Saurabh Mogre

Ph.D. Candidate, Physics Department, University of California, San Diego (UCSD)
Webpage: smogre.github.io | **Email:** saurabhmogre@gmail.com | **Phone:** 858-729-3519

Summary

- Biophysicist with 7+ years of experience in mathematical and computational modeling of biological processes
- Experienced in developing physical models of intracellular dynamics using a broad range of approaches
- Interdisciplinary collaborator with experience in collecting and analyzing experimental imaging data
- Author of 4 publications in peer-reviewed journals and 5+ presentations at top field conferences
- Experienced in scientific communication to various audiences through teaching and research presentations

Research Experience

University of California, San Diego, Doctoral Researcher (VMCC fellow 2018-2020) 2015-present
Department of Physics, research group led by Dr. Elena Koslover

Mathematical and computational modeling

- Identified the role of key parameters in organelle hitchhiking, aided by live-cell imaging data
- Used mathematical and computational methods to develop a model of autophagy dynamics in neurons
- Employed novel computational methods using parallel computing on the Open Science Grid framework
- Developed mathematical methods to improve simulation speed and accuracy of models
- Wrote and maintained codebases in FORTRAN90, MATLAB, and python using git version control

Data analysis and imaging

- Collaborated with experimental biology research groups to obtain and analyze live-cell imaging data
- Developed image analysis tools using MATLAB and ImageJ/FIJI for 3D single particle tracking
- Experience working with Lattice Light-Sheet Microscopy and Spinning Disk Confocal Microscopy

Indian Institute of Technology, Bombay, Graduate Researcher 2013-2015
Department of Physics, research group led by Dr. Anirban Sain

- Developed a novel simulation method based on the Gillespie algorithm to study cell division in bacteria
- Employed analytical techniques to develop a computational model of vesicle scission by dynamin polymers

Institute for Advanced Industrial Science and Technology, Tsukuba, Research intern 2013
Nanosystems Research Institute, advisor: Dr. Kazuhiko Seki.

- Derived diffusion coefficients for lipid domains in bilayer membranes in various physical conditions

Education

University of California, San Diego
Ph.D. Biophysics, Department of Physics — Expected May 2021

Indian Institute of Technology, Bombay
M.Tech Engineering Physics, Nanoengineering specialization — 2015
B.Tech Engineering Physics, Minor in Biosciences and Bioengineering — 2015

Technical Skills

Mathematical Modeling	Brownian dynamics simulations, stochastic mathematical models, Monte Carlo methods, linear algebra and PDE based modeling.
Programming	MATLAB, FORTRAN90, Mathematica, Python Proficient with LINUX/UNIX systems, bash scripting, version control
Data Analysis & Machine Learning	Image Processing, segmentation, and particle tracking (ImageJ/FIJI, Matlab), Pandas, scikit-learn, numpy, Tensorflow, statistical inference, Excel
Data Visualization	Inkscape, Powerpoint, LaTeX, seaborn

Honors and awards

- Visible Molecular Cell Consortium Pre-doctoral Fellowship *(Award amount: $100,000)* 2018-2020
- Physics Excellence Fellowship *(Award amount: $8,000)* 2015
- Heritage Fund Scholarship, IIT Bombay 2011-2014
- Physics Department Chairs Challenge Travel Award, UCSD 2019
- Travel Award, Kyoto Winter School of Statistical Physics, Yukawa Institute for Theoretical Physics 2015

Scientific activities and mentoring

Scientific workshops

- Cell Modeling Hackathon, *University of California, San Francisco* 2019
- Commmunicating Science Convention (ComSciCon-SD), *University of California, San Diego* 2018
- Kyoto Winter School for Statistical Physics, *Yukawa Institute for Theoretical Physics* 2015

Mentoring

- Research Scholars Summer Project, *University of California, San Diego* 2018
  Advised a high school student on a project analyzing trajectories of intracellular organelles
- Research facilitator, "Physical Biology of the Cell" at the *Marine Biological Laboratory, Woods Hole* 2017
  Co-advised two graduate students modeling ciliary pathways and cytoskeletal filaments
- Institute Student Mentorship Program, *Indian Institute of Technology Bombay* 2014-2015
  Mentored 15 freshmen attendees at IIT Bombay to facilitate their transition to college

Volunteering

- Volunteer for the Tech Trek summer camp, *University of California, San Diego* 2018
- Organizer for the social festival "Mood Indigo", *Indian Institute of Technology Bombay* 2011-2012

Publications

- Getting around the cell: physical transport in the intracellular world 2020
  S. S. Mogre, A. I. Brown, E. F. Koslover, *Physical Biology*
- Hitching a ride: Mechanics of Transport Initiation Through Linker-mediated Hitchhiking 2020
  S. S. Mogre, J. R. Christensen, C. S. Niman, S. L. Reck-Peterson, E. F. Koslover, *Biophysical Journal*
- Multimodal transport and dispersion of organelles in narrow tubular cells 2018
  S. S. Mogre, E. F. Koslover, *Physical Review E*
- Diffusion coefficients in leaflets of bilayer membranes 2014
  K. Seki, **S. S. Mogre**, S. Komura, *Physical Review E*

Talks and posters

- Non-canonical interactions in intracellular transport: Investigating the physical mechanisms of hitchhiking and tethering 2020
  Poster at the 2020 *Biophysical Society Meeting, San Diego, CA*
- Non-canonical interactions in intracellular transport: Investigating the physical mechanisms of hitchhiking and tethering 2019
  Poster at the 2019 Annual Meeting of the *American Society for Cell Biology, Washington, DC*
- Characterizing active runs, tethering, and hitchhiking in intracellular transport 2018
  Poster at the 2018 Annual Meeting of the *American Society for Cell Biology, San Diego, CA*
- The Interplay of Diffusion, Motor-Driven Walks, and Tethering in Intracellular Transport 2018
  Platform talk at the 2018 *Biophysical Society Meeting, San Francisco, CA*