HONGDA WU

LAS 3023, 4700 Keele Street, Toronto, ON, M3J 1P3, Canada
Email: hwu1226@yorku.ca / h.wu.yorku@gmail.com
Personal Website ◇ Google Scholar ◇ LinkedIn

Research Interests

Internship: Combing distributed machine learning, networking, and optimization for a broad range of applications/systems, e.g., data analytic, NLP tasks, IoT systems, and future intelligent wireless networks

Ph.D. stage: Theoretical federated (machine) learning, reinforcement learning, and their applications for wireless network, mobile edge computing and Internet of Things

Research Experience

Noah Ark's Lab, HUAWEI Montreal Research Centre — Montreal, Canada
incoming Graduate Co-op (Research Intern) — Sept. 2023 - Feb. 2023

- Tentative topics: Fairness/personalization in federated learning and/or graph representation learning. AI/ML theories and/or applications for networks

Dept. of EECS, Lassonde School of Engineering, York University — Toronto, Canada
Graduate Research Assistant — Sept. 2019 - Present

- Federated learning for mobile edge computing systems
  - Developed algorithms to improve the convergence rate of federated learning from the perspective of statistical heterogeneity and system heterogeneity
  - Contribution: device selection [TNSE'22, WCNC'22], adaptive aggregation [TCCN'21, ICC'21], adaptive model training [In Pre.]
- Deep reinforcement learning for Internet of Things (IoT) system
  Proposed DRL-based edge caching algorithm to improve the system performance (i.e., caching hit rate, energy consumption) of IoT networks [TVT'22]

Communication University of China — Beijing, China
Graduate Research Assistant — Sept. 2016 - June 2019

- Physical layer problems of wireless network
  Focused on the algorithm design for channel estimation of Massive MIMO systems, i.e., DOA estimation [El'19],[JWCN'19], and channel coding problem for NOMA systems [TVT'21].

Education

Ph.D. in Electrical Engineering & Computer Science — 2019 - 2023
York University — Toronto, Canada

- Federated Learning for Wireless Communication (Advisor: Ping Wang, FIEEE, DL of IEEE VTS)

M.A.Sc in Electrical Engineering — 2016 - 2019
Communication University of China — Beijing, China

- Received National Scholarship (Top 2%), Outstanding Graduate Thesis (Top 5%)

B.Eng. in Electrical Engineering 2012 - 2016
B.Man. in Administration Management (minor)
Inner Mongolia University Hohhot, China

Publication

Journal Papers

[J1] **Hongda Wu**, Ali Nasehzadeh, Ping Wang, "A Deep Reinforcement Learning-Based Caching Strategy for IoT Networks with Transient Data," *IEEE Transactions on Vehicular Technology*, Early Access, August 2022. [DOI]

[J2] **Hongda Wu**, Ping Wang, "Node Selection Toward Faster Convergence for Federated Learning on Non-IID Data," *IEEE Transactions on Network Science and Engineering*, Early Access, Feb. 2022. [DOI] [Code]

[J3] **Hongda Wu**, Ping Wang, "Fast-Convergent Federated Learning with Adaptive Weighting," *IEEE Transactions on Cognitive Communications and Networking*, vol.7, no.4, pp. 1078-1088, 2021. [DOI]

[J4] Shufeng Li, Mingyu Cai, Libiao Jin, Yao Sun, **Hongda Wu**, Ping Wang, "An Ultra-Reliable Low-Latency Non-Binary Polar Coded SCMA Scheme," accepted to *IEEE Transactions on Vehicular Technology*, vol. 71, no. 6, pp. 6518-6533, June 2022. [DOI]

[J5] Shufeng Li, **Hongda Wu***, Libiao Jin, "Codebook-aided DOA Estimation Algorithm for Massive MIMO System," *Electronics*, 8(1), 26, 2019 [DOI]

[J6] Shufeng Li, Baoxin Su, Libiao Jin, Mingyu Cai, **Hongda Wu**, "Joint Measure Matrix and Channel Estimation for Millimeter-Wave Massive MIMO with Hybrid Precoding," *EURASIP Journal on Wireless Communications and Networking*, 293, 2019 [DOI]

In Preparation

- **Hongda Wu**, Ping Wang, C V Aswarth Narayana
  Handling the System Heterogeneity of Federated Learning: An Adaptive Model Partition Method

Conference Papers

[C1] **Hongda Wu**, Ping Wang, "Probabilistic Node Selection for Federated Learning with Heterogeneous Data in Mobile Edge," *IEEE Wireless Communications and Networking Conference* (**WCNC 2022**), Austin, TX, USA [DOI] [Code]
The Best Paper Awards WCNC 2022 (1 of 4 out of 1000 submissions)

[C2] **Hongda Wu**, Ping Wang, "Fast-convergent Federated Learning with Adaptive Weighting," *IEEE Conference on Communication* (**ICC 2021**), Montreal, QC, Canada [DOI]

Professional Services & Activities

Technical Reviewer

IEEE Transaction on Wireless Communication, IEEE Transaction on Mobile Computing, IEEE Transactions on Cognitive Communications and Networking, IEEE Communications Letters, IEEE Network Magazine, IEEE conference proceedings, e.g., ICC, GLOBECOM, WCNC, VTC, etc.

Research Intern Mentoring

- *C V Aswarth Narayana* (May - August, 2022), Mitacs research intern at York University, undergraduate student at Amrita Vishwa Vidyapeetham; Research topic: adaptive model training for heterogeneous federated learning system by dropout

- *Aakash Agarwal* (May - August, 2022), Mitacs research intern at York University, undergraduate student at IIIT-Naya Raipur; Research topic: Deep reinforcement learning based IoT caching design

Teaching for Research Camp

- *Wireless Communications System Design* Sept. 2019 - Aug. 2022
  Prof. Danijela Cabric, University of California, Los Angles
- *Understanding Transistors and the Microelectronics Industry* Aug. 2019
  Prof. Ya-Hong Xie, University of California, Los Angles
- *Information Dissemination and Aggregation for the Next Decade* Jan. 2019
  Prof. Bernhard Haeupler, Carnegie Mellon University

Awards & Honors

Research-related Awards

- IEEE WCNC 2022 Best Paper Awards — IEEE ComSoc, 2022
- Academic Excellence Fund — Faculty of Graduate Studies, York U., 2022
- Innovation Scholarship for Graduate (Top 0.2%, 6/$\approx$ 3000) — M.A.Sc., 2018

Scholarship, Thesis Awards and Other Awards

- CUPE International Bursary — Canadian Union of Public Employees, 2022
- Hadi and Ozra Arjomandi Graduate Scholarship — Dept. EECS, LAS, 2022
- YU Graduate Fellowship & Scholarship — York U., 2019 - 2023
- National Scholarship (Top 2%) — Ministry of Education, China, 2017
- May 4th Youth Medal (Top 0.08%, 13/15000) — City of Beijing, 2019
- Outstanding Graduate Thesis (M.A.Sc., Top 5%), Merit Graduates (Top 10%) — CUC, 2019
- First-Class Academic Scholarship (Top 10%), Merit Graduate Student (Top 10%) — CUC, 2017, 2018

Skills

Programming
Python (Tensorflow, PyTorch, Keras, PySyft, Numpy, Scipy, Scikit-learn, Pandas), MATLAB, C, MySQL

Language
English (Fluent), Mandarin (Native), Cantonese (Basic)