ELI BRONSTEIN

elibronstein.com ◇ elibronst@gmail.com

EDUCATION

University of California, Berkeley Aug 2015 - May 2019
B.S. in Electrical Engineering & Computer Science, GPA: 3.9 / 4.0
Relevant coursework: Robotics, Deep RL, ML, Convex Optimization, Probability, Linear Algebra

EXPERIENCE

Waymo Research | *Research Software Engineer* Jan 2021 - Present
· Demonstrated first large-scale application of model-based GAIL to dense, urban self-driving.
· Improved robustness of an ML planner using counterfactual data to generate zero-shot curricula. Reduced collisions by 15% and increased route adherence by 14%, while using only 10% of the training data.
· Developed a hierarchical policy consisting of a high-level search-based route generation policy, and a low-level route-conditioned motion policy based on modern transformer architectures.
· **Published** (first author) in IROS and CoRL 2022.

Symbio Robotics | *Software Engineer* Sep 2019 - Dec 2020
· Implemented automatic and efficient computation of dynamic coordinate frame velocities.
· Designed hybrid motion-force controller and trajectory generation method to obey derivative bounds.
· Created a state machine-based framework to run software- and hardware-based endurance tests.
· Integrated control platform with PyBullet to run simulated tests and simplify the development process.

Berkeley AI Research Lab (InterACT Lab) | *Undergraduate Researcher* Sep 2017 - Jun 2019
· Worked with Prof. Anca Dragan on game-theoretic hierarchical planning for human and autonomous car interaction. Combined long-horizon solution to high-level dynamic game between human and autonomous vehicle with short receding-horizon online trajectory planning. **Published** (co-first author) in ICRA 2019.
· Integrated planning codebase with a realistic driving simulator for human-robot interaction experiments.

Berkeley AI Research Lab (Hybrid Systems Lab) | *Undergraduate Researcher* Jan - May 2019
· Worked with Prof. Claire Tomlin on a real-time, reachability-based safety framework to provide safety guarantees while exploring uncertain environments. **Published** in CDC 2019.
· Deployed safety algorithm with vision-based planner on TurtleBot to navigate an office environment.

Robotics Institute at CMU | *Robotics Institute Summer Scholar* Jun 2017 - Apr 2019
· Selected to participate in REU with Prof. Stephen Smith in the Intelligent Coordination & Logistics Lab.
· Developed a robust, low-data, Bayesian hierarchical statistical model for bus dwell time prediction.
· Generalized the model, resulting in integration with an adaptive traffic signal control system.
· **Published** in Transactions on Intelligent Transportation Systems.

AWARDS

NSF Computer and Information Science and Engineering Graduate Fellowship (CSGrad4US) Recipient (2022): provides full funding for 3 years of a PhD program. See nsf.gov/cise/CSGrad4US.

NSF Research Experience for Undergraduates (REU) Scholarship Recipient (2017): funding to do research in CMU's Robotics Institute Summer Scholars Program.

Kraft Award (2015): for attaining highest scholastic records (4.0 GPA).

CONFERENCE PUBLICATIONS

E. Bronstein*, S. Srinivasan*, S. Paul*, A. Sinha, M. O'Kelly, P. Nikdel, S. Whiteson. "Embedding Synthetic Off-Policy Experience for Autonomous Driving via Zero-Shot Curricula." Conference on Robot Learning (CoRL), 2022. **Oral presentation (6.5% acceptance rate).** [PDF]

E. Bronstein, M. Palatucci, D. Notz, et al. "Hierarchical Model-Based Imitation Learning for Planning in Autonomous Driving." International Conference on Intelligent Robots and Systems (IROS), 2022. [PDF]

J.F. Fisac*, E. Bronstein*, E. Stefansson, D. Sadigh, S.S. Sastry, A.D. Dragan. "Hierarchical Game-Theoretic Planning for Autonomous Vehicles." International conference on robotics and automation (ICRA), 2019. [PDF]

A. Bajcsy, S. Bansal, E. Bronstein, V. Tolani, C.J. Tomlin. "An Efficient Reachability-Based Framework for Provably Safe Autonomous Navigation in Unknown Environments." Conference on Decision and Control (CDC), 2019. [PDF]

WORKSHOP & JOURNAL PUBLICATIONS

Y. Lu, J. Fu, G. Tucker, X. Pan, E. Bronstein, B. Roelofs, B. Sapp, B. White, A. Faust, S. Whiteson, D. Anguelov, S. Levine. "Imitation Is Not Enough: Robustifying Imitation with Reinforcement Learning for Challenging Driving Scenarios." Machine Learning for Autonomous Driving, NeurIPS 2022. [PDF]

I.K. Isukapati, C. Igoe, E. Bronstein, V. Parimi, S.F. Smith. "Hierarchical Bayesian Framework for Bus Dwell Time Prediction." Transactions on Intelligent Transportation Systems, 2020. [PDF]

PROJECTS

Grasp Transfer by Parts   Mar - May 2019

· Developed a method to transfer precomputed robust grasps to novel objects using grasping-by-parts.
· Segmented novel object into parts approximated by superquadrics, identified most similar part from object dataset using a superquadric similarity algorithm, transferred precomputed grasps from dataset part to novel object part, and evaluated quality of transferred grasp.

Multi-Teacher Single-Task Policy Distillation in Deep RL   Oct - Dec 2018

· Extended RL policy distillation to a student policy learning from multiple teacher policies.
· Framed multi-teacher case as a multi-armed bandit problem and applied contextual bandit algorithm to learn holistic policy from multiple subspace teachers.

VOLUNTEERING

International Conference on Automated Planning and Scheduling (ICAPS) volunteer (2017): assisted with telepresence robots at ICAPS, allowing remote users to virtually attend talks.

CMU Leonard Gelfand Center research presentations (2017): presented research to 3rd-5th graders to promote interest in robotics, AI, and smart transportation.

Pioneers in Engineering (2015): taught an introductory electronics class at a high school in Oakland, CA to engage students with STEM projects and promote interest in higher education.

LEADERSHIP

Working papers journal editor (2017): organized, edited, and peer-reviewed the working research papers journal for the CMU Robotics Institute Summer Scholars Program.

TECHNICAL SKILLS

Computer Languages	Python, SQL, Java
Frameworks	TensorFlow, Keras, JAX, SciPy, NumPy, Pandas, ROS