

YINAN ZOU

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EDUCATION

University of Toronto

Ph.D. in Electrical and Computer Engineering,
Advisor: Prof. [Wei Yu](#)

Toronto, Canada

Sep. 2023 - Present

ShanghaiTech University

M.Eng. in Information and Communication Engineering
Advisor: Prof. [Yong Zhou](#)

Shanghai, China

Sep. 2020 - Jun. 2023

Chongqing University

B.Eng. in Electronic Information Engineering
Elite Class

Chongqing, China

Sep. 2016 - Jun. 2020

RESEARCH INTERESTS

My current research interests include learn to optimize, compressed sensing, and federated learning.

PUBLICATIONS

Preprints/Under Review

- J1 **Yinan Zou**, Yong Zhou, Xu Chen, and Yonina C. Eldar, "Proximal Gradient-Based Unfolding for Massive Random Access in IoT Networks," under review in IEEE Transactions on Wireless Communications (TWC). [\[Paper\]](#)

Journal Articles

- J2 Zixin Wang, Yong Zhou, **Yinan Zou**, Qiaochu An, Yuanming Shi, and Mehdi Bennis, "A Graph Neural Network Learning Approach to Optimize RIS-Assisted Federated Learning," IEEE Transactions on Wireless Communications (TWC), 2023. [\[Paper\]](#)
- J3 **Yinan Zou**, Zixin Wang, Xu Chen, Haibo Zhou, and Yong Zhou, "Knowledge-Guided Learning for Transceiver Design in Over-the-Air Federated Learning," IEEE Transactions on Wireless Communications (TWC), 2022. [\[Paper\]](#)

Conference Papers

- C1 Shuang Liang, **Yinan Zou**, and Yong Zhou, "GAN-Based Joint Activity Detection and Channel Estimation for Grant-Free Random Access," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), May 2022. [\[Paper\]](#)
- C2 **Yinan Zou**, Yong Zhou, Yuanming Shi, and Xu Chen, "Learning Proximal Operator Methods for Massive Connectivity in IoT Networks," IEEE Global Communications Conference (Globecom), Dec. 2021. [\[Paper\]](#)
- C3 Wenzhi Fang, **Yinan Zou**, Hongbin Zhu, Yuanming Shi, and Yong Zhou, "Optimal Receive Beamforming for Over-the-Air Computation," IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Sept. 2021. [\[Paper\]](#)

RESEARCH EXPERIENCE

ShanghaiTech University, Shanghai, China

Master Student, Advisor: Prof. Yong Zhou

Project: Algorithm Unfolding for Massive Random Access

Sep. 2020 - Present

- Proposed an effective unfolding recurrent neural network framework built upon the proximal gradient method [C2] to tackle the joint activity detection and channel estimation problem, which can be formulated as a multiple measurement vector problem.

- Incorporated momentum into unfolding neural network to improve convergence rate, and proved the accelerated convergence theoretically. Based on the convergence analysis, we further developed an adaptive-tuning algorithm, which adjusts its parameters to different signal-to-noise ratio and sparsity level settings according to the input data [J1].
- Developed a model-free learning method based on GAN [C1] to tackle the joint activity detection and channel estimation problem .

Project: Learn to Optimize AirComp-assisted Federated Learning

- Derived the upper bound of the time-average norm of the gradients to characterize the convergence of AirComp-assisted FL, which reveals the impact of the model aggregation errors accumulated over all communication rounds on convergence. We formulated an optimization problem to minimize the upper bound to enhance the learning performance, followed by proposing an alternating optimization algorithm. We further developed a knowledge-guided learning algorithm that exploits the domain knowledge to achieve computation-efficient transceiver design [J3].
- Employed analog compression and quantization for local gradients to reduce communication overhead of FL.
- Developed a GNN-based learning algorithm for reconfigurable intelligent surface-assisted FL [J2].
- Proposed a branch and bound algorithm to achieve the optimal receive beamformer design of AirComp [C3].

TEACHING EXPERIENCE

Teaching Assistant

ShanghaiTech University

EE241 Fundamentals of Wireless Communications

Fall 2021

SERVICES

Conference Volunteer

IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC) 2023

Conference Reviewer

IEEE International Conference on Communications (ICC) Workshop 2022

AWARDS

Outstanding Graduate of Shanghai, 2023.

Outstanding Graduate of ShanghaiTech University, 2023.

National Scholarship (Top 0.2% Nationwide), Ministry of Education in China, 2022.

Outstanding Student (Top 5%), ShanghaiTech University, 2022.

Merit Student (Top 10%), ShanghaiTech University, 2021.

Student Research Training Program, Excellent Project (Leader), Chongqing University, 2019.