
# SAC Symposium: Machine Learning for Communications

## Co-Chairs


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## Scope and Motivation

Machine learning (ML) is envisaged to play a prominent role in beyond-5G and 6G wireless communications. As ML relies directly on actual data rather than their mathematical models, ML has a great potential in optimizing communication techniques under hardware impairments and other non-linearities that are hardly modeled in traditional communication designs. ML is also promising to support various vertical service requirements and simplify communication architectures by approximating and combining multiple functionalities within and across communication layers. While ML has already been applied in domains such as self-organized networks, sensing or cognitive radio, research in the field of ML for wireless communications is still in its infancy. The viability of ML for wireless applications continues to increase, along with the relentless advances in basic enabling technologies and methods from ML. Meanwhile, the limitations of ML for wireless communications have not yet fully investigated, in terms of legacy compatibility and operator interpretability, as well as ML training overhead and data availability under privacy restrictions.

The goals of this symposium are to provide a platform for the latest results in the field of ML for wireless communications, shed light on the challenges and prospect of this new research field, open new perspectives, and inspire innovation. The call for papers is driven towards the needs of beyond-5G and 6G wireless networks and associated new communication concepts in which ML has the potential to be a key enabler. Furthermore, we encourage submissions in ML algorithm developments that are motivated by the specific constraints posed by wireless communications, such as low latency and massive connectivity requirements under distributed and coordinated architectures.

## Topics of Interest

We invite submissions of unpublished work related to application of ML for wireless communications. We do not restrict the type of ML techniques. A non-exhaustive list of relevant topics is given as follows:

- ML based optimization of modulation and coding schemes
- ML driven transceiver design, source coding, and channel decoding
- ML for channel estimation and prediction
- ML for non-traditional communication channels (e.g., high-dimensional and molecular channels)

- ML for radio environment awareness and decision making
- ML for massive connectivity and ultra-reliable and low latency communications (URLLC)
- ML for massive MIMO and large intelligent surfaces (LIS)
- ML for cell-free wireless systems
- ML for vision-aided wireless communications
- ML for positioning and location-based services
- ML for joint communication and control
- ML for semantic communications
- ML for non-linear signal processing
- ML for physical layer security
- ML for self-organized networks and resource management
- ML for network slicing and system coexistence
- ML for energy efficient communications
- ML for edge intelligence and sensing platforms
- ML based communication systems and their information theoretic capacity and complexity analysis
- Centralized and distributed learning for wireless communications
- Privacy and security preserving distributed training over communications networks
- Wireless transmission and protocol optimization for ML
- Neural network compression for low-complexity hardware implementation in wireless networks
- Unsupervised, semi-supervised, and self-supervised learning approaches to communications
- Generative and large language model (LLM) based approaches to communications
- Neuro-symbolic and causal ML approaches to communications
- Multi-agent and model-based reinforcement learning approaches to communications

## Biographies of the Co-Chairs

**Yansha Deng** received the Ph.D. degree in electrical engineering from the Queen Mary University of London, U.K., in 2015. From 2015 to 2017, she was a Post-Doctoral Research Fellow with King's College London, U.K., where she is currently a Senior Lecturer (an Associate Professor) with the Department of Engineering. Her research interests include molecular communication and machine learning for 5G/6G wireless networks. She has served as a TPC Member for many IEEE conferences, such as IEEE GLOBECOM and ICC. She was a recipient of the Best Paper Awards from ICC 2016 and GLOBECOM 2017 as the first author and the IEEE Communications Society Best Young Researcher Award for the Europe, Middle East, and Africa Region 2021. She also received the Exemplary Reviewers of the IEEE Transactions on Communications in 2016 and 2017 and IEEE Transactions on Wireless Communications in 2018. She is also an Associate Editor of the IEEE Transactions on Communications and IEEE Transactions on Molecular, Biological and Multi-Scale Communications, a Senior Editor of the IEEE Communications Letters, and the Vertical Area Editor of IEEE Internet of Things Magazine.

**Jihong Park** is a Lecturer at the School of IT, Deakin University, Australia. He received the B.S. and Ph.D. degrees from Yonsei University, Seoul, Korea, in 2009 and 2016, respectively. He was a Post-Doctoral Researcher with Aalborg University, Denmark, from 2016 to 2017; the University of Oulu, Finland, from 2018 to 2019. His recent research focus includes AI-native and semantic communications, as well as distributed and quantum machine learning. He served as a Conference/Workshop Program Committee Member for IEEE GLOBECOM, ICC, and INFOCOM, as well as NeurIPS, ICML, and IJCAI. He received the IEEE GLOBECOM Student Travel Grant and the IEEE Seoul Section Student Paper Prize in 2014, the 6th IDIS-ETNEWS Paper Award, and FL-IJCAI Best Student Paper Award in 2022. Currently, he is an Associate Editor of Frontiers in Data Science for Communications and in Signal Processing for Communications. He is a Senior Member of IEEE and a Member of ACM.

## How to Submit a Paper

All papers for technical symposia should be submitted via EDAS. Full instructions on how to submit papers and important deadlines are posted at https://globecom2023.ieee-globecom.org/