

CONFERENCE ABSTRACTS



2022 4th International Conference on Computer Communication and the Internet

Chiba, Japan

July 1-3, 2022 Japan Time (GMT+9)

Acknowledgements

Co-sponsored by



Non-Sponsor Supported by



Patrons:



About ICCCI

The first IEEE ICCCI was sponsored by IEEE and Central China Normal University, P.R.China, which was held in the beautiful and historical city Wuhan in 2016. The second and the third ICCCI were successfully held as a virtual conference owing to COVID-19. The conference proceedings of the previous ICCCI were included in IEEE Xplore and indexed by Ei & Scopus. ICCCI 2022, the 4th ICCCI, serves to foster communication among researchers, engineers and relevant practitioners with a common interest of researching in the broad areas of computer communications and Internet, developing scientific and technological innovations in these areas. The primary focus of the conference is on new and original research results in the areas of theoretical findings, design, implementation, and applications of computer communications and Internet.

Contents Index

I	WELCOME MESSAGE	2	VI	DAILY SCHEDULE	7
II	COMMITTEE	3-4	VII	KEYNOTE SPEECHES & SPEAKERS PROFILE	8-10
III	OVERALL AGENDA	5	VIII	INVITED SPEECHES & SPEAKERS PROFILE	11-12
V	GUIDELINE & TIPS	6	IX	ORAL SESSIONS	13-31
				Session 1	13
				Session 2	16
				Session 3	20
				Session 4	24
				Session 5	29

Welcome Message

You are immensely welcome to attend the 4th International Conference on Computer Communication and the Internet (ICCCI 2022). The conference focuses on the trending, highly popular, but exciting and extremely challenging areas from our keynote speakers of leading scientists and a variety of authors around the world. The outcome of our deliberations will play a crucial role in progress achieved in these areas. Due to the Covid-19, the organizing committee of ICCCI 2022 decided that this event will be held as a hybrid conference.

The conference brings together researchers looking for opportunities for conversations that cross the traditional discipline boundaries and allows them to resolve multidisciplinary challenging problems. It is the clear intent of the conference to offer excellent mentoring opportunities to participants. Through this hybrid platform, we trust that you will be able to share the state-of-the-art developments and the cutting-edge technologies in these broad areas.

We have the conference for three days. There will be 5 sessions (one onsite and four online), 3 keynote speeches and 2 invited speeches.

Special thanks are extended to our colleagues in program committee for their thorough reviews of all the submissions, which are vital to the success of the conference, and also to the members in the organizing committee and the volunteers who had dedicated their time and efforts in planning, promoting, organizing and helping the conference. Last but not least, our special thanks go to speakers as well as all the authors for contributing their latest researches to the conference.

In closing, we thank you for participating in ICCCI 2022 and we hope you enjoy the next three days.

Conference Chairs

Professor Shinji Sugawara

Chiba Institute of Technology, Japan

Professor Yutaka Ishibashi

Nagoya Institute of Technology, Japan

Organizing Committee



Conference Chairs

Shinji Sugawara

Chiba Institute of Technology,
Japan



Yutaka Ishibashi

Nagoya Institute of Technology,
Japan



Publicity Chairs

Takanori Miyoshi

Nagaoka University of Technology,
Japan



TPC Chairs

Chih-Yu Wen

National Chung Hsing University,
Taiwan



Chih-Peng Fan

National Chung Hsing University,
Taiwan



Kiyoshi Ueda

Nihon University,
Japan



Yu-Cheng Fan

National Taipei University of Technology,
Taiwan



Hiroshi Fujinoki

Southern Illinois University Edwardsville,
USA



Local Chair

Akihiro Fujihara

Chiba Institute of Technology,
Japan



Special Session Chairs

Tomio Goto

Nagoya Institute of Technology,
Japan



Pingguo Huang

Gifu Shotoku Gakuen University,
Japan

Technical Program Committee

Masaki Aida, Japan	Yinman Lee, Taiwan
Mohammad Ahmed Alomari, Malaysia	Ming Li, USA
Abdelfattah Amamra, USA	Tsung-Jung Liu, Taiwan
Abdullah Aydeger, USA	Muhammad Tariq Mahmood, South Korea
Jordi Mongay Batalla, Poland	Ericsson Santana Marin, USA
Riccardo Bettati, USA	Kenichi Matsui, Japan
Anthony Bianchi, USA	Melody Moh, USA
Rajendra V. Boppana, USA	Islam Mohammad, USA
Roy H Campbell, USA	VP Nguyen, USA
Lin-Huang Chang, Taiwan	Daiki Nobayashi, Japan
Elizabeth D Diaz, USA	Hitoshi Ohnishi, Japan
Yuichi Fujino, Japan	Chikara Ohta, Japan
Norihiro Fukumoto, Japan	Habeeb Olufowobi, USA
Nobuo Funabiki, Japan	Win Pa Pa, Yangon
Kouichi Genda, Japan	Wuxu Peng, USA
Sotirios Goudos, Greece	Graciela Perera, USA
Jiang Guo, USA	Katerina Potika, USA
Khondker Shajadul Hasan, USA	Jihad Qaddour, USA
Naohira Hayashibara, Japan	Heena Rathore, USA
Minchuan Huang, China	Kosuke Sanada, Japan
Takashi Ikebe, Japan	Navrati Saxena, USA
Takeshi Ikenaga, Japan	Hongchi Shi, USA
Miyuki Imada, Japan	Kohei Shiimoto, Japan
Satoshi Imai, Japan	Radu Stoleru, USA
Nobuhiro Inuzuka, Japan	Hiroshi Sunaga, Japan
Genya Ishigaki, USA	Tomokazu Takahashi, Japan
Wout Joseph, Belgium	Chisa Takano, Japan
Masaru Kamada, Japan	Sajedul Talukder, USA
Shohei Kamamura, Japan	Masato Tsuru, Japan
Yasunori Kawai, Ishikawa College, Japan	Tsang-Yi Wang, Taiwan
Ahmed Ezzeldin Khaled, USA	Jingyi Wang, USA
Kazuhiro Kikuma, Japan	Wei Wang, USA
Yeongkwun Kim, USA	You-Chiun Wang, Taiwan
Kazuyuki Kojima, Japan	Shaoen Wu, USA
Turgay Korkmaz, USA	Hailu Xu, USA
Bernard Ku, USA	Taku Yamazaki, Japan
Shiann-Rong Kuang, Taiwan	Shingchern You, Taiwan
Yaw-Wen Kuo, Taiwan	David Zeichick, USA
Palden Lama, USA	

Overall Agenda

Day 1 July 1, 2022 Friday (Online)	
10:30-16:00	ZOOM Test
Day 2 July 2, 2022 Saturday (Hybrid)	
9:20-9:50	Onsite Registration (Sign-in and materials pick-up)
10:00-15:10	Opening Remarks, Keynote and Invited Speeches
15:30-17:00	Session 1
Day 3 July 3, 2022 Sunday (Online)	
10:00-15:45	Sessions 2-5
16:20-16:40	Closing & Awarding Ceremony

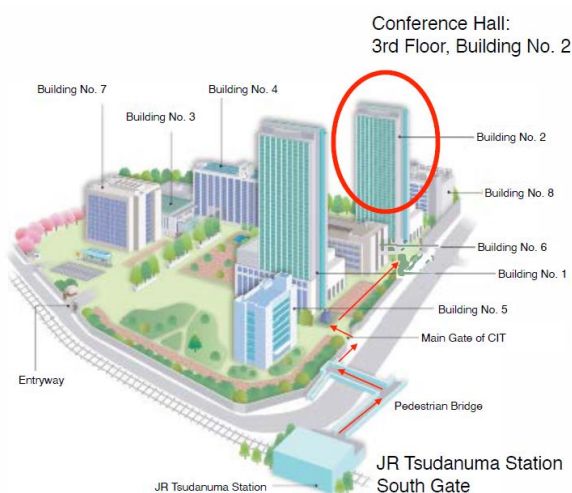
Sessions at a Glance		
Session 1: Computer and Control System	Session 2: Advanced Image Processing	
C054 C013 C019-A C009-A S0001 C034	C010 C020 C051 C0005 C031 C039-A C056	
Session 3: Wireless Communication and Mobile Network	Session 4: Big Data and Machine Learning	Session 5: Advanced Systems and Applications
C014 C055 C002 C018 C1001 C050 C008 C028	C016 C032 C026 C036 C025-A C017 C015 C0007 C052	C033 C037 C041 C060 C053 C0002 C057 C0003 C035

Guideline & Tips

Onsite conference

Conference Venue

Chiba Institute of Technology (Tsudanuma Campus)
Address: 2-17-1 Tsudanuma, Narashino, Chiba 275-0016, Japan



When you just get out of the south gate of JR Tsudanuma Station, you can see twin buildings of CIT.

Conference Hall is located on the 3rd floor of the Building No. 2.

Important Notes

- Please take care of your belongings during the conference. The conference organizer does not assume any responsibility for the loss of personal belongings of the participants.
- Accommodation is not provided for authors. Delegates are suggested make early reservation.
- For epidemic prevention and control, please wear a mask during the conference.

Recommended Hotel

JR-EAST Hotel Mets Tsudanuma

Website: <https://www.hotelmets.jp/en/tsudanuma/>

Online conference

Time Zone

Japan Time (GMT+9)

Platform: ZOOM

ZOOM, Download link:

- ◆ <https://zoom.us/download>
- ◆ <https://zoom.com.cn/download> (for Chinese authors)

Equipment Needed

- A computer with internet connection and camera
- Headphone/earphone

Environment Needed

- A quiet place
- Stable internet connection
- Proper lighting and background

Name

- Name yourself with your paper ID + Name
- Example: C001+Mary

Oral Presentation

- Timing: a maximum of **15 minutes** in total, including 3 minutes for Q&A.
- It is suggested that the presenter email a copy of his/her video presentation to the conference email box as a backup.

*Conference Recording

The whole conference will be recorded. We appreciate you proper behavior and appearance

Daily Schedule

Day 1 July 1, 2022 Friday (Online)		
10:30-11:30	ZOOM Test for Session 2-3	ZOOM ID: 857 2994 8737
	ZOOM Test for Session 4-5	ZOOM ID: 861 7606 2169
15:00-16:00	ZOOM Test for Keynote/Invited Speakers, Session Chairs	ZOOM ID: 857 2994 8737
Day 2 July 2, 2022 Saturday (Hybrid)		
Meeting Room: Conference Hall, 3rd floor, Building No. 2.		ZOOM ID: 857 2994 8737
9:20-9:50	Onsite Registration (Sign-in and materials pick-up)	
10:00-10:05	Welcome Address: Prof. Shinji Sugawara, Chiba Institute of Technology, Japan	
10:05-10:10	Opening Remarks: Prof. Yutaka Ishibashi, Nagoya Institute of Technology, Japan	
10:10-10:50	Keynote Speech I: FILS15.4: Fingerprint-based Indoor Localization System Using IEEE 802.15.4 Prof. Nobuo Funabiki, Okayama University, Japan	
10:50-11:10	Coffee Break & Group Photo	
11:10-11:50	Keynote Speech II: Modelling of Terahertz Antenna and Propagation Characteristics for Beyond 5G Mobile Communication Prof. Akihiko Hirata, Chiba Institute of Technology, Japan	
11:50-13:50	Lunch Break	
13:50-14:30	Keynote Speech III: New Applications with Flexible Color Electronic Papers Prof. Wen-Chung Kao, IEEE Fellow, National Taiwan Normal University, Taiwan (Online)	
14:30-14:50	Invited Speech I: Harmonization of Competition and Cooperation in Consensus Algorithm: Toward a Solution to the Blockchain Scalability Problem Prof. Akihiro Fujihara, Chiba Institute of Technology, Japan	
14:50-15:10	Invited Speech II: 6G-Enabled Massive Internet of Things Prof. Kostas E. Psannis, University of Macedonia, Greece (Online)	
15:10-15:30	Coffee Break	
15:30-17:00	Session 1: Computer and Control System	
Day 3 July 3, 2022 Sunday (Online)		
10:00-12:00	Session 2: Advanced Image Processing	ZOOM ID: 857 2994 8737
	Session 3: Wireless Communication and Mobile Network	ZOOM ID: 861 7606 2169
12:00-13:30	Break	
13:30-15:45	Session 4: Big Data and Machine Learning	ZOOM ID: 857 2994 8737
	Session 5: Advanced Systems and Applications	ZOOM ID: 861 7606 2169
15:45-16:20	Break	
16:20-16:40	Closing & Awarding Ceremony	ZOOM ID: 857 2994 8737

Keynote Speech I

Day 2-July 2

ZOOM ID: 857 2994 8737 (<https://us02web.zoom.us/j/85729948737>)

Speaker



Prof. Nobuo Funabiki
Chiba Institute of
Technology, Japan



10:10-10:50

Short Bio: Nobuo Funabiki received the B.S. and Ph.D. degrees in mathematical engineering and information physics from The University of Tokyo, Japan, in 1984 and 1993, respectively, and the M.S. degree in electrical engineering from Case Western Reserve University, USA, in 1991. From 1984 to 1994, he was with the System Engineering Division, Sumitomo Metal Industries, Ltd., Japan. In 1994, he joined the Department of Information and Computer Sciences, Osaka University, Japan, as an Assistant Professor, and became an Associate Professor in 1995. He was a Visiting Researcher with the University of California, Santa Barbara, from 2000 to 2001. In 2001, he was a Professor with the Department of Communication Network Engineering (currently, Department of Electrical and Communication Engineering), Okayama University. His research interests include computer networks, optimization algorithms, educational technology, and Web technology.

"FILS15.4: Fingerprint-based Indoor Localization System Using IEEE 802.15.4"

Abstract: Nowadays, the Indoor Localization System (ILS) has gained a lot of interests for offering location-based services in indoor environments. Although the Global Positioning System (GPS) has been established for outdoor location-based services, it may fail to cover indoor fields that have multiple floors and many rooms. Then, the Wi-Fi-based ILS has been extensively studied in literature. However, it can be uncomfortable for users because they always need to carry the devices that can be large and heavy, and have short battery lives.

Currently, we are studying FILS15.4, the Fingerprint-based Indoor Localization System using the IEEE 802.15.4 standard, to solve this drawback of the Wi-Fi-based ILS. By adopting this standard, FILS15.4 is suitable for long-time use of users by carrying small and light transmitters with long-life coin batteries. The signal fluctuation issue in the narrow-band low-power wireless communication of the IEEE 802.15.4 standard is solved by limiting the detection unit to a room or a space and adopting the fingerprint-parameter optimization tool.

For evaluations of FILS15.4, we have designed and implemented the testbed system using Mono Wireless transmitters/receivers, Raspberry Pi for data relaying devices through the Internet, a Linux PC for the server, and the message queuing telemetry transport (MQTT) protocol for data communications between the receivers and the server. Our experiment results in Okayama University campus confirm that the detection accuracy exceeds 92% in any room including moving users.

Keynote Speech II

Day 2-July 2

ZOOM ID: 857 2994 8737 (<https://us02web.zoom.us/j/85729948737>)

Speaker



Prof. Akihiko Hirata
Chiba Institute of
Technology, Japan

Short Bio: Akihiko Hirata completed his B.S. and M.S. degrees in chemistry and Dr. Eng. Degree in electrical and electronics engineering from the Tokyo University, Tokyo, Japan, in 1992, 1994, and 2007, respectively. He joined the Atsugi Electrical Communications Laboratories of Nippon Telegraph and Telephone Corporation (presently NTT Device Technology Laboratories) in Kanagawa, Japan, in 1994, where he worked as a senior research engineer and supervisor. Since 2016, he has been a professor for Chiba Institute of Technology. His current research involves terahertz passive devices, ultra-broadband terahertz wireless systems, and millimeter-wave and terahertz imaging. He was awarded the 2002 Asia-Pacific Microwave Conference APMC prize, the 2004 YRP Award, the 2007 Achievement Award presented by the Institute of Electronics, Information, and Communication Engineers (IEICE), the 2008 Maejima Award presented by the Post and Telecom Association of Japan, the 2009 Radio Achievement Award presented by the Association of Radio Industries and Businesses, the 2010 Foundation Award presented by the Hoso Bunka Foundation, the 2010, 2012, and 2013 Asia-Pacific Microwave Conference APMC prize, and the 2011 Commendation for Science and Technology from the Ministry of Education, Culture, Sports, Science and Technology. Prof. Hirata is a senior member of IEEE and IEICE.



11:10-11:50

"NTT R&D's Challenge toward Self-evolving Zero-Touch Network Operation with AI and Data analysis"

Abstract: Beyond the 5G era, network will serve as a critical social infrastructure that supports the cyber physical system with massive and diverse devices as well as service requirements. In such a situation, self-evolving zero-touch network operation with AI and data analysis will be essential to provide network functions and resources flexibly and dynamically. In addition, the key indicators of network value will expand from conventional parameters inside networks, such as throughput or latency, to the outside indicators such as user benefit or user behavior change. We introduce the concept and technologies concerning the self-evolving zero-touch and user-engagement as the direction of future network operation.

Keynote Speech III

Day 2-July 2

ZOOM ID: 857 2994 8737 (<https://us02web.zoom.us/j/85729948737>)

Speaker



Prof. Wen-Chung Kao
National Taiwan Normal
University, Taiwan

Short Bio: Prof. Wen-Chung Kao received his M.S. and Ph.D. degrees in electrical engineering from National Taiwan University, Taiwan, in 1992 and 1996, respectively. Before he joined academia in 2004, he was a Department Manager at SoC Technology Center, ITRI, Taiwan, an AVP at NuCam Corporation in Foxlink Group, and the co-founder of SiPix Technology Inc. He is currently a Chair Professor at Department of Electrical Engineering and the Dean of the College of Technology and Engineering. His current research interests include system-on-a-chip (SoC), embedded software design, flexible electronic paper, machine vision systems, and digital camera systems. Currently, he serves as President-Elect and VP of Publications in IEEE Consumer Electronics Society. He is a Fellow of IEEE.

"New Applications with Flexible Color Electronic Papers"

Abstract: The electronic paper (ePaper) made by electrophoretic display has been successfully used in e-books and other consumer products. Recently, the next generation of color electrophoretic materials has been announced. This new ePaper enables lots of new applications. However, the design of the corresponding signal processing for color ePaper is still under development. In the talk, Prof. Kao will share the latest developments in the improvements for the image quality as well as the user experience on ePaper. Finally, some possible interesting novel topics/applications for future research will be also introduced.



13:50-14:30

Invited Speech I

Day 2-July 2

ZOOM ID: 857 2994 8737 (<https://us02web.zoom.us/j/85729948737>)

Speaker



Prof. Akihiro Fujihara
Chiba Institute of
Technology, Japan

Short Bio: Akihiro Fujihara received the Ph.D. degree in science from Yokohama City University, Japan, in 2006. He was a Post-doc Researcher at Kwansei Gakuin University for seven years since 2007. In 2014, he joined Fukui University of Technology as an Associate Professor. In 2017, he joined Chiba Institute of Technology, where he is currently teaching graduate and undergraduate courses in the area of information and communication systems engineering. He is a Full Professor with the Department of Information and Communication Systems Engineering, Chiba Institute of Technology. He has authored or co-authored over 50 publications of research articles on stochastic processes, human mobility and communication behavior patterns, IoT, and blockchain. He has also been giving a number of invited talks on them. His research interests include blockchain architecture to solve the blockchain scalability problem and the use of blockchain technology in combination with AI and IoT for smart city services. He is a member of the IEEE and IEICE. He was a recipient of the COMPSAC Best Paper Award of 2014 and the International Conference on Intelligent Networking and Collaborative Systems (INCoS) Best Paper Awards of 2011 and 2018. He served on the editorial boards for the IEICE transactions on communications (EB).



14:30-14:50

"Harmonization of Competition and Cooperation in Consensus Algorithm: Toward a Solution to the Blockchain Scalability Problem"

Abstract: Since Bitcoin appeared in 2008, the word "blockchain" has been used in a variety of contexts. On the other hand, it is sometimes heard that blockchain is still not clearly defined, which may give the impression that it is a difficult technology. However, the essence of blockchain technology is not difficult to understand and does not require any knowledge of difficult mathematics or physics (except for the details of cryptography). In this talk, we show that the essence of blockchain technology does not lie in the database called blockchain, but in Internet-scale open participation of an unspecified number of nodes and consensus algorithms between them.

In blockchain systems, there is a serious problem in scalability, which is called the blockchain scalability problem. It is estimated that the transaction processing capacity of Bitcoin is only seven transactions per second at maximum. However, it is known that the credit card company VISA, whose cards are often used for payments in our daily lives, has a capacity of 56,000 transactions per second. This problem hinders innovative applications of blockchain technology, such as micropayment and blockchain for AI and IoT. By harmonizing consensus algorithms of existing distributed systems with Bitcoin's Nakamoto consensus or other variants, the blockchain scalability problem can be solved. The latest results of our theoretical consideration and experimental performance evaluation using a cross-referencing method will also be discussed.

Invited Speech II

Day 2-July 2

ZOOM ID: 857 2994 8737 (<https://us02web.zoom.us/j/85729948737>)

Speaker



**Prof. Kostas E.
Psannis**
University of
Macedonia, Greece

Short Bio: KONSTANTINOS E. PSANNIS was born and raised in Thessaloniki, Greece. He is currently Associate Professor in Communications Systems and Networking at the Department of Applied Informatics, School of Information Sciences, University of Macedonia, Greece, Director of Mobility2net Research & Development & Consulting JP-EU Lab, member of the EU-JAPAN Centre for Industrial Cooperation and Visiting Consultant Professor, Graduate School of Engineering, Nagoya Institute of Technology, Nagoya 466-8555, Japan. Konstantinos received a degree in Physics, Faculty of Sciences, from Aristotle University of Thessaloniki, Greece, and the Ph.D. degree from the School of Engineering and Design, Department of Electronic and Computer Engineering of Brunel University, London, UK. From 2001 to 2002 he was awarded the British Chevening scholarship. The Chevening Scholarships are the UK government's global scholarship programme, funded by the Foreign and Commonwealth Office (FCO) and partner organisations. The programme makes awards to outstanding scholars with leadership potential from around the world to study at universities in the UK.

"6G-Enabled Massive Internet of Things"



14:50-15:10

Abstract: As 5G wireless communication technology becomes a reality in terms of performance and implementation, the transition to 6G wireless technology emerges as a necessity to face the state-of-the art issues and limitations of current 5G systems. Massive MIMO is already providing high data rates along with spectral and energy efficiency. High multiplexing gain and beamforming capabilities also set the stage for optimal performance. IoT technology involves the dense deployment of smart sensing units that provide information in an accurate and timely manner. With the integration of Massive MIMO technology, the 6G Massive IoT introduces new challenges both from the 6G perspective such as higher frequency zone exploitation and high data rate performance as well as IoT design challenges such as latency, coverage and localization. Numerous technologies have been utilized to face the emerging issues of such massively deployed networks, such as artificial intelligence, machine learning, deep learning as well as Compressed Sensing. Compressed Sensing provides optimized performance achieving the two fold benefits of computational and implementation complexity reduction. This is realized by efficient information processing and hardware simplification. Joint consideration of the issues of efficient sensing, communication, storing and information processing could render 6G Massive IoT networks the promising technology in future communications.