Benjamin Stoler

Curriculum Vitae

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EDUCATION

Carnegie Mellon University | Pittsburgh, PA

Doctor of Philosophy in Computer Science December 2025
Master of Science in Computer Science Research May 2024
Thesis Area: Safe Autonomous Driving and Robust Social Navigation
Advisor: Prof. Jean Oh

University of Michigan | Ann Arbor, MI

Master of Science in Engineering in Computer Science April 2020
Bachelor of Science in Engineering in Computer Science May 2019
Minor in Multidisciplinary Design

RESEARCH PROJECTS

Carnegie Mellon University BIG Lab | Pittsburgh, PA

SEAL: Skill-Enabled Adversary Learning February 2024 – September 2024

- Developed a learned scoring function and adversarial skill policy, to enhance safety-critical scenario generation reactivity and fidelity, increasing adversary behavior realism by 35% over state-of-the-art baselines
- Implemented curriculum-based training with adversarially perturbed scenes, improving safety in navigation and control policies, and increasing task success rates by 20% in both in-distribution and out-of-distribution settings

SafeShift April 2023 – January 2024

- Designed a novel scenario characterization and scoring framework to evaluate robustness in trajectory prediction under safety-informed distribution shifts, across a variety of state-of-the-art models
- Developed a domain adaptation and remediation strategy, reducing prediction collision rates by 10%

T2FPV: Trajectories to First-Person View June 2022 – March 2023

- Systematized the construction of high-fidelity first-person view datasets from top-down trajectory data and conducted human path prediction experiments with realistic perception, contributing a novel error correction module
- Leveraged Unity for scene recreation and deep generative modeling for multi-modal, variational predictions
- Collaborated internationally with other research groups within the United States, United Kingdom, and France to host an IROS workshop on Social Robot Navigation with a benchmarking challenge

TrajAir August 2021 – May 2022

- Researched machine learning methods for predicting aircraft trajectories in non-towered airspaces
- Utilized clustering and vector field methods to capture movement patterns and infer pilot intent

University of Michigan EFES Lab | Ann Arbor, MI

Agamotto September 2019 – May 2020

- Designed and constructed a system to find persistent memory bugs in applications by utilizing symbolic execution
- Led investigation and experimentation on Oracle's NVM Direct framework, discovering and reporting 23 new bugs

PROFESSIONAL EXPERIENCE

Stack AV | Pittsburgh, PA March 2024 – August 2024

Research Software Engineer Intern

- Developed and implemented SEAL on internal datasets, generating safety-critical scenarios and improving autonomous driving validation through advanced scenario characterization and clustering methods
- Contributed core simulator and machine learning code, including converting internal datasets to open-source formats, injecting behavior perturbations into ROS logs, and building tools for message alignment and dataset creation

Johns Hopkins University Applied Physics Lab | Laurel, MD & Remote September 2020 – August 2023

Research Software Engineer – Robotics

- Coordinated adversarial assay and scenario generation framework for robustness in various UAV autonomy tasks

- Devised policy-agnostic metrics for measuring similarity between MDPs and improved resulting transfer performance in GridWorld environments
- Established an open-source benchmark for studying transfer and meta learning in 2D arcade settings
- Architected containerized infrastructure for a hybrid-intelligent, multi-agent system, used by both external performers and internal APL developers

Amazon Web Services | Seattle, WA June 2019 – August 2019
Software Development Engineer Intern
- Expanded an internal portal for the AWS Commerce Platform organization, enabling querying of invoices based on arbitrary constraints
- Engineered a highly extensible automated data-flow pipeline, duplicating and transforming DynamoDB NoSQL data-sources to Redshift SQL without requiring manual configuration

JPMorgan Chase & Co. | Ann Arbor, MI & Jersey City, NJ January 2018 – December 2018
Student Software Engineer – Multidisciplinary Design Program
- Launched a web-based, real-time batch monitoring dashboard, following the design-thinking process, consisting partly of user interviews, paper prototypes, and quality assurance testing
- Implemented full-stack features in Angular (TypeScript) and Spring (Java)

TEACHING EXPERIENCE

Carnegie Mellon University | Pittsburgh, PA January 2024 – Present
Teaching Assistant – Introduction to Computer Music
- Enhancing curriculum by incorporating new projects and frameworks for music information retrieval and generation
- Leading review sessions and assisting students with programming assignments in music synthesis, signal processing, and algorithmic generation

University of Michigan | Ann Arbor, MI January 2020 – April 2020
Graduate Student Instructor – Introduction to Computer Security
- Developed project structure and specifications for undergraduate computer security course
- Led coordination of weekly discussion materials, ensuring useful and consistent content between nine other TAs

SKILLS

Expertise: Machine Learning, Deep Learning, Generative Modeling, Computer Vision, Human-Robot Interaction
Languages: Python, C++, C, Java, JavaScript, MATLAB, SQL, Bash
Technologies: PyTorch, scikit-learn, Hydra, ROS, OpenCV, Bazel, AWS, Docker, Angular

PUBLICATIONS

- **Stoler, B.*,** Navarro, I.*, Jana, M., Hwang, S., Francis, J., & Oh, J. (2024). SafeShift: Safety-Informed Distribution Shifts for Robust Trajectory Prediction in Autonomous Driving. In *IEEE Intelligent Vehicles Symposium (IV 2024)*.
- **Stoler, B.,** Jana, M., Hwang, S., and Oh, J., 2023. T2FPV: Dataset and Method for Correcting First-Person View Errors in Pedestrian Trajectory Prediction. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023).*
- Patrikar, J., Dantas, J., Ghosh, S., Kapoor, P., Higgins, I., Aloor, J.J., Navarro, I., Sun, J., **Stoler, B.,** Hamidi, M. and Baijal, R., 2022. Challenges in Close-Proximity Safe and Seamless Operation of Manned and Unmanned Aircraft in Shared Airspace. In *Aerial Robotics Workshop ICRA 2022*.
- Staley, E.W., Ashcraft, C., **Stoler, B**., Markowitz, J., Vallabha, G., Ratto, C. and Katyal, K.D., 2021. Meta Arcade: A Configurable Environment Suite for Meta-Learning. In *Deep RL Workshop NeurIPS 2021.*
- Neal, I., Reeves, B., **Stoler, B.,** Quinn, A., Kwon, Y., Peter, S. and Kasikci, B., 2020. AGAMOTTO: How Persistent is your Persistent Memory Application?. In *14th USENIX Symposium on Operating Systems Design and Implementation (OSDI 20)* (pp. 1047-1064).

HONORS AND AWARDS

IEEE Micro Top Picks Honorable Mention 2021
William L. Everitt Student Award of Excellence 2019
James B. Angell Scholar 2018-2019
William J. Branstrom Freshman Prize 2017