Xiangfeng Zhu

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Research Interests

Systems and Networking, with a focus on systems for emerging large-scale workloads such as big data analytics and machine learning.

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)

Thesis: Toward Real-time Systems for Vision and Language Applications

Advisor: Prof. Mosharaf Chowdhury

Research Experience

Research Assistant Dec. 2018 - Now
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.

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

Undergraduate Researcher 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)

Undergraduate Researcher Mar. 2017 - Aug. 2017
Storage System Research Center, UC Santa Cruz
Worked under: Prof. Darrell D. E. Long and Prof. Ethan L. Miller

Rogue Cell tower(IMSI Catcher) detector

- Wrote a design document with three lab partners detailing the project and future work.
- Co-Designed an algorithm to pinpoint the location of IMSI Catchers based on received signal strength (RSS) and signal spike

Publications

1. Fan Lai, **Xiangfeng Zhu**, Harsha Madhyastha, Mosharaf Chowdhury, "FedScale: Benchmarking Model and System Performance of Federated Learning", *Under Review*
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", *Under Review*
3. 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%)
4. 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%)
5. 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

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

- **SIGCOMM**: Artifact Evaluation Committee, 2021
- **OSDI**: Artifact Evaluation Committee, 2021
- **EuroSys**: Artifact Evaluation Committee, 2021
- **Journal of Systems Research (JSys)**: Artifact Evaluation Board, 2021

Other Experience

- **CMPE107: Probability and Statistics** , UC Santa Cruz , Grader Spring 2018
- **CMPS12B: Introduction to Data Structures**, UC Santa Cruz , Learning Assistant Spring 2018, Winter 2018
- **CMPS101: Algorithms and Abstract Data Types**, UC Santa Cruz , Learning Assistant Fall 2017, Winter 2018

Awards

- **Distinguished Artifact Award:** *Oort: Efficient Federated Learning via Guided Participant Selection*, 2021
- **Allen School Computer Science & Engineering Research Fellowship**, 2021
- **Conference Student Grant**, OSDI '20, FAST '21, NSDI '21, OSDI '21

Skills

- **Programming**: Java, C, C++, Python, Scala, Bash, SQL, HTML, CSS, LaTeX
- **Tools**: Perf, GDB, Valgrind, Make, Git, Vim, Docker

Miscellaneous

- **Personal Blog**: xzhu0027.gitbook.io/blog/