Yunming Xiao

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RESEARCH INTEREST

I am broadly interested in computer networks. My current research focuses on two primary directions: (i) enhancing the security and privacy measures of various Internet services, and (ii) advancing the reliability of data center networks, aiming to minimize downtime.

EDUCATION

Ph.D. Candidate, Computer Science — Sep 2019 - *Present*
Northwestern University, Evanston, IL
Advisor: *Prof. Aleksandar Kuzmanovic*

B.Eng., Computer Science — Sep 2015 - Jun 2019
Beijing University of Posts and Telecommunications, Beijing, China
GPA: 3.7/4.0 (87/100), Graduated with Honors

RESEARCH AND WORK EXPERIENCE

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

- *[Privacy] PDNS: A Fully Privacy Preserving DNS*
  - Proposed and developed PDNS, a novel DNS system that provides full privacy perseverance to users by leveraging the single-server Private Information Retrieval (PIR) techniques
- *[Privacy] Snatch: Streaming Analytics at the Network Edge*
  - Proposed and developed Snatch, a system that enhances user privacy and accelerates online streaming analytics by breaking the current arrangement and leveraging semantic cookies
- *[Privacy] Monetizing Spare Bandwidth: the Case of Distributed VPNs*
  - Performed the first systematic measurement study of the decentralized VPNs ecosystem
- *[Security & Privacy] Decoding the Kodi Ecosystem*
  - Perform the first systematic measurement study of Kodi's decentralized ecosystem
  - My developed system SafeKodi has received multiple media coverage and is used by over 30K users
- *[Reliability] TENSOR: Lightweight BGP Non-Stop Routing*
  - Proposed TENSOR which achieves BGP non-stop routing without relying on kernel modification
  - TENSOR has been deployed in Tencent data centers
- *[Reliability] Fast And Practical Network Failover By Deterministic Re-Pathing*
  - Proposed a fast and practical network failover solution based on *deterministic* flow re-pathing

Teaching Assistant:

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

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

- Proposed a SmartNIC-aided control framework for machine learning workloads orchestration

→ *Winner of the Best-in-Class Technical Competition Award (2nd Place)*

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

- Built the first prototype for migrating the network transport for Keystore service from gRPC to Pony Express

Nokia Bell Labs, Murray Hill, NJ (Remote) Jun - Aug 2021
Networking Bell Labs Summer Intern, Host: *Dr. Matteo Varvello, Dr. T.V. Lakshman*
- *[Security] FIAT: Frictionless Authentication of IoT Traffic*
  - Built FIAT, a third-party system that frictionlessly authorizes IoT traffic by learning recurring traffic and validating human actions behind less predictable traffic

Bytedance, Beijing, China Mar - Jul 2019
Infrastructure R&D Intern
- Worked on Cronjob and FaaS systems of Bytedance Cloud

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*

Beijing University of Posts and Telecommunications, Beijing, China Jul 2017 - Feb 2018
Research Assistant, Host: *Prof. Bin Wu, Prof. Jingyu Wang*

PUBLICATIONS

(* Equal Contribution)

Conference Publications

- [6] **Yunming Xiao**, Yibo Zhao, Sen Lin, Aleksandar Kuzmanovic:
  Snatch: Online Streaming Analytics at the Network Edge.
  To appear in *EuroSys'24*.

- [6] 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*.

- [5] **Yunming Xiao**, Matteo Varvello:
  FIAT: Frictionless Authentication of IoT Traffic.
  In Proceedings of ACM *CoNEXT'22*.

- [4] **Yunming Xiao**, Sarit Markovich, Aleksandar Kuzmanovic:
  Blockchain Mining: Optimal Resource Allocation.
  In Proceedings of ACM Advances in Financial Technologies (*AFT'22*).

- [3] **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*).

- [2] Marc Anthony Warrior, **Yunming Xiao**, Matteo Varvello, Aleksandar Kuzmanovic:
  De-Kodi: Understanding the Kodi Ecosystem.
  In Proceedings of The Web Conference 2020 *(WWW'20)*.

- [1] **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)*, short paper.

Journal Publications

- [4] **Yunming Xiao**, Matteo Varvello, Marc Anthony Warrior, Aleksandar Kuzmanovic:
  Decoding the Kodi Ecosystem.
  ACM Transactions on the Web *(TWEB)*. 2023.

- [3] Aritra Dutta, El Houcine Bergou, **Yunming Xiao**, Marco Canini, Peter Richtárik:
  Direct Nonlinear Acceleration.
  EURO Journal on Computational Optimization. 2022.

- [2] 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.

- [1] **Yunming Xiao**, Bin Wu:
  Close spatial arrangement of mutants favors and disfavors fixation.
  PLoS Computational Biology, 15(9), e1007212. 2019.

Refereed Demos/Posters

- [3] **Yunming Xiao**, Chenkai Weng, Ruijie Yu, Peizhi Liu, Matteo Varvello, Aleksandar Kuzmanovic:
  Demo: PDNS: A Fully Privacy-Preserving DNS.
  In Proceedings of *SIGCOMM'23*.

- [2] **Yunming Xiao**, Matteo Varvello:
  FIAT: Frictionless Authentication of IoT Traffic.
  In Proceedings of ACM *CoNEXT'21*.

- [1] **Yunming Xiao**, Matteo Varvello, Aleksandar Kuzmanovic:
  A First Look Into Distributed VPNs.
  The 21st ACM Internet Measurement Conference *(IMC'21)*.

Un-refereed & Working Papers

- [2] Y Liu*, **Y Xiao***, C Miao, X Li, Z He, H Liu, W Dang, A Kuzmanovic, J Wang:
  Omitted for double-blind review.
  On Submission.

- [1] **Yunming Xiao**, Chenkai Weng, Ruijie Yu, Peizhi Liu, Matteo Varvello, Aleksandar Kuzmanovic:
  Omitted for double-blind review.
  On Submission.

PATENTS

[2] **Yunming Xiao**, Diman Zad Tootaghaj, Aditya Dhakal, Puneet Sharma:
Smart Network Interface Card Control Plane For Distributed Machine Learning Workloads.
On Submission.

[1] Diman Zad Tootaghaj, **Yunming Xiao**, Aditya Dhakal, Puneet Sharma:
Job Allocations To Graphics Processing Units With Tenant Isolation.
On Submission.

GRANTS

Helped with the proposal for NSF grant CNS-2310927: "Privacy-Preserving and Censorship-Resistant Domain Name System" ($750K, PI: Aleksandar Kuzmanovic, Co-PI: Xiao Wang).

Helped with the proposal for NSF grant CNS-2226107: "Enabling Streaming Analytics at the Network Edge" ($400K, PI: Aleksandar Kuzmanovic).

INVITED & CONFERENCE TALKS

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.

SERVICES

Program Committee member, ACM SIGCOMM 2023 Artifact Evaluation
Program Committee member, ACM SOSP 2023 Artifact Evaluation
Program Committee member, ACM SIGCOMM 2022 Artifact Evaluation
Reviewer, ACM SIGCOMM Computer Communication Review (CCR)
Reviewer, IEEE Journal on Selected Areas in Communications (JSAC)
Reviewer, Journal of Systems Architecture (JSA)