Shinan Liu

Ph.D. Candidate
Department of Computer Science,
University of Chicago
5730 S. Ellis Ave.
Chicago, IL 60637

shinanliu@uchicago.edu
https://www.shinan.info

Education

University of Chicago *Illinois, USA*

Ph.D. in Computer Science. June 2025 (expected).
Thesis: Operationalizing Machine Learning for Networks
Advisor: Prof. Nick Feamster

M.S. in Computer Science, May 2022
Thesis: Concept Drift Characterization, Explanation, and Mitigation in Cellular Networks
Advisor: Prof. Nick Feamster

University of Electronic Science and Technology of China *Sichuan, P.R. China*

B.Eng. (Honors) in Information Security @ Yingcai Honors College, June 2019.

Research Interests

Networking, Security, Measurement, Machine Learning Systems

Employment History

2019–NOW **Research Assistant (Advised by Prof. Nick Feamster)** University of Chicago, *Chicago, IL, USA*

Research assistant at the UChicago Computer Science Department. Projects include examining the entire lifecycle of ML through the perspective of network operations, where I design accessible, reliable, and performant machine learning systems for network data analysis, and employ network data analysis for critical issues in network management and security.

2024 **Research Intern (Mentored by Prof. Vyas Sekar)** Conviva Inc., *Foster City, CA, USA*

Operationalize synthetic network traces in enterprise settings.

2023–2024 **Research Consultant (Worked with Dr. Saurabh Shintre)** LangSafe.ai Inc., *San Mateo, CA, USA*

Lead and design methods that enable enterprises to enforce Role-based Access Control, Guardrails, and Auditing of LLM applications.

2019 **Research Assistant (Mentored by Prof. Yaling Yang & Prof. Gang Wang)** Virginia Tech, *Blacksburg, USA*

Led a group of 9 researchers from Virginia Tech, Microsoft Research, Facebook, and UESTC in designing GPS spoofing defense methods. Resulted in a USENIX Security 2021 paper.

2017 **Research Intern (Mentored by Dr. Yuanchao Shu & Dr. Kexiong Zeng)** Microsoft Research Asia, *Beijing, P.R. China*

Developed a field practical test and a user study which includes driving simulator based on Android and Euro Truck Simulator II to simulate actual GPS spoofing attacks on mobile devices. Resulted in a USENIX Security'18 and HotMobile'17 paper.

2017–2019 **Founder/CEO** Dominity Security Co., Ltd., *Chengdu, P.R. China*

Founded Dominity Security Co., Ltd. with 14 peers, served as CEO and worked on wireless security defense systems. Holder of 4 CN patents and 4 national awards on our product MAPRO.

Teaching Experience

2022 **Mentor**, Data clinics in collaboration with Verizon *Chicago, USA*

Mentored a collaborative project with master's students to develop strategies for managing exogenous shocks in Verizon. Created notes and interactive Python notebooks (with separate teacher and student versions) to support independent exploration while providing structured guidance.

2020 **Teaching Assistant**, CS15400 Introduction to Computer Systems *Chicago, USA*

Assisted around 150 students in hands-on projects, including cache optimization. Fostered engagement and collaboration, which was especially valuable during COVID-19 remote learning.

2020 **Teaching Assistant**, CS23400 Mobile Computing *Chicago, USA*

Supported approximately 40 students through regular office hours. Guided students through projects, including WiFi and AI-based virtual flag triangulation.

Research and Publications

Operational ML for Networking

Training: Break Network Silos Using Synthetic Data

[1] Xi Jiang*, **Shinan Liu***, Aaron Gember-Jacobson, Paul Schmitt, Francesco Bronzino, and Nick Feamster. Generative, high-fidelity network traces. In *ACM SIGCOMM Workshop on Hot Topics in Networks (HotNets)*, Cambridge, Massachusetts, 2023.

[2] Xi Jiang, **Shinan Liu**, Aaron Gember-Jacobson, Arjun Nitin Bhagoji, Paul Schmitt, Francesco Bronzino, and Nick Feamster. Netdiffusion: Network data augmentation through protocol-constrained traffic generation. In *Proceedings of the ACM on Measurement and Analysis of Computer Systems (SIGMETRICS)*, pages 1–14, Venice, Italy, 2024.

[3] Andrew Chu, Xi Jiang, **Shinan Liu**, Arjun Bhagoji, Francesco Bronzino, Paul Schmitt, and Nick Feamster. Feasibility of state space models for network traffic generation. In *Proceedings of the 2024 SIGCOMM Workshop on Networks for AI Computing (NAIC)*, pages 9–17, 2024.

Training: Merge Multi-modal Information

[4] **Shinan Liu**, Tarun Mangla, Ted Shaowang, Jinjin Zhao, John Paparrizos, Sanjay Krishnan, and Nick Feamster. Amir: Active multimodal interaction recognition from video and network traffic in connected environments. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT/UbiComp)*, Cancun, Mexico, 2023.

Inference: Handle Large Traffic Volume on Commodity Hardware

[5] **Shinan Liu**, Ted Shaowang, Gerry Wan, Jeewon Chae, Jonatas Marques, Sanjay Krishnan, and Nick Feamster. Serveflow: A fast-slow model architecture for network traffic analysis. In *Submission*, 2024.

[6] Gerry Wan, **Shinan Liu**, Francesco Bronzino, Nick Feamster, and Zakir Durumeric. Cato: End-to-end optimization of ml-based traffic analysis pipelines. In *Submission*, 2024.

[7] Xi Jiang, **Shinan Liu**, Saloua Naama, Francesco Bronzino, Paul Schmitt, and Nick Feamster. Ac-dc: Adaptive ensemble classification for network traffic identification. In *Submission.*, 2023.

Monitoring and Adaptation: Deal with Evolving Networks

[8] **Shinan Liu**, , Francesco Bronzino, Paul Schmitt, Arjun Nitin Bhagoji, Nick Feamster, Hector Garcia Crespo, Timothy Coyle, and Brian Ward. Leaf: Navigating concept drift in cellular networks. In *Proceedings of the ACM SIGCOMM International Conference on Emerging Networking Experiments and Technologies (CoNEXT)*, pages 1–12, Paris, France, 2023.

[9] **Shinan Liu**, Paul Schmitt, Francesco Bronzino, and Nick Feamster. Characterizing service provider response to the covid-19 pandemic in the united states. In *Proceedings of the Passive and Active Measurement Conference (PAM)*, pages 20–38, Brandenburg, Germany, 2021.

[10] **Shinan Liu**, Francesco Bronzino, Paul Schmitt, Nick Feamster, Ricardo Borges, Hector Garcia Crespo, and Brian Ward. Understanding model drift in a large cellular network. In *Proceedings of Annual Conference on Machine Learning and Systems Practical Adoption Challenges of ML for Systems in Industry (MLSys PACMI)*, Santa Clara, CA, 2022.

[11] Francesco Bronzino, Nick Feamster, **Shinan Liu**, James Saxon, and Paul Schmitt. Mapping the digital divide: Before, during, and after covid-19. In *Proceedings of The 48th research conference on communication, information and internet policy (TPRC)*, 2021.

Network Security and Privacy

[12] **Shinan Liu***, Xiang Cheng*, Hanchao Yang, Yuanchao Shu, Xiaoran Weng, Ping Guo, Kexiong Curtis Zeng, Gang Wang, and Yaling Yang. Stars can tell: a robust method to defend against gps spoofing attacks using off-the-shelf chipset. In *Proceedings of the USENIX Security Symposium (USENIX Security)*, pages 3935–3952, 2021.

[13] Kexiong Curtis Zeng, **Shinan Liu**, Yuanchao Shu, Dong Wang, Haoyu Li, Yanzhi Dou, Gang Wang, and Yaling Yang. All your gps are belong to us: Towards stealthy manipulation of road navigation systems. In *Proceedings of the USENIX Security Symposium (USENIX Security)*, pages 1527–1544, 2018.

[14] Kexiong Curtis Zeng, Yuanchao Shu, **Shinan Liu**, Yanzhi Dou, and Yaling Yang. A practical gps location spoofing attack in road navigation scenario. In *Proceedings of the International Workshop on Mobile Computing Systems and Applications (HotMobile)*, pages 85–90, 2017.

[15] Stefany Cruz, Logan Danek, **Shinan Liu**, Christopher Kraemer, Zixin Wang, Nick Feamster, Danny Yuxing Huang, Yaxing Yao, and Josiah Hester. Toward identifying home privacy leaks using augmented reality. In *Proceedings of the Symposium on Usable Security and Privacy (NDSS USEC)*, San Diego, CA, 2023.

[16] Junjie Shen, Jun Yeon Won, **Shinan Liu**, Qi Alfred Chen, and Alexander Veidenbaum. Poster: Security analysis of multi-sensor fusion based localization in autonomous vehicles. In *Proceedings of Network and Distributed System Security Symposium (NDSS)* **Best Poster Presentation Award**, San Diego, CA, 2019.

Academic Service

2023–2024	Head, NSF ACTION Institute Student Advisory Council
2024	Program Committee Member, ACM Internet Measurement Conference (IMC) 2024
2024	Pre-review Taskforce, USENIX NSDI 2025
2020	Committee Member, IAG (International Association of Geodesy) GNSS Interference and Spoofing
2017–2024	Reviewer for multiple conferences and journals, including:
	NeurIPS, USENIX Annual Technical Conference (ATC), IEEE Transactions on Dependable and Secure Computing (TDSC), IEEE Transactions on Machine Learning in Communications and Networking, Computer Networks, IEEE Transactions on Intelligent Transportation Systems, IEEE Conference on Computer Communications (INFOCOM), EAI SecureComm, IEEE Transactions on Wireless Communications

Awards and Honors

5/40+	Daniels Fellowship, UChicago CS Department fellowship
1/30+	NDSS'19 Distinguished Poster Presentation Award, the only team who received this award
12/3000+	Best Undergrad Thesis, 1 out of 12 Students in UESTC, Sichuan, P.R. China
Top 1%	Excellent Graduate of Sichuan Province, Top 1% Student of the Province
66/All	Network Security Scholarship, 1 of 66 Undergraduate Students who won this National Award
1/200+	Highest Prize, 10th Chinese National University Students Information Security Competition

Invited Talks

2024	Speaker, "Operationalizing Machine Learning for Networks" *@Stanford University ESRG Group, Carnegie Mellon University Networking Group, UIUC SysNet Seminar, UWisc Madison System Seminar, Dartmouth College, UMass Amherst, Boston University System Seminar, Virginia Tech CS Seminar, Emerald Innovation Inc. / MIT, Tufts University, Stony Brook University Security Seminar, Cornell Tech, TTIC, Northwestern University Embodied AI Seminar, Purdue Networking Group Seminar, Columbia University, Rutgers University, OSU Security Group*
2023	Speaker, "AMIR: Active Multimodal Interaction Recognition from Video and Network Traffic in Connected Environments" *@UbiComp'23*
2022	Invited Speaker, "Towards Data-centric AI for Robust and Secure Operations in Networks" *@Georgia Tech*
2022	Speaker, "Stars Can Tell: A Robust Method to Defend against GPS Spoofing Attacks Using Off-the-shelf Chipset" *@USENIX Security'22*
2021	Speaker, University of Chicago People and Tech Seminar
2018	Co-presenter with Kexiong (Curtis) Zeng, "All Your GPS Are Belong To Us: Towards Stealthy Manipulation of Road Navigation Systems" *@USENIX Security'18*
2017	Student Keynote Speaker, "MAPRO: a GNSS protection system based on SDR and CNN" *@XDef'17*

References[1]

Prof. Nick Feamster
University of Chicago
Department of Computer Science
5730 S. Ellis Ave., Room 261
Chicago, IL 60637
feamster@uchicago.edu

Prof. Vyas Sekar
Carnegie Mellon University
Department of Electrical and Computer Engineering
4720 Forbes Avenue, RMCIC 2122
Pittsburgh, PA, 15213
vsekar@andrew.cmu.edu

Prof. Giovanni Vigna
University of California, Santa Barbara
Department of Computer Science
Harold Frank Hall, Room 2165
Santa Barbara, CA 93106
vigna@ucsb.edu

Prof. Sanjay Krishnan
University of Chicago
Department of Computer Science
5730 S. Ellis Ave., Room 243
Chicago, IL 60637
skr@cs.uchicago.edu

Dr. Arjun Bhagoji
University of Chicago
Department of Computer Science
5730 S. Ellis Ave., Room 263
Chicago, IL 60637
abhagoji@uchicago.edu

[1]Contact details available on request.