introduction, ComEX publishes concise technical reports on outstanding inventions, innovation, and finding that have influential importance to communications engineers. Rapid circulation of publication as well as article quality is deemed important for both contributors and readers. All manuscripts are evaluated to be either "accepted for publication" or "rejected." Authors of manuscripts that could be potentially accepted after minor revision are informed by the corresponding Associate Editor of comments and suggestions, and they are advised to consider re-submission.

### 4. Preparing and Submitting manuscript

Manuscripts to ComEX are accepted via electronic submission only. Authors are requested to prepare their manuscripts by using one of the officially approved formats (LaTeX style file or Microsoft Word template), in which all the styles and formats are prescribed. Papers do not usually exceed six (6) pages of an A4-sized PDF file. The first page contains paper title, author list, affiliation(s), 100-word-abstract, keywords, and references. The main body of the text is limited to approximately 1,500 words. Manuscripts are allowed to have up to three (3) display items (Figures and/or Tables) with brief captions in principle as long as the final PDF file size would not exceed 4 MB. Since ComEX manuscripts are rapidly published as submitted (or at least minimum editing/formatting by publisher), it is essential to adhere to the provided templates. Instructions for including movie files in a PDF file are described in the template files.

For further information, please visit the ComEX web site at <http://www.comex.ieice.org/>.

### 5. Editorial Committee and Advisory Members

We believe that the ComEX Editorial Committee is a "Dream Team" accumulating rich editing experience. Furthermore, we feel highly honored to have invited renowned and powerful advisory members from all over the world. It is true that all the members are worthy of brilliant launching of ComEX toward the greatest letter journal in the world. We do hope that ComEX will play an important role in publishing and propagating precious accomplishments in the field of communications in near future.

#### Editorial Committee of IEICE Communications Express

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# Report on the 25<sup>th</sup> Anniversary Symposium of the Technical Committee on Optical Communication Systems



## Technical Committee on Optical Communication Systems

### 1. Overview

The 25<sup>th</sup> Anniversary Symposium of the IEICE Technical Committee on Optical Communication Systems was held on May 18<sup>th</sup> 2012 at the Kikai Shinko Kaikan building in Tokyo. This event was designed to take the first step into the next quarter century by looking back at the research and development activities in the field of optical communications over the past 25 years. There were 133 participants. This symposium included an exhibition displaying the products of twelve organizations from the dawn of optical communications.

### 2. Opening Session

Mr. Osamu Ishida, the IEICE OCS Committee Chair gave the opening remarks (Fig. 1). He recounted the pedigree of the OCS committee that was founded in 1987, branching off as a time-limited subcommittee of the Communication Society. It was expected to contribute to the growth of research and development of optical transport systems as they began to play an important role in the infrastructure of the information society. A quarter of a century has passed since the OCS committee was instituted, and the optical communication systems industry in Japan has entered a critical phase. He emphasized that while looking back to our beginnings we should take this opportunity to rise to the challenges of the next stage.



Mr. Osamu Ishida

Prof. Emeritus  
Ikutaro Kobayashi

Fig. 1 Opening remarks and keynote speech

### 3. Keynote Speech

The Keynote Speech, entitled “Development of optical communication systems over thirty years and into the Internet era”, was given by Ikutaro Kobayashi, a professor emeritus of the University of Tokyo (Fig. 1). He talked about the historical milestones of optical communication systems. In the earliest days of the optical communications industry, Japan led the development of major components and enabled a start

to be made on system designs. However he insisted that although there are various routes to success, there is no alternative to persevering with research, and outlined the need to meet endless challenges. In the 1990s, the

Table 1 Successive OCS chairs and representative topics.

| Year | Chair   | Representative topics in OCS symposium                     |
|------|---|--|
| 1988 | Masaki Koyama (NTT)                                       | High-vision broadcast signal transmission by optical fiber |
| 1989 | Kiyoshi Nakagawa (NTT)                                    | Optical IC   |
| 1990 | Kiyoshi Nakagawa (NTT)                                    | Optical devices  |
| 1991 | Takeshi Ito (NTT)   | Non-relay transmission                                     |
| 1992 | Takeshi Ito (NTT)   | Optical Network  |
| 1993 | Ikutaro Kobayashi (NTT)                                   | Future of optical comm.                                    |
| 1994 | Ikutaro Kobayashi (NTT)                                   | TDM/WDM  |
| 1995 | Masatoshi Saruwatari (NTT)                                | Simple, flexible, and high-quality optical NW              |
| 1996 | Masatoshi Saruwatari (NTT)                                | Trend of transoceanic submarine cable                      |
| 1997 | Mikio Takahara (Yamanashi Univ.)                          | Trend of Optical access network                            |
| 1998 | Mikio Takahara (Yamanashi Univ.)                          | Beyond 100Gbit/s OTDM                                      |
| 1999 | Hiroshi Toba (NTT)  | Next gen. optical fiber                                    |
| 2000 | Hiroshi Toba (NTT)  | Optical NW evolution                                       |
| 2001 | Kazuo Hagimoto (NTT)                                      | VCSEL  |
| 2002 | Kazuo Hagimoto (NTT)                                      | Quantum optical comm.                                      |
| 2003 | Minoru Shikada (NEC)                                      | Photonic crystal fiber                                     |
| 2004 | Minoru Shikada (NEC)                                      | Quantum-well and quantum-dot lasers                        |
| 2005 | Hideo Kuwahara (Fujitsu Lab.)                             | Coherent optical communication                             |
| 2006 | Hideo Kuwahara (Fujitsu Lab.)                             | Photonic network   |
| 2007 | Yoshiaki Yamabayashi (Chitose Inst. of Science and Tech.) | History of Ethernet  |
| 2008 | Yoshiaki Yamabayashi (Chitose Inst. of Science and Tech.) | Green ICT  |
| 2009 | Masatoshi Suzuki (KDDI Lab.)                              | Digital signal processing for optical communication        |
| 2010 | Yutaka Miyamoto (NTT)                                     | Inter-satellite optical communication                      |
| 2011 | Hiroshi Onaka (Fujitsu)                                   | Smart grid   |
| 2012 | Osamu Ishida (NTT)  | TBD  |

optical communications industry entered the terabit era, and Japan left its rivals around the world far behind. However he said that while Japan took the lead in technology, it has fallen behind in business. In his closing remarks, he warned that there are many things we need to do, such as cooperating with the overseas community and developing application services.

#### 4. Invited Session

The Invited Session included four special lectures by invited speakers (Fig. 2). The first invited lecture was entitled “International telecommunications and the role of technology in Japan”. The speaker was Dr Shigeyuki Akiba from KDDI R&D Labs. and the Tokyo Institute of Technology. He started by introducing two international telecommunications systems; satellite communications and fiber-optic communications. In the early 1990s, these two systems worked together in a complementary way. However, after the invention of the erbium doped fiber amplifier, fiber-optic communication systems landed the starring role. In addition, he described how the expansion in global traffic is occurring in Asian countries such as India and China, and also introduced the state-of-the-art technology for 100 Tbit/s submarine cable systems.

The second lecture was entitled “International business evolution and a perspective on optical transmission systems”, and the speaker was Mr. Satoshi Ikeuchi from Fujitsu. He introduced optical transmission systems and the next generation of optical access network systems. He explained that except for Japan, Korea, China, and the USA, there are few countries where access networks have become widely used, but that those others do have room for further growth.



Dr Shigeyuki Akiba

Mr. Satoshi Ikeuchi



Mr. Motoo Nishihara

Mr. Kazuo Hagimoto

Fig. 2 Presenters at Invited Session

The third lecture was entitled “Challenges to new paradigms and international cooperation”. The speaker was Mr. Motoo Nishihara from NEC. He talked about future Internet and OpenFlow technologies, and introduced several demonstrations of OpenFlow in cooperation with other organizations around the world as their approach to international cooperation.

The last lecture was entitled “Impact of optical communications and the role of the Technical Committee”. The speaker was Mr. Kazuo Hagimoto from NTT. He introduced technology trend and corresponding standardization activities of transport systems such as SDH, OTN, 40 Gb/s systems, and the digital coherent technologies used in 100 Gb/s systems. He also added sensible direction of the Technical Committee, emphasizing that we should hold strong convictions about our technologies and disseminate them around the world.

#### 5. Exhibition

Twelve organizations exhibited their products from the dawn of optical communications. Mr. Hidenori Takahashi from KDDI R&D Labs. introduced them one by one as the participants watched with interest (Fig. 3).

Table 2 List of products exhibited

| Exhibitor            | Products  |
|----------------------|---|
| Anritsu              | Optical power meter (1980)<br>Optical pulse generator (1990)                                |
| OKI                  | Semiconductor laser (1987)<br>Optical amplifier module (1991) etc.                          |
| KDDI R&D Lab.        | Optical soliton transmission technology (1995)  |
| Sumitomo             | Fiber splicer (1980)  |
| Tokyo Inst. of Tech. | VCSEL (1988)  |
| NEC                  | 2.5 Gb/s optical heterodyne receiver (1990)<br>2.5 Gb/s optical coherent transceiver (1990) |
| NTT                  | Erbium doped fiber amplifier (1989)   |
| Fujitsu              | 400 Mb/s optical transceiver unit (1985)<br>10 Gb/s XFP module (2006)                       |
| Fujitsu Lab.         | 1.1 Tb/s optical transmission system (1996)   |
| Furukawa             | Photonic crystal fiber (1999)<br>Multi-core fiber (19-core) (2012)                          |
| Mitsubishi           | Optical transmitter/receiver module (1985)  |
| Yokogawa             | Optical power meters (1985/1995/2009)   |



Fig. 3 Exhibition of developments for optical communications field in the earliest days

#### 6. Conclusion

We believe that all the participants were pleased with the presentations and discussions of past achievements and the future prospects for optical communications that constituted this 25<sup>th</sup> anniversary celebration symposium. We would like to thank our predecessors for their efforts in founding and growing this Technical Committee.

# Annual Report of Technical Committee on Network Systems

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## 1. Introduction

This report covers the annual activities of the IEICE Technical Committee on Network Systems (NS). It describes activities at the monthly technical meetings, recent research topics of the committee, and research awards for 2011.

## 2. Technical meetings

The schedule from April 2012 to March 2013 will consist of ten technical meetings and one workshop (Table 1). Several of these meetings will be held in collaboration with other group committees, e.g., Optical Communication Systems (OCS), Photonic

Table 1 Technical meeting schedule for fiscal 2012

| Date            | Location   | Theme   | Co-location with |
|-----------------|--|---|------------------|
| April 19-20     | Kochi University (Kochi)                                 | Traffic modeling, Network evaluation, Performance, Resource control, Traffic engineering, Network reliability, Resiliency   |                  |
| May 17-18       | National Institute of Informatics (Tokyo)                | Advanced protocol and network control (Application level routing, QoS and path control, P2P, P4P, SIP), Network System Architecture (Interface, Hardware, Software)   |                  |
| June 21-22      | Yamagata University (Yamagata)                           | Core metro system, Photonic network system, Optical network management and control and monitoring, Optical network design, Traffic engineering, Signaling, OTN, High-speed interface, Optical control (Switching and routing), OXC, OADM, WDM, optical signal process, optical switch element | OCS, PN          |
| July 19-20      | Iwate University (Iwate)                                 | Fixed/Wireless seamless network, Hand Over, Distributed MIMO, Mobile Ad-hoc Network   | RCS, USN         |
| September 20-21 | Tohoku University (Miyagi)                               | Post IP networking, Network model, Internet traffic, TCP/IP, Multimedia communication, Network management, Resource management, Private network, Network security, etc  | CS, IN           |
| October 11-12   | Kyoto University (Kyoto)                                 | Network architecture (Overlay, network P2P, network Ubiquitous network, Scale free network, Active network, NGN, new generation network), Next generation packet transport (high speed Ethernet, IP over WDM, multi-service packet technology, MPLS), Grid network                            |                  |
| November 15-16  | Nagahama Institute of Bio-Science and Technology (Shiga) | Quality of service, Quality of network, Traffic measurement, General areas  | ICM, CQ, NV      |
| December 13-14  | Ehime University (Ehime)                                 | Mobile ad-hoc network, Ubiquitous network, Wireless communication, Security, Multi-access network, User network interface, Home network   | RCS              |
| January 24-25   | Kumamoto University (Kumamoto)                           | Network software, Network application, SOA/SDP, NGN, IMS, API, Distributed control, Dynamic routing, Grid, Reliability of network and network system, Evaluation of network and network system  |                  |
| March 7-8       | Okinawa Zanpamisaki royal hotel (Okinawa)                | General   | IN               |

Network (PN), Radio Communication Systems (RCS), Ubiquitous Sensor Network (USN), Communication Systems (CS) and Information Networks (IN), Information Communication Management (ICM), Communication Quality (CQ), and Network Virtualization (NV).

Recently, presented papers have mainly focused on technologies that support wireless and mobile networks, applications, traffic control/measurement, P2P/content delivery networks, and network system issues. At each technical meeting, we hosted lectures by invited speakers who are experts in their fields. During this fiscal year, we held invited lectures on optimization of system performance, content-oriented networks, the new directionality of the packet network in the future, data off-loading from wireless LAN, smart communication technology for vehicles in the smart city, new generation networks based on AKARI architecture, trustable and effective communication network design, application to modeling and performance evaluation of the topological constitution of the communication network, network virtualization, and prospects of the cloud for enterprise. The number of papers presented at our meetings in recent years is shown in Fig. 1. The number of contributions is generally increasing but decreased slightly last year. The number of contributions from universities decreased; therefore, encouragement of contributions from universities is important.

Since June 2003, we have fostered the work of young researchers who have presented papers at technical meetings by inviting them to give a follow-up talk some months later. We call these “incentive lectures.”

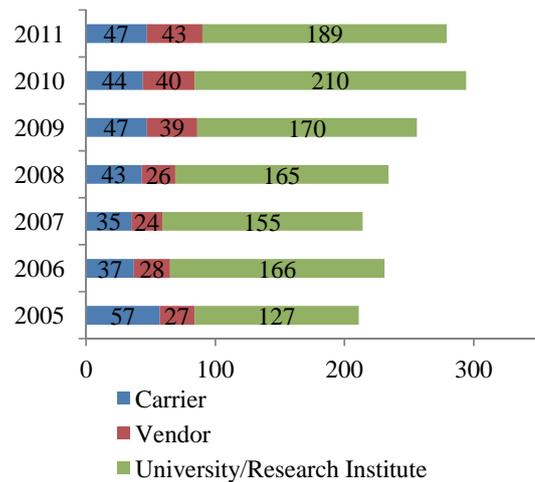


Fig. 1 Number of presented papers.

We invited 13 young researchers to give such lectures in the past year, and we will continue this activity.

### 3. Research Awards 2011

The Technical Committee selected recipients of the Network System Research Award from 268 papers that had been presented at monthly technical meetings from January to December 2011. The award is given to the authors of the three or four best papers of each year. The 2011 recipients attended the award ceremony at the IN/NS Workshop (Fig. 2) held in Miyazaki in March 2012. The abstracts of the four papers that won awards in 2011 are shown below.



Fig. 2 Research award recipients with chair Dr. Urushidani

**Norio Yamagaki, Kiyohisa Ichino, and Satoshi Kamiya: “Performance evaluation of rapid retransmission control for data centers” [1]**

TCP has various parameters with values tuned for use in wide-area networks. For example, the lower bound of retransmission time-out (RTO) is generally set to a few hundred milliseconds. On the other hand, data center networks have higher bandwidth and lower latency than conventional LAN/WAN environments, where the propagation delays between any servers may be in microseconds. Therefore, in such a high-bandwidth low-latency network, the “TCP Incast” problem, which is TCP throughput collapse due to the mismatch between RTO and round trip time (RTT), may occur and degrade application performance.

To address this problem, the rapid data retransmission control method in layer 2, named Rapid and Reliable Data Delivery (R2D2), has been recently proposed. R2D2 transmits data by using a shorter time-out value than that of TCP. It also treats all data flows from a source as a single flow.

Therefore, this paper focuses on the applicability of R2D2 as an efficient data transport technology in data center networks and evaluates its basic performance by using computer simulations to validate its effectiveness. The evaluation results show that though R2D2 may cause heavy congestion, it is effective in terms of data reachability. In addition, they show that R2D2 can reduce RTO frequency and improve fairness for TCP flows. From these results, this paper shows that R2D2 has the potential to efficiently transfer data in data center networks.

**Masato Uchida, Shuichi Nawata, Yu Gu, Masato Tsuru, and Yuji Oie: “Statistical properties of time-periodical packet sampling and their application to anomaly detection” [2]**

We proposed an anomaly detection method for finding patterns in network traffic that do not conform to legitimate (i.e., normal) behavior. The proposed method trains a baseline model describing the normal behavior of network traffic without using manually labeled traffic data. The trained baseline model is used as the basis for comparison with the audit network traffic. This anomaly detection works in an unsupervised manner through the use of time-periodic packet sampling, which is used in a manner that differs from its intended purpose - the lossy nature of packet sampling is used to extract normal packets from the unlabeled original traffic data. Evaluation using actual traffic traces showed that the proposed method has false positive and false negative rates in the detection of anomalies regarding TCP SYN packets comparable to those of a conventional method that uses manually labeled traffic data to train the baseline model. Performance variation due to the probabilistic nature of sampled traffic data is mitigated by using ensemble anomaly detection that collectively exploits multiple baseline models in parallel. Alarm sensitivity is adjusted for the intended use by using maximum- and

minimum-based anomaly detection that effectively takes advantage of the performance variations among the multiple baseline models. Testing using actual traffic traces showed that the proposed anomaly detection method performs as well as one using manually labeled traffic data and better than one using randomly sampled (unlabeled) traffic data. Therefore, the proposed method is preferable to one that uses manually labeled traffic data: it can save a lot of effort and is just as accurate.

**Masaki Fukushima, Teruyuki Hasegawa, Toru Hasegawa, Akihiro Nakao: “Minimum disclosure routing for network virtualization” [3]**

Today, Internet service providers (ISPs) are facing a mixture of challenges that may seem more difficult than ever to fulfill concurrently, such as (1) expanding network footprint, (2) reducing operational cost, (3) improving availability, and (4) maintaining operational confidentiality. An emerging concept of network virtualization (NV) is expected to help ISPs address challenges (1)-(3) at the same time. For example, virtual collocation separates infrastructure providers (InPs) that provide slices of physical resources and service providers (SPs) that utilize slices to operate virtual networks on in order for SPs to cost-effectively improve their network footprint and availability on top of multiple InPs without investing in physical infrastructure.

However, the last challenge (4), operational confidentiality, may be left unresolved. We observe that an ISP often strives to keep its competitors away from its operational practices that have been developed to survive business competition. In the light of these observations, one must note that NV in fact may have a negative impact on the confidentiality of operational information of SPs since virtual collocation implies that an InP runs its own SP service on its top as well as on the other InPs that have access to the operational details of the SP on top of them. Therefore, the challenge is to achieve secure network operations of SPs without disclosing much information to the underlying InPs.

Taking distributed routing in SP's virtual networks as an example, we focus on minimum disclosure routing (MDR), where an SP overlaid on top of multiple InPs minimizes disclosure of its routing information of the virtual network. We show that the MDR problem can be solved through the extension to secure multiparty computation (SMC). Our feasibility study revealed that the proposed method enables secure routing without degrading convergence time. Accordingly, our proposed method together with NV concurrently fulfills all the contradicting goals of ISPs.

**Genki Matsui, Takuji Tachibana, Yukinori Nakamura, and Kenji Sugimoto: “Model predictive control for distributed power adjustment in cognitive radio” [4]**

To measure the interference between primary networks and secondary networks in cognitive radio

networks, The Federal Communications Commission (FCC) has introduced interference temperature as a metric. When the interference temperature at a measurement point is larger than the interference temperature limit in primary networks, it implies that secondary networks interfere with primary networks. On the other hand, secondary networks should improve the performance of those own data transmission. Therefore, each transmitter in secondary networks has to adjust the transmission power carefully to both prevent interference with primary networks and improve quality of service (QoS) of the data transmission.

We propose a power adjustment method based on model predictive control (MPC) for cognitive radio networks. In this method, each transmitter in secondary networks receives feedback information about signal-to-interference plus noise ratio (SINR) from its corresponding receiver. With this feedback information, the transmitter derives the transmission power based on MPC to satisfy the QoS constraints in secondary networks. Moreover, the constraint condition is utilized to prevent interference with primary networks. We propose an effective update algorithm for this constraint condition. This algorithm can manage the power adjustment of a transmitter effectively in secondary networks. We also derive the optimal constraint condition when time-invariant channel gains are known. We evaluated the performance of our proposed method with a simulation and compare it with the distributed power control (DPC) method and the proportional-integral-derivative (PID)-based method. Numerical examples show that our proposed method is more effective than the conventional methods even if transmitters move dynamically in cognitive radio networks.

#### 4. Future Plans

The Technical Committee will organize open symposia at the IEICE Conferences, one of which will be on “Network and system technologies for advanced M2M services” at the IEICE Society Conference in September 2012.

(For more information, please see our home page.

URL: <http://www.ieice.org/cs/ns/index.html>)

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# Annual Report of Technical Committee on Communication Systems

Hisaya Hadama, NTT; Toshinori Tsuboi, Tokyo Univ. of Tech.;  
Seiji Kozaki, Mitsubishi Electric; Daisuke Umehara, Kyoto  
Institute of Technology;



## 1. Introduction

Technical Committee on Communication Systems (CS) actively organized seven ordinary technical conferences and one special workshop, at various cities in Japan, in FY2011. In this report, we introduce our activities which include technical conferences, the communication systems workshop (CSWS), special sessions on IEICE Society Conference 2011 and IEICE General Conference 2012, and CS Technical Committee Prizes. Visit our Web site (<http://www.ieice.org/cs/cs/>) to get up-to-date information. Our topics of interest include (but are not limited to) the followings:

- Transport technology,
- Access network,
- Modulation,
- Coding and signal processing,
- Network architecture,
- Wireless network and application,
- Network service and application.

We welcome submission to our conferences from all of you.

## 2. Summary of CS Technical Committee in 2011

Table 1 summarizes activities of CS Technical committee in FY2009, FY2010 and FY2011.

Number of presented papers on ordinary technical conferences is increasing every year and exceeded 100 in FY2010. Numbers of presented papers on IEICE Society/General Conferences were around 90 in average. Special sessions on those conferences were very popular because there were latest technical topics and its trends. Number of participants of CSWS was around 40 in average.

We had many interesting special invited talks by outstanding speakers in each conference. One of the most impressive talks was Mr. Norizo Higeta's one that was given in CS Conference on 21<sup>st</sup> of April, 2011 at Yakushima Island (Fig. 1). He belongs to The Yakushima Environmental Culture Foundation. His talk covers people's livelihood with abundant gifts from nature of Yakushima Island, which was registered as a World Natural Heritage in 1993. Additionally, his talk was very informative for the audiences to know the current situation of communication environment in isolated island. Another talk, impressively embedded in our memory, was Dr. Botaro Hirosaki's one in CS

workshop on 16<sup>th</sup> of November 2011, at Kawayu-onsen, Teshikaga-cho Hokkaido (Fig. 2). He presented NEC's C&C vision, its accomplishments and his dreams as the background of the vision. His talk covered consecutive challenges for information and communication technology (ICT) over three decades and current expectation about young researcher's performances to improve people's future lifestyle.

Through the FY2011, we had many valuable special invited talks. To refer them, please visit our archive web page (<http://www.ieice.org/cs/cs/special-e.html>).



Fig. 1 Mr. Norizo Higeta as a special invited speaker at CS Technical Conference in Yakushima Island on April 2011.



Fig. 2 Dr. Botaro Hirosaki giving a special invited talk at CSWS in Hokkaido on Nov. 2011.

Table 1 Summary of CS Technical Committee activities.

|        | Number of presented papers     |                                   | Special session on IEICE Society Conference<br>(Number of participants)                 | Special session on IEICE General Conference<br>(Number of participants)                  | Number of participants of CSWS |
|--------|--------------------------------|-----------------------------------|---|--|--------------------------------|
|        | Ordinary technical conferences | IEICE Society/General Conferences |   |  |                                |
| FY2009 | 81                             | 35/59                             | Ethernet Evolution: Future trend of carrier ethernet(37)                                | Current status and future trend of virtual networking technology(56)                     | 39                             |
| FY2010 | 104                            | 33/49                             | Digital media with utilizing network – Latest trends of the technology and business(18) | Green ICT: Technology of power reduction for communication equipments and data center(-) | 49                             |
| FY2011 | 106                            | 45/56                             | Latest trend and future vision of optical access network technology(40)                 | Latest trend of high speed ethernet technology and forwarding technology(49)             | 36                             |

\*: No participants in FY2010 IEICE General Conference because of the Great East Japan Earthquake

### 3. Activities of CS Technical Committee in 2012

#### 3.1. Technical Conferences

We have already held July's conference successively, with more than 40 participants. We are planning to have seven conferences in this year, which are shown in Table 2. We appreciate your entry to them. You can have precise information at our Web site (<http://www.ieice.org/cs/cs/>).

Table 2 Technical Conferences schedule, April 2012 – March 2013.

| Date       | Venue                              | Joint committee       | Theme   |
|------------|------------------------------------|-----------------------|---|
| July/12-13 | Okino-erabu Island                 | -                     | Next generation networks, Access network, Broadband access system, Power-line communications, Wireless communication systems, Coding system, etc.   |
| Sept/20-21 | Tohoku University                  | NS, IN                | Post IP networking, Next generation network, Network model, Internet traffic, TCP/IP, Multimedia communication, Network management, Resource management, Private network, Network                                     |
| Nov/21-22  | Kita-Yuzawa Springs (Hokkaido)     | CSWS                  | Broadband access systems, Home networks, Network services, Applications for communications, etc.  |
| Dec/6-7    | Fukui City                         | IE, ITE-BCT, IPSJ-AVM | Image Coding, Streaming, etc.   |
| Jan/24-25  | Ehime University                   | OCS                   | Core/Metro system, Optical access system/Next generation PON, Broadband access, (Wide area) Ethernet, Optical transport network (OTN), High speed interface, Analog optical transmission, Quantum communication, etc. |
| March      | Tsuruoka Campas of Keio University | SIP, CAS              | Network processor, Signal processing for communication, Wireless LAN/PAN, etc.  |
| April      | Sado Island                        | CQ                    | Service quality, Cloud, SDN (Software-Defined Network), Contents delivery, etc  |

#### 3.2 Special Sessions on IEICE Society/General Conference

CS Technical Committee will organize a tutorial session: "Current Status and Trend of Optical Access and Wireless Access Network Technologies" on 12th September in the IEICE Society Conference 2012 (Sept. 12-14, Univ. of Toyama). Outstanding five speakers will be invited.

For the IEICE General Conference 2013 (Mar. 19-22, Gifu University), we are now planning to have a highly motivated tutorial session: "Communication Technology for M2M."

#### 3.3 CS Workshop

CS Workshop 2012 will be held in Hokkaido, on 20-22nd November, 2012 (<http://www.ieice.org/cs/cs/jpn/cs/ws/index-e.html>).

The subject of the workshop is "Forefront of Media and Network Technologies". Professor Iwao Sasase, as General Chair of the workshop, invited twelve outstanding researchers for giving talks about state-of-the-art media and network technologies and their applications. In addition, IEICE Fellow Session will be organized for special talk by Professor Ken-ichi Sato of Nagoya University.

### 3.4 CS Prizes

The committee gives prizes to authors or speakers who made good presentations and excellent papers every year. The information on the committee's prizes is described in Table 3.

Table 3 The information on the committee's prizes.

|                   |   |
|-------------------|---|
| Chairman's prize  | Summary: The aim of the chairman's prize to the superior papers is activating investigations on communication systems engineering.  |
|                   | Candidates: The paper must be submitted to the IEICE committee on communication systems. At least one of authors must be a member of the IEICE on the presentation day. Invited and special talks are excluded. |
| Encouraging prize | Summary: The aim of the encouraging prize to the excellent speakers is encouraging young researchers who are engaged in communication systems engineering.  |
|                   | Candidates: The speaker must be less than 33 years of age and a member of the IEICE on the presentation day. His/her paper must be submitted to the IEICE committee on communication systems.                   |

The winners of the chairman's prize in 2011 are the authors of two papers [1], [2]. The first authors of the papers are Keiji Miyazaki and Takayoshi Tashiro.

The winners of the encouraging prize in 2011 are the speakers of five papers [3] – [7], Kentaro Toyoda, Yoshinori Murata, Koki Takeshima, Naotoshi Yoda and Shouta Ichikawa.

Four invited talks by the speakers of CS2011-45, CS2011-82, CS2011-7, and CS2011-92 were conducted and the prize ceremony 2011 was held at the banquet in the technical conference of Okinoerabu Island on July 12th, 2012. The ceremonial photograph is illustrated in Fig. 3.



Fig. 3 The prize ceremony 2011 at Okinoerabu Island on July 12th, 2012. From left, Keiji Miyazaki (CS2011-45), Takayoshi Tashiro (CS2011-82), Hisaya Hadama (Chairman of CS Technical Committee), Kentaro Toyota (CS2011-7), Koki Takeshima (CS2011-92).

### 4. Conclusion

This report summarizes activities of Technical Committee on Communication Systems. Any comments and feedbacks are appreciated to improve our activities. We welcome your submission to our technical conferences (visit <http://www.ieice.org/cs/cs/>).

### 5. Reference

- [1] K. Miyazaki, K. Nishimura, J. Tanaka, and S. Kotabe, "A Study on First-Come First-Served Routing – Low Latency and Loop-Free Routing –," CS2011-45, Sep. 2011.
- [2] T. Tashiro, S. Yoshida, Y. Fukada, T. Sakamoto, Y. Kajiyama, and N. Yoshimoto, "Performance Evaluation of 10G-EPON Prototype System with Frequency and Time Synchronization Functions," CS2011-82, Jan. 2012.
- [3] K. Toyoda, Y. Kamiguchi, S. Inoue, and I. Sasase, "Efficient Solution to Decrease the Effect of DoS Attack against IP Address Ownership Proof in Mobile IPv6," CS2011-7, Apr. 2011.
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- [5] K. Takeshima, H. Takahashi, I. Morita, and H. Tanaka, "Faster Polarization Tracking with Feedback Method in Polarization-Division-Multiplexed Transmission Systems with Multiple-Input Multiple-Output Processing," CS2011-92, Jan. 2012.
- [6] N. Yoda, C.-J. Ahn, T. Omori, and K. Hashimoto, "A Design of Single Symbol Decodable QO-STBC with Full Diversity," CS2011-113, Mar. 2012.
- [7] S. Ichikawa, T. Tsuboi, and H. Ueda, "Time Domain Design of ONU Burst Signal Receiver for Optical Switched Access Network E-OSAN," CS2011-132, Mar. 2012.

## Technical Committee of Software Radio: 7<sup>th</sup>-Year

Suguru Kameda, Kentaro Ishizu,  
Shinsuke Ibi, Kenta Umabayashi,  
Osamu Takyu, Keigo Hasegawa,  
and Hiromasa Fujii  
Technical Committee of  
Software Radio



### 1. Introduction

Technical Committee on Software Radio (TCSR) has promoted research on software radio, cognitive radio, and their related technologies since 1999. It was 7th year of TCSR since it was restructured to a permanent committee of IEICE in 2005. The steering committee members of TCSR in 2011 are shown below:

**Chair:** Yukitoshi Sanada (Keio Univ.)  
**Vice Chair:** Kei Sakaguchi (Tokyo Inst. of Tech.)  
 Takeo Fujii (Univ. of Electro-Commun.)  
**Secretary:** Kenta Umabayashi  
 (Tokyo Univ. of Agriculture and Tech.)  
 Seishi Hanaoka (Hitachi, -Oct. 2011)  
 Masayuki Ariyoshi (NEC, Oct. 2011-)  
**Assistant:** Suguru Kameda (Tohoku Univ.)  
 Osamu Takyu (Shinshu Univ.)  
 Kentaro Ishizu (NICT)

TCSR organized five technical conferences in fiscal year of 2011 (FY2011). Moreover, the 6th International ICST Conference on Cognitive Radio Oriented Wireless Networks and Communications 2011 (CrownCom 2011) was held, and a related special section on the IEICE transactions was published. This article summarizes the latest activities of TCSR.

### 2. The 1st Technical Conference in April 2011

- ✓ Topics: Standardization of software/cognitive radio
- ✓ Date: April 21-22, 2011
- ✓ Venue: Matsue Terrsa, Matsue, Shimane
- ✓ The number of presentations: 17 (Invited talks: 4, Regular talks: 13)
- ✓ The number of participants: 68

#### Invited talks:

Two speakers were invited on the subject of standardizations of software / cognitive radio. Dr. Yoshino (SOFTBANK MOBILE) addressed an invited talk, based on his own activities in ITU-R, on its current status about cognitive radio systems toward the WRC-12. Dr. Ariyoshi (NEC) told on standardization activities on white space in ETSI RRS. Throughout the

talks, the audiences were impressed with difficulties of international standardization with national interests tangled among many countries and future practical applications of the white space.

Next, two expert members who had been serving in the technical committee on software radio for more than six years and supposed to resign due to expiration of their terms were invited to talk on the future of the committee. Prof. Katayama (Nagoya Univ.) emphasized that many practical issues remain with regard to software radio from perspective of new applications. Dr. Hamai (KDDI Labs.) pointed out the importance of world-wide strategy of relationship among industry, academia, and government as well as human resources development of young generation engineers.

#### Evening session (Fig. 1):

After all the sessions on the first day, an evening session was held in Japanese traditional style inn in front of the beautiful Lake Shinji-ko. In the session, the award ceremony was taken place followed by short speeches from volunteers on future direction of the committee. Finally, the organizing staffs of the coming CrownCom 2011 introduced some episodes on difficulties of their preparations, which raised expectations of the participants for its opening a month later.



Fig. 1 The 1st technical conference in April 2011: Evening session in Japanese traditional style inn in front of the beautiful Lake Shinji-ko

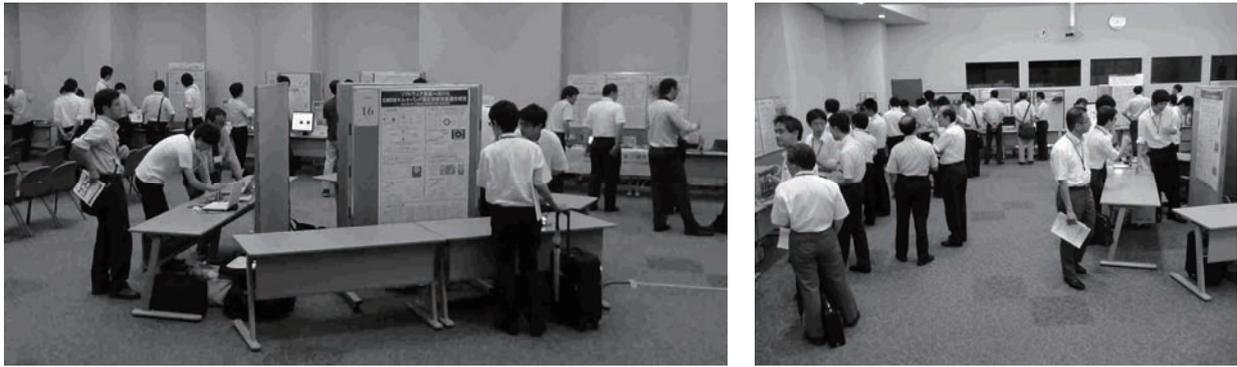


Fig. 2 The 2nd technical conference in July 2011: Software and cognitive radio technical expo 2011

### 3. The 2nd Technical Conference in July 2011

- ✓ Topics: Software & cognitive radio technical expo
- ✓ Date: July 28-29, 2011
- ✓ Venue: Yokosuka Research Park (YRP)
- ✓ Number of papers: 26 (Invited talks: 4, Regular talks: 7, Technical exhibitions: 15)
- ✓ Number of participants: 128

#### Software and cognitive radio technical expo 2011 (Fig. 2):

In TCSR, software and cognitive radio technical expo is held once a year. The 7th technical expo was held in YRP. There are 15 technical exhibitions and 8 product exhibitions. The following technical exhibitions were held:

- Research of a multi-band transceiver for software defined radio (Tokyo Inst. of Tech.)
- Research of a multi-band VCO for software defined radio (Tokyo Inst. of Tech.)
- A reconfigurable power amplifier for multi-band/multi-mode mobile terminals (NTT DOCOMO)
- Network simulator supporting multiple wireless systems and adjacent channel interference for performance evaluation of spectrum sharing technologies in ISM band (ATR)
- Field tests of multi-channel inter-vehicle communication network over white space (UEC, TOYOTA ITC, KyuTech)
- FPGA implementation of wideband MIMO-OTA system with simplified configuration (UEC)
- Multiple signal identification equipment based on cyclostationarity (NTT DOCOMO)
- 11GHz MIMO channel sounder using software radio architecture (Tokyo Inst. of Tech)
- Compressed sensing technology for flexible wireless system (NTT)
- Implementation of channel sounder to software defined radio (KODEN)
- Implementation of OFDM signal processing on PSoC microcontroller (Shinshu Univ.)
- Implementation issues of automatic modulation classification on software defined radio platform (Tokyo Inst. of Tech.)

- Experimental study of signal detection scheme with overlapped FFT (Keio Univ.)
- Software defined radio architecture of transmission experimental system for super high bit-rate mobile communications (Tokyo Inst. of Tech.)
- Time synchronized MIMO two-way relay network enabling dynamic node participation (Tokyo Inst. of Tech., NDK)

#### Invited talks (SDR technology for 3.9G (LTE) and future wireless communication system):

As you know, the mobile cellular service of Long Term Evolution (LTE) has been started in Japan. For clarifying how to apply SDR technology to LTE system and estimating how to contribute SDR to the future wireless system, the invited session was held. We invite four experts of SDR technology:

- Mr. Uhm (WIF, MIPS Technology) “Current SDR adoption rates and the future for SDR processing,” Introducing multi-core and multi-thread technology for SDR.
- Mr. Akabane (NTT) “Research and development of flexible wireless system -- Future wireless platform which can simultaneously deal with various types of wireless systems --,” Explaining the concept of detecting the signals of different standard format and the compressing sensing of key technology of flexible wireless platform.
- Mr. Ikekawa (NEC), “A programmable signal processing accelerator for flexible LTE base stations,” Talking about the accelerator for LTE base station and the flexible accelerator based on the programmable processor of CORDIC.
- Mr. Kojima (Nokia Siemens Networks), “Nokia Siemens Networks’ SDR based LTE basestation,” Introducing the serious problem of the traffic explosion and the necessity of multi-standard base station and showing the field experiment of the constructed base station under the cold and hot weather regions.



Fig. 3 The 3rd technical conference in October 2011: Special session (Wireless distributed networks)

#### 4. The 3rd Technical Conference in October 2011

- ✓ Topic: Workshop on wireless distributed networks
- ✓ Joint TCs: AN, RCS and USN
- ✓ Date: October 26-28, 2011
- ✓ Venue: Sophia University
- ✓ Number of papers: 35 (Invited talks: 1, Tutorial talks: 10, Special session talks: 18, Regular talks: 6)
- ✓ Number of participants: 234

##### General session:

In the general session, six papers were presented and accompanied by fruitful discussions on the first and third days. The session included technical fields as follows:

- Antenna selection criterion in spectrum sharing
- Complexity reduced multimode MIMO receiver
- MAC protocol to improve TCP performance
- White space dynamic spectrum access
- MAC level channel capacity in cognitive radio

##### Special invited and tutorial talks:

We had one special invited talk “Software radio and cognitive radio for medical ICT and reliable robust radio control” addressed by Prof. Kohno (Yokohama National Univ.). He indicated that dependable wireless ICT would create new business opportunities while rising new global trends.

The tutorial session covered five topics on sophisticated networking for wireless distributed networks as follows: (1) ad-hoc/mesh networks, (2) sensor networks, (3) cognitive wireless networks, (4) multi-hop cellular networks, (5) cooperative multi-point cellular networks. For each topic, two high-profile speakers, one from industry and the other one from academia, made tutorial presentations in terms of their fundamentals as well as applications.

##### Special session (Fig. 3):

In the session specialized on the wireless distributed networks, 18 papers were presented. Their technical fields were as follows:

- Sensor network
- Distributed antenna network
- Multi-user MIMO systems
- SC-FDMA using adaptive subcarrier allocation



Fig. 4 The 4th technical conference in January 2012: Panel discussion (Further possible applications of cognitive radio and software radio techniques)

- 5 GHz band RF-tag system
- DSA system in 2.4GHz ISM band
- Distributed spectrum monitor
- Decision fusion in OR-rule based spectrum sensing

#### 5. The 4th Technical Conference in January 2012

- ✓ Topics: Cognitive radio network, Cross layer
- ✓ Date: January 26-27, 2012
- ✓ Venue: Kirishima Hotel, Kagoshima
- ✓ Number of papers: 27 (Special talk: 1, Invited talk: 1, Panel discussions: 6, Regular talks: 19)
- ✓ Number of participants: 65

##### Special talk (Propagation characteristics of long-distance wireless LAN system over the sea):

Prof. Masuya (Kagoshima Univ.) introduced his recent research activities on implementing wireless link connections to small islands. The project focused on wireless LAN systems, because the propagation paths assumed mainly cross the sea and low-cost wireless backbone links are desirable. In the project, two points, which are 47.5km apart, were connected by wireless LAN systems, a national record at that time. Some insights obtained from the experiment were addressed in his talk.

##### Panel discussion (Further possible applications of cognitive radio and software radio techniques) (Fig. 4):

Prof. Ohta (Kobe Univ.), Mr. Fujii (NTT DOCOMO), Dr. Harada (NICT), Dr. Suzuki (Toyota CRDL), Prof. Sakaguchi (Tokyo Inst. of Tech.), and Prof. Kato (Tsukuba Univ. of Tech.) were invited as the panelists. Each gave a 15-min presentation prior to discussions. The topics covered various aspects such as (1) spectrum management issues, (2) development of an “area one-segment” system within the framework of a governmental white-space trial, (3) cognitive radios within cellular systems / for ITS systems.

In the subsequent discussion time, about an hour was used for discussions and Q&As from the floor and

among the panelists. The topics included “Reliability and security issues on the communication using cognitive radio for ITS and smart grid systems” and “Issues to be improved on the current area one-segment broadcast trial”.

#### **Invited talk (Technical requirements of TV white space in Japan - Status at the end of year 2011 -):**

Prof. Takada (Tokyo Inst. of Tech.), who is a member of a governmental committee on the usage of white space, outlined ongoing discussions in the committee and their relationship to associated ITU-R recommendations and radio regulations. Moreover, he also mentioned comparisons between FCC rules for the spectrum sharing usage and Japanese tentative rules under discussion and the assumed schedule.

#### **Evening session:**

A session took place in the evening of the first conference day, where Dr. Uehara (NTT), the general chair of CrownCom 2011, gave an overview of the conference. A panel session entitled “SR technical committee from the view points of students” also took place. It involved four students studying on this research field and there were extensive discussions on how to make the committee more active.

#### **6. The 5th Technical Conference in March 2012**

- ✓ Topics: Workshop on mobile communications
- ✓ Date: March 7-9, 2012
- ✓ Joint TCs: RCS and SRW
- ✓ Venue: Yokosuka Research Park (YRP)
- ✓ Number of papers: 32 (SR organized sessions talks: 5, Organized session talks of three TCs collaboration: 6, Regular talks: 21)
- ✓ Number of participants: 330

#### **General session:**

We annually cosponsor mobile communications workshop at Yokosuka Research Park (YRP) in Yokosuka, Kanagawa. In this year, we cosponsored the workshop with RCS and SRW. There were 21 presentations during the three day workshop. Their technical fields are listed as follows:

- TV whitespace wireless communication systems
- Dynamic spectrum access systems in ISM band
- Heterogeneous network systems
- Overview of standardization and regulation
- MIMO and its bi-directional relay network systems
- Modulation classification
- Location estimation
- Channel estimation

#### **Organized session of SR:**

The concept of SR’s organized session is the reviewing of research activities in SR by inviting the active researchers presented many interested results in SR conference throughout the year. There were 5 invited talks in this session. The invited speakers and topics of presentations are listed as follows:

- Prof. Inamori (Keio Univ.), “Spectrum sensing algorithm via finite random matrix theory”
- Dr. Yano (ATR), “R&D on DSA systems on ISM band”
- Dr. Lan (NICT), “Overview of IEEE 802.11af”
- Prof. Sasaki (Niigata Univ.), “Overview of IEEE 802.22”
- Prof. Umehira (Ibaraki Univ.), “Examples of spectrum engineering for frequency sharing and its future perspectives”

#### **Organized session of three committee collaboration (Future perspectives of wireless communication systems and its application):**

On the second day, the three TCs had co-organized session on future perspectives of wireless communication systems and its application. Since all session topics are very attractive, 150 seats prepared were filled with dedicated academics and engineers. Additional seats had been provided to accommodate the overwhelming attendees.

There are 6 invited talks in this session. The invited speakers and topics of presentations are listed as follows:

- Dr. Harada (NICT), “Standardization for wireless smart utility network (WiSUN): IEEE802.15.4g/4e”
- Dr. Asai (NTT), “Overview of IEEE802.11ac - next generation high-speed wireless LAN standard”
- Dr. Nakamura (NTT DOCOMO), “Views on LTE enhancements and future radio access”
- Dr. Yoshino (SOFTBANK MOBILE), “Trends of ITU-R standardization - Results of ITU-R RA-12 & WRC-12, and future perspective -”
- Dr. Shimizu (NTT), “ITU-R standardization activities for wide-area sensors and/or actuators network (WASN) systems”
- Dr. Konishi (KDDI Labs.), “Future trends on both services and market of IMT systems - Introduction of ITU-R M.2243 -”

#### **7. CrownCom 2011 (Osaka)**

The 6th International ICST Conference on Cognitive Radio Oriented Wireless Networks and Communications 2011 (CrownCom 2011) was held at Osaka University Nakanoshima Center, Osaka, Japan, June 1st - 3rd. There were 140 participants.

The conference was organized by general co-chairs, Dr. Uehara (NTT) and Prof. Benedetto (Univ. of Rome, Italy). Continuing the tradition from previous years, the CrownCom has focused on cognitive radio aspects of wireless communications and provided opportunities for researchers in both academia and industry to present the latest technologies and exchange ideas in the area of cognitive radio.

In the conference, there were large paper submissions of 163 regular session papers, 26 special session papers, and 9 demonstration papers. After peer, independent, and rigorous reviews, 93 high quality papers were accepted, which include 76 regular session papers, 10 special session papers, and 7 demonstration papers.

We had 1 panel session for discussion about standardization of cognitive radio, the demonstration and exhibition sessions.

There were also four great keynote speeches every day at Keizo Saji Memorial Hall in the conference venue. On the 2nd day, world-widely known Prof. Tarokh (Harvard Univ., USA) gave us a talk about “Information theoretic fundamentals, regulatory issues, physical limitations and the future of opportunistic transmission.”

**Details:**

K. Umebayashi et al., “Report on the 6th international ICST conference on cognitive radio oriented wireless networks and communications (CrownCom 2011),” Global News Letter, IEICE Communications Society, vol.35, no.3, pp.30-33.

Website URL:

[http://www.ieice.org/cs/gnl/gnl\\_vol35\\_3.pdf](http://www.ieice.org/cs/gnl/gnl_vol35_3.pdf)

**8. Special Section on Cognitive Radio and Heterogeneous Wireless Networks in Conjunction with Main Topics of CrownCom2011 (IEICE Transaction on Communications, Vol.E95-B, No.4, April 2012)**

Radio spectrum is being exhausted due to the growing demands for wireless broadband communications. To cope with this problem, the paradigm shift from the conventional exclusive use of frequency resources to the flexible frequency utilization is indispensable for future wireless networks. Cognitive radio and heterogeneous wireless networks are key technologies that bring us an emerging paradigm of flexible frequency spectrum usage. By cognition of the radio frequency environment, cognitive radio terminals dynamically select the optimal frequency and transmission media with the cooperation of networks. Technologies for heterogeneous wireless networks also realize the seamless system roaming among wireless systems. To facilitate the active discussion and to further promote research and development in these fields, this special section is planned.

In response to a call for papers, 51 papers and 12 letters were received. After fair review, two invited papers, 25 papers and four letters are accepted for the publication in this section. These papers widely cover related technologies including dynamic spectrum access and management, cognitive networks, and architecture and implementations. And they also cover regulation, standardizations, and the applications. The editorial committee hopes this section will provide useful information and new ideas to those interested in these fields.

The guest editor-in-chief and deputy editor-in-chief of the special section were Dr. Uehara (NTT) and Prof. Benedetto (Univ. Rome, Italy), respectively. They were general co-chairs of CrownCom 2011.

We have two invited papers. First one is “ITU-R standardization activities on cognitive radio,” which is written by Dr. Yoshino (SOFTBANK MOBILE). In

this paper, cognitive radio is the merging technology for significantly improving the spectrum usage efficiency. So, in ITU-R, cognitive radio systems are currently being studied. This paper introduces the recent results of the ITU-R studies on cognitive radio.

Second invited paper is “Distributed dynamic spectrum allocation for secondary users in a vertical spectrum sharing scenario,” which is written by Dr. Babadi and Prof. Tarokh (Harvard Univ., USA). This paper considers the spectrum sharing under the preestablished priorities as the vertical spectrum sharing fashion and then introduces the greedy asynchronous distributed interference avoidance (GADIA) as the horizontal spectrum sharing algorithm. From the theoretical analysis, the network performance of GADIA is clarified.

The themes of these papers are strictly related to the topics of TCSR and thus we expect the new results of TCSR’s related theme would be shown in the conference of TCSR due to the encouragement from these papers.

**Website URL:**

<http://search.ieice.org/bin/index.php?category=B&year=2012&vol=E95-B&num=4&lang=E>

**9. Conclusions**

Technical Committee on Software Radio (TCSR) held five conferences, one international conference in 2011 and organized one special section on IEICE Transactions on communications that was published in April 2012. TCSR makes a strong effort to international collaboration with the research organization of software defined radio and cognitive radio fields all over the world. In FY2012, we will plan five conferences as follows:

- May 2012: Keio Univ. (Technical exhibition)
- July 2012: Yakushima, Kagoshima Pref. (Panel discussion, Open air discussion)
- October 2012: Fukuoka Univ. (Joint workshop)
- January 2013: Shinshu Univ. (International workshop)
- March 2013: Waseda Univ. (Joint workshop)

TCSR welcomes contributions from newcomers. We are looking forward to meeting you at conferences.

**More information:**

Website URL: <http://www.ieice.org/cs/sr/eng/>

Contact email: [sr\\_ac-sec@mail.ieice.org](mailto:sr_ac-sec@mail.ieice.org)

# Global R&D Formation in NEC

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## 1. Introduction

NEC Laboratories has four global R&D centers under the same management: Central Research Laboratories (CRL) in Japan, NLA in America[1], NLC in China[2] and NLE in Europe[3]. R&D centers outside Japan (NL-ACE) have several important roles as follows:

### 1) Acquiring global talents

One clear advantage of having R&D centers outside Japan is ease of acquiring global research talents. All of NL-ACE are located near excellent universities, such as Princeton, Stanford, Tsinghua and Beijing. Also, NL-ACE are very active in collaborating with those universities and accepting intern students.

### 2) Capturing global technology trends

Undoubtedly, US is leading ICT technology and business innovation. Europe is a center of standardization especially in telecommunication area. China is "world's factory". It is important to have "antennas" to catch technology trends in those areas.

### 3) Contribution to global business

Increasing global business is an urgent issue for many Japanese companies. NL-ACE play important role in capturing local market requirements and providing technology to meet the requirements to local business. In Smart City business, for example, it is essential to understand local requirements, such as regulations and people's feeling about privacy. Expectation to NL-ACE is getting higher and higher.

## 2. NEC Laboratories America (NLA)

NLA has the longest history among NL-ACE. It was created in 2002 as a merger of two research laboratories, which were formed in 1989 and 1991, respectively. NLA is headquartered in Princeton, New Jersey (Fig. 1) and has second location in Cupertino, California (Fig. 2). Princeton office covers 8 research areas: Autonomic Management, Computing Systems Architecture, Machine Learning, Mobile Communications/Networking, Optical Networking, Quantum IT, Storage Systems, and Systems Analysis/Verification. Cupertino office covers 3 research areas: Data Management, Energy Management, and Media Analytics.

NLA cultivates a dynamic culture that emphasizes excellence in both research and business contributions. In the latest fiscal year, NLA published 131 papers (including 3 best papers) at leading conferences and

filed 111 patent applications. NLA currently has 26 technology transfer projects with business departments.



Fig. 1 NLA in Princeton



Fig. 2 NLA in Cupertino

## 3. NEC Laboratories Europe (NLE)

NLE was formed in 1994. Most researches are based in Heidelberg, Germany and some are in Acton, UK. Heidelberg is located in southern Germany where global ICT industry and leading universities are concentrated (Fig. 3). Acton is a district of west London. NLE has two divisions: Network Research Division (NWRD) and Software and Services Research Division (SSRD). NWRD covers research areas of Future Carrier Network, Software Defined Network, Networking for Cloud, and Intelligent Transport Systems. SSRD covers Machine-to-Machine Platforms/Services, Cloud Security, Media Cloud, and Smart Energy.

NLE is engaged in many European research projects and collaborating with universities, research institutes and companies. Also, it is very active in contributing to standardization such as 3GPP, OMA, ETSI, IETF, IEEE, BBF and ONF. Some researchers are acting as core members, such as area directors and WG chairs, in those standard bodies.



Fig. 3 NLE in Heidelberg

#### 4. NEC Laboratories China (NLC)

Being formed in 2003, NLC is the newest of the three. It is located in Tsinghua Science Park, Beijing (Fig. 4) and active in collaborating with universities such as Tsinghua University, Beijing University and Beijing University of Posts and Telecommunications. The research area covers Mobile Networks, Cloud Networking, Data Mining, Video Surveillance, Telematics, Position Detection, Sensing, and Lithium Ion Batteries. It also has an organization for developing business in China market called Product and Business Innovation Center.

The most important role of NLC is to develop technologies targeted to China market. Mobile Networks team, for example, is working on TD-LTE which China is considered as the most important market. Smart City is another area China plays important role.



Fig. 4 NLC in Beijing

#### 5. Global Collaboration

Collaboration among the four R&D centers is highly encouraged. We organize annual Open House which is open to all the group companies. Although it is designed for showing our vision and technology to business departments, it is also a good opportunity for researchers to learn about activities in other laboratories and start collaboration. One good example is Ambient Interface[4] development. It is an interactive interface technology that allows the control of information through a combination of user gestures and the display of images from a projector. The technology was developed by collaboration between the projector team in CRL and the media analytics team in NLA. They learned about each other when they participated in the Open House and jointly developed the new user interface technology very quickly.

Although most of those collaborations were between CRL and one of NL-ACE, so far, collaboration among more than two R&D centers is increasing. For example, all of the four R&D centers have mobile networking research activities. Those groups exchange information with each other and complement their technology. NLA mainly works on physical and MAC layers, while NLE focuses more on networking and services. NLC is responsible to TD-LTE. CRL works closely with business departments and deeply involved in product development.

#### 6. Next Step

I am in charge of promoting global collaboration inside and outside the company. It is a fun to find the four R&D centers have different colors, culture and strengths. I would like to contribute to maximizing R&D outcomes through my job.

This time, unfortunately, I could not introduce detail of the technologies NL-ACE are working on. I hope, someday, I (or my colleagues in NL-ACE) will come back and report on those wonderful technologies in detail.

#### 7. Reference

- [1] <http://www.nec-labs.com>
- [2] [http://www.nec.cn/templates/T\\_content\\_jan/index.aspx?nodeid=728](http://www.nec.cn/templates/T_content_jan/index.aspx?nodeid=728)
- [3] <http://www.neclab.eu>
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# Introduction to MERL in USA

Richard C. WATERS, President  
Mitsubishi Electric Research Laboratories Inc.



## 1. Introduction

Mitsubishi Electric Corporation (MELCO) operates three overseas R&D centers, Mitsubishi Electric Research Laboratories (MERL) [1] in U.S.A., and two others in France and UK [2] and in China, to promote global research, development and standardization

activities, as shown in Fig. 1. These R&D centers harmonize with Domestic laboratories in Japan for accelerating innovation according to R&D, Business and IP & Standardization strategies in this company.

This article focuses introducing to MERL of overseas R&D centers.

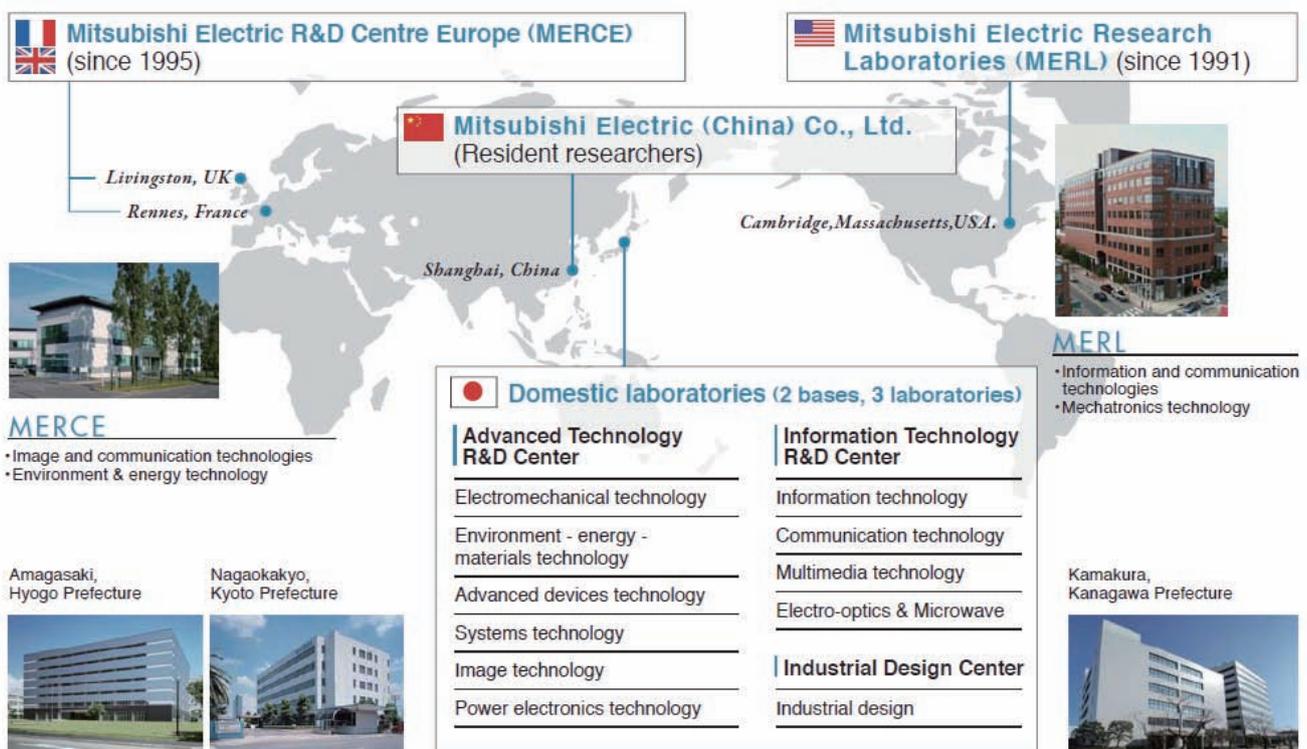


Fig. 1 Global R&D framework

## 2. What is MERL?

MERL is the North American arm of the Corporate R&D organization of MELCO. It is located in Cambridge, Massachusetts as shown in Fig. 2. MERL conducts application-motivated basic research and advanced development in mechatronics and communication technologies.

### (1) MERL's mission

There are two aspects to MERL's mission: (a) creation of highly significant intellectual property (papers, patents and prototypes) in selected areas and (b) contribution to real business through close partnership between U.S.A and Japan.



Fig. 2 Location of MERL

(2) Focusing on technology sectors

MERL has five principal technology sectors and a fundamental algorithm sector which supports all of five principal technology sectors. These sectors are as follows.

- Digital Communications - featuring wired and wireless transmission technology and networking.
- Multimedia - featuring speech interfaces and the encoding, decoding and analysis of video.
- Data Analytics - featuring data analysis and equipment condition monitoring.
- Imaging - featuring computer vision algorithms
- Mechatronics - featuring advanced simulation and control of factory automation systems.

3. MERL R&D activities

This section describes MERL’s technology sectors in more detail.

- (1) Digital Communications: High speed mobile communications, ubiquitous networking, reliable wireless, next generation standards and new applications.



Wideband wireless communication technology

- (2) Multimedia - Efficient representation, transmission, security, processing and interaction of multimedia; including video compression, display processing, information coding for security, compressive sensing, and speech processing.

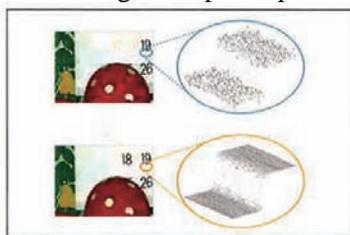


Image noise reduction technology

- (3) Data Analytics - Predictive analytics (statistical machine learning, data analysis), decision analytics (optimization and control), and software infrastructure (distributed software systems, data stream processing).



Data analysis and scene extraction technology

- (4) Mechatronics - Advanced control algorithms, system dynamics, modeling and performance analysis, mechatronics design, innovative system concepts, and 2D/3D adaptively-sampled distance field applications.



Example of modeling and performance analysis

- (5) Imaging - Developing and applying novel methods for sensing people, objects and events; extending what cameras can do by adding motion, force, ultrasound, 3D and other sensors to quantify the world.

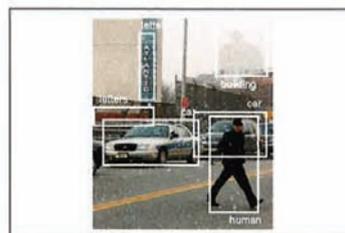


Image classification and recognition technologies

- (6) Algorithms - Solution methods for optimization problems involving very large numbers of variables in the areas of information theory and coding, stochastic optimization, inference and learning, and sensing and perception.

4. Publications by MERL

MERL has been publishing R&D activities in major journals and conferences. A recent publication survey is shown in Fig. 3. Researchers at MERL have been obtaining many awards in academic fields.

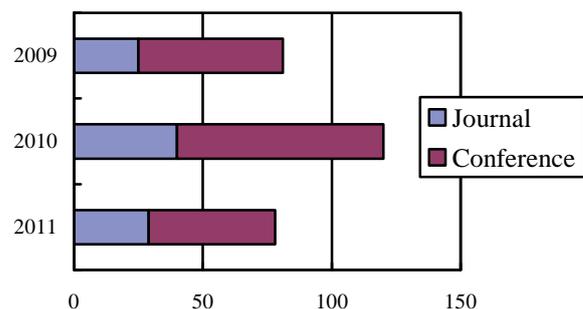


Fig. 3 MERL Publications

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- [1] <http://www.merl.com/>  
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# Experiences in Japan

Le Liu

Green Platform Research Laboratories, NEC Corporation



## 1. Introduction

It's my pleasure to accept the editor's invitation to share my experiences in Japan with the readers of IEICE Global Newsletter. The opportunity to come to Japan was started from a corporation between National Institute of Information and Communications Technology (NICT) and Beijing University of Posts and Telecommunications (BUPT) in April 2003. During one-year working experience as a foreign researcher in NICT, I met Professor Fumiyuki Adachi, who let me find out the motivation of studying toward Ph.D. degree and know the fun of research. Thanks to the scholarship of Japanese government, I joined the International Doctoral Program in Communication Engineering in Tohoku University in October 2004, which is located in Sendai, Japan. Three-year study in Japan is the most impressive experience for me. After my graduation in September 2007, I choose to work in Wireless Access Network Technology Group of Green Platform Research Laboratories in NEC Corporation and live in Japan.

This essay will give a brief introduction of my study, career and life experiences in Japan in the past 9 years.

## 2. Study Experience in Japan

I still remember the first time I attended an international conference meeting, which was the IEEE Vehicular Technology Society meeting in Spring 2004, in Milan, Italy. By presenting my research paper, I had a chance to make new friends and discuss the technologies with them. One of them was Prof. Lajos Hanzo [1], a famous professor of University of Southampton. I knew him by reading his book before. It was quite exciting to talk to him face-to-face. We had interesting discussion on radio access technologies. Besides, I was invited to celebrate his birthday party together with his students, as shown in Fig. 1. His passion on communication research and personality as a great teacher leads me dreaming of being a researcher like him.

However, the motivation of studying in Japan is originated from another important person, Professor Fumiyuki Adachi. When I met him, I was kind of losing direction of research and couldn't stop emphasizing the difficulties of research and life in Japan. His simple Japanese sentence, “でも研究は面白いよ”(research is interesting, though), stopped my complaining. This made me change the thinking way and let me understand why to continue the research in my life. The decision to be his student brought me to visit another city in Japan, Sendai in north east part of

Japan. When I joined his lab in Tohoku University (as shown in Fig. 2), I even don't know that Tohoku University is not in Tokyo. There are many Japanese and International students in Adachi laboratory [2], shown in Fig. 3. Without their generous assistance, I couldn't keep positive motivation in both study and life. Their encouragement let me forget the loneliness and difficulties during the three years in Sendai and complete my Ph.D. course.



Fig. 1 VTC Spring 2004 in Milan



Fig. 2 Adachi research laboratory



Fig. 3 Nomikai party with members of Adachi research laboratory

### 3. Work Experience in Japan

For me, it was a good choice to work in a Japanese company after my graduation. Especially, the opportunity to work as a researcher in Green Platform Research Laboratories in NEC Corporation is invaluable.

Different from the research in the university, the goal of research in a company is mainly technical transfer such as patent filing. Filing patents is important to provide a way for protecting an invention or an innovative idea as the research output. As a researcher in industry, I still take a basic approach of research to analyze massive data sets, build models and so forth. The difference from academic research is to keep research and engineering tightly integrated and to make sure that the research outreach is aligned with the practical implementation and applications. Knowing that the systems I build will have immediate impact on the future implementation is a huge motivator.

After I joined the Wireless Access Network Technology Group in NEC's research lab, I have been participating in 3GPP standardization activity [3]. The 3GPP specification work is done in Technical Specification Groups (TSGs) and Working Groups (WGs). The RAN (Radio Access Network) is one of the TSGs, which is composed of five working groups. The RAN1 WG mainly focuses on the specification of technologies of physical layer. Companies ("individual members") participate through their membership to a 3GPP Organizational Partner. As one of the delegate member of NEC, I have been attending the RAN1 WG meetings. The technical discussion during the standardization meetings is different from that of academic conference meetings, where the former concerns more about the impact of non-ideal measurement and estimation for real implementation. For example, it is quite usual for companies to argue specific signaling with 1bit or 2bits.

Currently, I am developing the techniques related to the standardization of 3GPP LTE (an initialism of Long Term Evolution) and LTE-Advanced for wireless communication of high-speed data for mobile phones and data terminals. For example, for uplink wideband transmission, multiple access schemes have been proposed on top of single carrier-frequency division multiple access (SC-FDMA) of LTE Release 8. DFT-spread-OFDM with non-contiguous resource allocation in Fig. 4, one of our proposed candidate access schemes, was accepted for LTE-Advanced to improve average user throughput by multi-user diversity while keep compatibility of the physical channel structure of

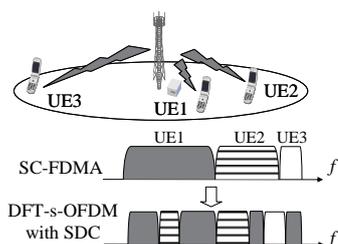


Fig. 4 Uplink access schemes for LTE-Advanced

LTE. For downlink transmission, coordinated multi-point (CoMP) transmission is considered for LTE-Advanced as a tool to improve the downlink cell-edge user throughput and/or to increase average user throughput. Three main CoMP schemes, including joint transmission (JT), dynamic point selection (DPS), and coordinated scheduling/beamforming (CB/CS). Currently, I am investigating the employment of CoMP in a heterogeneous network, where the efficient coordination between Macro cell and Pico cells is expected to achieve high CoMP gain on the cell-edge user throughput.

### 4. Life Experience in Japan

Experience in Japan let me feel the exclusive Japanese culture. Japan is known as one of most polite countries in the world. Foreigners who visit or live here often praise this aspect of the culture. I myself consider this kind of politeness to be one of the most positive things about Japan. I'm often impressed by the power of the word "すみません". Again and again, I've seen how using this word at just the right moment can change negative feelings into positive ones. When I accidentally bump into a woman in a crowded station, she apologized first even though it was my fault. We both said "すみません" at the same time. Such a simple way can save both people from bad feelings that might last all day.

Another experience is in a rush-hour train in Japan. Japan has the most complicated system of train and subway in the world. Obviously the answer to the question of what's good about a rush-hour train is "NOTHING"! Of course, it can be very unpleasant to be crammed into such a small space with so many people. But most of the time, I feel quite philosophical about it all. When I look around me at all those people on the train, I often feel a great fondness for humanity. Nobody wants to be crowded into such a small space, but there we are, and we make the best of it. Nobody yells, nobody fights, nobody even gives anyone a dirty look. We may be thinking bad thought about the person whose elbow is sticking into my back, or the person breathing right into my ear, but most people seem to make a real effort not to cause any trouble. Except the rare weirdo who tries to take advantage of the situation, I basically feel this way, that is "we are all in this together and we'll get through it somehow. It's only temporary".

### 5. Remarks

No one will doubt it that the internationality of the world changes the everyday life of everybody. Studying and working abroad is quite common. It's my honor to write this essay and share a slice look of my experiences in Japan.

### 6. Reference

- [1] <http://www-mobile.ecs.soton.ac.uk/newcomms/?q=people/lh>
- [2] <http://www.mobile.ecei.tohoku.ac.jp/>
- [3] <http://www.3gpp.org/>

# My Ph.D Research Life in Japan

Guanghai Song  
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Doshisha University



## 1. Introduction

I come from China. I am going to complete my Ph.D course in Doshisha University. I benefit a lot from Ph.D research in Japan. Also, I want to share my stories with other people. In this essay, I tell my experiences and considerations in my Ph.D research life around selection of research topic, conference presentation, and writing the paper.

## 2. Selection of research topic

Selecting research topic and finding problems are the first thing for a researcher. Before I became a Ph.D candidate, I always thought that the advisor was an expert in my area and he would give me a very interesting problem. And I thought it was time to distinguish myself. I harbored feelings of excitement came to Japan. However, the true situation made me disappointed at first. My advisor didn't know details about my master's research direction. When I discussed my research with him, he only told me some general principles about how to select a research topic and how to do a research. This confused me for a long time.

Gradually, I realized that my thought was completely wrong. In fact, even in the same area there are variety of research topics. In the past, my advisor had studied on an entirely different topic with my previous research. What he did know was that how to find a problem and how to do a research. Up to then, all I know was that how to solve a specific problem. If no one told me, I did not know what to do. This seemed to be a terrible status.

As the things goes, if you depend too much on the help of others, you will find yourself completely helpless. To become a qualified researcher, you must be competent in every link of research. The selection of research topic is a very important link, so I should do it by myself. I began to come down to earth without complaint.

My following experience told me that selecting research topic freely by oneself is more favorable and more promising. At first, I continued with my master's research topic. This topic was from my master's advisor and I had submitted several papers on this research. However, I felt that it was very difficult for me to continue to generate new ideas. My mind became numb on this research. Later, I finally found my research topic when I guided a master student in my laboratory with his research. He took a paper to me and wanted me to show him the unclear parts he marked in the paper. To explain these parts to him, I read the

paper. I immediately found that this paper was interesting and easy to understand for me. I could soon seize the essence of the paper. After I got back, I thought a lot on this paper, and many questions concerned with the main idea of this paper poured from my mind. To figure out these questions, I began to read some related papers. These papers and the associated questions became my research topic even by now.

The research is really various. Some may be hard for you to start with. In my opinion, at first it may be handier to choose a topic according to your own background. Once you specialize in one field, you will also have the ability to do other things.

## 3. Conference presentation

It seems that academic conference in Japan is well organized. After I came to Japan, the chance of conference presentation increased. I had many new lessons from these conference presentations.

The most impressed thing was preparing slides for presentation. That was my first time to do a presentation in Japan. What made me a bit surprised was that my advisor attached much importance to my presentation. He made it a point to tell me to prepare the slides well. And since that was the first presentation for me, I made the slides more seriously than all my former ones. Finally, I completed the slides and submitted to my advisor. Sometime later, my advisor took a stack of modified slides to me, with some disappointment. I found that my slides were written and marked beyond recognition. My advisor began to explain the modified parts little by little. He showed me its reasons for each modification. He said that my presentation was difficult to be followed with. Moreover, I found that he was very strict on format. At that time, I could not much accept his suggestions. In face of his strict requirements, I had many arguments and complaints. I even considered that his opinions were one-sided and partial. However, in order to meet his requirements, I had to reconsider my slides. After much more consideration, I began to realize that my original slides were really hard to understand. I began to listen to his opinions one by one. I modified my original slides for several days and submitted a new version to my advisor. He pointed out some problems once again. I tried to match his requirement. This was repeated for many times. Ultimately, my advisor generally accepted the modified slides.

I went to the conference to make my presentation. There were not as many people as I thought. Conference hall was an ordinary classroom. When I

came into the hall, the conference was going on. I sat at the end of a row and took out my computer. All the other attendees seemed to be Japanese and they spoke Japanese. They dressed formally and looked serious. I felt a bit nervous. Somehow, I felt I was with something different with them or there was something I hadn't done well. There were still several presentations before my turn. I breathed a sigh of relief and looked around. I unexpectedly found that teachers and students intermingled freely. Teachers did not come to control the conference, they were just audience. After each speech, there were always some questions to the speaker. Almost all the speeches were made in Japanese, so I could not understand at all. From their slides, I could roughly guess what they studied on. Their slide styles differed but all were elaborately made. I thought to myself, luckily I had been strictly required, or how embarrassed I would be. It would be my turn for presentation. I was still not confident on my research. Maybe the reason was that I could not understand their talks. So many different research and mathematical formulas appeared in their slides that I had never seen before. I thought to myself, other people seemed to be cleverer than me. What was the relationship between their research and mine? Would they feel strange about me for my English speech? All these thoughts disappeared with the beginning of my presentation. It seemed that my speech was dull and juiceless or it was not well understood. Only few listeners asked me questions.

My slides are gradually appreciated by my advisor now. I am also aware of my progress. This owes to the careful guidance of my advisor. In the conference presentation, I am more confident than before. Also, I have a great progress on Japanese now.

#### 4. Writing a paper

Writing a paper is the last step for a research. Before I became a Ph.D candidate, I thought it was the easiest part in a research. Now I have to say that writing a paper is the most difficult part and needs you to spend much time.

The first time for me to write a paper was in my second grade of master degree. My advisor told me to write a paper on my research. I was totally unaware of the difficulty of writing. I soon completed it and took it to my advisor. Several days she gave me a modified version where almost all the sentences were rewritten. At that time, I only felt that the modified paper read better and more smoothly. However, I did not know what the intrinsic difference between them was.

My ability of writing the paper had been greatly improved since I came to Japan. The superiority of education here was that my advisor not only told me the principles of writing but also the specific reasons for each principle. Of course, it was very difficult for me at first. I experienced a similar process as in making slides. Here I do not repeatedly tell the same story.

My new understanding on writing the paper is that it is a job of logic more than a job of language. Above all, statements in a paper should be correct, rigorous,

simple, exact, brief, and well-founded. When you are going to meet these principles, you will know how difficult it is. You consider in most of time other than thumbing the dictionary. So when I am writing a paper, I always stay in a quiet place, such as my home. I have to take care of every word and every sentence in the paper. I also have to take every assumption and conclusion seriously. Sometimes, I begin to doubt every word and every sentence in my writing. Sometimes, I am exhausted and cannot consider any more. Then I know it is time for me to do other things.

I would like to say especially the principle that the statement in a paper should be exact. There are some impressive and interesting examples. For example, in sentence “its complexity is very high”, words “very” and “high” are ambiguous. What do you mean “high”, and what is the criterion to say “very high”? This sentence is with little information. It is better to say “its complexity is of exponential order” or “its complexity is higher than ...” and so on. Similarly, description of “scheme A is better than scheme B” is also ambiguous. Readers do not know in what aspect scheme A is better than scheme B in this sentence? Maybe they can guess what you mean from the context. As a single sentence, it makes no sense. It is better to say “scheme A can provide lower error rate than scheme B” or “scheme A has lower complexity than scheme B”.

Another new understanding on writing a paper is that it is a chance to understanding your research. To write a paper, you do not only simply narrate your work. You should consider the value of your work and compare it with others. You will ask yourself such questions as, what problems I have solved, what I have not solved yet, and what I should do next. You will never think through these questions before writing the paper.

At last, I should submit my paper for peer review. This was the most upsetting experience in my Ph.D career. Even if I took great pains to write the paper, it was still stingingly rejected by the reviewers. This confused me a lot. My papers had been rejected for presentation in international conferences several times. When this happened, I cannot stop doubting that I was lack of insight or my work was useless. Sometimes, comments given by the reviewers seemed to be cursory and hard be accepted. I wanted to complain. But I knew I should not do this. I had to look for my own reasons. Fortunately, after a great deal of effort and many times of modification, my paper was finally accepted by a top-level academic journal. But even now I still have low self-confidence on submission to an international conference.

#### 5. Conclusion

This is my story of Ph.D research in Japan. I am very sorry if you feel it is boring.

The career of Ph.D candidate is an important stage in my life. It provides me a quiet place and a long time to reflect myself. Doing research really involves many things. In fact, when you are doing a research, you understand not only your specialty but also things outside your specialty.

# Report on European Wireless 2012

Krzysztof Wesołowski  
Poznan University of Technology



## 1. Introduction

On April 18-20, 2012 European Wireless, the international conference devoted to several aspects of wireless communications took place at the premises of Poznan University of Technology in Poznan, Poland. One of the conference technical sponsors was IEICE-CS and IEICE Europe Section. This was the eighteenth conference of this series organized under auspices of VDE – Association of Electrical Electronic and Information Technologies. In the previous years it took place in Vienna (2011), Lucca (Tuscany, Italy, 2010), Aalborg (Denmark, 2009), Prague (2008) and Paris (2007). Although the name of the conference suggests that the conference has a European range, the conference participants arrived from the whole world, including Japan, China, New Zealand, Brazil and USA. Nevertheless, the predominant number of participants arrived from European countries.



Fig. 1 The conference logo

## Keynote speakers



Fig. 2 Plenary speakers shown in the conference web page <http://ew2012.org>

The conference organizers inspired some specialists in the field to organize seven special sessions devoted to:

- UWB communications,
- Body sensor networks,
- Relays,
- THz communications,
- Network coding,
- V2V communications,
- Spectrally efficient digital communication in the presence of nonlinear distortions.



Fig. 3 Opening session: General Co-chairs: Prof. Krzysztof Wesolowski and Prof. Paweł Szulakiewicz, Technical Co-chairs: Prof. Hanna Bogucka and Prof. Rahim Tafazolli (University of Surrey, UK)

Besides special sessions three panel sessions were organized. They were:

- Future mobile communications beyond 2020 – organized by Dr Egon Schulz, Huawei, Germany
- Trends in the future of wireless communications – organized by Prof. Luis M. Correia, IST Lisbon, Portugal,
- Cognitive radio issues and challenges – organized by Prof. Hanna Bogucka, PUT, Poznan, Poland.

Seventeen regular technical sessions constituted the main part of the conference. They were organized in three parallel tracks.

On the day preceding the conference, i.e. April 17, six half-day tutorials were offered to the conference participants. They included topics associated with V2V communications, cellular technologies, iterative receivers, advanced techniques of modeling of wireless radio channels, issues in radio resource management and M2M communications.

The conference organizers managed to obtain meaningful conference sponsors such as Nokia Siemens Networks Polska and Alcatel-Lucent Poland. The conference was also accompanied by a technical exhibition in which some Polish and foreign companies showed their products and services. There was also a special industrial session offered to the conference participants.

Despite scientific part of the conference which took place in the building of the Faculty of Electronics and Telecommunications and in the Lecturing and Conference Center of PUT, there were three social events accompanying the conference. There was the so called get-together party on April 17, the dinner on April 18 in one of the Old Market Square restaurants and the gala dinner in another four-star hotel restaurant. The latter event was graced by the performance of the men's singing sextet Affabre Concinui followed by the

announcement of the winner of the best young author's paper award. The best paper award committee decided to award Mr. Dong Fang from University of York, UK.

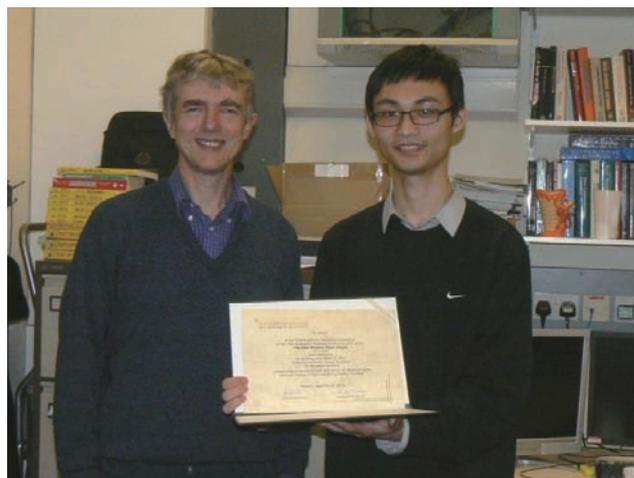


Fig. 4 Dong Fang – the winner of the award for the best young paper's author and his supervisor Prof. Alister Burr from University of York (UK)

The logo of IEICE, Europe Section was exposed in the web page of the conference, in the conference program, the conference proceedings and the banners shown in the conference rooms.

### 3. Conclusions

We have to admit that the conference participants frequently expressed their positive opinion about the organization of the conference and its excellent premises.

We hope that due to European Wireless 2012 Poznan University of Technology presented itself in a positive light and proved to be a good organizer of meaningful scientific events.

# Report on the 2012 IEEE 75th Vehicular Technology Conference (VTC2012-Spring)

Yoshihiro Ishikawa  
General Secretary, VTC2012-Spring Organizing Committee



## 1. Introduction

The IEEE Vehicular Technology Conference (VTC) is the semi-annual flagship conference of the IEEE Vehicular Technology Society (VTS) that brings together researchers, industry professionals, and academics dedicated to innovation across the broad fields of wireless communication, car, and railway technologies. VTC2012-Spring in Yokohama was held on May 6-9 at Pacifico Yokohama gathering about 600 delegates from about 30 countries all over the world, with the IEICE Communications Society, IEICE Engineering Sciences Society, and IEICE itself as the technical co-sponsors. This article reports the major topics of the conference.

## 2. Opening Plenary

Prof. Takeshi Hattori gave his address welcoming all the delegates and opened the conference. Following his introduction, Dr. Tracy Fulghum, the president of VTS, and Prof. Seiichi Sampei gave their addresses.

The keynote session was moderated by Prof. Susumu Yoshida. Mr. Ryuji Yamada, President and CEO, NTT DOCOMO, INC., Japan and Dr. Nobuhiro Endo, President, NEC Corporation, Japan gave their presentations successively regarding cutting-edge technologies on mobile communications or cloud networks. At the end of their speeches, Prof. Fumiyuki Adachi on behalf of all the delegates presented plaques as a token of gratitude to Mr. Yamada and Dr. Endo.

## 3. Panel Sessions

Two panel sessions were organized for the conference. Panel Session I was entitled “Next Generation Mobile Communication Technologies” and



Prof. Hattori



Dr. Fulghum



Prof. Sampei



Prof. Yoshida

was moderated by Prof. Nobuo Nakajima. Four panelists were invited: Prof. Lajos Hanzo (University of Southampton), Dr. Erik Dahlman (Ericsson), Prof. Fumiyuki Adachi (Tohoku University), and Dr. Hiroshi Harada (NICT). Panel Session II was entitled “Future Prospect and Potential of Mobile Phone Business” and was moderated by Prof. Takeshi Hattori. Four panelists were invited: Mr. Kazuya Hashimoto (NEC), Dr. Shinichi Nomoto (KDDI R&D Labs), Mr. Shingo Mizuno (Fujitsu), and Dr. Hiroshi Nakamura (NTT DOCOMO).

## 4. Technical Sessions

A total of 973 papers were submitted to this conference and 467 papers were selected for presentation, of which 67 oral sessions and 9 poster sessions were organized for the conference. The number of submissions was larger than that for the previous VTC in San Francisco despite concerns regarding the influence of the great earthquake in eastern Japan last year. There were many presentations regarding the 4th generation or further mobile communication systems and we recognized at this conference in Japan that we are just starting to take steps toward further expanding our development of mobile communications.

## 5. Exhibitions

In the exhibition room, we had eight exhibition booths and a booth for the next two VTCs. Since the poster sessions were also held in the same room and



Prof. Adachi and Mr. Yamada



Prof. Adachi and Dr. Endo



Panelists of Panel Session I



Panelists of Panel Session II

refreshments were served during the break times, the room was always filled with people. The exhibition room was a very good place to experience the latest technologies, discuss the latest research results, and network with other delegates while enjoying a beautiful panoramic view of the Minato Mirai area.

## 6. Social Events

The welcome reception was held at the VTC venue on the evening of the first day. Many delegates were glad to renew old ties and enjoyed meeting new friends. We also enjoyed soft beautiful music from the traditional Japanese instrument, the koto.

For the banquet, nine Yakata-bune boats, Japanese traditional roofed boats, were chartered. Japanese food and sake were served during the cruise around the Yokohama port. Many delegates also enjoyed the beautiful night view of Yokohama from the ocean.

In addition, at the VTC venue, an origami table was set up to demonstrate the traditional Japanese art of paper folding. Many delegates were able to enjoy origami for the first time. There were many opportunities for the foreign delegates to experience the Japanese culture at the conference.

## 7. Co-located conference

The IEEE vehicular electronics conference, VE2012, was co-located with the VTC. This conference is the starting-point for further development of this field in the near future.

## 8. Conclusion

It has been 12 years since VTC2000-Spring was held in Tokyo, and we enjoyed continued success with this conference in the beautiful harbor front city of Yokohama thanks to the cooperation of many people including the members of the IEICE. The subsequent VTCs in the near future are going to be VTC2012-Fall in Quebec City, Canada, and VTC2013-Spring in Dresden, Germany.



Welcome Reception



Banquet on Yakata-bune boats



Origami Table

## 9. Reference

[1] <http://www.vtc2012spring.org/>

### Appendix: Organizing Committee

The organizing committee for this conference was specially organized in Japan.

General Co-chairs: Takeshi Hattori, Susumu Yoshida, and Fumiyuki Adachi

Technical Program Chair: Seiichi Sampei

Technical Program Vice Chair: Mamoru Sawahashi

Keynote and Plenary Co-chairs: Fumiyuki Adachi, Takeshi Hattori, and Susumu Yoshida

Panels Chair: Nobuo Nakajima

Tutorials Chair: Hiroshi Suzuki

Patronage & Exhibits Chair: Jim Budwey

Finance Chair: JR Cruz

Finance Co-chair: Tomoaki Ohtsuki

Publication Committee Chair: Yasushi Yamao

Local Arrangements/ Volunteer Chair: Takuro Sato

Publicity Chair: Shinji Uebayashi

Registration Chair: Hiroyuki Kawai

International Advisory Committee Chair: Yoshihiko Akaiwa

General Secretary: Yoshihiro Ishikawa

Technical Advisory Committee Chair: James M. Irvine

Conference Administrator: Jim Budwey

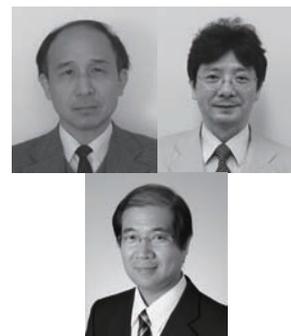
Conference Administrator: Clint Keele

# Report on 2012 Korea-Japan EMT/EMC/BE Joint Conference (KJJC-2012)

Nobuo Kuwabara<sup>\*</sup>, Masao Taki<sup>\*\*</sup>, and Masahiko Nishimoto<sup>\*\*\*</sup>

<sup>\*</sup>Kyushu Institute of Technology,

<sup>\*\*</sup>Tokyo Metropolitan University, <sup>\*\*\*</sup>Kumamoto University



## 1. Introduction

The 2012 Korea-Japan Joint Conference (KJJC-2012) was held from May 18 to 19, 2012 at Yonsei University in Seoul, Korea. KJJC was started in 1996 to provide an academic forum in which to exchange information. Of six previous KJJC's, five had been held in Korea and one in Japan

The KJJC-2012 was sponsored by the Korean Institute of Electromagnetic Engineering & Science (KIEES) and was technically cosponsored by the IEICE-ES Technical Committee on Electromagnetic Theory (EMT) and IEICE-CS Technical Committee on Electromagnetic Compatibility (EMCJ). On Japanese side, EMT performed adjustment for the program of conference in regard to Korea side at this time.

KJJC-2012 provided information on the progress of research and development in Electromagnetic Theory (EMT), Electromagnetic Compatibility (EMC), and Biological Effect (BE) by electromagnetic fields (EMF) including Biomedical Electromagnetics. In the conference, three sessions were conducted in parallel. The Japanese and Korean sides both presented eight papers in each of the three fields, 48 papers in total. For the Japanese side, EMCJ took charge of the papers on EMC and BE, and EMT took charge of the papers on EMT. There were other two papers in the conference, which were provided to plenary sessions. Moreover, 17 posters were presented in the poster session.

Sixty-two persons attended from Korea and 38 persons attended from Japan, 100 persons in total.

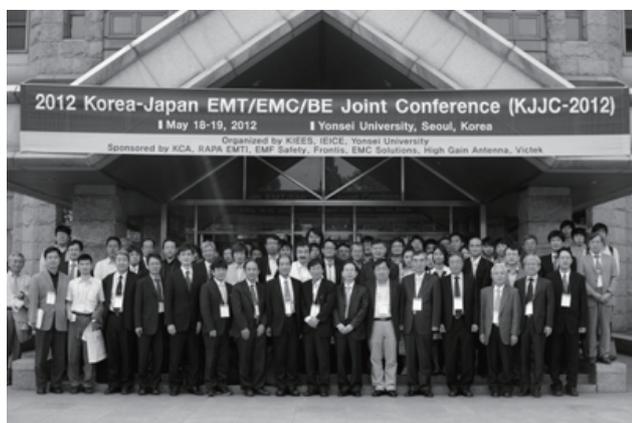


Fig. 1 Members joined in KJJC-2012

## 2. Conference location

Yonsei University, the location of KJJC-2012, was first established in 1885 by Christian missionaries and is the oldest private university in Korea. The main campus is located in several minutes away from Sinchon subway station in central Seoul and has 3500 faculty members. The main hall of the conference was in the Engineering Research Park, which is located beside the main gate.



Fig. 2 Engineering Research Park of Yonsei University

## 3. Plenary sessions

There were two plenary sessions in the conference, and one special paper was presented at each session. In one session, representative from the National Cancer Center, Korea, presented a paper on mobile phone use and the risk of tumors, and in the other session, representative from Osaka Electro-Communication University presented a paper on electromagnetic scattering. Each presentation was followed by group discussions.

## 4. Regular sessions

### 4.1 Electromagnetic theory (EMT)

In the EMT sessions, twelve papers including four poster papers were presented from the Japanese side. Both basic electromagnetic field analysis and practical applications of electromagnetic theory were treated by using various kinds of analytical and numerical approaches. The presented papers were roughly categorized into 6 groups which include (1) Scattering and diffraction, (2) High frequency techniques, (3) Periodic structures including electromagnetic bandgap structures, (4) Nano-scale electromagnetic, (5) Random

media and rough surfaces, and (6) Radar remote sensing. These papers gave an overview of recent progress of research and development in electromagnetic theory and its applications.

#### 4.2 Electromagnetic compatibility (EMC)

In the regular session of EMC, the Japanese and Korean side both presented eight papers. The Japanese papers concerned an EMC design method for printed circuit boards (PCBs), an EMC in IC level, a radio wave absorber, an evaluation method for electromagnetic interference, and an evaluation method for electromagnetic information leakage. The Korean papers concerned a design method for print antennas above 30GHz, an equivalent circuit of 3D-IC, an evaluation method for interface board for wafer, a study of wireless power transmission, and an evaluation method of high altitude electromagnetic pulse (HEMP). The presentations were followed by group discussions.

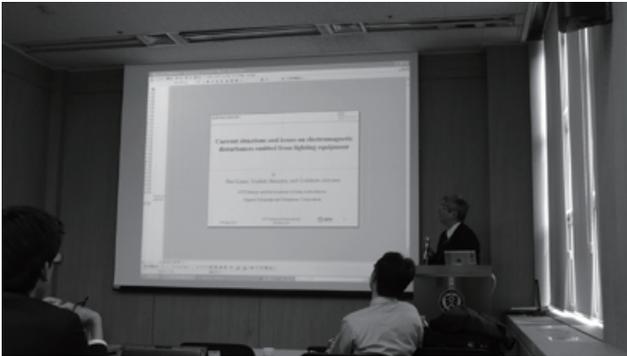


Fig. 3 Presentation in regular session

#### 4.3 Biological effect (BE)

Topics on biological effect of electromagnetic fields were presented at sessions for BE. They covered both engineering and biomedical aspects of electromagnetic field exposures.

Papers addressing engineering aspect included Specific Absorption Rate (SAR) measurement with array sensors, exposure evaluation of data transmission terminals, exposure assessment in workplace, hybrid method for SAR calculation, numerical analysis of millimeter wave exposure, analysis of temperature elevation of human body, shape deformable numerical human model, and exposure assessment of wireless power transmission.

Papers related to biological effect and medical application included epidemiological study on mobile phone use, millimeter wave effect on rabbit eye, effect of RFID signal on melatonin secretion of rat, effect of 60 Hz magnetic field on *C. Elegance*, effect of intermediate frequency magnetic field on blood and immune system of rat, microwave tomography for breast cancer detection, and hyperthermia apparatus with array antenna.

#### 5. Technical tour

After the regular sessions, we visited the radio telescope for millimeter wavelength that is located on the Seoul campus of Yonsei University. Three sets of millimeter range telescopes have been built in Korea that obtain important data. Moreover, we visited the instrumentation room behind the parabolic antenna which was a very interesting experience.



Fig. 4 Radio telescope built in Yonsei University

#### 6. Social events

The welcoming reception was held at a restaurant in the university on May 18. The guests made speeches, and the main members of organizing committee also made speeches, which deepened friendship.

Moreover, on May 19, group dinners were held for each technical field. We discussed the technical problem of each field till late at night and deepened friendship.

#### 7. Conclusion

At a business meeting on May 19, a decision was made to hold the next KJJC in 2015 in Japan.

The KJJC seemed like a meeting between old friends. Although it is important to hold big international conferences and to exchange information with researchers from many countries, smaller international conferences are also important because they contribute to deepening relationships between neighboring countries.

# Report on 2012 Sarajevo Technology Forum (STF2012) on Information and Communication Technology

Amir Ligata  
IPSA Institute, Bosnia and Herzegovina



## 1. Introduction

Sarajevo Technology Forum 2012 (STF 2012) on information and communication technology was held on 24<sup>th</sup> and 25<sup>th</sup> of May 2012, at Hotel Europe in Sarajevo the capital of Bosnia and Herzegovina. Sarajevo is one of the most important cultural centers on the Balkans, often called “Europe’s Jerusalem” due to its cultural diversity and very eventful history.

The Forum was organized jointly by IEICE Europe Section and IPSA Institute. In addition, the Forum has been technically sponsored by both IEICE and Communications Society of IEICE (IEICE-CS).

The aim of STF2012 was to gather researchers in Europe and encourage the collaboration of national and research institutions outside Europe. The Forum also promoted the IEICE Europe Section and its activities in Europe.

## 2. STF 2012 program

Professors and researchers from Japan, USA, Denmark, Belgium, Poland, Romania, Slovenia, Greece, Serbia and Bosnia and Herzegovina, in their presentations addressed the most recent issues in information and communication technologies making a very interesting STF 2012 program.



Fig. 1 Dr. Haris Gacanin opening remarks.

The Forum has been opened by Dr. Haris Gacanin, IEICE Europe Section Chair (see Fig. 1). Dr. Gacanin expressed his joy with the organization of STF 2012

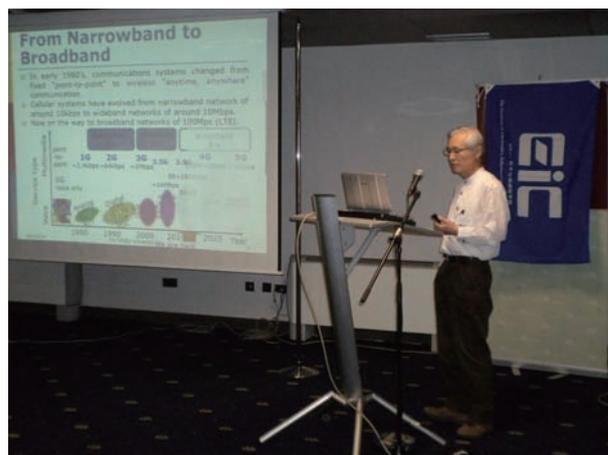


Fig. 2 Invited speech by professor Fumiuyuki Adachi.

and underlined that the number of speakers and Forum participant are increasing year by year, as the quality of presentations are improving. He stressed that the IEICE Europe Section is working hard on promoting its activities and that it is gaining significant attention in Europe.

The STF 2012 program has been organized into five different sessions:

- Broadband Access;
- Next-generation Networking I;
- Next-generation Networking II;
- Applications;
- Miscellaneous.

In addition, a special session has been devoted to the technical papers, which were accepted for presentations on STF 2012.

The Forum presentations started with the keynote speech by the STF 2012 General Chair, Professor Fumiuyuki Adachi, IEICE (Tohoku University) entitled “Spectrum and Energy Efficient Distributed Antenna Network” (see Fig. 2). Prof. Adachi stressed the main design issues for technology intended for beyond fourth generation (4G).

The second keynote speech was provided by Dr. Nozomu Nishinaga, Director of New-Generation



Fig. 3 Participants at STF 2012.



Fig. 4 Forum speakers.

Network Laboratory (National Institute of Information and Communication Technology, Japan) with presentation entitled “Overview of New generation network research and development”. Dr. Nishinaga presented research and standardization activities concerning the Future Internet and Future Networks from NICT point of view.

The keynote speeches were followed by very interesting invited speeches throughout two days (24<sup>th</sup> and 25<sup>th</sup> of May). Speakers addressed a variety of topics concerning information and communication technologies and they had a very positive feedback and interest from the audience.

Over 70 participants visited the Forum during two days making a very successful event (see Fig. 3). The Forum speakers expressed their joy with the quality of presentations and the event organization.

At the end of the second day, Dr. Haris Gacanin gave the closing remarks. He expressed his delight with the STF 2012, and gratitude to all speakers who made this year event a true success (see Fig. 4).

### 3. IEICE Europe Section

At the end of the first day the IEICE Europe Section held its meeting. On this meeting following issues were discussed:

- IEICE-ES in 2011-2012;
- Events in 2013 ;
- Special issues of IEICE Transactions on Communications;
- New activities.

The successes of 2012 Sarajevo Technology Forum lead the IEICE-Europe Section committee to rename the Forum as IEICE Information and Communication Technology Forum (ICTF) in order to present the final research and development efforts globally. The Forum will comprise of two day sessions, divided into blocks, generally according to the subject.

### 4. Future Event

The next Forum “2013 IEICE Information and Communication Technology Forum” will be held on 30<sup>th</sup> and 31<sup>st</sup> of May, 2013 in Sarajevo, Bosnia and Herzegovina. The detailed information on 2013 IEICE ICT Forum will be distributed to IEICE members and provided on the web page, once defined.

# Report on the 10th International Conference on Optical Internet (COIN 2012)

Takashi Miyamura, Osamu Ishida and Atsushi Hiramatsu  
COIN 2012 Organizing Committee



## 1. Introduction

The 10th Conference on Optical Internet (COIN 2012) was held with the sponsorship of IEICE Communications Society (CS), at the Hiyoshi campus of Keio University, Yokohama, during 29-31 in May 2012.

## 2. Outline

- Conference Title: the 10th International Conference on Optical Internet (COIN 2012)
- General Co-Chairs: Atsushi Hiramatsu (NTT, Japan) and Hequan Wu (Chinese Academy of Engineering, China)
- Sponsor: the IEICE Communications Society
- Technical co-sponsors: IEEE Photonics Society, Korea Information and Communications Society, and the Australian Optical Society
- In cooperation with: IEEE Communications Society Japan Chapter, Photonic Internet Forum
- Financial support (in part): the Japan Society for the Promotion of Science (JSPS).
- Date: May 29-31, 2012
- Venue: Fujiwara Memorial Hall, Hiyoshi Campus, Keio University, Yokohama, Japan
- Registration: 136 participants from 12 countries
- Participating countries: Japan, Korea, China, Australia, United States, Czech Republic, Denmark, Spain, Egypt, Finland, Taiwan, and United Kingdom
- Program and number of papers: 31 oral (56%) or 44 oral+poster (80%) accepted from 55 submissions
- URL: <http://www.ieice.org/~COIN2012>



Fig. 1 Opening remarks by Atsushi Hiramatsu

## 3. Session report

In this conference, a wide range of current technology trends on optical networking and its applications was covered from physical layer photonic networking technologies to Big Data processing applications, to provide a forum for discussion and development of appropriate technologies through synergy and interaction between these areas identified as "Optical Internet". 2 plenary, 14 technical, and 1 poster sessions were organized. The excellent technical programs have been assembled with the leadership of Technical Program Co-Chairs, Osamu Ishida (NTT, Japan) and Yong-Hyub Won (Korea Advanced Institute of Science and Technology, Korea). Moreover, a COIN2012- EXAT (Technical Committee on Extremely Advanced Optical Transmission Technologies) joint workshop with the title "Innovations in Optical Communications Technologies" was also held after the main conference.

The details are described below.

### (1) Plenary Sessions

In the morning of first and third days, a plenary session was held, and five invited speakers gave keynote addresses. The opening session started with opening remarks by Atsushi Hiramatsu, General Co-Chair of COIN 2012.

In the plenary session of the first day, three executive leaders were invited:

- The K computer: 10 Peta-FLOPS supercomputer (presented by Motoyoshi Kurokawa, RIKEN)
- COIN and Optical Internet (presented by Minho Kang, Korea Advanced Institute of Science and Technology)
- Optical Communication Technology: Opportunities and Challenges (presented by Yuefeng Ji, Beijing University of Posts and Telecommunications)

In the third day, May 31, the COIN-iPOP (International Conference on IP + Optical Network) joint plenary session was held. The plenary session started with opening remarks by Naoaki Yamanaka. iPOP2012 General Co-Chair (Keio University), followed by COIN Summary & Award Ceremony presented by Osamu Ishida. Two executive leaders were invited:

- Networking and Cloud Computing Issues to Handle Big Data (presented by Prof. Tomonori Aoyama, Keio University)
- Towards Cloud-Ready Transport Networks (presented by Victor López, Telefónica I+D)

### (2) Technical Sessions

31 accepted papers out of 55 submissions were categorized into the 14 technical sessions listed below, and oral presentations were given. The titles of the technical sessions were:

- Advanced Photonic Signal Processing
- Advanced Photonic Devices
- Optical Transport Systems and Technologies I
- Optical Transport Systems and Technologies II
- Network Virtualization I
- Optical Networking I
- Switching and Routing
- Technologies of Highly efficient optical access networks
- Network Virtualization II
- Optical Networking II
- Applications on Overlay Networks
- Data Center Management
- Technologies for robust and resilient optical Access Networks
- WDM and TDM Passive Optical Networks



Fig. 2 Audience-filled hall

### (3) Poster Session

In the poster session, 12 posters were presented on a variety of topics including optical networks, cloud networks, photonic devices networks, and network architecture.



Fig. 3 Poster session

### (4) Workshop

The COIN2012-EXAT joint workshop was held on May 31, chaired and organized by Toshio Morioka (Tech. Univ. of Denmark), Kunimasa Saitoh (Hokkaido Univ.), and Toshihiko Hirooka (Tohoku Univ.). The workshop was technically co-sponsored by IEICE CS EXAT. Recent progress in advanced fiber, amplification and transmission technologies were presented by five invited speakers from Asia and Pacific areas, followed by panel discussions for exchanging ideas and visions of future optical communication systems.

### 4. Award

This year's COIN award was presented to Yuefeng Ji for his distinguished contribution to evolving optical network technologies.

Three-class Paper Awards were presented to authors of the selected papers;

- COIN 2012 Best Paper Award: Hyeon CHOI, Takehiro TSURITANI, and Itsuro MORITA (KDDI R&D Laboratories, Japan), "Effects of LN Modulator Chirp on Performance of Digital Coherent Optical Transmission System"
- IEEE ComSoc JC Young Engineer Award: Takafumi TANAKA (NTT, Japan) "Comparative Study of Optical Networks with Grid Flexibility and Traffic Grooming"
- COIN 2012 Young Engineer Award: presented to each first author of the four selected papers.

### 5. Conclusion

We believe that the presentations given by the distinguished speakers provided fruitful insight into research and development. The next COIN will be held in 2013 in Beijing, China.

## IEICE-CS Conferences Calendar

| Date                        | Conference Name   | Location                         | Note                                 |
|-----------------------------|---|----------------------------------|--------------------------------------|
| 20 May -<br>23 May 2013     | URSI Commission B 2013 International Symposium on Electromagnetic Theory ( <b>EMTS2013</b> )  | Hiroshima, Japan                 | Submission deadline:<br>15 Nov. 2012 |
| 28 Jan. -<br>30 Jan. 2013   | 27th International Conference on Information Networking ( <b>ICOIN2013</b> )  | Bangkok, Thailand                | Submission Closed                    |
| 05 Nov. -<br>09 Nov. 2012   | 9th Asia-Pacific Symposium on Information and Telecommunication Technologies ( <b>APSITT2012</b> )                                  | Santiago and Valparaiso, Chile   | To be held <b>soon</b>               |
| 05 Nov. -<br>08 Nov. 2012   | 12th International Conference on Telecommunications for Intelligent Transport Systems ( <b>ITST2012</b> )                           | Taipei, Taiwan                   | To be held <b>soon</b>               |
| 29 Oct. -<br>02 Nov. 2012   | 2012 International Symposium on Antennas and Propagation ( <b>ISAP2012</b> )  | Nagoya, Japan                    | To be held <b>soon</b>               |
| 15 Oct. -<br>17 Oct. 2012   | The 18th Asia-Pacific Conference on Communications ( <b>APCC2012</b> )  | Jeju Island, Korea               | To be held <b>soon</b>               |
| 08 Oct. -<br>11 Oct. 2012   | 16th International Conference on Intelligence in Next Generation Networks ( <b>ICIN2012</b> )                                       | Berlin, Germany                  | To be held <b>soon</b>               |
| 25 Sept. -<br>27 Sept. 2012 | The 14th Asia-Pacific Network Operations and Management Symposium ( <b>APNOMS 2012</b> )  | Seoul, Korea                     | To be held <b>soon</b>               |
| 09 Sept. 2012               | The 2012 International WDN Workshop on Cooperative and Heterogeneous Cellular Networks ( <b>WDN-CN2012</b> )                        | Sydney, Australia                | To be held <b>soon</b>               |
| 05 Sept. -<br>07 Sept. 2012 | 6th Advanced Satellite Multimedia Systems Conference ( <b>ASMS2012</b> )  | Baiona, Spain                    | To be held <b>soon</b>               |
| 23 Aug. 2012                | AsiaFI Network Virtualization Workshop  | Kyoto, Japan                     | Done                                 |
| 01 Aug. -<br>03 Aug. 2012   | The 4th International Conference on Communications and Electronics ( <b>ICCE2012</b> )  | Hue, Vietnam                     | Done                                 |
| 18 Jul. -<br>21 Jul. 2012   | 8th IEEE, IET Int. Symposium on Communication Systems, Networks and Digital Signal Processing ( <b>CSNDSP2012</b> )                 | Poznan, Poland                   | Done                                 |
| 18 Jun. -<br>21 Jun. 2012   | The 11th International Workshop on Assurance in Distributed Systems and Networks ( <b>ADSN2012</b> )                                | Macau, China                     | Done                                 |
| 29 May -<br>31 May 2012     | 10th International Conference on Optical Internet ( <b>COIN2012</b> )   | Yokohama, Japan                  | <b>Reported</b><br>on this issue     |
| 24 May -<br>25 May 2012     | The 4th Sarajevo Technology Forum 2012 ( <b>STF2012</b> )   | Sarajevo, Bosnia and Herzegovina | <b>Reported</b><br>on this issue     |
| 18 May -<br>19 May 2012     | 2012 Korea-Japan Electromagnetic Theory, Electromagnetic Compatibility, and Biological Effect Joint Conference ( <b>KJJC-2012</b> ) | Seoul, Korea                     | <b>Reported</b><br>on this issue     |
| 06 May -<br>09 May 2012     | The 2012 IEEE 75th Vehicular Technology Conference ( <b>VTC2012-Spring</b> )  | Yokohama, Japan                  | <b>Reported</b><br>on this issue     |
| 18 Apr. -<br>20 Apr. 2012   | 18 <sup>th</sup> European Wireless Conference 2012 ( <b>EW2012</b> )  | Poznan, Poland                   | <b>Reported</b><br>on this issue     |

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

## Special Section Calendar of IEICE Transactions on Communications

| Issue     | Special Section   | Note  |
|-----------|---|---|
| Oct. 2013 | Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2012             | Submission due:<br>31 Jan. 2013                       |
| Sep. 2013 | No special section  | /   |
| Aug. 2013 | No special section  | /   |
| Jul. 2013 | Internet Architectures, Protocols, and Management Methods that Enable Sustainable Development       | Submission due:<br>7 Nov. 2012<br><b>See page 46</b>  |
| Jun. 2013 | Heterogeneous Networks for Future Cellular Systems  | Submission due:<br>12 Oct. 2012<br><b>See page 45</b> |
| May 2013  | No special section  | /   |
| Apr. 2013 | No special section  | /   |
| Mar. 2013 | No special section  | /   |
| Feb. 2013 | Quality of Communication Services Improving Quality of Life   | Submission closed                                     |
| Jan. 2013 | Network Virtualization, and Fusion Platform of Computing and Networking                             | Submission closed                                     |
| Dec. 2012 | Coding and Coding Theory-Based Signal Processing for Wireless Communications                        | Submission closed                                     |
| Nov. 2012 | Satellite Communication Technologies in Conjunction with Main Topics of JC-SAT2011                  | To be issued <b>soon</b>                              |
| Oct. 2012 | Medical Information Communication Technology for Disaster Recovery and Human Health Care Support    | To be issued <b>soon</b>                              |
| Sep. 2012 | Emerging Technologies and Applications for Ad Hoc and Wireless Mesh Networks                        | Vol. E95-B, No. 9                                     |
| Aug. 2012 | Networking Technologies for Cloud Services  | Vol. E95-B, No. 8                                     |
| Jul. 2012 | Future Internet Technologies against Present Crises   | Vol. E95-B, No. 7                                     |
| Jun. 2012 | Towards Management for Future Networks and Services   | Vol. E95-B, No. 6                                     |
| May 2012  | Frontiers of Information Network Science  | Vol. E95-B, No. 5                                     |
| Apr. 2012 | Cognitive Radio and Heterogeneous Wireless Networks in Conjunction with Main Topics of CrownCom2011 | Vol. E95-B, No. 4                                     |

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| Society   | Transactions                 | Editorial Subject Indexes  |
|---|------------------------------|--|
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| <b>B</b><br>(Communications)  | EB (English)<br>B (Japanese) | Fundamental Theories for Communications, Devices/Circuits for Communications, Transmission Systems and Transmission Equipment for Communications, Optical Fiber for Communications, Fiber-Optic Transmission for Communications, Switching for Communications, Switching for Mobile Communications, Network, Network Management/Operation, Internet, Wireless Communication Technologies, Terrestrial Radio Communications, Satellite Communications, Optical Wireless Communications, Antennas and Propagation, Electromagnetic Compatibility (EMC), Sensing, Navigation, Guidance and Control Systems, Energy in Electronics Communications, Terminals for Communications, Multimedia Systems for Communications, Broadcast Systems, Integrated Systems for Communications, Space Utilization Systems for Communications   |
| <b>C</b><br>(Electronics)   | EC (English)<br>C (Japanese) | Electromagnetic Theory, Lasers, Quantum Electronics, Optoelectronics, Microwaves, Millimeter-Waves, Ultrasonic Electronics, Electronic Circuits, Electronic Materials, Organic Molecular Electronics, Electronic Components, Electromechanical Devices and Components, Semiconductor Materials and Devices, Integrated Electronics, Electron Tubes, Vacuum and Beam Technology, Electronic Displays, Superconducting Electronics, Storage Technology, Electronic Instrumentation and Control   |
| <b>D</b><br>(Information and Systems)   | ED (English)<br>D (Japanese) | Computation and Computational Models, Automata and Formal Language Theory, Algorithm Theory, Complexity Theory, Computer Components, VLSI Systems, Computer Systems, Fundamentals of Software and Theory of Programs, System Programs, Software Engineering, Database, Contents Technology and Web Information Systems, Data Mining, Networks, Dependable Computing, Application Information Security, Distributed Cooperation and Agents, Artificial Intelligence and Cognitive Science, Human-computer Interaction, Office Information Systems, e-Business Modeling, Educational Technology, Rehabilitation Engineering and Assistive Technology, Pattern Recognition, Speech and Hearing, Image Processing and Video Processing, Image Recognition, Computer Vision, Computer Graphics, Multimedia Pattern Processing, Natural Language Processing, Biocybernetics, Neurocomputing, Biological Engineering, Music Information Processing, Kansei Information Processing, Affective Information Processing |

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|                                       |                  | Registration of the first society (includes its online version transactions) | Registration of additional societies (includes its online version transactions) | Journal (written in Japanese) | Transactions (written in Japanese or in English) |        |
|                                       |                  |  |   |                               | (In one society)                                 |        |
| One title                             | Two titles       |  |   |                               |  |        |
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| Member (overseas) with OMDP*          | 1,000            | 5,000  | 3,000 / 1society  | 5,000                         |  |        |
| Student member (overseas)             | -                | 2,000  | 2,000 / 1society  | 6,000                         |  |        |
| Student member (overseas) with OMDP*  | -                | 1,000  | 1,500 / 1society  | 5,000                         |  |        |

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- If you want to change membership from Member (In Japan) to Overseas Member, you don't need to pay an Entrance charge.

● **Optional Rapid Mailing Service**

Surface mail charge is included in the membership charge. Optional rapid mailing service is available by air mail or surface air lifted (SAL) mail. The additional charge per year periodical depends on the mailing address, as shown in the right table.

| Areas  | Air mail   | SAL mail  |
|--|------------|-----------|
| Asia; Guam; Midway islands                                   | 5,600 yen  | 3,200 yen |
| Oceania; Near & Middle East; North & Central America; Europe | 7,800 yen  | 4,400 yen |
| Africa; South America  | 11,000 yen | 5,600 yen |

Please contact the IEICE Membership Section: E-mail: [member@ieice.org](mailto:member@ieice.org) FAX: +81 3 3433 6659 **Please fill out the application form printed on the reverse side of this paper.**



**IEICE-CS Overseas Membership with Special Annual Fees  
for Sister Society Members**

To foster the cooperation between the Sister Society and the IEICE Communications Society (IEICE-CS), the Sister Society agreement enables members of each institution to become members of both societies by granting special annual fees.

A 10% - 20% discount\* of the annual fees will be granted to the sister society members to become the IEICE-CS overseas members. The discounted fees will be applied for the individual members when the new membership is starting or the current membership is renewing. The details of this discount can be found in the following IEICE-CS Web page:

URL [http://www.ieice.org/cs/member/sister\\_society.html](http://www.ieice.org/cs/member/sister_society.html)

\* The discount does not apply to the optional items and services i.e. “Additional Society”, “Additional Transactions of paper version” and “Rapid Mailing Service”.

----- Please send the following Sister Society membership information, together with membership application form in the next page. -----

**Sister Society membership information**

***To apply discount rates for this IEICE-CS Sister Society member’s application, please indicate your Sister Society Membership number below, and attach a copy of your Sister Society Membership certificate or card to this form.***

Sister Society:     IEEE ComSoc         KICS         VDE-ITG

Membership number (Member): \_\_\_\_\_

Copy of Membership certificate or Membership card:

(Attached here)

# IEICE Overseas Membership Application Form for IEICE-CS Sister Society Members

URL <http://www.ieice.org/eng/member/OM-appli.html> E-mail [member@ieice.org](mailto:member@ieice.org) FAX +81-3-3433-6659

◆ **Please type or print in English. The deadline for submitting application form is the 1<sup>st</sup> day of every month.**

## Personal Information

Full name: \_\_\_\_\_ Nationality: \_\_\_\_\_  Male  
First name Middle name Last name  Female

Prof.  Dr.  Mr.  Ms. Place of birth: \_\_\_\_\_ Date of birth: \_\_\_\_\_  
Day Month Year

## Mailing Address

Home  Office

\_\_\_\_\_  
Name of Company/School/College Department/Section

\_\_\_\_\_  
Street City State/Province

\_\_\_\_\_  
Postal code Country

\_\_\_\_\_  
TEL FAX E-mail

## Academic Background

The highest academic degree:  Ph.D.  Masters  Bachelors  Others: \_\_\_\_\_

\_\_\_\_\_  
University/college/school of the highest academic degree Month & year of graduation

## Application Information

**Membership:** I want to apply for the following membership\*:

- Member  Member (including Japanese Journal subscription)  
 Student Member  Student Member (including Japanese Journal subscription)  
 \*Membership applies only to applicant who reside outside of Japan and who have non-Japanese citizenship.  
 ◆ If you want to apply for OMDP (Overseas Membership Development Program), please check;  OMDP

**Society registration (Membership fee\*\* includes one Society of Transaction of Online version.):**

B: Communications

\*\*Discount rate (see the URL below) is applied to this IEICE-CS Sister Society Member's application.

URL [http://www.ieice.org/cs/member/sister\\_society.html](http://www.ieice.org/cs/member/sister_society.html)

----- Discount rate is not applied for the following optional items. -----

**Additional Society (optional):**  A: Engineering Sciences  C: Electronics  D: Information and Systems

**Additional Transactions of paper version (optional):**

- EA: Fundamentals  EB: Communications  EC: Electronics  ED: Information and Systems  
 A: Fundamentals (Japanese)  B: Communications (Japanese)  C: Electronics (Japanese)  D: Information and Systems (Japanese)

## Remittance

Remittance is available only in **Japanese yen** by a **credit card**.

Admission charge.....¥ \_\_\_\_\_ Journal subscription (optional).....¥ \_\_\_\_\_  
 Annual charge..... ¥ \_\_\_\_\_ Mailing option:  Air mail.....¥ \_\_\_\_\_  
 Additional Society (optional) ..... ¥ \_\_\_\_\_  SAL mail.....¥ \_\_\_\_\_  
 Additional Transactions (optional).....¥ \_\_\_\_\_ **Total.....¥ \_\_\_\_\_**

Credit Card:  UC  Master Card  VISA  JCB  American Express

Card number:

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Expiry date: \_\_\_\_\_ / \_\_\_\_\_ Credit Card Holder: \_\_\_\_\_ Signature: \_\_\_\_\_  
Year Month

## Endorsement

The following endorsement for this Sister Society member's application will be given by an IEICE-CS director (any related action of endorsement by applicant is not necessary if a copy of your Sister Society Membership certificate or card is indicated).

I recommend this applicant for IEICE membership.

(Director of Planning and Member Activities, IEICE-CS)

\_\_\_\_\_  
Endorser's name Membership number Endorser's signature Date

## IEICE Communications Society - GLOBAL NEWSLETTER Submission Guideline

First version in only Japanese: May 30, 2008

Second version in only Japanese: Feb. 13, 2009

Third version in only Japanese: Jul. 22, 2010

Forth version in English and Japanese: Mar. 8, 2011

### 1. About GLOBAL NEWSLETTER

The Institute of Electronics, Information and Communication Engineers Communications Society (IEICE-CS) GLOBAL NEWSLETTER has been established since 2002. We quarterly publish an English newsletter every March, June, September, and December.

#### 1.1. Goal

Our goal is to share information between overseas/foreign members and other members in IEICE-CS as a global activity, and to show IEICE presence internationally.

#### 1.2 Articles

This newsletter includes many articles such as messages from IEICE-CS President/Vice President, IEICE-CS activities, IEICE-CS sponsored conferences reports, essays, laboratory activity reports, technology reports, messages from overseas/foreign members, call for paper/participation, and etc.

##### 1) Messages from President/Vice President

- An inaugural message from CS President is published once per year in June. That from CS Vice President is published properly.

##### 2) IEICE-CS activities now

- IEICE General/Society Conference participation/reports
- Technical committee reports
- International activities on society

##### 3) IEICE-CS Sponsored Conferences Report

- IEICE-CS sponsored/co-sponsored/technically cosponsored/cooperated conferences reports

- IEICE-CS Conferences Calendar (\*)

##### 4) Others

- Essays, Laboratory activity reports, Technology reports, Messages from overseas/foreign members, etc.
- Information from Sister Societies
- Special topics (\*)

##### 5) IEICE Information

- Call for papers
- From editor's desk (\*)

\*: planned / written by IEICE-CS Directors, Planning and Members Activities

### 2. Major notes for contribution

Basically welcome IEICE-CS members and readers to contribute newsletters. IEICE-CS Directors, Planning and Members Activities can ask them to contribute newsletters as special topics. The content should be fruitful and profitable for IEICE-CS members, **NOT** for particular organization.

#### 2.1 Newsletter format

Please use a sample format in English for your newsletter.

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

## 2.2 Number of pages

Two to four pages are preferable. One page is also acceptable, and the maximum number of pages is eight. When you try to entry a contribution with five to eight pages, you need to negotiate with IEICE-CS Directors, Planning and Members Activities.

## 3. Copyright

This signed statement must be received by the IEICE when your manuscript is first submitted to an IEICE publication. By signing this statement, the author(s) are agreeing to be bound by the IEICE Provisions on Copyright. Please see a web site related to IEICE provisions on copyright.

<http://www.ieice.org/eng/about/copyright.html>

## 4. Publication fee / Manuscript fee

No publication fee and no manuscript fee for all articles.

## 5. Schedule

Main schedule (deadline)

|                                    |                            |                            |                            |                             |
|------------------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|
| Publication date                   | 1 <sup>st</sup> , Mar.     | 1 <sup>st</sup> , Jun.     | 1 <sup>st</sup> , Sept.    | 1 <sup>st</sup> , Dec.      |
| Call for newsletter                | 1 <sup>st</sup> Fri., Dec. | 1 <sup>st</sup> Fri., Mar. | 1 <sup>st</sup> Fri., Jun. | 1 <sup>st</sup> Fri., Sept. |
| Contribution entry                 | 4 <sup>th</sup> Fri., Dec. | 4 <sup>th</sup> Fri., Mar. | 4 <sup>th</sup> Fri., Jun. | 4 <sup>th</sup> Fri., Sept. |
| Submission of Manuscript/Copyright | 3 <sup>rd</sup> Fri., Jan. | 3 <sup>rd</sup> Fri., Apr. | 3 <sup>rd</sup> Fri., Jul. | 3 <sup>rd</sup> Fri., Oct.  |

### 5.1 Call for newsletters

IEICE-CS Directors, Planning and Members Activities will give you the information on call for newsletters.

### 5.2 Contribution entry

You should send **information on title, summary and number of page** to IEICE-CS Directors, Planning and Members Activities by e-mail.

E-mail: [cs-gnl@mail.ieice.org](mailto:cs-gnl@mail.ieice.org)

### 5.3 Submission of Manuscript and COPYRIGHT TRANSFER

You can download formats from the Internet.

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

You should send a manuscript [word file and pdf] and COPYRIGHT TRANSFER FORM [including signature, pdf] to IEICE-CS Directors, Planning and Members Activities by e-mail.

E-mail: [cs-gnl@mail.ieice.org](mailto:cs-gnl@mail.ieice.org)

If you cannot send IEICE-CS Directors COPYRIGHT TRANSFER by e-mail, you can send it to IEICE-CS office by facsimile or mail.

Name: IEICE-CS Office

Address: Kikai-Shinko-Kaikan Bldg., 103, 5-8, Shibakoen 3 chome, Minato-ku, Tokyo,  
105-0011 Japan

Facsimile: +81-3-3433-6616, Phone: +81-3-3433-6692

Contact point: IEICE-CS Directors, Planning and Members Activities in charge of  
IEICE CS - GLOBAL NEWSLETTER, [cs-gnl@mail.ieice.org](mailto:cs-gnl@mail.ieice.org) (End of document)

## From Editor's Desk

### ● As a New Editorial Staff Member

I newly joined the editorial staff member in May this year and this is the first GLOBAL NEWSLETTER issue that I fully involved in the editing. I could not do this task without number of guidance from the other member and cooperation of authors of every article. All authors very kindly cooperated with any request from us and did the best to meet the deadline, which may not be the case in general. Being one of precious English channels in IEICE-CS, GLOBAL NEWSLETTER has to deliver as useful information as possible especially for non-Japanese-speaking readers or readers in overseas. One of new things on this issue is the inclusion of Special Section Calendar of IEICE Transactions on Communications. As a new editorial staff member, I am feeling I can do my best to make it even better.

IEICE GLOBAL NEWSLETTER Editorial Staff

#### Editorial Staff of this issue

No special order is observed



**Michiharu NAKAMURA**

Fujitsu Laboratories, Ltd.

Network Systems Laboratories

*Director, Planning and Member Activities, IEICE Communications Society*



**Fumio FUTAMI**

Tamagawa University

Quantum ICT Research Institute

*Director, Planning and Member Activities, IEICE Communications Society*



**Takao NAITO**

Fujitsu Laboratories, Ltd.

Network Systems Laboratories

*IEICE-CS Director-International Publication*

## Call for Papers

### ----- Special Section on Heterogeneous Networks for Future Cellular Systems -----

The IEICE Transactions on Communications announces that it will publish a special section entitled “Special Section on Heterogeneous Networks for Future Cellular Systems” in **June 2013**.

With the increase in data traffic driven by a new generation of wireless devices, the demand for data rates has been increasing exponentially, especially in hot spots and indoor environments. To accommodate such a significant data traffic in a cost-effective manner, there has been an increasing interest to a *heterogeneous network*, in which relays, distributed antennas, picocells, and femtocells are deployed upon the conventional macro cellular networks. Heterogeneous networks inspire new wireless communications and signal processing challenges in the design of cellular systems. They introduce additional interference that can be coordinated, avoided, canceled, or managed in some other way by signal processing algorithms. In many settings, heterogeneous networks will require development of decentralized algorithms and autonomous operation of the nodes, because of the delays and overhead in the backhaul connections between the nodes. Therefore, a special section is being planned (scheduled to appear in the June 2013 issue) to further promote research and development of this area.

#### 1. Scope

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

- Downlink and uplink PHY/MAC scheme/design of heterogeneous networks
- Interference coordination, avoidance, and mitigation for heterogeneous networks
- Decentralized resource allocation and power control algorithms for heterogeneous networks
- Restricted access, open-access, and hybrid access femtocells/picocells
- Relaying transmission for heterogeneous networks
- Energy efficient algorithms for heterogeneous networks
- Mobility support, cell selection, and handover for heterogeneous networks
- Self organizing networks for heterogeneous networks

#### 2. Submission Instructions

The standard number of pages is 8 (Letter submissions are not accepted). 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, [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html). The term 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. Prospective authors are requested to follow carefully the submission process described below.

1. Submit a manuscript and electronic source files (TeX/Word files, figures, authors' photos and biographies) via the IEICE Web site: [https://review.ieice.org/regist\\_e.aspx](https://review.ieice.org/regist_e.aspx) by **October 12, 2012 (Japan Time)**. Authors should choose the [Special-EB] Heterogeneous Networks for Future Cellular Systems as a “Type of Issue (Section)/Category of Transactions” on the online screen. **Do not choose [Regular-EB]**.
2. Send “Copyright Transfer and Page Charge Agreement” and “Confirmation Sheet of Manuscript Registration” by E-mail, FAX or postal mail to the following address (guest editor of the special section) by the above due date. We may withdraw the submission if these documents have not been received by the due date, even if the manuscript has been received by electronic submission. For additional guidelines on manuscript preparation, please visit: [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html).

Send the above documents to:

**Name: Satoshi Suyama**

**Institute: Department of Communications and Integrated Systems, Tokyo Institute of Technology**

**Address: S3-49, 2-12-1, O-okayama, Meguro-ku, Tokyo, 152-8550, Japan**

**Tel: +81-3-5734-3770, Fax: +81-3-5734-3770, Email: rcs\_ac-hetnet@mail.ieice.org**

#### 3. Special Section Editorial Committee

Guest Editor-in-Chief: Kenichi Higuchi (Tokyo Univ. of Science)

Guest Editors: Tony Q.S. Quek (Inst. for Infocomm Research), Satoshi Suyama (Tokyo Institute of Tech.)

Guest Associate Editors: Tsuguhide Aoki (Toshiba), Takahiro Asai (NTT DoCoMo), Naoto Ishii (NEC), Shinsuke Ibi (Osaka Univ.), Eiji Okamoto (Nagoya Institute of Tech.), Satoshi Konishi (KDDI R&D Lab.), Osamu Takyu (Shinshu Univ.), Masayuki Hoshino (Panasonic), Manabu Mikami (Softbank Mobile), Koji Yamamoto (Kyoto Univ.), Wenyi Zhang (Univ. of Science and Tech. of China), Hung-Yu Wei (National Taiwan Univ.), Wei Peng (Tohoku Univ.)

\* Please note that if the submitted paper is accepted, all authors, including authors of invited papers, are requested to pay for the page charges covering partial cost of publications. Authors will receive 50 reprints.

\* 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: <http://www.ieice.org/eng/member/OM-appli.html>.

## Call for Papers

### ----- Special Section on Internet Architectures, Protocols, and Management Methods that Enable Sustainable Development -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Internet Architectures, Protocols, and Management Methods that Enable Sustainable Development" in **July 2013**.

The Internet has become an indispensable communication infrastructure. Currently, migration from IPv4 to IPv6 is strongly required due to exhaustion of IPv4 addresses. However, such a migration is not adequate to solve the problems the current Internet has and to support future demands; we must make the Internet sustainably evolvable. One of research trends called "clean slate approach" has attracted considerable attention since 2006, in which the Internet is redesigned based on new concepts. As a result, some new concepts, e.g., information centric networking and software-defined networking, are proposed. A huge number of sensor nodes connected to the Internet will make the Internet larger and more complex. This requires new routing technologies and traffic control technologies. Since cloud computing and grid computing will become more popular, new security technologies for such an environment are also required. In addition, new network management schemes for large and complex networks are necessary. We thus call for publications (scheduled to appear in the July 2013 issue) for promoting discussion and development of the Internet architectures, protocols, and management methods for sustainable development.

#### 1. Scope

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

- \* Architectures and protocols for new generation Internet
  - new paradigms for new generation Internet, e.g., information centric networking, delay tolerant networking, and software-defined networking
  - routing and traffic control technologies for ultra-large and complex networks, e.g., P2P networks and Internet-of-Things.
  - security technologies for multi-domain environment, e.g., authentication, authorization and accounting mechanisms for cloud/grid computing, intrusion detection, and prevention against DDOS.
- \* Network management methods and operation experiences for new generation Internet
  - network management methods based on new schemes, e.g., ontology and cross-layer collaboration.
  - guidelines according to trustworthiness, quality evaluation methods, and services
- \* Other technologies for new generation Internet
  - mobility support mechanisms
  - scalable QoS support mechanisms
  - etc.

#### 2. Submission Instructions

The standard number of pages is 8. Submissions of "letters" are not permitted. 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, [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html). The term 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. Prospective authors are requested to follow carefully the submission process described below.

1. Submit a manuscript and electronic source files (TeX/Word files, figures, authors' photos and biography) via the IEICE Web site [https://review.ieice.org/regist\\_e.aspx](https://review.ieice.org/regist_e.aspx) by **Nov. 7, 2012**. Authors should choose the [Special-EB] Internet Architectures, Protocols, and Management Methods that Enable Sustainable Development as a "Type of Section (Issue)/ Transactions" on the online screen. Do not choose [Regular-EB].
2. Send "Copyright Transfer and Page Charge Agreement" and "Confirmation Sheet of Manuscript Registration" by E-mail, FAX or postal mail to the following address (guest editor of the special section) by the above due date. We may withdraw the submission if these documents have not been received by the due date, even if the manuscript has been received by electronic submission. For additional guidelines on manuscript preparation, please visit: [http://www.ieice.org/eng/shiori/mokuji\\_cs.html](http://www.ieice.org/eng/shiori/mokuji_cs.html)

**Send the above documents to: Toyokazu Akiyama**  
**Faculty of Computer Science and Engineering, Kyoto Sangyo University**  
**Address: Kamigamomotoyama, Kita-ku, Kyoto-city, Kyoto 603-8555, JAPAN**  
**Tel: +81-75-705-1531, Fax: +81-75-705-1531, Email: ia-eb-1307-submit@inl.ics.keio.ac.jp**

#### 3. Special Section Editorial Committee

**Guest Editor-in-Chief:** Fumio Teraoka (Keio Univ.)

**Guest Editors:** Keiichi Shima (IJJ-II), Toyokazu Akiyama (Kyoto Sangyo Univ.)

**Guest Associate Editors:** Osamu Akashi (NTT Network Innovation Lab.), Katsuyoshi Iida (Tokyo Inst. of Tech.), Shingo Ichii (Univ. of Tokyo), Masashi Eto (NICT), Kunitake Kaneko (Keio Univ.), Tohru Kondo (Hiroshima Univ.), Masato Tsuru (Kyusyu Inst. of Tech.), Teruyuki Hasegawa (KDDI R&D Lab.), Kazutoshi Fujikawa (NAIST), Masaki Minami (Komazawa Univ.)

\* Please note that if the submitted paper is accepted, all authors, including authors of invited papers, are requested to pay for the page charges covering partial cost of publications. Authors will receive 50 reprints.

\* 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 <http://www.ieice.org/eng/member/OM-appli.html>



# EMTS 2013

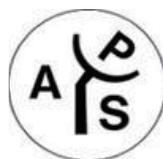


## First Call for Papers

### URSI Commission B

## 2013 International Symposium on Electromagnetic Theory Hiroshima, Japan May 20-24, 2013

[www.ursi-emts2013.org](http://www.ursi-emts2013.org)



### General Information

The "2013 International Symposium on Electromagnetic Theory" (EMTS 2013) is organized by Commission B (Fields and Waves) of the International Union of Radio Science (URSI) and the Electronics Society of The Institute of Electronics, Information and Communication Engineers (IEICE). It will be held May 20-24, 2013 in Hiroshima, Japan. Its scope covers all areas of electromagnetic theory and its applications. The working language of the Symposium is English.

### Sponsorships

This Symposium is sponsored by:

URSI Commission B  
IEICE Electronics Society

Technically sponsored by:

International Union of Radio Science (URSI)  
IEEE Antennas and Propagation Society (AP-S)  
IEICE Communication Society

In cooperation with:

The Institute of Electrical Engineering of Japan  
(IEEJ)

### Location

Hiroshima is a center of peace, industry and culture in Western Japan. Hiroshima is also a beautiful city, facing the scenic Seto Inland Sea with its spectacular array of islands, surrounded by green mountains, and with six pure rivers flowing right through town. Visitors will find various museums, cultural facilities, nice hotels and sightseeing spots near the symposium venue. Hiroshima possesses two World Heritage sites, the Atomic Bomb Dome and the Itsukushima Shrine on the island of Miyajima. Hiroshima is an easy place to visit from all over the world as well as from inside Japan, being fully accessible by air, land and sea.

### Venue

International Conference Center Hiroshima  
1-5, Nakajima-cho, Naka-ku, Hiroshima, Japan  
URL:  
<http://www.pcf.city.hiroshima.jp/icch/english.html>

### Schedule

|                 |  |
|-----------------|--|
| June, 2012      | Final Call for Papers  |
| Nov. 1, 2012    | Deadline for receipt of YSA papers   |
| Nov. 15, 2012   | Deadline for receipt of papers   |
| Jan. 15, 2013   | Notification of authors regarding acceptance of papers, notification of YSA applicants |
| Mar. 15, 2013   | Deadline for pre-registration of authors   |
| April 30, 2013  | Deadline for pre-registration of participants  |
| May 20, 2013    | URSI Commission B School for Young Scientists  |
| May 20-24, 2013 | Symposium  |

### Young Scientist Awards

Young Scientist Awards (YSA) have been planned for young scientists. For details, visit the website.

### Suggested Topics

Contributions concerning all aspects of electromagnetic theory and its applications are welcome. Novel and innovative contributions are particularly appreciated. Special topics will also be announced in the Final Call for Papers in addition to the following list.

- New basic theoretical developments
- Scattering and diffraction
- Inverse scattering and imaging
- Time domain methods
- High-frequency methods
- Guided waves
- Solutions to canonical problems
- Propagation and scattering in layered structures
- Random media and rough surfaces
- Metamaterials and complex media
- Beam and pulse propagation and scattering in lossy and/or dispersive media
- Non-linear phenomena

- Antennas: general aspects
- Antenna arrays, planar and conformal
- Numerical methods: general aspects
- Numerical methods for integral and differential equations
- Hybrid methods
- Interaction of EM waves with biological tissues
- EM theory and applications for radio systems
- Antennas and propagation for communication systems:
- Smart antennas, UWB systems, etc.
- Mathematical modeling of EM problems

### Session Proposals

Proposals of novel topics, special sessions as well as session organization are welcome. Send the proposal as soon as possible to:

E-mail: [g.manara@iet.unipi.it](mailto:g.manara@iet.unipi.it)

### Submission and Further Information

The instructions for the submission of papers and the updated information on the Symposium will be available in the Final Call for Papers and on the conference Web site. Copyrights of all accepted papers are to be transferred to the IEICE.

All accepted and presented papers will be available through IEEE Xplore.

### URSI Commission B School for Young Scientists

The "URSI Commission B School for Young Scientists" will be organized for the first time at EMTS 2013 in Hiroshima. In this one-day school, a series of lectures will be delivered by leading scientists in the Commission B community and young scientists are encouraged to learn the fundamentals and future directions in the area of electromagnetic theory. Details will be announced later.

### Conference Contacts

#### General questions and technical program:

Chair, Conference and Commission B of URSI  
Prof. Giuliano Manara  
Department of Information Engineering,  
University of Pisa, Italy  
E-mail: [g.manara@iet.unipi.it](mailto:g.manara@iet.unipi.it)

#### Questions regarding local arrangements:

Co-Chairs, Local Organizing Committee  
Prof. Makoto Ando  
Dept. of Electrical and Electronics Engineering  
Tokyo Institute of Technology, Japan  
E-mail: [mando@antenna.ee.titech.ac.jp](mailto:mando@antenna.ee.titech.ac.jp)  
Prof. Tsuneki Yamasaki  
College of Science and Technology  
Dept. of Electrical Engineering  
Nihon University, Japan  
E-mail: [yamasaki@ele.cst.nihon-u.ac.jp](mailto:yamasaki@ele.cst.nihon-u.ac.jp)

#### EMTS 2013 Japan Secretariat:

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3F Sun-Arch Bldg., 3-1 Nemoto, Matsudo,  
Chiba 271-0077, Japan  
Tel: +81-47-361-6030, Fax: +81-47-308-5272  
E-mail: [secretariat@ursi-emts2013.org](mailto:secretariat@ursi-emts2013.org)