

Rupam Mukherjee

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Research Interests

Medical Image Computing; Image Processing; ML for Health & Medicine; Digital & Computational Pathology

Education

- **Indian Institute of Technology Kharagpur** Jul 2024 – Present
M.Tech in Medical Imaging & Informatics; GPA: 8.59/10 Kharagpur, India
 - Coursework: Digital Image Processing, Biostatistics, Physics & Instrumentation of Medical Imaging, Medical Image Analysis, Pathological Image Processing, Molecular Imaging, Computer Vision.
- **Kalyani Government Engineering College** Oct 2020 – May 2024
B.Tech in Computer Science & Engineering; GPA: 8.88/10 West Bengal, India
 - Coursework: Programming, Engineering Mathematics, Data Structures, Algorithms, Machine Learning, Theory of Computation, Compiler Design, Operating Systems.

Experience

- **Student Lead — IEEE EMBS BHI 2025 Data Competition** 2025
Team Coordination & Administration Remote
 - Served as the student lead for the IEEE EMBS BHI 2025 Data Competition team.
 - Handled team registration, administrative coordination, and official communications with the organizers.
 - Coordinated with respective Task Leaders across multiple competition tracks to ensure smooth participation.
 - Task Leaders remained responsible for technical execution and evaluation of their assigned tasks.
- **Research Intern — MIT Lab, SMST, IIT Kharagpur** Jan 2025 – Present
Deep Learning for OPMD Classification Kharagpur, India
 - Developed DL models for Oral Cytology WSIs to classify Oral Potentially Malignant Disorders.
 - Working under the supervision of Dr. Subhamoy Mandal and Dr. Shirin Dasgupta.
- **Teaching Assistant — SMST, IIT Kharagpur** Jul 2025 – Present
Course: Introduction to Programming Kharagpur, India
 - Assisting in teaching Python programming to MMST students (MBBS doctors).
 - Mentoring students in algorithmic thinking and coding practices.
- **Industrial Project Trainee — Ardent Computech Pvt Ltd** May 2023 – Jul 2023
Machine Learning for Water Potability Prediction Kolkata, India
 - Built an end-to-end ML pipeline for water potability prediction.
 - Implemented Random Forest and other algorithms to classify water as potable/non-potable.
 - Optimized preprocessing and feature engineering to improve model accuracy and robustness.

Thesis & Selected Projects

- **M.Tech Thesis — IIT Kharagpur** Jan 2025 – Present
Deep Learning for Lung Nodule Analysis & Malignancy Risk Estimation from LDCT
 - Preprocessed LDCT volumes (.mha, .nii) and trained 3D CNNs (ResNet, I3D, nnU-Net).
 - Integrated imaging and clinical biomarkers for malignancy risk prediction.
- **Capstone: Image Processing Lab** Oct 2024 – Dec 2024
Brain Tumor Segmentation

- Used Publicly available MRI Brain dataset (2D Slices)
- Implemented anisotropic diffusion, tophat filtering, and histogram-based segmentation.
- Extended to U-Net with improved Dice and AUC.
- **Capstone: Medical Imaging Lab** Jan 2025 – May 2025
Pap Smear Cytology: Classification & Segmentation of Cervical Cells
 - Developed hybrid pipeline combining classical methods with DL models.
 - Achieved strong accuracy and Dice across Pap smear datasets.
- **Capstone: Telemedicine Platform** Jan 2025 – May 2025
Neurology Hospital Management
 - Designed web platform (Apache, PHP) with integrated AI-assisted image analysis.
- **B.Tech Thesis — KGEC** 2023 – 2024
Pancreatic Cancer Prediction from Imaging & Biomarkers
 - Built CNNs for pancreatic cancer detection from CT scans.
 - Implemented ML on urinary biomarkers, surpassing prior SOTA by 0.7%.

Technical Skills

- **Programming:** Python, C/C++, MATLAB
- **ML/DL:** PyTorch, MONAI, scikit-learn, Optuna
- **Medical Imaging:** OpenCV, Pillow, SimpleITK, NiBabel, PyRadiomics, ITK
- **Data/Visualization:** NumPy, Pandas, Matplotlib, Seaborn, SciPy
- **MLOps/Tools:** Git, Docker, Linux, HPC

Achievements

- AIR 2741 / 120K+ in GATE CS (2024).
- GMR 1801 / 100K+ in WBJEE (2020).
- Olympiad Rank-7 in iOS & iOM (SilverZone, 2013).
- 10/10 CGPA in CBSE SSE (2017).

Summer Schools & Academic Training

- **IITB SysCon Summer School** May 2023
Department of Systems & Control, IIT Bombay
 - Attended theory sessions on Quantum Control, Multi-Agent Systems, Reinforcement Learning, and Vibrational Control.
 - Participated in tutorials and research lab visits.
- **JTG / IEEE IT Society Summer School** Jul 2025
Department of Electrical Engineering, C-MInDS, IIT Bombay
 - Topics included Deep Learning, Graph Signal Processing, and Wireless Networks.
 - Attended lectures by Mikhail Belkin (UCSD), Siva T. Maguluri (Georgia Tech), and Prabha Mandayam (IIT Madras).
 - Engaged in tutorials and invited talks on cutting-edge research topics.

Publications

- **Mukherjee, R.,** Daniel, R., Hazra, S., Dasgupta, S., Mandal, S. *Multimodal RGB-HSI Feature Fusion with Patient-Aware Incremental Heuristic Meta-Learning for Oral Lesion Classification.* [In Review - arXiv Version](#)
- **Mukherjee, R.,** Daniel, R., Hazra, S., Dasgupta, S., Mandal, S. *RAA-MIL: A Novel Framework for Classification of Oral Cytology.* [In Review - arXiv Version](#)