

SOURYA SENGUPTA

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Dept. of Electrical and Computer Engineering

University of Illinois Urbana-Champaign

EDUCATION

- Electrical and Computer Engineering (Ph.D.)** Fall 2020 -
University of Illinois Urbana-Champaign (UIUC)
- Vision Science and Systems Design Engineering (MS by research)** Fall 2018 - 2020
University of Waterloo, Canada
- Electrical Engineering (BS)** 2014 - 2018
Jadavpur University, Kolkata, India

RESEARCH EXPERIENCE

- AI/ML in Healthcare PhD Intern** *GE Healthcare* May 2024 – Aug 2024; May 2025 – Oct 2025
Foundation Models for Zero-shot Medical Image Segmentation
- Graduate Research Assistant** *Computational Imaging Science Lab, UIUC* Jan 2021 -
Towards label-efficient and interpretable computational methods for medical imaging
Advisor: *Prof. Dr. Mark A. Anastasio* - Professor, UIUC
- Graduate Research Assistant**, *University of Waterloo* Sept 2018 - Jun 2020
Deep generative models for retinal image analysis
Advisor: *Prof. Dr. Vasudevan Lakshminarayanan & Prof. John Zelek* - Professor, Univ. of Waterloo
- Charpak Summer Research Fellow**, *ENS PARIS, France* June 2017-Aug 2017
Advisor: *Prof. Dr. Yves Boubenec* - Associate Professor, ENS Paris

RESEARCH INTEREST

Foundation Models, Medical Imaging, Interpretable Deep Learning

SELECTED PUBLICATIONS (H INDEX = 11)

Journals

- S. Sengupta*, Brooks, F., Liu, Y., & Anastasio, M. A. (2025). On the Utility of Virtual Staining for Downstream Applications as It Relates to Task Network Capacity. **Biomedical Optics Express**. doi: <https://opg.optica.org/boe/fulltext.cfm?uri=boe-16-10-4224&id=581780>
- S. Sengupta** & Anastasio, M. A. (2024). A Test Statistic Estimation-based Approach for Establishing Self-interpretable CNN-based Binary Classifiers. **IEEE Transactions on Medical Imaging**. doi: <https://ieeexplore.ieee.org/document/10378976>
- Shao, Z.*, *S. Sengupta**, Li, H., & Anastasio, M. A. (2023). Semi-Supervised Semantic Segmentation of Cell Nuclei via Diffusion-based Large-Scale Pre-Training and Collaborative Learning. **Journal of Medical Imaging (SPIE)**. doi: <https://doi.org/10.1117/1.JMI.12.6.061403> (* *Equal contribution.*)
- S. Sengupta*, Zhang, C., Alizada, S., Zheng, S., Chen, H., Brooks, F. J., Zangle, T. A., Anastasio, M. A., & Liu, Y. (2025). CellPhase: An Open-Source Whole-Cell Segmentation Tool in Label-free Quantitative Phase Imaging. Manuscript submitted to **Nature Methods**.

- Lu, C., [S. Sengupta](#), & Anastasio, M. A. (2024). Observer-Usable Information as a Task-specific Image Quality Metric. Manuscript submitted to **IEEE Transactions on Medical Imaging**.

Conferences

- [S. Sengupta](#)*, Chakrabarty, S.*, Soni, R., & Gopal, A. (2025). *SynthFM: Training Modality-Agnostic Foundation Models for Medical Image Segmentation Without Real Medical Data*. **IEEE International Symposium on Biomedical Imaging (ISBI Oral)**. doi: [10.1109/ISBI60581.2025.10980740](https://doi.org/10.1109/ISBI60581.2025.10980740)
- [S. Sengupta](#), Chakrabarty, S., & Soni, R. (2025). *Is SAM 2 Better than SAM in Medical Image Segmentation?* **SPIE Medical Imaging 2025**. doi: <https://doi.org/10.1117/12.3047370>
- [S. Sengupta](#) & Anastasio, M. A. (2023). *Revisiting model self-interpretability in a decision-theoretic way for binary medical image classification*. **ICML 2023 Workshop on Interpretable Machine Learning in Healthcare**. Accepted. doi: <https://doi.org/10.1117/12.2612614>
- [S. Sengupta](#), Wong, A., Singh, A., Zelek, J., & Lakshminarayanan, V. (2020). *DeSupGAN: Multi-scale Feature Averaging Generative Adversarial Network for Simultaneous De-blurring and Super-Resolution of Retinal Fundus Images*. **MICCAI 2020 Workshop OMIA**. Oral. doi: https://doi.org/10.1007/978-3-030-63419-3_4
- Singh, A., [S. Sengupta](#), Zelek, J., & Lakshminarayanan, V. (2020). *What Is the Optimal Attribution Method for Explainable Ophthalmic Disease Classification?* **MICCAI 2020 Workshop OMIA**. Oral; Best Paper Award. doi: https://doi.org/10.1007/978-3-030-63419-3_3

Book Chapters

- H Leopold, A Singh, [S Sengupta](#), V Lakshminarayanan, *Deep learning for ophthalmology using optical coherence tomography* in **State of the Art in Neural Networks and their Applications** (pp. 239-269). Academic Press, Elsevier.

FILED PATENT

Synthetic Data Generation for Modality-agnostic Zero-shot Foundation Model for Medical Images, U.S. Patent Application No. 19/291,155, filed August 5, 2025.

INVITED TALKS

- IEEE EMBS Lecture series at Indian Institute of Technology, Kharagpur School of Medical Science and Technology, 2024.
- IEEE Young Professional Lecture Series at Jadavpur University Department of Computer Science, 2024.
- Guest Lecture at BIOE 580 Applied Deep Learning for Bio-imaging, UIUC Bioengineering Fall 2024.

AWARDS AND ACHIEVEMENTS

- **Lalit Bahl Graduate Fellowship for Academic Excellence (Department of ECE, UIUC) 2023-2025**
- **NIH T32 Pre-doctoral Traineeship Award Cohort 2021** ([Cohort 2021 Webpage](#))
- University of Waterloo **Graduate Scholarship for Excellent Academic Performance**, UWaterloo, 2019
- **Best Paper Award** MICCAI 2020 workshop OMIA
- Indo-France **Charpak Summer Research Fellow** 2017 (Only 26 students from India were selected)

MEDIA HIGHLIGHTS

Cancer Center at Illinois Student Spotlight : [Link](#)

AI Researcher in Medical Imaging Finds Success through Campus Collaboration: [Link](#)

New AI model revolutionises disease diagnosis with visual maps [Link](#)

ACADEMIC SERVICES (PAPER REVIEWER):

Conference: MICCAI, EMBC, IPCAI

Journal: IEEE Transaction on Medical Imaging, SPIE Journal of Medical Imaging, Elsevier Artificial Intelligence in Medicine, Journal of Electronic Imaging, Nature Scientific Reports, Journal of Biomedical Optics.

MENTORSHIP EXPERIENCE

Kara mathias (Uni High School), Anusha Ghosh (UIUC CS 2023), Mariam Vaid (Uni High School), Zhuchen Shao (Tsinghua Uni), Akshaya Athawale (ISM Dhanbad, India)