Sean Nian

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Education

University of Illinois Urbana-Champaign Champaign, IL
Doctor of Philosophy in Computer Science Aug. 2025 – Aug. 2031
GPA: X.X/4.0

San Jose State University San Jose, CA
Bachelor of Science in Computer Science with Honors Aug. 2021 – Dec. 2024
GPA: 3.95/4.0

Publications

K. Hollingsworth, **S. Nian**, A. Gutierrez, and A. Padmanabhan. *An Analysis of Network Overhead in Distributed TinyML.* [Short Paper]. IEEE/ACM Symposium on Edge Computing (SEC), Rome, Italy, 2024, pp. 449-455. DOI: 10.1109/SEC62691.2024.00051.

S. Nian and G. Ishigaki. *Autoscaling in Knative for Serverless Computing Using Deep Reinforcement Learning.* [Short Paper]. IEEE Global Communications Conference (GLOBECOM), Taipei, Taiwan, 2025. (Under Review).

Presentations

An Analysis of Network Overhead in Distributed TinyML. [Sole Presenter]. INTERACT Workshop, IEEE/ACM Symposium on Edge Computing (SEC), Rome, Italy, 2024.

An Analysis of Network Overhead in Distributed TinyML. [Poster, Co-presented]. Harvey Mudd College CS Summer Research Multi-Institutional Seminar, 2024.

Other

S. Nian, A. Huang, and B. Reed. *Building a Mastodon Compatible Java Server for ActivityPub.* [Preprint]. arXiv:2412.09011 [cs.SI], 2024. DOI: 10.48550/arXiv.2412.09011.

S. Qi, X. I. Quan, T. Park, and B. Makani. *The Role of Artificial Intelligence in Enhancing Scholarly Research – AI Tools Evaluation.* [Acknowledged Research Assistance: **S. Nian**]. Quarterly Review of Business Disciplines, vol. 11, no. 3/4, Feb. 2025, pp. 90-114.

Research

ML Systems for Serverless Computing with Dr. Genya Ishigaki Aug. 2024 – April 2025
San Jose State University

- Developed a Deep Reinforcement Learning (DRL) agent using PPO to perform simultaneous horizontal (pod count) and vertical (CPU/memory) scaling in Knative
- Achieved superior performance over native autoscalers, reducing memory consumption by up to 44% while increasing request throughput by 18.6% in high-concurrency scenarios
- Engineered a custom OpenAI Gym environment wrapping a live Kubernetes cluster to train the agent and programmatically apply scaling decisions by modifying Knative manifests in real-time

Optimizing TinyML Systems with Dr. Arthi Padmanabhan May 2024 – July 2024
Harvey Mudd College (NSF Funded REU)

- Engineered a distributed TinyML inference system using C++ on ESP32-S3 microcontrollers by partitioning a quantized TensorFlow MobileNet model and distributing intermediate computations over Bluetooth Low Energy (BLE)
- Optimized the BLE network communication protocol for enhanced fault-tolerance and energy efficiency, analyzing network overhead to reduce the distributed inference failure rate to 0%
- Authored a 6-page paper on the network overhead and challenges of distributed TinyML, accepted for publication and presentation at the INTERACT workshop at ACM/IEEE SEC 2024

Decentralized Social Media Networks with Dr. Ben Reed Jun. 2023 – May 2024
San Jose State University

- Explored decentralized social media networks by analyzing the ActivityPub Protocol's architecture
- Engineered moth, an open-source ActivityPub server in Java, by implementing RESTful API endpoints with JSON payloads using Spring WebFlux to ensure robust decentralized communication
- Reverse-engineered Mastodon's client-server API by analyzing network traffic with Wireshark, enabling full compatibility between our moth server and the official Mastodon web frontend

Industry Experience

PACCAR Silicon Valley Innovation Center May 2025 – Present
R&D Software Engineer Intern

- Engineered a real-time, edge-to-cloud data pipeline on an embedded Linux system to stream data from AI-powered cameras and vehicle sensors for ML model serving
- Enhanced an in-cab Android application (Kotlin) by developing new UI components and optimizing backend C modules for efficient inter-process communication (IPC) and data processing
- Validated the end-to-end data acquisition system by conducting in-field truck testing and performing research on SAE/ISO standards to inform system design and ensure data compliance
- Developed and presented a dynamic project dashboard to the Board of Directors, built with Next.js, React, and TypeScript to visualize real-time vehicle data and system status

Awards

2025 NSF Graduate Research Fellow
2024 NSF Student Travel Grant IEEE/ACM SEC – $1,700
2021 SJSU Gail Fullerton Endowment – $1,000
2021 SJSU XILINX Scholarship – $2,500

References

Dr. Genya Ishigaki
Assistant Professor of Computer Science at San Jose State University, Email: genya.ishigaki@sjsu.edu.

Dr. Arthi Padmanabhan
Assistant Professor of Computer Science at Harvey Mudd College, Email: arpadmanabhan@g.hmc.edu.

Dr. Ben Reed
Assistant Professor of Computer Engineering at San Jose State University, Email: ben.reed@sjsu.edu.