SOURYA SENGUPTA, PH.D.

Postdoctoral Scholar, Stanford University, School of Medicine
souryas2@stanford.edu

EDUCATION

Electrical and Computer Engineering (Ph.D.) 2026
University of Illinois Urbana-Champaign (UIUC)

Vision Science and Systems Design Engineering (MS by research) 2020
University of Waterloo, Canada

Electrical Engineering (BS) 2018
Jadavpur University, Kolkata, India

EXPERIENCE

Postdoctoral Scholar, *Stanford University* April 2026-
Vision language AI models for personalized medicine and cancer detection
Advisor: *Mirabela Rusu* - Assistant Professor, Stanford University

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 - March 2026
Computational and information-theoretic approaches in bio-medical imaging
Advisor: *Mark A. Anastasio* - Professor, UIUC

Graduate Research Assistant, *University of Waterloo* Sept 2018 - Jun 2020
Deep generative models for retinal image analysis
Advisor: *Vasudevan Lakshminarayanan* & *Prof. John Zelek* - Professor, Univ. of Waterloo

RESEARCH INTEREST

Multi-modal AI, Foundation models, Information Theory, Interpretability

SELECTED PUBLICATIONS

Journals (First author/ Co-first author)

1. *Sengupta, S.* & Anastasio, M. A. (2026). *Input-Dependent Fisher Information for Local Sensitivity Analysis of Medical Image Classifiers.* **IEEE Transactions on Medical Imaging (IEEE TMI)**. Submitted; under revision.
2. *Sengupta, S.*, 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://doi.org/10.1364/BOE.576061
3. *Sengupta, S.* & Anastasio, M. A. (2024). *A Test Statistic Estimation-based Approach for Establishing Self-interpretable CNN-based Binary Classifiers.* **IEEE Transactions on Medical Imaging (IEEE TMI)**. doi: 10.1109/TMI.2023.3348699
4. Lu, C.*, *Sengupta, S.**, & Anastasio, M. A. (2024). *Observer-Usable Information as a Task-specific Image Quality Metric.* **IEEE Transactions on Medical Imaging (IEEE TMI)**. doi: 10.1109/TMI.2026.3680092. (* *Equal contribution.*)

5. Shao, Z.*, *Sengupta, S.*, 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.*)

Conferences

1. Chakrabarty, S.*, *Sengupta, S.**, Gopal, A., & Soni, R. (2026). *Synthetic Volumetric Data Generation Enables Zero-Shot Generalization of Foundation Models in 3D Medical Image Segmentation.* **IEEE International Symposium on Biomedical Imaging (ISBI)**. (* equal contribution)
2. *Sengupta, S.**, 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
3. *Sengupta, S.* & 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

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

- Guest Lecture at BIOE 580 Applied Deep Learning for Bio-imaging, UIUC Bioengineering Fall 24, 25, 26.
- IEEE EMBS Lecture series at Indian Institute of Technology, Kharagpur SMST, 24.

AWARDS AND ACHIEVEMENTS

- **Elsa and Floyd Dunn Award 2026**, UIUC
- **Lalit Bahl Graduate Fellowship for Academic Excellence** Department of ECE, UIUC 23-25
- **NIH T32 Pre-doctoral Fellowship** Award Cohort 2021(Cohort 2021 Webpage)
- **Best Paper Award** MICCAI 2020 workshop OMIA

MEDIA HIGHLIGHTS

- Beckman Institute News Link
- Cancer Center at Illinois Student Spotlight : Link
- New AI model revolutionises disease diagnosis with visual maps Link

ACADEMIC SERVICES (REVIEWER):

Conference: MICCAI, EMBC, IPCAI, IPMI, ISBI
Journal: IEEE Transactions on Medical Imaging, SPIE Journal of Medical Imaging, Elsevier Artificial Intelligence in Medicine, Journal of Electronic Imaging, 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)