

Yunming Xiao

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RESEARCH INTERESTS

I am broadly interested in computer networks. My current research focuses on enhancing the security, privacy, and reliability of Internet infrastructure and services.

EDUCATION

Ph.D., Computer Science Sep 2019 - Jun 2024
Northwestern University, Evanston, IL
Thesis: *Revising System Premises For a Secure and Private Web*
Advisor: Aleksandar Kuzmanovic

B.Eng., Computer Science Sep 2015 - Jun 2019
Beijing University of Posts and Telecommunications, Beijing, China

RESEARCH AND WORK EXPERIENCE

University of Michigan, Ann Arbor, MI Jun 2024 - *Present*
Research Fellow, Advisor: *Prof. Ang Chen*

Northwestern University, Evanston, IL Sep 2019 - May 2024
Research Assistant, Advisor: *Prof. Aleksandar Kuzmanovic*

Hewlett Packard Labs, Milpitas, CA May - Aug 2022 (Full time) & Jan 2023 - Jan 2024 (Part-time)
Research Intern, Networking and Distributed Systems Lab, Host: *Dr. Puneet Sharma*

Google, New York City, NY Sep - Dec 2022
Software Engineering Intern, Technical Systems & Infrastructure (TI)

Nokia Bell Labs, Murray Hill, NJ (Remote) Jun - Aug 2021
Networking Bell Labs Summer Intern, Host: *Dr. Matteo Varvello, Dr. T.V. Lakshman*

Bytedance, Beijing, China Mar - Jul 2019
Infrastructure R&D Intern

Tsinghua University, Beijing, China Mar 2018 - Mar 2019
Research Assistant, Host: *Prof. Wenfei Wu*

King Abdullah University of Science and Technology, Jeddah, KSA Jul - Oct 2018
Visiting Student, Host: *Prof. Marco Canini*

GRANTS AND AWARDS

Co-lead the development of NSF grant CNS-2310927: “Privacy-Preserving and Censorship-Resistant Domain Name System” (\$750K, PI: Aleksandar Kuzmanovic, Co-PI: Xiao Wang).

Co-lead the development of NSF grant CNS-2226107: “Enabling Streaming Analytics at the Network Edge” (\$400K, PI: Aleksandar Kuzmanovic).

EuroSys Best Student Paper Award, 2024
Northwestern University PhD Terminal Year Fellowship, 2023
Travel Grant For ACM HotNets’23
HPE Best-in-Class Technical Competition Award, 2022
Distinguished Undergraduate Student in Beijing, 2019

PUBLICATIONS

(* Equal Contribution)

Conference Publications

- [C10] J Lu, **Y Xiao**, S Chakraborty, S Fu, Y Ji, A Chen, M Chowdhury, N Rao, S Ratnasamy, X Wang
OpenInfra: A Co-simulation Framework for the Infrastructure Nexus.
In *HotInfra'24*.
- [C9] C Miao*, Z Zhong*, **Y Xiao***, F Yang*, S Zhang*, C Lu, J Geng, Y Wang, X Zhou, Y Jiang,
Z Bai, C Yang:
MegaTE: Extending WAN Traffic Engineering to Millions of Endpoints.
In Proceedings of *SIGCOMM'24*.
- [C8] **Y Xiao**, DZ Tootaghaj, A Dhakal, L Cao, P Sharma, A Kuzmanovic:
Conspirator: SmartNIC-Aided Control Plane for Distributed ML Workloads.
In Proceedings of *USENIX ATC'24*.
- [C7] **Yunming Xiao**, Yibo Zhao, Sen Lin, Aleksandar Kuzmanovic:
Snatch: Online Streaming Analytics at the Network Edge.
In Proceedings of *EuroSys'24*. **Best Student Paper Award!**
- [C6] C Miao*, **Y Xiao***, M Canini, R Dai, S Zheng, J Wang, J Bu, A Kuzmanovic, Y Wang:
TENSOR: Lightweight BGP Non-Stop Routing.
In Proceedings of ACM *SIGCOMM'23*.
- [C5] **Yunming Xiao**, Matteo Varvello:
FIAT: Frictionless Authentication of IoT Traffic.
In Proceedings of ACM *CoNEXT'22*.
- [C4] **Yunming Xiao**, Sarit Markovich, Aleksandar Kuzmanovic:
Blockchain Mining: Optimal Resource Allocation.
In Proceedings of ACM Advances in Financial Technologies (*AFT'22*).
- [C3] **Yunming Xiao**, Matteo Varvello, Aleksandar Kuzmanovic:
Monetizing Spare Bandwidth: the Case of Distributed VPNs.
In Proceedings of the ACM on Measurement and Analysis of Computing Systems (*SIGMETRICS'22*).
- [C2] Marc Anthony Warrior, **Yunming Xiao**, Matteo Varvello, Aleksandar Kuzmanovic:
De-Kodi: Understanding the Kodi Ecosystem.
In Proceedings of The Web Conference 2020 (*WWW'20*).
- [C1] **Yunming Xiao**, Haifeng Sun, Zirui Zhuang, Jingyu Wang, Qi Qi:
Common Knowledge Based Transfer Learning for Traffic Classification.
IEEE 43rd Conference on Local Computer Networks (*LCN'18*).

Journal Publications

- [J5] **Yunming Xiao**, Matteo Varvello, Marc Anthony Warrior, Aleksandar Kuzmanovic:
Decoding the Kodi Ecosystem.
ACM Transactions on the Web (*TWEB*). 2023.
- [J4] P Wang, Z Wei, H Qi, S Wan, **Y Xiao**, G Sun, Q Zhang:
Mitigating Poor Data Quality Impact with Federated Unlearning for Human-Centric Metaverse.
IEEE Journal on Selected Areas in Communications (*JSAC*). 2023.
- [J3] Aritra Dutta, El Houcine Bergou, **Yunming Xiao**, Marco Canini, Peter Richtárik:
Direct Nonlinear Acceleration.
EURO Journal on Computational Optimization. 2022.

- [J2] P Wang, Y Zhao, MS Obaidat, Z Wei, H Qi, C Lin, **Y Xiao**, Q Zhang:
Blockchain-Enhanced Federated Learning Market with Social Internet of Things.
IEEE Journal on Selected Areas in Communications (*JSAC*). 2022.
- [J1] **Yunming Xiao**, Bin Wu:
Close spatial arrangement of mutants favors and disfavors fixation.
PLoS Computational Biology, 15(9), e1007212. 2019.

Refereed Demos/Posters

- [D4] **Yunming Xiao**, Mushtari Sadia, Ang Chen:
Multi-modal Swarm Intelligence for Secure UAV Missions.
GENZERO 2024 Workshop.
- [D3] **Yunming Xiao**, Chenkai Weng, Ruijie Yu, Peizhi Liu, Matteo Varvello, Aleksandar Kuzmanovic:
Demo: PDNS: A Fully Privacy-Preserving DNS.
In Proceedings of *SIGCOMM'23*.
- [D2] **Yunming Xiao**, Matteo Varvello:
FIAT: Frictionless Authentication of IoT Traffic.
In Proceedings of ACM *CoNEXT'21*.
- [D1] **Yunming Xiao**, Matteo Varvello, Aleksandar Kuzmanovic:
A First Look Into Distributed VPNs.
In the 21st ACM Internet Measurement Conference (*IMC'21*).

Un-refereed & Working Papers

- [W6] Shihan Lin, Suting Chen, **Yunming Xiao**, Yanqi Gu, Xiaowei Yang, Aleksandar Kuzmanovic:
PreAcher: Secure and Practical Password Pre-Authentication by Content Delivery Networks.
In Submission.
- [W5] **Y Xiao**, A Kuzmanovic, Y Yang, X Li, D Gu, M Wan, C Pei, J Wang, C Miao:
UPath: Unified Packet Tracing and Analysis for Heterogeneous Cloud Gateways.
In Submission.
- [W4] C Miao*, **Y Xiao***, D Gu, J Wang, Y Yang, M Wan, C Pei, A Kuzmanovic, Z Liu:
Seamless Migration of Stateful Gateway in Large-Scale Cloud.
In Submission.
- [W3] Y Liu*, **Y Xiao***, X Li, Z He, H Liu, W Dang, A Kuzmanovic, J Wang, C Miao:
Unlocking ECMP Programmability for Precise Traffic Control.
In Submission.
- [W2] **Yunming Xiao**, Yiwei Du, Matteo Varvello, Pengfei Wang, Linghe Kong:
Third-Party Frictionless Authentication For Home IoT Traffic.
In Submission.
- [W1] **Yunming Xiao**, Chenkai Weng, Ruijie Yu, Peizhi Liu, Matteo Varvello, Aleksandar Kuzmanovic:
PDNS: Collusion Resistant DNS With Private Information Retrieval.
In Submission.

PATENTS

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- [P4] Diman Zad Tootaghaj, **Yunming Xiao**, Aditya Dhakal, Puneet Sharma:
Job Allocations to Fractions of Parallel Processing Units.
Filed on June 2024.

- [P3] Diman Zad Tootaghaj, **Yunming Xiao**, Aditya Dhakal, Puneet Sharma:
DMA Transfers of Job Data From an Adapter to Parallel Processing Unit Fractions.
Filed on June 2024.
- [P2] **Yunming Xiao**, Diman Zad Tootaghaj, Aditya Dhakal, Puneet Sharma:
Conspirator: A SmartNIC Aided Control Plane for Distributed Machine Learning Workloads.
Filed on September 2023.
- [P1] Diman Zad Tootaghaj, **Yunming Xiao**, Aditya Dhakal, Puneet Sharma:
Job Allocations To Graphics Processing Units With Tenant Isolation.
Filed on April 2023.

TEACHING AND MENTORING EXPERIENCE

Teaching

Teaching Assistant, Northwestern University

- COMP_SCI 397/497: Selected Topics in Computer Networks – Spring 2021, 2022, 2023, 2024
- COMP_SCI 340: Intro to Computer Networking – Winter 2022
- COMP_SCI 110: Intro to Computer Programming – Fall 2020

Mentoring

- Mushtari Sadia (PhD student @ UMich): co-authored [D4], working on the extension
- Archit Bhatnagar (PhD student @ UMich): working on a privacy-preserving advertisement system project
- Jiaheng Lu (undergraduate @ UMich): co-authored [C10], working on the extension
- Suting Chen (undergraduate @ ShanghaiTech → PhD student @ Northwestern): co-authored [W6]
- Yibo Zhao (undergraduate @ ShanghaiTech → PhD student @ UMD): co-authored [C7]
- Yiwei Du (master student @ Rice University): co-authored [W2]
- Peizhi Liu (undergraduate → PhD student @ Northwestern) co-authored [D3] and [W1]
- Ruijie Yu (master student @ Northwestern → software engineer @ Alibaba): co-authored [D3] and [W1]
- Grayson Donnelly (undergraduate @ Northwestern): worked on extension of the Snatch project [C7]. He won the McCormick Summer Undergraduate Research Award in 2022.

INVITED & CONFERENCE TALKS

USENIX ATC 2024, “Conspirator: SmartNIC-Aided Control Plane for Distributed ML Workloads”, Santa Clara, CA, July 2024.

Hewlett Packard Labs, “Conspirator: SmartNIC-Aided Control Plane for Distributed ML Workloads”, Milpitas, CA (Remote), July 2024.

EuroSys 2024, “Snatch: Online Streaming Analytics at the Network Edge”, Athens, Greece (Remote), April 2024.

University of Texas at Arlington, “Renovating Internet Services: Towards a Secure, Private, and Reliable Web”, March 2024.

The University of Houston, “Renovating Internet Services: Towards a Secure, Private, and Reliable Web”, February 2024.

HKUST-GZ, “Renovating Internet Services: A New Paradigm for a Secure, Private, and Reliable Online Infrastructure”, Guangzhou, China (Remote), January 2024.

Rice University, “Renovating Internet Services: A New Paradigm for a Secure, Private, and Reliable Online Infrastructure”, Houston, TX, November 2023.

Illinois Institute of Technology, “Tensor: Lightweight BGP Non-Stop Routing”, Chicago, IL, October 2023.

SIGCOMM 2023, “Tensor: Lightweight BGP Non-Stop Routing”, New York City, NY, September 2023.

CoNEXT 2022, “FIAT: Frictionless Authentication of IoT Traffic”, Rome, Italy (Remote), December 2022.

Nokia Bell Labs, “FIAT: Frictionless Authentication of IoT Traffic”, Murray Hill, NJ, November 2022.

SIGMETRICS 2022, “Monetizing Spare Bandwidth: The Case of Distributed VPNs”, Mumbai, India (Remote), June 2022.

SERVICE

Program Committee Member

ACM CCS 2025

APNet 2025

ACM SIGCOMM 2023 Artifact Evaluation

ACM SOSP 2023 Artifact Evaluation

ACM SIGCOMM 2022 Artifact Evaluation

Reviewer

ACM SIGCOMM Computer Communication Review (CCR)

IEEE Journal on Selected Areas in Communications (JSAC)

Journal of Systems Architecture (JSA)

IEEE Transactions on Sustainable Computing

REFERENCES

- Aleksandar Kuzmanovic (Doctoral Advisor)
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- Ang Chen
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