Chenyuan Wu

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Education

University of Pennsylvania PA, US
Ph.D. candidate, Computer and Information Science *2020 - Present*
- Thesis: "AI-driven Adaptive Distributed Systems in Untrusted Environments"
- Advisor: Boon Thau Loo

Beijing Jiaotong University Beijing, China
B.E., Electrical Engineering *2016 - 2020*
- Ranked top 1 out of 500 students

Research Interest

My research interest mainly lies in distributed data management, consensus protocols, and blockchains. I am especially interested in using machine learning to build the next generation of distributed systems that are adaptive and smart. In pursuit of this goal, I have researched and published across the system stack deployed in untrusted environments, from adaptive transaction management to adaptive Byzantine fault-tolerant consensus and their underlying infrastructure.

Publications

BFTBrain: Adaptive BFT Consensus with Reinforcement Learning
Chenyuan Wu, Haoyun Qin, Mohammad Javad Amiri, Boon Thau Loo, Dahlia Malkhi, Ryan Marcus
USENIX Symposium on Networked Systems Design and Implementation, **NSDI 2025**

Towards Full Stack Adaptivity in Permissioned Blockchains
Chenyuan Wu, Mohammad Javad Amiri, Haoyun Qin, Bhavana Mehta, Ryan Marcus, Boon Thau Loo
International Conference on Very Large Data Bases, **VLDB 2024**

BFTGym: An Interactive Playground for BFT Protocols
Haoyun Qin, **Chenyuan Wu**, Mohammad Javad Amiri, Ryan Marcus, Boon Thau Loo
International Conference on Very Large Data Bases, **VLDB 2024 Demo**

Towards Truly Adaptive Byzantine Fault-Tolerant Consensus
Chenyuan Wu, Haoyun Qin, Mohammad Javad Amiri, Boon Thau Loo, Dahlia Malkhi, Ryan Marcus
ACM SIGOPS Operating Systems Review, **SIGOPS OSR 2024**

The Bedrock of Byzantine Fault Tolerance: A Unified Platform for BFT Protocols Analysis, Implementation, and Experimentation
Mohammad Javad Amiri, **Chenyuan Wu**, Divyakant Agrawal, Amr El Abbadi, Boon Thau Loo, Mohammad Sadoghi
USENIX Symposium on Networked Systems Design and Implementation, **NSDI 2024, Outstanding Paper Award**

AdaChain: A Learned Adaptive Blockchain
Chenyuan Wu, Bhavana Mehta, Mohammad Javad Amiri, Ryan Marcus, Boon Thau Loo
International Conference on Very Large Data Bases, **VLDB 2023**

FlexChain: An Elastic Disaggregated Blockchain
Chenyuan Wu, Mohammad Javad Amiri, Jared Asch, Heena Nagda, Qizhen Zhang, Boon Thau Loo
International Conference on Very Large Data Bases, **VLDB 2023**

Synthesizing Formal Network Specifications from Input-Output Examples
Haoxian Chen, **Chenyuan Wu**, Andrew Zhao, Mukund Raghothaman, Mayur Naik, Boon Thau Loo
IEEE/ACM Transactions on Networking, **ToN 2022**

Provenance for Probabilistic Logic Programs
Shaobo Wang, Hui Lyu, Jiachi Zhang, **Chenyuan Wu**, Xinyi Chen, Wenchao Zhou, Boon Thau Loo, Susan B. Davidson, Chen Chen
International Conference on Extending Database Technology, **EDBT 2020, Best Paper Award**

Preprints

On Orchestrating Parallel Broadcasts for Distributed Ledgers
Peiyao Sheng*, **Chenyuan Wu***, Dahlia Malkhi, Michael K. Reiter, Chrysoula Stathakopoulou, Michael Wei, Maofan Yin (*Both authors contributed equally)
ePrint [pdf]

Reference Letters

Prof. Boon Thau Loo (boonloo@seas.upenn.edu)
RCA Chair Professor at University of Pennsylvania
Senior Associate Dean, Education and Global Initiatives, Penn Engineering

Prof. Dahlia Malkhi (dahliamalkhi@ucsb.edu)
Professor at UC Santa Barbara
ACM Fellow
Distinguished Scientist at Chainlink Labs
Co-Founder of VMWare Research

Prof. Ryan Marcus (rcmarcus@seas.upenn.edu)
Assistant Professor at University of Pennsylvania

Professional Experience

Chainlink Labs
Research Intern *May 2023 - Dec. 2023*
Mentor: Dahlia Malkhi
Ticketing regimes for orchestrating parallel broadcasts in distributed systems

Huawei, Central Research Institute
Research Intern, Network Technology Lab *Nov. 2019 – Jan. 2020*
Mentor: Delei Yu
Congestion control and performance study of Multipath TCP

Teaching

CIS Online 553: Networked Systems, University of Pennsylvania
Teaching Assistant *Spring 2022*

CIS Online 553: Networked Systems, University of Pennsylvania
Course Designer *Fall 2021*

Selected Awards

NSDI Outstanding Paper Award, USENIX, 2024
VLDB Travel Award, National Science Foundation, 2023
EDBT Best Paper Award, EDBT Association, 2020
Ph.D. Fellowship, University of Pennsylvania, 2020
President's Scholarship (10 out of 15,000), Beijing Jiaotong University, 2019
National Scholarship, Chinese Ministry of Education, 2019
National Scholarship, Chinese Ministry of Education, 2017
Second Prize in the National College Physics Competition, Beijing Institute of Physics, 2017

Service

Journal Reviewer: IEEE/ACM Transactions on Networking, Transactions on Storage, Transactions on Dependable and Secure Computing, Transactions on Computers

External Reviewer: CIKM 2022, WORDS 2021, CoNEXT 2020

Organizer: Distributed Systems Laboratory Seminar at University of Pennsylvania, Fall 2022, Spring 2023

Recent Talks

AI-driven Adaptive Distributed Systems in Untrusted Environments
HKUST(GZ), CUHK(SZ), ShanghaiTech, September 2024 - November 2024

On Orchestrating Parallel Broadcasts for Distributed Ledgers
UC Davis, Virtual, November 2023

AdaChain: A Learned Adaptive Blockchain
VLDB 2023, Vancouver, August 2023

FlexChain: An Elastic Disaggregated Blockchain
VLDB 2023, Vancouver, August 2023

Mentoring

Haoyun Qin (undergraduate at Penn), 2022 - Present

Bhavana Mehta (Ph.D. student at Penn), 2022 - 2023

Jared Asch (undergraduate at Penn), 2022, now Software Engineer at Five Rings

Heena Nagda (Ph.D. student at Penn), 2022