Shinan Liu

Assistant Professor
Department of Data and Systems Engineering,
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Current Employment

UNIVERSITY OF HONG KONG   *Hong Kong SAR, P.R. China*

Assistant Professor @ the Department of Data and Systems Engineering

Lab Director and Principal Investigator,
Networked AI Systems and Security (NAISS) Lab

Education

UNIVERSITY OF CHICAGO   *Illinois, USA*

Ph.D. in Computer Science. June 2025
Thesis: Operational Learning Systems for Network Data Intelligence
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

Machine Learning Systems, Networking, Security

Experience

2019–2025 **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.

2022 **Research Intern (Worked with Dr. Chaoyang He)**   FedML.ai Inc., *Los Angeles, CA, USA*

Designed an end-to-end MLOps pipeline that monitors model performance and helps explain and mitigate drifts.
Built a serving framework that supports model optimization and deployment.

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.

2018	**Research Assistant**	NISL, Tsinghua University, *Beijing, P.R. China*

Designed a course in Wireless Security (Mentored by Prof. Jianwei Zhuge and Prof. Haixin Duan). Taught mobile security to developers from China Mobile Wireless at the Research Center.

2016–2019	**Research Assistant (Mentored by Dr. Yuanchao Shu & Dr. Kexiong Zeng)** Microsoft Research Asia & Virginia Tech, *Remote*	

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.

Awards and Honors

5/Applicants	Carnegie Bosch Fellowship, Carnegie Bosch Institute and ECE Department of CMU
1/Applicants	ACTION AI PostDoc Fellowship
38/Worldwide	Rising Star in ML and Systems, MLCommons 2025
94/U.S.	NSF NeTS Early-Career Investigators Travel Grant
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/China 2018 UG	Network Security Scholarship, 1 of 66 Undergraduate Students who won this National Award
1/200+ Teams	Highest Prize, 10th Chinese National University Students Information Security Competition

Research and Publications

Preprints

[1] **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*, 2025.

[2] Xi Jiang, **Shinan Liu**, Saloua Naama, Francesco Bronzino, Paul Schmitt, and Nick Feamster. Ac-dc: Adaptive ensemble classification for network traffic identification. In *Submission.*, 2025.

[3] Weisi Yang, **Shinan Liu**, Feng Xiao, Nick Feamster, and Stephen Xia. Towards scalable defenses against intimate partner infiltrations. In *Submission*, 2025.

[4] Ted Shaowang, **Shinan Liu**, Jonatas Marques, Nick Feamster, and Sanjay Krishnan. Algorithmic data minimization for machine learning over internet-of-things data streams. In *Submission*, 2025.

[5] Ragini Gupta, **Shinan Liu**, Ruixiao Zhang, Xinyue Hu, Pranav Kommaraju, Xiaoyang Wang, Hadjer Benkraouda, Nick Feamster, and Klara Nahrstedt. Generative active adaptation for drifting and imbalanced network intrusion detection. In *Submission*, 2025.

[6] Andrew Chu, Xi Jiang, **Shinan Liu**, Arjun Bhagoji, Francesco Bronzino, Paul Schmitt, and Nick Feamster. Netssm: Multi-flow and state-aware network trace generation using state-space models. In *Submission*, 2025.

Conference

[7] Xiang Cheng, Hanchao Yang, **Shinan Liu**, and Yaling Yang. Distributed multi-antenna gps spoofing attack using off-the-shelf devices. In *Proceedings of the ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec)* **Best Full Paper Award**, pages 28–39, 2025.

[8] Gerry Wan, **Shinan Liu**, Francesco Bronzino, Nick Feamster, and Zakir Durumeric. Cato: End-to-end optimization of ml-based traffic analysis pipelines. In *Proceedings of USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, 2025.

[9] 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.

[10] **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.

[11] **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.

[12] 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.

[13] **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.

[14] **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.

[15] 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.

[16] 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.

Workshop

[17] Fenghao Dong, Yucheng Yin, **Shinan Liu**, Giulia Fanti, and Vyas Sekar. Tackling long-term network trace retention challenges using deep generative compression. In *The NDSS 2025 Workshop on SOC Organization and Construction (WOSOC'25)*, February 2025.

[18] 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.

[19] 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.

[20] **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.

[21] Xi Jiang, **Shinan Liu**, Saloua Naama, Francesco Bronzino, Paul Schmitt, and Nick Feamster. Towards designing robust and efficient classifiers for encrypted traffic in the modern internet. In *IAB Workshop on Management Techniques in Encrypted Networks (M-TEN)*, October 2022.

[22] Francesco Bronzino, Elizabeth Cully, Nick Feamster, **Shinan Liu**, Jason Livingood, and Paul Schmitt. Interconnection changes in the united states. In *IAB COVID-19 Workshop*, January 2021.

[23] 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.

Poster

[24] 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

2023–2025	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
2017–2025	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

Teaching and Mentoring Experience

Teaching

2022	**Student Instructor**, 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.

Mentoring

UChicago	**Xi (Chase) Jiang**, Ph.D. student, coauthored [2,7,16,17,19], working on multiple follow-ups.
UChicago	**Van Tran**, Ph.D. student.
UChicago	**Ronghua Li**, Visiting Ph.D. student (from PolyU Hong Kong).
UChicago	**Johann Hugon**, Visiting Ph.D. student (from ENS Lyon).
UIUC	**Ragini Gupta**, Ph.D. student. coauthored [5], working on a follow-up.
Northwestern	**Weisi Yang**, Ph.D. student (UESTC UG, UChicago intern). coauthored [3], working on a follow-up.
CMU	**Fenghao Dong**, Ph.D. student. coauthored [15], working on an extension.
UChicago	**Jeewon Chae**, Master student -> Meta. coauthored [1].

UChicago	**Rahim Rasool**, Master student -> data scientist at UChicago DSI.
UChicago	**Jasmine Huang**, Master student -> Meta -> ServiceNow.
CMU	**Goutam Mukku**, Master student.
CMU	**Anirudh Mani**, Undergraduate student.
CMU	**Ayca Bulbul**, Undergraduate student.

Invited Talks

2024-2025	Speaker, "Weaving Intelligence into Network Operations" *@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 ECE Seminar, Purdue Networking Group Seminar, Columbia University, Rutgers University, OSU Security Group, Williams College, DePaul Univerisity, HKUST Guangzhou, NJIT, Clemson, Nokia Bell Labs, University of Alberta, University of Hong Kong*
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*