S. Shailja │ Curriculum Vitae

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Academic Appointment

Stanford University   **July 2024 -**
Postdoctoral Fellow, Radiological Sciences Laboratory
Advisor: *Dr. Jennifer McNab*

Education

University of California, Santa Barbara (UCSB)   **2018 - 2024**
PhD, Electrical and Computer Engineering
Advisor: *Dr. B. S. Manjunath*
Committee: *Dr. Scott T. Grafton, Dr. Jefferson W. Chen, Dr. Nina Miolane, and Dr. Shiv Chandrasekaran*
Thesis: Reeb graphs for topological connectomics

Indian Institute of Technology (IIT), Kharagpur   **2012 - 2016**
B.Tech. in Instrumentation Engineering, Electrical Engineering Department
Advisor: *Dr. Jayanta Mukhopadhyay*
Thesis: Visual Navigation of Mobile Robots

Publications

[1] **Shailja, S.**, et al. "AI-based analysis of the shunt treatment in pre- and post-surgery computed tomography brain scans of iNPH patients". Neurosurgery, 2024.

[2] **Shailja, S.**, et al. "ReeBundle: a method for topological modeling of white matter pathways". IEEE Transactions on Medical Imaging 2023.

[3] **Shailja, S.**, et al. "Scaffolding AI research projects lowers the mathematical difficulty in teaching AI to high school students". American Society for Engineering Education (ASEE) Annual Conference & Exposition 2024.

[4] **Shailja, S.**, et al. "A computational geometry approach for modeling neuronal fiber pathways". International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2021.

[5] Bowen Zhang, **Shailja, S.** (equal contributors), et al. "ReeSPOT: Reeb Graph Models Semantic Patterns of Normalcy in Human Trajectories". 27th International Conference on Pattern Recognition (ICPR), 2024.

[6] Jiang, J., Khan, A., **Shailja, S.**, et al. "Segmentation, Tracking, and Sub-cellular Feature Extraction in 3D Time-Lapse Imagery". Nature Scientific Reports 2023.

[7] Zhang, A., **Shailja, S.**, et al. "Automatic Detection and Neurotransmitter Prediction of Synapses in Electron Microscopy". Biological Imaging 2022.

[8] Kao, P.Y., **Shailja, S.**, et al. "Improving patch-based Convolutional Neural Networks for MRI brain tumor segmentation by leveraging location information". Frontiers in Neuroscience 2020.

[9] **Shailja, S.**, et al. "ReTrace: Topological insight to evaluation of white matter tractography using Reeb graphs". Highest ranked paper in CDMRI Workshop at the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2023.

[10] **Shailja, S.**, et al. "Semi supervised segmentation and graph-based tracking of 3D nuclei in time-lapse microscopy". International Symposium on Biomedical Imaging (ISBI) 2021.

Awards & research grants

○ **Wu Tsai Pathways to Neurosciences Fellow, Stanford (2024-26).**

○ **Lancaster Dissertation Award:** Winner of the 2024 Lancaster Dissertation Award in the field of Mathematics, Physical Sciences, and Engineering. Will serve as UCSB's entrant in the national competition sponsored by the Council of Graduate Schools and ProQuest.

o **UCSB Graduate Division Mentorship Award:** Won the Fiona and Michael Goodchild Graduate Mentoring Award for impactful undergraduate mentorship and outstanding academic achievements. In media: UCSB GradPost

o **NSF iREDEFINE Fellow:** Named iREDEFINE fellow, sponsored by the National Science Foundation, at the ECE Department Heads Association Annual Conference. Presented a poster entitled "Topological characterizations of spatial trajectories for neuroscience and beyond". In media: College of Engineering's Magazine, *Convergence*

o **ECE Dissertation Fellowship for $10,000:** Awarded the ECE Dissertation Fellowship at UCSB.

o **Individualized Professional Skills Grant:** Awarded IPS grant to present my research at the American Society for Engineering Education Symposium 2024.

o **Finalist for the Schmidt Science Fellowship:** Selected as one of the finalists for the prestigious Schmidt Science Fellowship 2024.

o **IARPA Grant:** Co-wrote and secured funding for a large grant proposal on normal behavior modeling and anomaly detection to Haystack (Hidden Activity Signal and Trajectory Anomaly Characterization). Proposed Tasks involving normal behavior modeling, anomaly detection, trajectory generation, and iterative improvements track.

o **UC Vice Chancellor's Seed Grant for $10,000:** Led the proposal writing for COVID-19 detection using AI and secured funding from the UC grant. Subsequently, wrote and submitted a full proposal to NIH (not funded). Mentored high school and undergraduate students in the project.

o **Santa Barbara Cottage Hospital Research Grant for $10,000:** Led the proposal and secured a $10,000 grant for developing a robust AI algorithm to distinguish COVID-19 from other viral pneumonia using brain CT scans. Collaborated with radiologists from Cottage Hospital to collect data and for early detection of COVID-19.

o **Travel award** recipient for workshop at IPAM 2024, MICCAI 2023, ECEDHA iREDEFINE workshop 2023, MICCAI 2022, workshop at IPAM 2022, and NeurIPS 2021.

o **Second rank** in ISBI Cell Tracking Challenge 2020.

o **Undergraduate Academic Scholarship (2012-16):** Awarded by Indian Institute of Technology (IIT).

Teaching & mentoring experience

o **UCSB Certificate in College and University Teaching (CCUT):** Completed teaching-training and experience to demonstrate superior competence in teaching at the university level. The Certificate will be awarded in conjunction with the Ph.D degree. Teaching portfolio

o **Teaching Associate (Instructor of record):** Designed an interdisciplinary course (Diagnostic AI) on biomedical image analysis, where students learn the mathematical tools and concepts of feature extractions, image registration, segmentation, and classification to analyze images ranging from molecular/cellular imaging to tissue/organ imaging.

o **Teaching Assistant:** Digital Image Processing, Data Structure and Algorithm, Operating System, Machine Intelligence: An introduction to optimization and machine learning, Introduction to Python

o **Mentoring Roles:**

2023	**Summer Research Academies**: Ayush Garg, Saanvi Kotha
2022	**Research Mentorship Program**: Kathy Li, Sanjay Adhikesaven, Claire Chen, Zhaozhong (Alex) Wang
	Research Engineering Units (REUs): Krithika Thanigaivelan (joining Columbia), Vikram Bhagavatula (joined CMU)
2021	**Women in Science & Engineering (WiSE) and American Association of University Women (AAUW)** : Jeanette Quintero
2020	**High School Students**: Nisha Balaji (now in Caltech)

Community Service

o **Organiser:** Computational Diffusion MRI (CDMRI) Workshop at MICCAI, 2024.

- **Reviewer:** Medical Image Computing and Computer Assisted Intervention (MICCAI 2022, 2023, 2024), International Journal of Computer Assisted Radiology and Surgery (IJCARS) 2024, International Conference on Information Processing in Computer-Assisted Interventions (IPCAI) 2024, Medical Physics Journal 2023, International Workshop on Medical Optical Imaging and Virtual Microscopy Image Analysis (MOVI 2022), MICCAI Student Board EMERGE Workshop 2024.

- **Student Board Officer** (Webinars Officer) at MICCAI, 2022–23.

- **Advisory Board:** MICCAI Student Society, 2024.

- **Volunteer** at Women in Machine Learning workshop at NeurIPS, 2021.

- **Volunteer** at Joint Workshop On Scalable Image Informatics (LIMPID), 2020.

Industry Experience

- Research Intern, Mayachitra Inc., Santa Barbara   May 2019 - Sep 2019
- Software Development Engineer, Flipkart Internet Pvt Ltd., India   Dec 2016 - Aug 2018