



# Faranak Rajabi

Ph.D. Student, Mechanical Engineering Department, UC Santa Barbara

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## Areas of Interests

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- Mathematical Modeling and Simulation
- Scientific Software Development
- Computational Physical Simulations and Modeling
- Machine Learning for Nonlinear Dynamical Systems

## Education

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### University of California, Santa Barbara

Jan. 2022 – Present

*Ph.D. student at [Computational Applied Science Laboratory](#), Department of Mechanical Engineering Santa Barbara, CA*

- GPA: 3.94/4
- Co-advised by Dr. Fredric Gibou and Dr. Jeff Moehlis
- **Relevant Courses:**
  - Numerical Simulation with ODEs · Finite Difference Methods for PDEs · Applied Dynamical Systems · Advanced Matrix Computations · Linear Systems · Kalman and Adaptive Filtering · Partial Differential Equations

### University of California, Santa Barbara

Aug. 2023 – Present

*Master of Science in Computer Science, Department of Computer Science*

*Santa Barbara, CA*

- GPA: 4/4
- **Relevant Courses:**
  - Level Set Methods · Machine Learning: a Signal Processing Approach · Data Structures Algorithms

### Sharif University of Technology

Sep. 2016 – July. 2021

*Bachelor of Science in Aerospace Engineering, Department of Aerospace Engineering*

*Tehran, Iran*

- GPA: 3.57/4
- Advised by Dr. Kaveh Ghorbanian
- Bachelor's Thesis title: An overview of the biomedical applications of mechanical micropumps

## Experience

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### Graduate Research Assistant - [CASL](#) at UC Santa Barbara

Jan. 2022 – Present

*Under the supervision of Dr. Fredric Gibou and Dr. Jeff Moehlis*

*Santa Barbara, CA*

- Developed advanced computational methods for protein-aggregation modeling in continuum media, with applications in biotherapeutics.
- Created a general Level Set Methods software package in C++ with MATLAB interface, solving numerical PDEs of Hamilton-Jacobi type Equations up to 4-dimensions.
- Pioneered a data-driven, machine learning-based approach to Adaptive Deep Brain Stimulation.
- Implemented minimum energy control optimization for a four-dimensional system of coupled neural oscillators.
- Designed an optimal stochastic control strategy for a noisy network of neural oscillators.

### Graduate Teaching Assistant - UC Santa Barbara

Apr. 2022 – Present

*Teaching Assistant for undergraduate courses*

*Santa Barbara, CA*

- TA for Introduction to Programming course - Elaborated an intensive Matlab crash course to UC Santa Barbara's undergraduate STEM majors, resulting in a remarkable boost in students' proficiency in Matlab programming.
- TA for Mathematics of Engineering course - Instructed numerical simulation for engineering problems and ODEs using Matlab for Mechanical Engineering major undergraduate students at UC Santa Barbara.
- TA and Lab instructor for Basic Electronics and Circuits course - Taught engaging lectures in electronics circuits, mentored students, and facilitated group projects, leading to a 20
- TA for Dynamics - Instructed fundamental principles of motion and forces in physics and engineering, increase in student performance in challenging topics including classical mechanics and kinetics.

### Career Mentor Fellow - [American Physics Society](#)

Sept. 2023 – Present

*Mentor doctoral students in the APS Career Mentoring Program*

*Remote*

- Provide guidance and career advice to physics doctoral students, helping them navigate academia and explore career opportunities in both academic and non-academic settings.

### Mentor - Graduate Division at UC Santa Barbara

Sept. 2023 – Present

*Graduate mentor*

*Santa Barbara, CA*

- Mentor first-year and second-year doctoral students from diverse backgrounds.

### Mentor - Women in STEM Organization at UC Santa Barbara

Oct. 2022 – Present

*Undergraduate mentor*

*Santa Barbara, CA*

- Mentor and support female undergraduate STEM students, providing academic assistance and fostering a supportive learning environment.

## Publications

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### Conference Publications

- Z. Rostami, **F. Rajabi**, and A. Shamloo, "Cell Separation by Using Active and Passive Methods Together," 4th International Conference on Innovative Technologies in Science, Engineering and Technology, Istanbul, Turkey, November 12, 2020.
- **F. Rajabi**, A. Bakhshi, and G. Kazemi, "Drug Delivery Applications of Mechanical Micropumps," International Conference on Applied Researches in Science & Engineering, Amsterdam, Netherlands, January 10, 2021.

### Presentations

- **F. Rajabi**, "A Level-Set Method Approach to Optimally Control Stochastic Neural Oscillators," Poster presented at the 2023 ResearchGate Conference. [[Poster](#)]

## Honors and Awards

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- **UCSB Graduate Summer Fellowship**, 2024, 2023, 2022 - Awarded highly competitive fellowship to fund summer research.
- **UCSB Block Grant**, 2022 - Recipient of grant awarded to top 10% of incoming PhD students.
- **Sharif University Scholarship**, 2016-2021 - Awarded full tuition waiver based on national exam performance.
- **Iranian National Elite Foundation**, 2016 - Selected as outstanding student in national universities entrance exam (top 0.1% among 163,000 participants).