Matthew H. Bronars

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EDUCATION

Carnegie Mellon University, Robotics Institute – School of Computer Science   *Aug 2024 – PRESENT*
PhD: *Robotic* | Cumulative GPA: 4.3/3.0
Georgia Institute of Technology, School of Interactive Computing   *Aug 2022 – Aug 2024*
Master of Science: *Computer Science – Concentration in Computation Perception and Robotics*
Cumulative GPA: 4.0/4.0
University of California Berkeley, College of Engineering   *Aug 2017 – May 2022*
Bachelor of Science: *Electrical Engineering and Computer Science (EECS) & Mechanical Engineering*
Commendations: Dean's List (Fall 2020), Certificate in Design Innovation
Cumulative GPA: 3.7/4.0
Notable Coursework
Deep Learning, Machine Learning, Artificial Intelligence, Machine Learning with Limited Supervision, Human Robot Interaction, Multi-Robot Systems, Convex Optimization, Efficient Algorithms

RESEARCH EXPERIENCE

Graduate Research Assistant – *Katerina Fragkiadaki*, Carnegie Mellon University   *Aug 2022 – PRESENT*
- Researching foundational models for robotics – investigating how task decomposition and chain-of-thought reasoning can improve the generalizability of robot policies trained on large scale demonstration datasets
- Other interests include in-the-wild policy improvement and safe human robot interactions

Graduate Research Assistant – *Danfei Xu*, Georgia Tech   *Aug 2022 – Aug 2024*
- Researched offline imitation learning, representation learning, and data driven approaches to human robot interaction
- Developed a framework for guided diffusion policies which can autonomously generate legible robot motion

Undergraduate Research Assistant – *Lydia Sohn*, UC Berkeley   *Aug 2020 – May 2022*
- Automated analysis of stem cell data by implementing a pipeline for instance segmentation and object tracking
- Annotated and cleaned an internal training dataset then finetuned the parameters of a U-Net CNN

PROFESSIONAL EXPERIENCE

Machine Learning Intern – Symbotic   *May 2023 – Aug 2023*
- Analyzed correlations between robot failures and structural locations. Wrote procedures for validation data collection.
- Designed, implemented, and deployed machine learning models for classifying structural failures.

Computer Vision Intern – Schlumberger Doll Research   *May 2021 – Dec 2021*
- Built and trained a neural network for visual failure detection. Made a pipeline for semi-supervised data collection.
- US patent pending: Cable Damage Detection by Machine Vision

Robotics Intern – National Security Innovation Network   *May 2020 – Sept 2020*
- Designed, specified, and constructed a prototype UAV based on constrains set by the Department of the Navy.

SELECTED PAPERS

M. Bronars, S. Cheng, D. Xu, "Legibility Diffuser**:** Offline Imitation for Intent Expressive Motion." *IEEE RA-L 2024*
- TLDR; We generate legible robot motion by training a guided diffusion-based policy on multi-modal human demonstrations. This end-to-end approach does not require hand designed cost functions or classical motion planners.

V. Saxena, **M. Bronars**, N. Arachchige, K. Wang, W. Shin, S. Nasiriany, A. Mandlekar, D. Xu "What Matters in Learning From Large-Scale Datasets for Robot Manipulation" *International Conference on Learning Representations (ICLR) 2025*
- TLDR; MimicLabs is a simulation dataset and generation pipeline for systematically evaluating sources of variation in robotics datasets. We identify crucial dimensions for diversity in data collection and alignment in retrieval.

S. Kuhar, S. Cheng, S. Chopra, **M. Bronars**, D. Xu, "Learning to Discern: Imitating Heterogeneous Human Demonstrations with Preference and Representation Learning." *Conference on Robot Learning* **(***CoRL) 2023*
- TLDR; Learning to Discern (L2D) is an imitation learning framework for learning from suboptimal demonstrations. Training a quality critic in a learned latent space allows L2D to effectively generalize to unseen demonstrators.

MISC

Graduate Teaching Assistant – Deep Learning & Deep Learning for Robotics   *Aug 2023 – PRESENT*
- Created an assignment on generative models (theory and coding) for Georgia Tech's Deep Learning class.
- Created an assignment on robot learning from demonstrations for Georgia Tech's Deep Learning for Robotics class.

RoboMimic Development Team   *Dec 2022 – PRESENT*
- Help maintain the RoboMimic repository with algorithms for robot learning from human demonstrations