

Brian Shu

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Available full-time May 10 – Aug 20, 2027 (Summer 2027 internship)

Research interests: Robot learning for long-horizon manipulation: imitation learning, VLA post-training, benchmarks and evaluation.

EDUCATION

Purdue University, *M.S. Computer Science* West Lafayette, IN · Aug 2026 – May 2028 (expected)
Cognitive Robot Autonomy & Learning (CoRAL) Lab, advisor Prof. Ahmed H. Qureshi

University of Hawai'i at Mānoa, *B.S. Computer Science (GPA 3.93/4.00) and B.B.A. Finance* Honolulu, HI · May 2026
Coursework: Machine Learning, Neural Networks & Deep Learning, Large Language Models, Algorithms, Software Engineering, Databases

PUBLICATIONS

P. Bushyueu*, Y. Chen*, A. Nikolaev*, **B. Shu***, I. Molybog. “Fiatlux: A Long-Horizon Benchmark for Humanoid Ladder Climbing and Light-Bulb Replacement.” arXiv:2609.38216, 2026. Under review at IEEE ICRA 2027. *equal contribution, alphabetical. fiatlux-bench.github.io

RESEARCH EXPERIENCE

CoRAL Lab, Purdue University — *Graduate Researcher (advisor Prof. Ahmed H. Qureshi)* West Lafayette, IN · Aug 2026 – Present

- Building a **general dishwasher-loading manipulation policy** in **NVIDIA Isaac Lab**; released the simulated dish assets (huggingface.co/datasets/shu4dev/dishsim-assets).
- Designed a **load-quality scoring function** that serves as the task reward, and a **dish-placement dependency graph** used as a planner heuristic.
- Developing the loading planner and robot motion generation; demonstrations will seed an **imitation-learning** policy.

Hawai'i AI Initiative (HawAI), UH Mānoa — *Research Assistant (advisor Prof. Igor Molybog)* Honolulu, HI · Mar 2026 – Sep 2026

Fiatlux benchmark — humanoid ladder climbing and bulb replacement (Isaac Lab, Unitree G1); under review at ICRA 2027

- Built the **12 subtask environments** (flat navigation, manipulation, climbing) as registered **Isaac Lab** envs with chained start states, 120 s horizons and quantitative **success gates** (e.g. ≤ 50 N hand force on a 35 g bulb).
- Built the unified scene hierarchy and **asset pipeline**: per-task preset layouts, **domain randomization** (layout, friction, lighting, materials) and image-to-mesh **USD** assets with a structural verifier (haw-ai-i/fiatlux-assets).

AI for Industry Challenge (Intrinsic & Open Robotics) — cable insertion on a UR5 in Gazebo / ROS 2

- Wrote the privileged **“cheat-code” expert policy** with force-monitored insertion and jam recovery, and generated demonstrations with **DART-style noise injection** so the learner sees recovery states; added 10 trial scenarios run on a Slurm cluster.
- Trained **ACT** and **Diffusion Policy** on the demonstrations with **LeRobot**; wrote the MCAP→LeRobot converter (shu4dev/aic-cable-insertion_sample). Scored ~100/300 in the Gazebo qualification stage.

SKILLS

Robotics & Simulation NVIDIA Isaac Lab / Isaac Sim, Gazebo, ROS 2, LeRobot, ACT, Diffusion Policy, GR00T, USD assets, Slurm

Machine Learning PyTorch, TensorFlow, scikit-learn, Hugging Face, imitation learning, RAG and LLM/VLM fine-tuning

Programming Python, C, C++, Java, JavaScript/TypeScript, SQL, Isabelle/HOL, Linux, Git

WORK EXPERIENCE

Hyundai Card — *Data Science Intern* Seoul, KR · Jun 2025 – Jul 2025

- Built a **retrieval-augmented generation (RAG)** pipeline for text-to-SQL from scratch; added **self-consistency decoding** to cut output variance and raise execution accuracy.
- Cut inference cost by migrating from a closed to an open-source model while preserving **80% execution accuracy**; ran backbone and embedding sweeps and iterated on database and knowledge-graph designs.

University of Hawai'i at Mānoa — *Software Verification Developer* Honolulu, HI · May 2024 – May 2025

- Applied **formal methods** in **Isabelle/HOL** to prove functional correctness of critical software components, following the seL4 and RT-11 file-system verification efforts.

University of Hawai'i at Mānoa — *Research Assistant* Honolulu, HI · Jun 2023 – Aug 2023

- Designed an efficient algorithm to simulate a mathematical model of biological reactions, with 2D and 3D visualization of the results.

PROJECTS

- **Data Curation for Visual-Language Reasoning** — built a pipeline that generates synthetic multimodal question-answer pairs with intermediate reasoning steps (**10K-sample DCVLR_10K** dataset) and fine-tuned **Qwen2.5-VL** on it.
- **Jane Street Real-Time Market Data Forecasting** (Kaggle) — supervised autoencoder + MLP with engineered features; ranked **440 / 3,000** (top 15%).
- **Spinner Dolphin Photo Grading Protocol** — multi-stage model that detects, rates and classifies dolphins by fin distinctiveness; automated the image pipeline and analysed environmental correlates of photo quality.
- **BirdCLEF 2024** — identified under-studied Indian bird species from spectrograms with a transfer-learned MobileNet-v2.
- **Higgs Boson Detection** — compared scikit-learn classifiers; 11th / 52 public and 12th / 52 private leaderboard.
- **OpenAI CarRacing** — 2D CNN agent with dropout trained in TensorFlow for randomly generated tracks.
- **Full Cycle TakeOut web app** — 2023 Hawai'i Annual Code Challenge (HACC) finalist; MERN and Meteor stacks for ZeroWaste O'ahu.
- **Protein folding** — hydrophobic-polar lattice model solved by recursive backtracking; sponsored by Decision Research Corp.

LEADERSHIP

- **Programming and Algorithms Club (PANDA)** — Lecturer & Curriculum Developer, Aug 2022 – Aug 2025. Designed a curriculum matched to students' level and led small-group algorithm sessions; 2023 Best Officer (Big Panda) award.
- **ACM at Mānoa** — Server Administrator & Webmaster, Oct 2023 – Oct 2024. Maintained the ACM site (ReactJS, Ruby/Jekyll) and built internal tools for the leadership team.