Sahil Moza, PhD

Postdoctoral Fellow, Harvard / Systems neuroscience, connectomics, modeling / Creator of CeDNe, a graph-based platform for multi-omic brain data

Contact Information

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Harvard University
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Research Interests

Computational neuroscientist developing unified models of whole-brain function and learning

Current Projects

Co-leading a multi-institutional project on **whole-brain learning** dynamics in *C. elegans*. *Manuscript in preparation.* (2023-)

CeDNe: A graph-based neuroscience platform for integrating multi-modal data with embedded optimization and simulation workflows. *Manuscript in preparation.* (2024-)

Education & Training

Postdoctoral Research Dept of Organismic & Evolutionary Biology — Sep 2022-
Harvard University, Cambridge, USA
Mentor: Yun Zhang

Postdoctoral Research Boston Children's Hospital — Jul 2021-Sep 2022
Harvard Medical School, Boston, USA

Scientist , EBRAINS, Human Brain Project — Oct 2020 - July 2021
KTH, Stockholm

Ph.D Neuroscience/Systems Biology — July 2020
National Centre for Biological Sciences Bangalore, India
Mentor: Upinder S. Bhalla

M.E. Computational and Systems Biology — Aug 2012
Jawaharlal Nehru University New-Delhi, India

B.E. Biotechnology — Jul 2010
Panjab University Chandigarh, India

Research Publications

Bhatia, A.*, **Moza, S.***, Bhalla, U.S., "Precise excitation-inhibition balance controls gain and timing in hippocampus.", *eLife, Apr 2019* (*Equal contribution)
Faculty Opinions (Exceptional) Recommendation. In Faculty Opinions, 04 May 2020

Moza S., Bhalla, U.S., "Different dimensions of robustness- noise, topology and rates - are nearly independent in chemical switches.", *bioRxiv Aug 2020*

HarshaRani, G.V., **Moza, S.**, Ramakrishnan, N., Bhalla, U.S., "SWITCHES: Searchable Web Interface for Topologies of CHEmical Switches.", *Bioinformatics Jan 2021*.
http://**SWITCHES**.ncbs.res.in

Open Source Development

CeDNe — Graph-based framework for multimodal connectome modeling — Jun 2025
NeuroRD-SBML Biophysical model translation and standardization — Mar 2022
Latin Hypercube Sampling with Multi-Dimensional Uniformity (LHSMDU) — Jun 2020

Book Chapters

Bhatia, A., **Moza, S.**, Bhalla, U.S., "Patterned Optogenetic Stimulation using a DMD-projector", *Channelrhodopsin, Chapter 11, Springer Protocols, 2020*

Research Highlights

Moza S., "Action at a Distance: Theoretical Mechanisms of Cross-Dendritic Heterosynaptic Modification", eNeuro, 2023

Conferences, workshops & talks

Analysis and Modeling of Connectomes, Janelia Research Campus	Jun 2025
CeNeuro, Wisconsin, Madison, USA	Jun 2024
Neuronal Circuits, CSHL, NY, USA	Mar 2024
Harvard MCZ Seminar Series	May 2023
NeuroMatch Conference, Online Webinar	March 2020
No Garlands Neuroscience, IISER Pune, India	Jan 2020
Transylvanian Experimental Neuroscience Summer School, Romania	Jun 2019
Molecules and Memory, NCBS, Bengaluru, India	Mar 2019
Quantitative approaches to Behaviour & Neural Systems, Lisbon, Portugal	Oct 2018
Spikes lecture series, Centre for Neuroscience, IISc Bengaluru, India	Jan 2018
Neuroscience 2017, Society of Neuroscience, Washington DC, USA	Nov 2017
No Garlands Neuroscience, IISER Pune, India	Oct 2017
BSSE Symposium, IISc Bengaluru, India	Jan 2017
Molecular Mechanisms at the Synapse, Janelia Research Campus	May 2016

Teaching and Mentorship

Teaching Assistant and Organization

Sciencspur Introduction to Computational Neuroscience -I & II — Winter 2023

Computational approaches to memory and plasticity (CAMP) — Summer 2014-18
National Centre for Biological Sciences, Bangalore

Boston Bangalore Biosciences Beginnings Neuroscience school — Winter 2016
Harvard University, Cambridge
National Centre for Biological Sciences, Bangalore

Professional Service

Reviewer: eNeuro (2023-), J. Comp. Neuro. (2025–), J. Biosciences (2022-)
Co-reviewer for Neuron, eLife and Cell (with senior collaborators)

Awards & Fellowships

Fellowships

Council of Scientific and Industrial Research (CSIR)
- Senior Research Fellowship (SRF), Biology — Jul 2014 - Jul 2017
- Junior Research Fellowship (JRF), Biology (All India Rank 36) — Jul 2012 - Jul 2014

DBT Bioinformatics National Certification (All India Rank 33) — Feb 2011
Jawaharlal Nehru University- Masters Fellowship — Aug 2010 - Jul 2012

Travel Awards

IBRO-PERC, The Brain Prize and FENS stipend	May 2019
Wellcome Trust Travel Award	Sep 2018
Infosys Travel Award, Infosys Foundation	Dec 2017
Department of Biotechnology Travel Award, Government of India	Nov 2017

Wet lab

Model organisms: *C. elegans* and *Drosophila melanogaster*
Techniques: genetics, optogenetics, calcium imaging, behavior

Computational skills

Modeling: Large-scale simulations, dynamical systems, control-based system identification, chemical reaction network modeling, stochastic simulation (Langevin/Gillespie), optimization
Analysis: Neural time series modeling, connectome topology, tensor decomposition (SVD/CP/Tucker), graph-based learning, unsupervised learning and clustering
Tools: Python, PyTorch, scikit-learn, Optuna, NetworkX, NumPy, pandas, MOOSE, CoPaSi, Brian
Systems: UNIX, multiprocessing, SLURM/SGE cluster environments