

## Education

**The University of Texas at Austin, PhD**  
*Computer Science*  
Focus in Deep Reinforcement Learning and Robotics

**2022 - Present**  
**GPA: 3.95**

**University of Maryland, M.S**  
*Aerospace Engineering*  
Focus in Control Theory and Dynamical Systems

**2015 - 2017**  
**GPA: 3.97**

**University of Maryland, B.S**  
*Aerospace Engineering (Honors Program)*

**2010 - 2015**  
**GPA: 4.00**

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## Research Projects

**Translating Open-loop Trajectory Optimization into Closed-Loop Policy Optimization**  
Research Project with Prof. David Fridovich-Keil

Austin, TX  
2023

- 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

- 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.
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## Professional Experience

**Autonomy Aerospace Engineer, Johns Hopkins University Applied Physics Lab (JHU/APL)**

2017 - 2022

- 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
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## Technical Skills

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

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## Selected Publications

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