Jared Macshane

Ph.D. Student in Computer Science

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Research Summary

My research develops distributed machine-learning systems for resource-constrained edge and split-computing environments. I focus on adaptive neural compression, progressive inference, and task-informed deployment for wildfire intelligence, environmental monitoring, and disaster-resilience systems.

Education

2023–Present **Ph.D. in Computer Science**, *University of California, Irvine*
- Distributed Systems Middleware Group

Dec 2022 **M.S. in Computer Science**, *California State University San Marcos*
- Constructing Trail Networks from Public GPS Data using Growing Self-Organizing Maps

June 2017 **B.S. in Mathematics**, *University of California, Santa Barbara*

Publications

Under Review Macshane, J., et al. "MANTIS: Modulated Adaptive Neural Compression for Task-Informed Split Computing."

2025 Macshane, J., Venkatasubramanian, K., and Li, Y. "ADAPT: Automated Decision-flow for Adaptive Progressive Inference on Sensor Devices." Proceedings of the Middleware for Autonomous AIoT Systems in the Computing Continuum (MAIoT), pp. 19–24. doi:10.1145/3774901.3778065

2024 Jiang, Y., et al. "Developing scalable hands-on virtual and mixed-reality science labs." Virtual Reality 28, 173.

2023 Gow, S., et al. "Miniaturization and geometric optimization of SteamVR active optical trackers." SPIE 12449.

2023 Macshane, J., and Ahmadinia, A. "AI-Assisted Trail Map Generation based on Public GPS Data." IEEE SIEDS.

Professional Experience

Aug 2025 – Dec 2025 **Research Engineer Intern**, *Fixstars Solutions Inc.*
- Implemented a ROS perception pipeline using real-time object-detection models and explainable AI (XAI) techniques
- Performed statistical analysis of CAN bus waveform characteristics

May 2022 – Sept 2022 **Machine Learning Consultant**, *Ecorithms*
- Architected and deployed production semantic-segmentation models
- Optimized inference latency via model compression and deployment strategies

May 2021 – Oct 2021 **Research Fellow**, *San Diego Zoo Wildlife Alliance*
- Developed a real-time computer-vision system for wildlife monitoring
- Engineered a multithreaded video pipeline to capture, process, and archive positive wildlife detections

Awards & Achievements

2024 Dean's Fellowship — Competitive funding award for outstanding Ph.D. candidates

2024 NSF Advanced Studies Institute (ASI) Fellowship — Selected for an intensive coastal hazards research program at Tohoku University, Japan

2023 IEEE SIEDS Best Paper Award — Machine-learning approach to geospatial data

Research Projects

2024–Present **SHIELD Digital Twin Project**, *University of California, Irvine*

- Lead development of a large-scale digital-twin platform for disaster resilience and resource-aware inference
- Design progressive inference models for resource-constrained environments
- Coordinate a cross-functional team across multiple institutions

2023–2024 **Wildfire Intelligence Projects**, *University of California, Irvine*

- Developed a generative model for wildfire-spread prediction using conditional variational autoencoders (CVAEs)
- Designed supervised image-compression models reducing inputs to 4.8 KB while preserving 72.9% wildfire-detection accuracy
- Designed an edge-computing framework for distributed wildfire detection using early-exit neural networks

2021–2023 **Hands-On Virtual Reality Labs**, *California State University San Marcos*

- Developed a computer-vision tracking system using ArUco markers for precise spatial tracking
- Led user-experience studies to validate system effectiveness and improve user interaction

2022 **Geospatial Machine Learning**, *California State University San Marcos*

- Designed a machine-learning algorithm for large-scale geospatial data processing
- Developed automated trail detection for noisy GPS traces
- Implemented efficient data structures to improve computational performance

Academic and Mentoring Experience

2023–Present **Teaching Assistant**, *University of California, Irvine*

- ICS 32: Programming with Software Libraries (F23, W25)
- ICS 33: Intermediate Programming (F24)
- CSE 90: Systems Engineering and Technical Communication (W24)

2023–Present **Graduate Student Mentor**, *Zotbins Undergraduate Research Project*, University of California, Irvine

- Lead a team of undergraduate researchers developing an IoT-enabled smart-waste management system
- Manage the project lifecycle from design through iterative deployments across campus locations
- Develop an ML-based classification system to improve campus waste diversion

2023–Present **Mentor**, *IoT-SITY REU*, University of California, Irvine

- Lead development of a Unity-based disaster-simulation platform

2020–2021 **Teaching Assistant**, *California State University San Marcos*

- Math 422: Number Theory (F20), CS 231: Assembly Language and Digital Circuits (W21)

Skills

Programming Languages: Python (PyTorch, TensorFlow), C++ (CUDA), Java, JavaScript, SQL

Technologies: Computer Vision, Distributed Systems, Edge Computing, Machine Learning

Tools: Git, Docker, Linux, AWS, Google Cloud, Unity, OpenCV

Additional Experience

2018–2020 Ad Account Manager, The New Patient Machine — Managed digital healthcare ad campaigns and client ROI reporting.

2017 Mathematics Tutor, Mathnasium — Tutored students from elementary math through calculus with individualized learning plans.