Xiangfeng Zhu

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Research Interests

Systems and Networking, with a focus on microservices, service mesh, and application-level networking.

Education

University of Washington — Expected: June 2026

Ph.D., Computer Science

Advisors: Prof. Arvind Krishnamurthy and Prof. Ratul Mahajan

University of Michigan, Ann Arbor — May 2021

B.S., Computer Science(with honors)

Advisor: Prof. Mosharaf Chowdhury

Research Experience

Graduate Research Assistant — Sep. 2021- Now
Systems Lab, University of Washington
Advisors: Prof. Arvind Krishnamurthy and Prof. Ratul Mahajan

Dissecting Service Mesh Overheads

- Conducted studies on the performance overheads in using a service mesh.

Application Defined Networks

- Designing a new network architecture for building application networks.

Research Assistant — Dec. 2018 - Aug. 2021
Symbiotic Lab, University of Michigan
Advisor: Prof. Mosharaf Chowdhury

Fast Distributed Computation Over Slow Networks

- Co-Developed a general-purpose execution engine, Sol, that can adapt to diverse network conditions on top of Apache Spark.
- Improved SQL, machine learning, and streaming jobs by 4.2× and 16.4× on average, respectively, in offline and online settings compared to the state-of-the-art systems in resource-constrained networks.

Efficient Participant Selection for Federated Learning

- Co-Developed a participant framework to tackle data and device heterogeneity in Federated Learning using importance sampling
- Improved time-to-accuracy performance by 1.2× - 14.1× and final model accuracy by 1.3%-9.8% compared to state-of-the-art FL framework

Research Assistant — Mar. 2018 - Sep. 2019
Disorderly Lab, UC Santa Cruz
Advisor: Prof. Peter Alvaro

Protocol Repair Using Lineage Graphs

- Co-Designed a debugging approach for distributed systems based on analysis of data provenance obtained during system executions
- Co-Developed a standalone prototype Debugger Nemo and Evaluated it on the TaxDC collection of real-world bugs from large-scale distributed systems (e.g., Hadoop and HBase)

Publications

1. Fan Lai, Yinwei Dai, Sanjay S. Singapuram, Jiachen Liu, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "FedScale: Benchmarking Model and System Performance of Federated Learning at Scale", *Proceedings of the 39th International Conference on Machine Learning (ICML 2022)*, Baltimore, MD, 2022
2. Sebastian Burckhardt, Badrish Chandramouli, Chris Gillum, David Justo, Konstantinos Kallas, Connor McMahon, Christopher S. Meiklejohn, **Xiangfeng Zhu**, "Netherite: Efficient and Reliable Execution for Stateful Serverless Applications", *Proceedings of the 48th International Conference on Very Large Databases (VLDB 2022)*, Sydney, Australia, 2022
3. Fan Lai, Yinwei Dai, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "FedScale: Benchmarking Model and System Performance of Federated Learning", *Proceedings of the First Workshop on Systems Challenges in Reliable and Secure Federated Learning (ResilientFL 2021)*, Virtual, 2021, **Best Paper Award**
4. Fan Lai, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "Oort: Informed Participant Selection for Scalable Federated Learning", *Proceedings of the 15th USENIX Symposium on Operating Systems Design and Implementation (OSDI 2021)*, Virtual, 2021 (Acceptance Rate: 18.79%), **Distinguished Artifact Award**
5. Fan Lai, Jie You, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "Sol: Fast Distributed Computation Over Slow Networks", *Proceedings of the 17th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2020)*, Santa Clara, CA, 2020 (Acceptance Rate: 18.36%)
6. Lennart Oldenburg, **Xiangfeng Zhu**, Kamala Ramasubramanian, Peter Alvaro, "Fixed It For You: Protocol Repair Using Lineage Graphs", *Proceedings of the 9th biennial Conference on Innovative Data Systems Research (CIDR 2019)*, Asilomar, CA, 2019

Work Experience

Uber June 2023 - Sep. 2023
Incoming PhD Software Engineer Intern

VMware Research June 2022 - Sep. 2022
Research Intern
Mentor: Dr. Radhika Niranjan Mysore

Microsoft Research May 2021 - Aug. 2021
Research Intern , RiSE Group
Mentor: Dr. Sebastian Burckhardt

Databricks May 2020 - Aug. 2020
Software Engineer Intern , Serverless Team

Dropbox May 2019 - Aug. 2019
Software Engineer Intern , Filesystem Team

Professional Activities

- **Virtual Chair**: WORDS 2022
- **Program Committee**: NeurIPS(Datasets and Benchmarks Track) 2022, EuroSys 2022 (Shadow PC), IMC 2022 (Shadow PC)
- **Student Volunteer**: SoCC 2021, SIGCOMM 2021
- **Artifact Evaluation Committee**: SIGCOMM 2021, OSDI 2021, EuroSys 2021, JSys 2021

Other Activities

- **Area Chair (System)**: UW CSE PhD Admissions Committe, 2022
- **Reader**: UW CSE PhD Admissions Committe, 2021
- **Mentor**: UW CSE PhD Pre-Application Mentorship Service (PAMS), 2021

Honors & Awards

- **Best Paper Award**, ACM SOSP ResilientFL, 2021
  For *FedScale: Benchmarking Model and System Performance of Federated Learning*
- **Distinguished Artifact Award**, USENIX OSDI, 2021
  For *Oort: Efficient Federated Learning via Guided Participant Selection*
- **Allen School Computer Science & Engineering Research Fellowship**, 2021
- **Conference Student Grant**, HotNets '22, OSDI '20, FAST '21, NSDI '21, OSDI '21

Mentoring

- **Banruo Liu**, Tsinghua University, 2022 - Now
  - Project: Application Defined Networks
- **Ami Oka**, University of Washington, 2023 - Now
  - Project: Characterizing Service Mesh Overheads
- **Fenet Guyassa**, Bonney Lake High School, 2023 - Now
  - Project: Characterizing Service Mesh Overheads