

Contact Information

bhaskar_mishra@berkeley.edu
(954) 445 - 9251

BHASKAR MISHRA

Online Profiles

Github: mbhaskar1
LinkedIn: bhaskar-mishra

EDUCATION

University of California, Berkeley
Berkeley, California

Class of 2029

- Candidate for **Ph.D. in Computer Science** advised by **Prof. Stuart Russell**, GPA: 3.91
- Relevant Coursework: Deep Reinforcement Learning, Theoretical Statistics, Large Language Model Agents, Randomness and Computation, Language Agents in Action

University of Florida
Gainesville, Florida

Class of 2023

- **B.S. in Computer Science, B.S in Mathematics, and Minor in Philosophy**, GPA: 3.96
- Relevant Coursework: Machine Learning, Mathematics for Intelligent Systems, Deep Learning for Computer Graphics, Elements of Topology, Advanced Calculus 1 & 2, Abstract Algebra, Philosophy of Artificial Intelligence
- Accepted member of the University Research Scholars Program and the UF Honors Program

RESEARCH EXPERIENCE

Graduate Researcher in Scalable Probabilistic Inference at CHAI, U.C., Berkeley

2023 – Present

Conducting research on the design of scalable Bayesian probabilistic inference algorithms advised by Dr. Stuart Russell. Current projects include designing an approximate inference algorithm for Probabilistic Dependency Graphs and crafting a meta-level control MDP through which to learn efficient approximate inference algorithms in very large Bayesian networks.

- **Relevant Skills:** Sequential Monte Carlo Algorithms, Graphical Probabilistic Modelling, Deep Reinforcement Learning, Transformer Neural Networks, Convex Optimization, Probabilistic Programming

Undergraduate Researcher in Empirical Game-Theoretic Analysis at Brown University

2021 – 2024

Conducted research on Empirical Game-Theoretic Analysis (EGTA) under the guidance of Dr. Amy Greenwald from Brown University and Dr. Cyrus Cousins from UMass Amherst.

- Designed several novel progressive sampling algorithms which outperform state-of-the-art sampling algorithms with up to 50% sample complexity savings experimentally in Random Zero-Sum games. Also derived the novel sub-Gamma statistical convergence bounds and novel regret-based pruning criteria on which these algorithms depend.
- Developed a Python code-base for EGTA experimental work which has been used to create highly detailed and explanatory visualizations of the performance of various sampling algorithms and the learnability of several game-theoretic properties. The code-base has been used to generate experiments for my own publications, as well as works by Dr. Greenwald from Brown University and Dr. Michael Wellman from the University of Michigan.
- **INFORMS 2022, Sequential Auctions Workshop:** Computational and Data Requirements for Learning Generic Properties of Simulation-Based Games. (Second Author)
- **AAMAS 2023, Main Track:** Learning Extreme Properties in Simulation-Based Games (Second Author)
- **To be submitted, arXiv Preprint:** Regret Pruning for Learning Equilibria in Simulation-Based Games (First Author)

Undergraduate Researcher in Computational Geometry at University of Florida

2022 – 2023

Designed a Python library for efficiently solving elliptic partial differential equations on smooth free-form surfaces represented by complex polyhedral control nets with irregular configurations (grid, n-gon, polar, etc.). Advised by Dr. Jorg Peters.

- **ELSEVIER, Computers & Mathematics with Appl.:** Polyhedral control-net splines for analysis (First Author)

Algorithmic Game Theory and Reinforcement Learning Reading Group at Brown University

2022 – 2023

Presented and led discussions on many Algorithmic Game Theory research papers and topics, including “Towards the PAC-Learnability of Nash Equilibrium” and “Variance Reduction in Monte-Carlo Counterfactual Regret Minimization,” in a group of 27 individuals consisting of multiple CS professors, PhD students, industry professionals, and undergraduate students.

EAAI 2021 Gin Rummy Undergraduate Research Challenge (First Author)**2019 – 2020**

Utilized Deep Neural Networks in combination with heuristic strategies based on expert strategies and hyperparameters optimized via an evolutionary algorithm in order to create a high-performance Gin Rummy agent. Paper was accepted and has been presented at the EAAI 2021 conference.

Undergraduate Researcher in Deep Learning Applications for Computer Science Education (Python)**2019 – 2020**

Designed and trained an LSTM model for predicting student performance in an Intro to MATLAB class on the basis of student's learning habits, homework quality and submission times, and performance in various topics in weekly quizzes. I played a prominent role in data collection and data cleaning.

RELEVANT EXPERIENCE

Volunteer Mentor via MentorGNV at Buchholz High School**2022 – Present**

Volunteering weekly in learning strategies classrooms at our local high school to help students at risk of not graduating stay motivated and approach classwork in less stressful ways. I have received highly positive feedback from many of the students I have worked with, and have helped students significantly improve performance in their classes.

Deep Learning for Computer Graphics Class Final Project (Python)**2020**

Implemented a simplified version of the approach used in the paper "Learning to Simulate Dynamic Environments with GameGAN" for the game of Pong. Used a generative adversarial network based architecture in order to train a model to simulate Pong gameplay, taking screen images and keyboard actions as input, and outputting the following frame in the game.

Educational Personal Blog – mbhaskar1.github.io**2019 – Present**

Written several educational blog posts explaining complex concepts from topics such as Mathematics, Machine Learning, Algorithmic Game Theory, and Statistical Learning Theory.

West Broward Programming Club – Founder and President**2017 – 2019**

Taught 20+ students algorithmic thinking and the intuition for a variety of data structures and competed in several online competitive programming competitions. Our programming team went on to place in 2nd place at the Florida Mu Alpha Theta State Programming Competition.

HONORS / AWARDS

Robert Long Mathematics Essay Competition – First Place Winner (On Gödel's Two Incompleteness Theorems) **2020**

AIME (American Invitational Mathematics Examination) Qualifier **2019**

Florida Mu Alpha Theta State Competitions – Several Top 10 Placements **2017 – 2019**

TECHNICAL SKILLS

Deep Learning: Certified in Convolutional Neural Networks, Sequence Models, and 3 other topics through Andrew Ng's Deep Learning specialization on Coursera

Programming: Proficient in Python (PyTorch, Keras, Pandas, NumPy), C++, C#, Java (DeepLearning4J), and JavaScript

EXTRA-CURRICULAR ACTIVITIES

Berkeley Sangha – Indian Philosophy and Meditation Club (Founder)**2023 – Present**

Started Berkeley Sangha, an Indian Philosophy and Meditation Club with weekly discussion meetings. 17 total members.

UF Dostana – Pop Indian Dance Team at University of Florida**2021 – 2022**

Performed famous 2000s pop Indian dances at several multi-cultural events with hundreds of members in the audience.