

# Siddarth Venkatraman

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## Education

### Mila, Université de Montréal

PhD in Computer Science, Co-Supervised by Glen Berseth and Nikolay Malkin.

Sep. 2023 - Present

### Carnegie Mellon University

MS in Robotics, GPA 4.19/4.0, Advisor: Dr. Jeff Schneider

Aug. 2021 - Jun. 2023

### Manipal Institute of Technology

BTech in Computer Science, GPA 8.91/10

Jun. 2017 - Jun. 2021

## Publications

- [1] **Siddarth Venkatraman\***, Vineet Jain, Sarthak Mittal, Vedant Shah, Johan Obando-Ceron, Yoshua Bengio, Brian R. Bartoldson, Bhavya Kailkhura, Guillaume Lajoie, Glen Berseth, Nikolay Malkin. Recursive Self-Aggregation Unlocks Deep Thinking in Large Language Models. **Preprint, NeurIPS 2025 - Foundations of Reasoning in Language Models Workshop**
- [2] Brian R. Bartoldson, **Siddarth Venkatraman**, James Diffenderfer, Moksh Jain, Tal Ben-Nun, Seanie Lee, Minsu Kim, Johan Obando-Ceron, Yoshua Bengio, Bhavya Kailkhura. Trajectory Balance with Asynchrony: Decoupling exploration and learning for fast, scalable, LLM post-training. **NeurIPS 2025**
- [3] **Siddarth Venkatraman\***, Mohsin Hasan\*, Minsu Kim, Luca Scimeca, Marcin Sendera, Yoshua Bengio, Glen Berseth, Nikolay Malkin. Outsourced diffusion sampling: Efficient posterior inference in latent spaces of generative models. **ICML 2025**
- [4] **Siddarth Venkatraman\***, Moksh Jain\*, Luca Scimeca\*, Minsu Kim\*, Marcin Sendera\*, Mohsin Hasan, Luke Rowe, Sarthak Mittal, Pablo Lemos, Emmanuel Bengio, Alexandre Adam, Jarrid Rector-Brooks, Yashar Hezaveh, Laurence Perreault-Levasseur, Yoshua Bengio, Glen Berseth, Nikolay Malkin. Amortizing intractable inference in diffusion models for Bayesian inverse problems. **NeurIPS Machine Learning and the Physical Sciences Workshop 2024**
- [5] **Siddarth Venkatraman\***, Moksh Jain\*, Luca Scimeca\*, Minsu Kim\*, Marcin Sendera\*, Mohsin Hasan, Luke Rowe, Sarthak Mittal, Pablo Lemos, Emmanuel Bengio, Alexandre Adam, Jarrid Rector-Brooks, Yoshua Bengio, Glen Berseth, Nikolay Malkin. Amortizing intractable inference in diffusion models for vision, language, and control. **NeurIPS 2024**
- [6] **Siddarth Venkatraman\***, Shivesh Khaitan\*, Ravi Tej Akella\*, John Dolan, Jeff Schneider, Glen Berseth. Reasoning with Latent Diffusion in Offline Reinforcement Learning. **ICLR 2024**
- [7] Benjamin Freed, **Siddarth Venkatraman**, Guillaume Adrien Sartoretti, Jeff Schneider, Howie Choset. Learning Temporally Abstract World Models without Online Experimentation. **ICML 2023**
- [8] Conor Igoe, Swapnil Pande, **Siddarth Venkatraman**, Jeff Schneider. Multi-Alpha Soft Actor-Critic: Overcoming Stochastic Biases in Maximum Entropy Reinforcement Learning. **ICRA 2023**
- [9] Shreyansh Daftry, Neil Abcouwer, Tyler Del Sesto, **Siddarth Venkatraman**, Jialin Song, Lucas Igel, Amos Byon, Ugo Rosolia, Yisong Yue, Masahiro Ono. MLNav: Learning to Safely Navigate on Martian Terrains. **IEEE Robotics and Automation Letters** 7, 5461–5468 (2022). (Also accepted and presented at **ICRA 2022**)
- [10] Neil Abcouwer, Shreyansh Daftry, **Siddarth Venkatraman**, Tyler Del Sesto, Olivier Toupet, Ravi Lanka, Jialin Song, Yisong Yue, Masahiro Ono. Machine Learning Based Path Planning for Improved Rover Navigation. **2021 IEEE Aerospace Conference** (50100) (2021), 1–9.
- [11] Shivam Agarval\*, **Siddarth Venkatraman\***. Deep Residual Neural Networks for Image in Audio Steganography (Workshop Paper). **2020 IEEE Sixth International Conference on Multimedia Big Data (BigMM)** (2020), 430–434.

## Experience

### Research Intern -> Collaborator, Lawrence Livermore National Laboratory

Livermore, CA

Research projects related to scaling GFlowNets for intractable inference

Jun. 2024 - Now

- Worked on scientific applications of intractable posterior inference with GFlowNets, specifically the problem of gravitational lensing inverse problem with diffusion priors.
- Scaling GFlowNet objectives for entropy regularized policies in LLM RLHF.
- Scaling reasoning training with off-policy RL.

### Research Intern, Valence Labs (Recursion)

Montreal, QC

Worked with the molecule sampling team, advised by Emmanuel Bengio

Jun. 2025 - Sep. 2025

- Free energy estimation with Flow model bridges.

**Research Intern, Caltech (Advised by Dr. Yisong Yue)***Pasadena, CA*

Trained amortized MPC optimizer for control of a Segway Robot in simulation

Dec. 2020 - Apr. 2021

- Trained a behaviour cloning policy to control a segway robot in simulation.
- Trained a control policy to produce a trajectory to be used for warm-starting an OSQP solver for MPC.
- Trained an amortized MPC optimizer LSTM that used gradients from a differentiable cost function to help optimize the trajectory. Required fewer iterations(3X) to optimize than the OSQP solver, with a tradeoff in task success rate (reduction of 20%).

**Research Intern, NASA Jet Propulsion Laboratory***Pasadena, CA*

Designed, implemented and tested a Machine Learning heuristic for use in motion planning of Mars Rovers.

May. 2020 - Aug. 2020

- Trained a model to predict Mars Rover trajectories with high probability of rover clearance failure which is quantified by the ACE (Approximate Clearance Evaluation) score.
- Integrated the above model with a tree based planner in the ROS navigation stack of the rover.
- Method significantly improved upon key metrics as compared to the base navigation stack used in the Perseverance rover. Improvement found in planning cycle time (4x reduction), path inefficiency (8% reduction) as well as overall mission success rate (9% increase).
- Two papers based on the above method accepted at IEEE Aerospace Conference [5], and ICRA 2022[4].

**AI division Member, Project Manas***Manipal, India*

Machine Learning for robotics projects

Jan. 2018 - Apr. 2020

- Trained and deployed models for lane and obstacle detection, built the perception stack of a robot for the Intelligent Ground Vehicle Competition (IGVC) 2019. Our team won the grand prize at the competition, held at University of Oakland, Michigan.
- Developed and deployed various perception modules for the team's autonomous car including lane detection, object detection as part of the Mahindra Rise Prize challenge.