MINGHAO LI

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EDUCATION

Harvard University
Ph.D., Computer Science   **Aug 2021 – May 2026**

Cornell University
Bachelor of Science, Computer Science   **Aug 2017 – May 2021**
summa cum laude

RESEARCH INTERESTS

Systems and Networking, Machine Learning Systems

PUBLICATIONS

Li, M., Basat, R., Vargaftik, S., Lao, C., Xu, K., Mitzenmacher, M. & Yu, M.
THC: Accelerating Distributed Deep Learning Using Tensor Homomorphic Compression
USENIX Symposium on Networked Systems Design and Implementation (NSDI'24)

Duan, Y., Zhao, X., Pan, Y., Li, S., **Li, M.**, Xu, F. & Zhang, M.
Towards Automated Safety Vetting of Smart Contracts in Decentralized Applications
ACM Conference on Computer and Communications Security (CCS'22)

Wu, H., Tian, X., **Li, M.**, Liu, Y., Ananthanarayanan, G., Xu, F. & Zhong, S.
PECAM: Privacy-Enhanced Video Streaming & Analytics via Securely-Recoverable Transformation
International Conference on Mobile Computing and Networking (MobiCom'21)

Wu, H., Tian, X., Gong, Y., Su X., **Li, M.** & Xu, F.
DAPter: Preventing User Data Abuse in Deep Learning Inference Services
The Web Conference (TheWebConf'21)

PRESENTATIONS

Analyzing the Security of Smart Contracts Using Neural Networks
ASEE 2021 St. Lawrence Section Conference

RESEARCH & RELATED EXPERIENCE

Ph.D. Student (Advisor: Minlan Yu)   **Aug 2021 – Present**
Computer Science Department, Harvard University, Cambridge, MA

- Currently developing Federated Learning systems with efficient client clustering to mitigate statistical heterogeneity and selection strategies to reach the target accuracy faster. Address edge devices local data drift and new devices arrival through timely re-clustering with low overheads.

- Built systems that accelerate distributed Deep Neural Networks training. Focused on reducing the inter-machine synchronization overhead through gradient compression and in-network aggregation at the emerging programmable network devices. This project led to a publication accepted by NSDI'24.
- Also investigating efficient path planning for drones in the cloud-edge scenario with data points caching on edge devices. This project is under submission.

Research Assistant (Advisors: Elaine Shi, Robbert Van Renesse)   **May 2019 – May 2021**
Computer Science Department, Cornell University, Ithaca, NY

- Accomplished a research project on recovering the business logic of smart contracts from function model graphs using neural networks. Concluded that the technique was promising but would not outperform existing methods much by relying on static information only. The conclusion led to the idea of incorporating dynamic information into smart contract analysis.
- Funded by the College of Engineering Undergraduate Research Funds Summer 2020 to work on the privacy-enhanced video streaming and analytics system PECAM. PECAM makes recoverable video transformation that eliminates visual details while preserving enough information for analytics tasks.
- Worked on the DApps (decentralized applications, which are applications that run on decentralized networks such as blockchains) security tool DAPPSCOPE, which automatically discovers the discrepancy between the UI of a DApp and its contract code. Defined the high-level specifications used by DAPPSCOPE to check against a DApp's business model graphs.
- Researched on constructing graphs from Ethereum data and applying node classification algorithms to the graphs. Evaluated the algorithms' performances by checking whether they computed potentially malicious nodes as similar.

COURSEWORK

- **At Harvard University**: Advanced Computer Networks, Big Data Systems, Algorithms at Ends of the Wire, High Performance Computing, Systems Security, Systems and Control, Artificial Intelligence.
- **At Cornell University**: Cloud Computing, Practicum in Operating Systems, Operating Systems, Computer Networks, Computer Architecture, Embedded Systems, Introduction to Database Systems, Introduction to Analysis of Algorithms, Data Structures and Functional Programming, Object-Oriented Programming and Data Structures, Digital Logic and Computer Organization

TEACHING EXPERIENCE

Teaching Fellow – Networking at Scale (Spring 2023)
Computer Science Department, Harvard University, Cambridge, MA

- Developed course projects. Led discussion sections and held weekly office hours to help students comprehend course materials and complete projects. Graded projects, homework, and exams.

Course Consultant – Operating Systems; Discrete Structures (Fall 2020, Spring 2021; Fall 2018)
Computer Science Department, Cornell University, Ithaca, NY

- Held weekly office hours to help students comprehend course materials and complete homework. Developed homework and handouts. Supervised study groups. Graded homework and exams.

LANGUAGES

- Chinese: Native language.
- English: Speak fluently and read/write with high proficiency.