



## Tutorial 4 Artificial Intelligence for 6G: Implementations, Algorithms, and Optimizations



### Presenter



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#### Presentation Title

Artificial Intelligence for 6G: Implementations, Algorithms, and Optimizations

Chuan Zhang received the B.E. degree in microelectronics and the M.E. degree in very-large scale integration (VLSI) design from Nanjing University, Nanjing, China, in 2006 and 2009, respectively, and the Ph.D. degree from the Department of Electrical and Computer Engineering, University of Minnesota, Twin Cities (UMN), USA, in 2012.

He is currently the Young Chair Professor of Southeast University. He is also with the LEADS, National Mobile Communications Research Laboratory, Frontiers Science Center for Mobile Information Communications and Security of MoE, Quantum Information Center of Southeast University, and the Purple Mountain Laboratories, Nanjing, China. His current research interests are algorithms and implementations for signal processing and communication systems.

Dr. Zhang serves as an Associate Editor for the IEEE Transactions on Circuits and Systems - II, a Senior Editorial Board (SEB) member for the IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS), and a Steering Committee member for the IEEE Transactions on Mobile Computing. He served as an Associate Editor for the IEEE Transactions on Signal Processing and IEEE Open Journal of Circuits and Systems, and a Corresponding Guest Editor for the JETCAS three times. He was a Distinguished Lecturer and now is the Chair-Elect of the Circuits and Systems for Communications TC of the IEEE Circuits and Systems Society. He is also a member of the Applied Signal Processing Systems TC of the IEEE Signal Processing Society, and Circuits and Systems for Communications TC, VLSI Systems and Applications TC, and Digital Signal Processing TC of the IEEE Circuits and Systems Society. He received the Best Contribution Award of the IEEE Asia Pacific Conference on Circuits and Systems (APCCAS) in 2018, the Best Paper Award in 2016, the Best (Student) Paper Award of the IEEE International Conference on DSP in 2016, three Best (Student) Paper Awards of the IEEE International Conference on ASIC in 2015, 2017, 2019, and 2023, the Best Paper Award Nomination of the IEEE Workshop on Signal Processing Systems in 2015, three Excellent Paper Awards and two Excellent Poster Presentation Awards of the International Collaboration Symposium on Information Production and Systems from 2016 to 2018, the Outstanding Achievement Award of the Intel Collaborative Research Institute in 2018, and the Merit (Student) Paper Award of the IEEE APCCAS in 2008. He also received the Three-Year University-Wide Graduate School Fellowship of UMN and the Doctoral Dissertation Fellowship of UMN.

**Abstract:** This tutorial focuses on the very popular topic “Artificial Intelligence for 6G: Circuits, Systems, and Optimizations”. Due to its undoubted significance, research combining “AI” and “6G” has drawn lots of attentions from both academia and industry. Although some initiatives related to “AI for 6G” have been named, their design, implementation, and optimization are unfortunately not complete and of course in infancy. Having lots of potential for AI’s new innovations, advances are required in network architectures, signal processing solutions, semiconductor technologies as well as in its optimization regarding the overall wireless system design. Much of the research has scattered on the design, implementation, and optimization of the corresponding circuits and systems. This tutorial would like to emphasize its uniqueness on “AI for 5G and B5G” related VLSI/IC designs and help audience to know the cutting-edge progresses from the perspective of circuits and systems. With a focus on bridging the gaps between theory and practical implementations, the goal of this tutorial is to demonstrate the latest research progress on circuits and systems design for efficiently realizing machine learning in wireless communications. The tutorial will bring together academic and industrial aspects to identify technical challenges and recent results related to this area, including Big Data Processing, Artificial Intelligence, Internet of Things, 6G, and Multi-Gigabit Optoelectronics Communications.