

IEEE ICC 2021 Panel on “6G Network AI”

1. Title of the Panel

6G Network AI

2. Panel Organizers (names, affiliation, and contact information)

Organizer

Jianjun Wu, Huawei, wujianjun@huawei.com

Panelists

Dr. Guangyi Liu, liuguangyi@chinamobile.com

Prof. Zhishen Niu, niuzhs@tsinghua.edu.cn

Prof. Yingchang Liang, hyyang@std.uestc.edu.cn

Prof. Guangming Shi, gmsi@xidian.edu.cn

Prof. Honggang Zhang, honggangzhang@zju.edu.cn

Prof. Shuguang Cui, shuguangcui@cuhk.edu.cn

3. Motivation and Rationale of the Panel

The mobile communication system has transformed to be the fundamental infrastructure to support digital demands from all industry sectors, and 6G is envisioned to go far beyond the communication-only purpose. The next generation mobile communication system is considered to be the universal ICT infrastructure that could bring overarching perspective for all industries. With such powerful infrastructure as the innovation backbone, the goal from connected things to connected intelligence will be fulfilled. IT and CT industries are slowly merged during the previous decades. It is the time to further embrace other advanced technologies in order to provide a better and pervasive platform for industry players, and help them to enter a new digital era with unlimited possibilities for future innovation.

Based on the early 6G academic publications, organization white papers, there is coming to a consensus that 6G will treat Artificial Intelligence (AI) as the cornerstone of entire system design and has a potential capability to offer Intelligence Inclusion for our society, meaning, anyone could access AI services at anytime and anywhere. Apparently, the intelligent inclusion vision produces far-reaching influence on the corresponding network architecture design in 6G and

deserves a clean-slate rethink, which could be the key driver to invoke innovations from telecom as well as other relevant vertical sectors.

4. Technical Scope of the Panel

This panel aims to bring the discussion on the topic of 6G Network AI, which will include aspects from the technology, industry, and ecosystem challenges for future 6G connected intelligence and intelligent inclusiveness. Hopefully, it could provide forward-looking reference for future action plans and implementation in research, standards, and industry to make 6G Network AI a reality.

This panel will invite professors as well as experts from relevant industry sectors who have long experience in the field. We hope it could bring in-depth viewpoints from academic as well as enterprise players which could strike chords with the researchers and decision makers. In this context, the technical discussion is expected to share views on one or more of the following fundamental aspects of 6G Network AI during the panel:

- Concept of 6G Network AI and its enabling technologies
- 6G Network AI use cases and essential requirements
- Methodology to enable native AI support in mobile communication system (including radio access network architecture, core network architecture, etc.)
- End to end AI workflow orchestration in 6G
- Converged computation and communication to support native AI
- Data management and corresponding privacy and security consideration to support native AI
- Exploiting artificial intelligence techniques to enable use cases requiring ultra-high reliability and ultra-low latency communication (e.g. use cases in industry 4.0, V2X, etc.)
- Intelligent edge

5. Short Biography of the Organizers and Panelists



Jianjun Wu he has been working in Huawei from 2001, has been assigned multiple positions from chief engineer in shanghai R&D center to director of European research center, and from 2017 till now he is Director of the Future Network Architecture Lab and Chief of 6G Architecture, responsible for the definition /research of 6G network architecture, 5G E2E slicing solutions, standards and industry development.



Guangyi LIU, Fellow, 5G director and chief technical officer of Wireless and Device Department of China Mobile Research Institute (CMRI). He received his M.S. and Ph.D. degrees in circuits and systems from Beijing University of Posts and Telecommunications in 2000 and 2006, respectively. Since 2006, he has been working for the CMRI. Now he is leading the 6G R&D of China Mobile. He has led the 5G activities of China Mobile since 2014, including standardization, industrialization and commercialization. He has also led the world first 3D-MIMO commercialization in 2.6GHz TD-LTE with 128 antennas. He was granted an outstanding winner special award of national science and technology innovation by Chinese government in 2017 due to his distinguished contribution on TD-LTE.



Prof. Zhisheng Niu graduated from Beijing Jiaotong University, China, in 1985, and got his M.E. and D.E. degrees from Toyohashi University of Technology, Japan, in 1989 and 1992, respectively. During 1992-94, he worked for Fujitsu Laboratories Ltd., Japan, and in 1994 joined with Tsinghua University, Beijing, China, where he is now a professor at the Department of Electronic Engineering. His major research interests include queueing theory and traffic engineering, wireless communications and mobile Internet, vehicular communications and smart networking, and green communication and networks.

Dr. Niu has served as editor of IEEE Wireless Communication (2009-2013) and associate Editor-in-Chief of IEEE/CIC joint publication China Communications (2012-2016), and currently serving as Editor-in-Chief of IEEE Trans. Green Commun. & Networks (2020-2022). He received the Outstanding Young Researcher Award from Natural Science Foundation of China in 2009, Best Paper Awards from IEEE Communication Society Asia-Pacific Board in 2013 and from Journal of Communications and Information Networks (JCIN) in 2019, Distinguished Technical Achievement Recognition Award from IEEE Communications Society Green Communications and Computing Technical Committee in 2018, and Harold Sobol Award for Exemplary Service to Meetings & Conferences from IEEE Communication Society in 2019. He was selected as a distinguished lecturer of IEEE Communication Society (2012-2015) as well as IEEE Vehicular Technologies Society (2014-2018). He is a fellow of both IEEE and IEICE.



Prof. Yingchang Liang (Fellow, IEEE) is currently a Professor with the University of Electronic Science and Technology of China, Chengdu, China, where he leads the Center for Intelligent Networking and Communications and is currently the Deputy Director with the Artificial Intelligence Research Institute. He was a Professor with The University of Sydney,

NSW, Australia, a Principal Scientist and Technical Advisor with Institute for Infocomm Research, Singapore, and a Visiting Scholar with Stanford University, Stanford, CA, USA. His research interests include wireless networking and communications, cognitive radio, symbiotic networks, dynamic spectrum access, the Internet of Things, artificial intelligence, and machine learning techniques. Since 2014, he has been recognized by Thomson Reuters (now Clarivate Analytics) as a Highly Cited Researcher. He was the recipient of the Prestigious Engineering Achievement Award from The Institution of Engineers, Singapore, in 2007, the Outstanding Contribution Appreciation Award from the IEEE Standards Association, in 2011, and the Recognition Award from the IEEE Communications Society Technical Committee on Cognitive Networks, in 2018. He was also the recipient of numerous paper awards, including the IEEE Jack Neubauer Memorial Award in 2014 and the IEEE Communications Society APB Outstanding Paper Award in 2012. He is a Foreign Member of the Academia Europaea. He is the Founding Editor-in-Chief of the IEEE Journal on Selected Areas in Communications: Cognitive Radio Series, and the Key Founder and now the Editor-in-Chief of the IEEE Transactions On Cognitive Communications and Networking. He is also an Associate Editor-in-Chief for China Communications. He was the Guest or Associate Editor for the IEEE Transactions on Wireless Communications, the IEEE Journal Of Selected Areas in Communications, the IEEE Signal Processing Magazine, the IEEE Transactions on Vehicular Technology, and the IEEE Transactions on Signal and Information Processing Over Network. He was also an Associate Editor-in-Chief for the World Scientific Random Matrices: Theory and Applications. He was a Distinguished Lecturer of the IEEE Communications Society and the IEEE Vehicular Technology Society. He was the Chair of the IEEE Communications Society Technical Committee on Cognitive Networks, and was the TPC Chair and Executive Co-Chair of the IEEE Globecom'17.



Guangming Shi (Fellow'2020) received the M.S. degree in computer control, and the Ph.D. degree in electronic information technology from Xidian University, Xi'an, China, in 1988, and 2002, respectively. His research interest includes Artificial Intelligence, Intelligent Communications, Human-Computer Interaction. He is a Professor with the School of Artificial Intelligence, Xidian University. He is an IEEE Fellow and the chair of IEEE CASS Xi'an Chapter, senior member of ACM and CCF, Fellow of Chinese Institute of Electronics, and Fellow of IET. He was awarded Cheung Kong scholar Chair Professor by the ministry of education in 2012. And he won the second prize of the National Natural Science Award in 2017.



Prof. Honggang Zhang is a Full Professor, College of Information Science and Electronic Engineering; Co-Director, York-Zhejiang Lab for Cognitive Radio and Green Communications; Zhejiang University, China; International Chair Professor of Excellence (12/2012 -12/2014), CominLabs Excellence Center (Laboratoire d'Excellence), Université Européenne de Bretagne (UEB) &, France; Honorary Visiting Professor, the University of York, UK (08/2010-08/2018).

Prof. Zhang received the Ph.D. degree in Electrical Engineering from Kagoshima University, Japan, in March 1999. Prior to that, he received the Bachelor of Engineering and Master of Engineering degrees, both in Electrical Engineering, from Huazhong University of Science & Technology (HUST), China, in 1989, and Lanzhou University of Technology, China, in 1992, respectively. He was the founding member of UWB Forum and the principle author and contributor for proposing DS-UWB in IEEE 802.15 WPAN standardization task group, for which he initiated the “Soft-Spectrum Adaptation (SSA)” technique and contributed to its worldwide developments. From September 2004 to February 2008, he has been with CREATE-NET (<http://www.create-net.org/>), where he led its wireless teams in exploring Cognitive Radio (CR) and its integration with Ultra-Wideband (UWB) technologies for dynamic open-spectrum wireless communications and networks evolution (i.e. UWB-CR: Ultra-Wideband Cognitive Radio) while participated a number of European FP6/FP7 projects (EUWB, PULSERS 2).



Shuguang Cui received his Ph.D in Electrical Engineering from Stanford University, California, USA, in 2005. Afterwards, he has been working as assistant, associate, full, Chair Professor in Electrical and Computer Engineering at the Univ. of Arizona, Texas A&M University, UC Davis, and CUHK at Shenzhen respectively. He has also been the Executive Dean for the School of Science and Engineering at CUHK, Shenzhen, and the Executive Vice Director at Shenzhen Research Institute of Big Data. His current research interests focus on data driven large-scale system control and resource management, large data set analysis, IoT system design, energy harvesting based communication system design, and cognitive network optimization. He was selected as the Thomson Reuters Highly Cited Researcher and listed in the Worlds’ Most Influential Scientific Minds by ScienceWatch in 2014. He was the recipient of the IEEE Signal Processing Society 2012 Best Paper Award. He has served as the general co-chair and TPC co-chairs for many IEEE conferences. He has also been serving as the area editor for IEEE Signal Processing Magazine, and associate editors for IEEE Transactions on Big Data,

IEEE Transactions on Signal Processing, IEEE JSAC Series on Green Communications and Networking, and IEEE Transactions on Wireless Communications. He has been the elected member for IEEE Signal Processing Society SPCOM Technical Committee (2009~2014) and the elected Chair for IEEE ComSoc Wireless Technical Committee (2017~2018). He is a member of the Steering Committee for IEEE Transactions on Big Data and the Chair of the Steering Committee for IEEE Transactions on Cognitive Communications and Networking. He was also a member of the IEEE ComSoc Emerging Technology Committee. He was elected as an IEEE Fellow in 2013, an IEEE ComSoc Distinguished Lecturer in 2014, and IEEE VT Society Distinguished Lecturer in 2019. He has won the IEEE ICC best paper award, ICIP best paper finalist, and the IEEE Globecom best paper award all in 2020.