

# S. Shailja | Curriculum Vitae

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## Education

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**University of California, Santa Barbara (UCSB)** 2018 - 2024 (expected)

*PhD Candidate, 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 of the human brain

**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

## Peer-reviewed journal publications

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- [1] Shailja, S., et al. "ReeBundle: a method for topological modeling of white matter pathways". [IEEE Transactions on Medical Imaging](#) 2023.
- [2] Shailja, S., et al. "AI-based analysis of the shunt treatment in pre- and post-surgery computed tomography brain scans of iNPH patients". Under review in *Neurosurgery Journal*, 2023. [medRxiv](#).
- [3] Jiang, J., Khan, A., Shailja, S., et al. "Segmentation, Tracking, and Sub-cellular Feature Extraction in 3D Time-Lapse Imagery". [Nature Scientific Reports](#) 2023.
- [4] Zhang, A., Shailja, S., et al. "Automatic Detection and Neurotransmitter Prediction of Synapses in Electron Microscopy". [Biological Imaging](#) 2022.
- [5] 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.

## Peer-reviewed conference publications

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- [1] Shailja, S., et al. "Scaffolding AI research projects lowers the mathematical difficulty in teaching AI to high school students". Abstract accepted at American Society for Engineering Education (ASEE) Annual Conference & Exposition, 2024. Full paper in preparation.
- [2] Shailja, S., et al. "ReTrace: Topological insight to evaluation of white matter tractography using Reeb graphs". [CDMRI Workshop at the International Conference on Medical Image Computing and Computer Assisted Intervention \(MICCAI\)](#) 2023.
- [3] 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.
- [4] 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

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- **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](#)
- **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](#)
- **Finalist for the Schmidt Science Fellowship:** Selected as one of the finalists for the prestigious Schmidt Science Fellowship 2024. This recognizes my intention to transition from the ECE Department towards interdisciplinary research for postdoctoral.
- **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.
- **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.
- **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.
- **Travel award** recipient for MICCAI 2023, ECEDHA iREDEFINE workshop 2023, MICCAI 2022, workshop at IPAM 2022, and NeurIPS 2021.
- **Second rank** in ISBI Cell Tracking Challenge 2020.
- **Undergraduate Academic Scholarship (2012-16):** Awarded by Indian Institute of Technology (IIT).

## Teaching & mentoring experience

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- **In progress: 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](#)
- **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.
- **Teaching Assistant:** Digital Image Processing, Data Structure and Algorithm, Operating System, Machine Intelligence: An introduction to optimization and machine learning.
- **Mentor:** 2 pre-college Summer Research Academies (SRA) students, 4 pre-college students in the Research Mentorship Program (RMP) at UCSB, 1 undergraduate student at UCSB through the American Association of University Women (AAUW 2020-21) program, and 2 undergraduate students (REUs) in my research lab.

## Community Service

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- **Reviewer:** International Conference on Information Processing in Computer-Assisted Interventions (IPCAI) 2024, Medical Physics Journal 2023, Medical Image Computing and Computer Assisted Intervention (MICCAI 2022, 2023), International Workshop on Medical Optical Imaging and Virtual Microscopy Image Analysis (MOVI 2022).
- **Student Board Officer** (Webinars Officer) at MICCAI, 2022–24.
- **Volunteer** at Women in Machine Learning workshop at NeurIPS, 2021.
- **Volunteer** at Joint Workshop On Scalable Image Informatics (LIMPID), 2020.

## Industry Experience

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

## Talks and Posters

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- Talk on “ReTrace: Topological insight to evaluation of white matter tractography using Reeb graphs.” In: CDMRI Workshop at the International Conference on Medical Image Computing and Computer Assisted Intervention, [MICCAI 2023](#).
- Poster on “Topological characterizations of spatial trajectories for neuroscience and beyond.” In: iREDEFINE Workshop at the ECE Department Head Association Annual Conference, [ECEDHA 2023](#).
- Talk on “A robust Reeb graph model of white matter fibers.” In: IPAM Workshop on Reconstructing Network Dynamics from Data: Applications to Neuroscience and Beyond, [IPAM UCLA, 2022](#).
- Talk on “Topological characterizations of neuronal fibers and its implications in comparing brain connectomes.” [WiML workshop at NeurIPS 2021](#).
- Poster on “A computational geometry approach for modeling neuronal fiber pathways.” In: International Conference on Medical Image Computing and Computer-Assisted Intervention), [MICCAI 2021](#)
- Talk on “Semi supervised segmentation and graph-based tracking of 3D nuclei in time-lapse microscopy.” In: “IEEE 18th International Symposium on Biomedical Imaging”, [ISBI 2021](#)
- Talk on “SLIC Supervoxels improve nuclei segmentation in weakly annotated time-lapse video sequences.” In: International Symposium on Biomedical Imaging, [ISBI 2020](#)
- Talk on “Two-Level Ensemble Methods for Improving CNNs for MRI Brain Tumor Segmentation”. In: LIMPID Joint Workshop on Scalable Image Informatics and Data Driven Materials Discovery, [LIMPID 2020](#)

## References:

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1. Dr. B. S. Manjunath (manj@ucsb.edu), Distinguished Professor & Chair of the Electrical and Computer Engineering Department, UCSB
2. Dr. Scott Grafton (scott.grafton@psych.ucsb.edu), Distinguished Professor, Psychological & Brain Sciences Department, UCSB
3. Dr. Jefferson W. Chen (jeffewc1@hs.uci.edu), Clinical Professor & Acting Chair, Neurological Surgery School of Medicine, UCI Health Center
4. Dr. Lina Kim (lina.kim@ucsb.edu), Director, Academic Programs, UCSB