

Karan Srivastava

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EDUCATION

MA, PhD in Mathematics University of Wisconsin-Madison	Expected 2025
PhD Minor in Computer Science	GPA: 3.57/4
BSc. Mathematics University of Illinois at Urbana-Champaign	May 2020
Magna Cum Laude with Highest Distinction in Mathematics	GPA: 3.97/4
Study Abroad Independent University of Moscow	Spring 2019
Graduate Courses in Pure Mathematics, Math in Moscow Program	GPA: 3.87/4

RESEARCH EXPERIENCE

<i>PhD Work, University of Wisconsin-Madison and Wisconsin Institute for Discovery</i>	Aug 2020 – present
<ul style="list-style-type: none">Developing reinforcement learning models in PyTorch and Julia that generate data for problems in pure math.Testing graph convolutional network architectures for detecting hidden cliques in graph networks.Found bounds for a novel method of reconstructing linear data robust to noise and published findings at the IEEE ISIT 2022. Slides, code, and paper can be found here.	

SELECTED PROJECTS

Learning Tic Tac Toe with Reinforcement Learning	July 2023 - Aug 2023
<ul style="list-style-type: none">Implemented a reinforcement learning model in python that learns tic tac toe from just the rules. Github linkWith no heuristic information, the agent learns how to play with 100% accuracy by playing 10,000 games.	

Erdős Institute | Data Science Bootcamp

<i>CoverMyMed Copayment Prediction</i>	Nov 2022 - Jan 2022
<ul style="list-style-type: none">Worked in a team of 3 PhD students and postdocs to reduce bias and predict copayments based on patient information with RMSE ~\$15.30 compared to ~\$40 in baseline models.Developed gradient boosting, random forest, and other machine learning models on a large synthetic dataset of ~13.9 million rows. Github link	

What's Cooking? Cuisine Analysis

	May 2022 – July 2022
<ul style="list-style-type: none">Worked in a team of 3 PhD students to classify cuisines based on ingredients and apply clustering techniques to find similarities in a Kaggle dataset of ~60,000 entries.Developed a random forest, linear SVC, and other machine learning models to achieve classification accuracies of ~80%. Github link	

University of Wisconsin

<i>Causal Inference through Machine Learning</i>	Aug 2022 - Dec 2022
<ul style="list-style-type: none">Designed Support Vector Regression models that can uncover certain causal relationships in synthetic and real-world data with ~90% confidence. Github Link.Synthesized advancements in causal learning and my own theoretical and experimental work in a blog post.	

SKILLS

- Languages:** Python, SQL (Basic), Julia, Mathematica, C++ (Basic), Java, Latex,
- Python Libraries:** Pytorch, Tensorflow, Keras, Pandas, Scikit-Learn, Numpy, Seaborn, BeautifulSoup
- OS and Platforms:** Bash, GitHub([ksrivastava1](https://www.github.com/ksrivastava1)), MacOS, Jupyterlab, VSCode, Linux computing clusters.

LEADERSHIP AND SERVICE

Madison Experimental Math Lab , University of Wisconsin-Madison	2022 – present
<ul style="list-style-type: none">Organize ~45 undergraduate research projects with faculty and PhD mentors over many semesters.Running a project on using reinforcement learning to study algorithms in number theory.	
Directed Reading Program , University of Wisconsin-Madison	2021 – present
<ul style="list-style-type: none">Organizes a reading program that grouped ~300 undergraduate students with PhD mentors.Designed 3 projects in machine learning, graph neural networks, and algebraic geometry.	
Math Circle , University of Wisconsin-Madison	2021 – 2022
<ul style="list-style-type: none">Organized ~30 mathematical talks and workshops by university researchers for local middle and high schools.	
Undergraduate Mentor Program , University of Wisconsin-Madison	2022 – present
<ul style="list-style-type: none">Founded and organized a mentorship program that paired ~30 PhD mentors with undergraduates.	

CERTIFICATES AND AWARDS

Institute for Foundations of Data Science Research Assistantship: \$12,000 Research Grant	Aug 2023 - Jan 2023
Campus-wide Exceptional Service Award: Awarded to 3/2300 Teaching Assistants	2022-2023
Departmental Exceptional Service Award: Awarded to 2/120 Math Dept. Teaching Assistants	2022-2023
Exceptional Teaching Award: Demonstrated excellence in teaching for 4 or more semesters	2020-2022
Edmund J. James Scholar: Awarded to top 15% of undergraduates campus-wide	2017-2020
Dean's List , University of Illinois at Urbana-Champaign	All semesters