FARANAK RAJABI

UC Santa Barbara, Santa Barbara, CA
faranakrajabi@ucsb.edu faranak-rajabi faranakR Scholar Portfolio

SUMMARY

Computational scientist and software engineer specializing in high-performance simulation, numerical PDEs, and scalable C++/Python systems. Experienced in MPI/CUDA parallel computing and scientific software optimization with 50× speedups and peer-reviewed publications computational physics and control systems.

EDUCATION

Ph.D., Mechanical Engineering - UC Santa Barbara - GPA: 3.94/4.00 2022–Dec 2026
Advisors: Dr. Frédéric Gibou & Dr. Jeff Moehlis, CASL
Key Courses: Numerical PDEs, Dynamical Systems, Stochastic Processes, Level-Set Methods

M.S., Computer Science - UC Santa Barbara - GPA: 4.00/4.00 2023–Dec 2025
Key Courses: ML & Signal Processing, Optimization Theory, Runtime Systems, Extended Reality

SKILLS

Languages	Python, C, C++, MATLAB, Shell scripting
HPC & Libraries	PETSc, MPI, p4est, OpenMP, PyTorch, JAX, CUDA
Development Tools	Git/GitHub, Linux/Unix, Docker, CI/CD, Version Control
Expertise	Numerical PDEs, HPC, Physics-based Modeling, Scientific Software Development

EXPERIENCE

Research Assistant - *Computational Applied Science Lab (CASL)* Mar 2022–Present
UC Santa Barbara *Santa Barbara, CA*

- Engineered high-performance numerical solvers in C++/Python achieving 50x computational speedup through adaptive mesh refinement and MPI parallelization; reduced computational cells by 98% while maintaining accuracy.
- Developed multiscale modeling frameworks bridging microscopic and macroscopic scales for complex systems; implemented multiphysics simulations coupling PDEs on massively parallel architectures.
- Published 4 first-author papers; presented at 3 international conferences; contributed major open-source software package at *Computer Physics Communications*.

Peer Reviewer, Journal of Computational Physics & Journal of Complex Networks Jun 2025–Present
Evaluate manuscripts on numerical methods, computational physics, and complex systems for top-tier journals.

Technical Instructor, UC Santa Barbara Mar 2022–Present
Instructed 200+ students across 5 engineering courses; developed materials and mentored students in programming.

SELECTED PUBLICATIONS & SOFTWARE

F. Rajabi et al. "CASL-HJX: Deterministic & Stochastic HJ Solvers." *Comp. Phys. Comm.* (2025). [GitHub]

F. Rajabi et al. "Optimal Control of Stochastic Neural Oscillators." *Biol. Cybern.* (2025).

M. Zimet, **F. Rajabi**, J. Moehlis. "Chaotic Desynchronization of Neural Populations." *Front. Netw. Physiol.* (2025).

J. Moehlis, M. Zimet, **F. Rajabi**. "Nearly Optimal Chaotic Desynchronization." *IEEE CDC* (2025).

Summary: 4 first-author papers in computational physics & control; lead developer of CASL-HJX, a high-performance C++ PDE framework (40% faster) applied in physics, finance, and biomedicine.

LEADERSHIP & SERVICE

- **President**, Graduate Hiking & Movement Club (2025–Present) - Lead 100+ member wellness community.
- **Mentor**, Women* In Science & Engineering, UCSB (2023–Present) - Guide undergraduate STEM students.
- **Career Mentor Fellow**, American Physical Society (2024–2025) - Coached physicists on industry transitions.

Authorized to work in the U.S. with CPT for internships; eligible for 36 months OPT upon graduation