

Brett Evan Barkley

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Education

The University of Texas at Austin, PhD <i>Computer Science</i> Focus in Deep Reinforcement Learning and Robotics	2022 - Present GPA: 3.95
University of Maryland, M.S <i>Aerospace Engineering</i> Focus in Control Theory and Dynamical Systems	2015 - 2017 GPA: 3.97
University of Maryland, B.S <i>Aerospace Engineering (Honors Program)</i>	2010 - 2015 GPA: 4.00

Research Projects

Deployment and Sample Efficient Iterated Offline Reinforcement Learning via Synthetic Upsampling Research Project with Prof. David Fridovich-Keil	Austin, TX 2024
<ul style="list-style-type: none">– Investigated transforming off-policy deep reinforcement learning into a sample-efficient iterated offline RL framework.– Developed Jax implementations of Synther and MBPO, reducing training time from days to hours. Code.– Leveraged these fast generative and rollout models to explore mitigation of overestimation and overfitting in high update-to-data ratio RL training.	
Translating Open-loop Trajectory Optimization into Closed-Loop Policy Optimization Research Project with Prof. David Fridovich-Keil	Austin, TX 2023
<ul style="list-style-type: none">– Developed a novel policy optimization algorithm (D4PO) which combined the structure of iLQR/DDP with deterministic policy gradients.– Hypothesized and validated that incorporating iLQR/DDP feedback gains and value functions improves sample efficiency and reduces sensitivity to exploding gradients in reinforcement learning.– Demonstrated strong performance in contact-free environments, while highlighting challenges with managing large gradients due to contact dynamics.	
Time Symmetric Data for RL , Austin, TX Research Project with Profs. David Fridovich-Keil and Amy Zhang	Austin, TX 2023
<ul style="list-style-type: none">– Investigated the utility of time reversal symmetry in reinforcement learning. Code. Paper.– Developed a data augmentation technique (TSDA) that leverages time symmetry across a range of RL problems.– Demonstrated that TSDA can provide SOTA sample efficiency in time symmetric and asymmetric environments.	

Professional Experience

Autonomy Aerospace Engineer , Johns Hopkins University Applied Physics Lab (JHU/APL)	2017 - 2022
<ul style="list-style-type: none">– Efforts culminated in first ever combat tests between AI and human-piloted F-16s in 2023– JHU/APL's Air Combat Evolution (ACE) deep reinforcement learning (DRL) lead for sub and full-scale aircraft– Guidance, control, and aerospace simulation subject matter expert (SME) for JHU/APL ADT and ACE teams	

Technical Skills

Languages: Python, C++, Cython, Bash, CUDA
Libraries/Software: JAX, Pytorch, Flax, Brax, Git, \LaTeX

Selected Publications

1. Stealing That Free Lunch - The MDP Diversity Problem in Model-Based Reinforcement Learning
Brett Barkley, David Fridovich-Keil | In preparation for ICML 2025
2. [An Investigation of Time Reversal Symmetry in Reinforcement Learning](#)
Brett Barkley, Amy Zhang, David Fridovich-Keil | L4DC 2024