# SUMEET BATRA

SSBATRA@USC.EDU, LOS ANGELES; 720-454-4821 (M)

www.linkedin.com/pub/sumeet-batra/55/80b/1a/
https://github.com/SumeetBatra
https://sumeetbatra.github.io

## EDUCATION

**University of Southern California**

5th year Computer Science PhD student, USC Robotic Embedded Systems Lab (RESL)

Advisor: Gaurav Sukhatme

Research Interests: Generalist embodied agents. Work in reinforcement learning, representation learning, learning from surprise / novelty search, and diffusion generative modeling.

Relevant Coursework: Advanced Analysis of Algorithms, Deep Learning, Machine Learning, Advanced Robotics

**University of Colorado Boulder**

Bachelor of Science (**summa cum laude**), Computer Science (Minor: Applied Math) 4.0/4.0

## TECHNICAL SKILLS

- Python (advanced), PyTorch (advanced), C++ (proficient), ROS (proficient), Robotics (advanced), OpenCV (past experience)
- Deep Reinforcement Learning, Novelty Search, Diffusion Generative Models, Robotics
- Applied AI research internship experience working on self-guided projects. Experience working in large teams and on large codebases.

## PUBLICATIONS

- **Sumeet Batra,** Gaurav Sukhatme, "Zero Shot Generalization of Vision-Based RL Agents Without Data Augmentation" — *ICML 2025*
- **Sumeet Batra**, Bryon Tjanaka, Matthew C. Fontaine, Aleksei Petrenko, Stefanos Nikolaidis, Gaurav Sukhatme. "Proximal Policy Gradient Arborescence for Quality Diversity Reinforcement Learning" – *ICLR 2024 Spotlight paper (<10%)*
- Shashank Hegde*, **Sumeet Batra***, KR Zentner, Gaurav Sukhatme "Generating Behaviorally Diverse Policies with Latent Diffusion Models" – *in Neurips 2023*
- Ryan Boldi, Matthew Fontaine, **Sumeet Batra**, Gaurav Sukhatme, Stefanos Nikolaidis "Generating Diverse Critics for Conditioned Policy Distillation" – *in GECCO 2024*
- **Sumeet Batra**, Bryon Tjanaka, Stefanos Nikolaidis, Gaurav Sukhatme "Quality Diversity for Robot Learning: Limitations and Future Directions" – *in GECCO 2024*
- Zhehui Huang, Zhaojing Yang, Rahul Krupani, Baskin Senbaslar, **Sumeet Batra**, Gaurav Sukhatme "Collision Avoidance and Navigation for a Quadrotor Swarm Using End-to-end Deep Reinforcement Learning" – *in ICRA 2024*
- Zhehui Huang, **Sumeet Batra**, Tao Chen, Rahul Krupani, Tushar Kumar, Artem Molchanov, Aleksei Petrenko, James Preiss, Zhaojing Yang, Gaurav Sukhatme. "QuadSwarm: A Modular Multi-Quadrotor Simulator for Deep Reinforcement Learning with Direct Thrust Control" – *ICRA 2023 Workshop paper*
- **Sumeet Batra*,** Zhehui Huang**,** Aleksei Petrenko, Tushar Kumar, Artem Molchanov, Gaurav Sukhatme. "Decentralized Control of Quadrotor Swarms with End-to-end Deep Reinforcement Learning" – *In CoRL 2021*
- Gautam Salhotra, Shashank Hegde, **Sumeet Batra,** Peter Englert, Gaurav S. Sukhatme. "Guided Learning of Robust Hurdling Policies with Curricular Trajectory Optimization"
- **Sumeet Batra**, John Klingner, and Nikolaus Correll. "Augmented Reality for Human-Swarm Interaction in a Swarm-Robotic Chemistry Simulation." *In DARS-SWARM 2021*

## RESEARCH EXPERIENCE

**Research Intern at NVIDIA: Diffusion Generative Models for Diverse Scenario Generation          May'23 – September'23**

I used Diffusion generative models to generate a diverse range of realistic and challenging autonomous driving scenarios, trained on large-scale real driving data. The model successfully learned to jointly predict realistic multi-agent trajectories given diverse initial conditions.

**Research Intern at NVIDIA: High Throughput Simulation for RL and Neural Traffic Modeling          May 2022 – August 2022**

I successfully completed two projects over the course of my internship:

- Implemented a high-throughput vectorized simulator enabling large-scale experience collection for Reinforcement Learning algorithms.
- Integrated NVIDIA's learned prediction model into DriveSim, a highly realistic simulator for autonomous vehicle development. This enables the team to use their pipeline as a Neural Traffic Model in a realistic simulator, enabling further testing, validation, and refinement of their algorithms. Showcased at CVPR'23.

**Research Intern at NIST: Generative Adversarial Networks (GANs)**                    **June 2019 – May 2020**

- Designed a flexible framework using PyTorch to automate large scale factor-screening experiments of different GAN architectures, and developed quantitative evaluation metrics to be used in these experiments.
- Implemented many modern GAN architectures, including DCGAN, PACGAN, LSGAN, etc., as well as training optimization techniques such as Spectral Normalization, Minibatch Discrimination, Feature Matching, etc. on several datasets like MNIST, CIFAR, etc. as well as a custom dataset from the signal processing group at NIST.
- Worked towards designing factor-screening experiments, as well as creating a new GAN architecture to replicate 4G LTE signals.

## ACHIEVEMENTS

- DoD SMART Scholarship Awardee 2020
- USC PhD Fellowship Awardee
- Graduated summa cum laude from the University of Colorado Boulder
- Undergraduate Research Opportunities Program Awardee – 2016
- Undergraduate Research Opportunities Program Awardee – 2018
- Accepted into the highly selective Discover Learning Apprenticeship (DLA) 1-year research program at CU Boulder
- Nominated for best research presentation and attended the 2017 research symposium through DLA
- Engineering Merit Scholarship 2017

## TEACHING EXPERIENCE

- Teaching Assistant – Introduction to Computer Science I – Fall 2021
- Teaching Assistant – Introduction to Computer Science II – Spring 2022
- Teaching Assistant – Introduction to Robotics – Fall 2022
- Teaching Assistant – Introduction to Robotics – Fall 2024