

Sara Vanaki

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Research Interests

Applied Computational Analysis, Interdisciplinary Applications of Computer Vision

Education

Rice University

PhD in Electrical and Computer Engineering Expected May 2028
MS in Electrical and Computer Engineering May 2025

University of San Diego

Bachelor of Arts in Mathematics GPA: 3.9/4
Bachelor of Arts in Computer Science May 2023

Relevant Courses: Intro to Machine Learning, Intro to Deep Learning, Cybersecurity, Partial Differential Equations, Algorithms, Human Computer Interaction, Probability

Professional Experience

ECE Graduate Student

Aug 2023 - present

Behnaam Aazhang's lab, Rice University

- Collaborating with Dr. David Maluf on building a new visualization technique for cybersecurity networks at Cisco
- Conducted research on neural signal data using non-negative matrix factorization (NMF) with MATLAB to identify key neurons in long-term operant conditioning
- Applied object identification techniques with models like Segment Anything - Meta (SAM) to improve the identification of neurons
- Collaborated with Dr. John Byrne at the University of Texas Health Science Center and used dimensionality reduction techniques to unveil neuronal activity patterns in *Aplysia* feeding behavior
- Manuscript submitted to Nature Communications Biology and presented research at Society for Neuroscience 2024, Next-Generation Computational Bio-Imaging Conference 2024, Molecular & Cellular Cognition Society, and Rice Interface 2024

Machine Learning Intern (NOAA Hollings Scholar)

May 2022 - Aug 2022

National Marine Fisheries Service

- Published "How many dollars are in the sea?" in Ecological Informatics: Computational methods and machine learning for oceans
- Enhanced a YOLO-based Convolutional Neural Network (CNN) with a human-in-the-loop R program to annotate seafloor images, reducing analysis time from 3 years to 36 hours
- Utilized the CNN and R for statistical computing to estimate populations of sand dollars, improving accuracy through iterative feedback
- Presented this work at the 2024 Energy High Performance Computing (HPC) Conference, ComSciCon Houston 2024, 45th Annual Larval Fish Conference (2022), and the 2022 Science and Education Symposium

Research and Development Intern

May 2021 - Aug 2021

Genentech

- Worked as a validation research scientist and corrected erroneously labeled data points from past trials
- Designed Python scripts to optimize the formatting and processing of pKa data in a data toolkit (MoKa)
- Created a web application for chemists to annotate molecules for predicting pKa values
- Presented this work at the 2021 Intern Project Showcase

Leadership Experience

Research Mentor

June 2025 - July 2025

BlueRobins

- Led an 8-week research project with a high-school student on "Brain Tumor Classification using MRI Images"

Research Intern

Dec 2024 - Jan 2025

Young@AI

- Developed curriculum content and designed projects to simplify complex AI/ML concepts for young learners (K-12)
- Created detailed lesson plans, such as "Image Processing Techniques" to teach students about image classification, segmentation, object detection, and recognition

Teaching Assistant

Jan 2024 - Dec 2024

Rice University Electrical and Computer Engineering Dept.

- Grade assignments and provide feedback for Intro to Random Processes and Learning from Sensor Data students, enhancing their understanding of complex concepts

President, Math Club (Tri Pi)

2022 - May 2023

University of San Diego

- Revitalized the student math community post-pandemic by organizing social events (Tri Pi Tie Dye, Tri Pi Trivia Night), academic colloquia, and networking events
- Collaborated with the math department to recruit new majors and foster a supportive environment, especially for women in STEM

Resident Assistant

Aug 2021 - May 2023

University of San Diego Residential Life

- Mentored a hall of 30 female STEM students and later a hall of primarily BIPOC STEM students, providing support for their physical, mental, and emotional well-being
- Organized community-building events such as Mission Beach Cleanup, Lego building activities, and tie-dye events, creating safe spaces for residents to connect

Teaching Assistant

2020 - 2023

University of San Diego Mathematics Dept.

- Graded assignments and provided feedback for Probability, Calculus 3, Calculus 1, Survey of Calculus, Intro to Statistics, and Algebraic Reasoning students, helping them improve their mathematical reasoning skills

Academic Achievements

Walter Loewenstern Jr. Endowment Recipient

Aug 2023 - present

- 1 of 3 Electrical and Computer Engineering students at Rice University are selected for this funding as the donors want to invest in my success over the course of my graduate studies

Phi Beta Kappa Honors Society (PBK)

2023 - present

- 1 of 60 students at the University of San Diego selected for this academic society that honors the best and brightest undergraduates from 290 top schools across the nation through a highly selective, merit-based invitation process

Ernest F. Hollings Undergraduate Scholarship

2021 - 2023

- 1 of 125 students in the nation awarded with a scholarship award for two-years of academic study and a ten-week, full-time internship during the summer at a NOAA facility

Further Honors and Awards: Magna Cum Laude, IEEE Honors Society (Eta Kappa Nu), USD Presidential Scholarship, USD First Honors Dean's List, Math & Computer Science Departmental Honors, Dean's Prize from Rice's Office of Graduate & PostDoctoral Studies

Skills

Programming:Python, Pytorch, R, MATLAB, Java, C, C++, \LaTeX , HTML, CSS, JavaScript**Languages:**

Farsi (fluent), Spanish (intermediate)

Other:

Github, Microsoft Office