

Amritpal Singh, MBBS, MS

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Location: Atlanta, Georgia, USA

EDUCATION

Ph.D in Computer Science and Informatics, Emory University, USA

Aug 2024 - Present

Research focus: Multimodal biomarker discovery for cancer using deep learning methods on radiology/pathology images. Advisor: Dr. Anant Madabhushi, Professor, Georgia Institute of Technology and Emory University

Master in Computer Science, Georgia Institute of Technology, USA

Aug 2022 - Apr 2024

GPA - 3.82/4.0, Machine learning specialization: BMED4803 Regulatory issues for medical devices, BMED6739 Medical robotics, CS8803 Animal computer interactions, CSE8803 ML for graphs, CSE8803 ML in Chemistry, CS6515 Graduate algorithms, CS7642 Deep learning, CS7650 Natural Language, CS7642 Reinforcement learning, CS7641 Machine learning, CS6601 AI

Bachelor of Medicine, Bachelor of Surgery(M.B.B.S)

Aug 2015 - Mar 2020

Maulana Azad Medical College, Delhi. Practiced and studied Genomics, Pharmacology, Biochemistry, Medicine, Surgery, Pediatrics, Gynecology, Ophthalmology, ENT and others. Three years of clinical rotation, followed by one year of clinical posting at Lok Nayak Hospital and GB Pant Institute of Postgraduate Medical Education & Research(GIPMER), Delhi

PUBLICATIONS

Oculomics Meets Exposomics: Multi-Modal Ocular Biomarkers for Precision Environmental Health: Provided a roadmap integrating ocular biomarkers with environmental exposure analytics. Published in *Exposome*, 2025. [🔗](#)

AI-Informed Retinal Biomarkers Predict 10-Year Risk of Multiple Hematological Malignancies: Developed

retinal-image-derived biomarkers predicting long-term hematological malignancy risk. Published in *European Journal of Cancer*, 2025. [🔗](#)

AI-Based Early Identification of Nonresponders and Surgical Need in Spinal Tuberculosis via Baseline MRI: Built MRI-based AI models predicting treatment nonresponse and surgical need in spinal TB. Published in *The Spine Journal*, 2025. [🔗](#)

Evaluation of AI-Derived Peripapillary and Parafoveal Retinal Vessel Features for Cardiovascular Risk Prediction: Assessed retinal microvascular biomarkers for cardiovascular risk stratification in the CRIC study. Presented at ARVO, 2025. [🔗](#)

Artificial intelligence-based virtual staining platform for identifying tumor-associated macrophages from hematoxylin and eosin-stained images: European journal of cancer, Arpit Aggarwal, Mayukhmala Jana, Amritpal Singh [🔗](#)

Spatial Arrangement of Neoplastic Lymphocytes Predicts Molecular Subtypes in Diffuse Large B-cell Lymphoma: Podium presentation, USCAP 2025

Explainable AI Better Predicts 3-Year MACE Risk Compared to Clinical and ASCVD Models in the UK Biobank Cohort: Abstract presentation, AHA2024 Annual Conference, American Heart Association [🔗](#)

GraphPrint: Combining Traditional Fingerprint with Graph Neural Networks For Drug Target Prediction: Combining traditional molecular and protein features with 3D features from graph neural network for drug target affinity. published NEURIPS 2023

Class-Incremental Continual Learning for General Purpose Healthcare Models [🔗](#) : Building medical imaging AI that can learn new diseases without catastrophic forgetting on previous tasks, in different modalities, specialties, and hospitals. published NEURIPS 2023

Multi-Modal Deep Feature Integration for Alzheimer's Disease Staging: Learning Alzheimer's disease stage classification using multimodal data: MRI, PET, EHR, and Genomics data. Published at IEEE BIBM conference 2023 [🔗](#)

Autonomous Soft Tissue Retraction Using Demonstration-Guided Reinforcement Learning [🔗](#) : Learning to control DaVinci surgical robot for soft tissue manipulation using expert demonstrations. Accepted in MICCAI- AE-CAI workshop 2023

Multi-Modality Deep Learning Methods to Learn Alzheimer's Disease Classification: Paper presentation at Suddath Symposium (Biomedical Informatics and AI for Biodiscovery and Healthcare) Georgia Institute of Technology. Mar 2023

Roadmap to Autonomous Surgery - A framework to Surgical autonomy [arXiv:2206.10516v1](#) [🔗](#): Apr - May 2022

In-Silico Repositioning of Drugs for Neurofibromatosis 2 Vestibular Schwannoma using Machine Learning

10.7303/syn25958848 [🔗](#) : Mar -Sep 2021, deep learning framework for re-purposing old drugs using drug-target similarity

Personalized brain state targeting via Reinforcement Learning [🔗](#) : Sep - Nov 2020, Active sleep induction in insomnia patients using non-invasive brain stimulation and reinforcement learning

Validation of expert system enhanced deep learning algorithm for automated screening for COVID Pneumonia on chest

X-rays - Nature Scientific reports 10.1038/s41598-021-02003-w [🔗](#) : Apr-Sep 2020. Novel methods to augment deep learning methods with human expert knowledge to predict COVID-19 on chest X-rays with limited data

GRANTS AND AWARDS

CDAIT Student innovation grant: For medtech device development, by Georgia institute of technology, Mar 2024

Ma Amriteshwari Charity Sansthan (MACS) Achievement Award: For outstanding achievement outside medical field - Jul 2019

REVIEWER EXPERIENCE

IEEE COMPSAC 2024 conference: Osaka, Japan

NEURIPS 2023 conference: Deep Generative Models for Health workshop

NEURIPS 2023 conference: GenBio(Generative AI and Biology) workshop

IEEE COMPSAC 2023 conference: Italy

WORK EXPERIENCE

Research Assistant, Emory University

Aug 2023 - Jul 2024

Design clinical studies for cancer quantitative studies. Developing quantitative multimodal (radiomics, pathomics, genomics) biomarkers to predict patient prognosis and outcomes in CDK4/6 treated liver metastatic breast cancer patients. Clinical research experience with design protocol/clinical studies and clinical data interpretation for imaging. Disease area of focus: Colorectal, lung cancer.

Advisor: Anant Madabhushi, PhD. Madabhushi Lab

Data Science Intern: Abacus.ai, California(USA)

May 2023 - Aug 2023

Train custom large language models (LLMs) for text extraction and manipulation; Implement, train, and selection of machine algorithms for varying applications like forecasting, anomaly detection, and regression.	
Research Assistant, BioML Lab, Georgia Tech	Aug 2022 - May 2023
Multi-modality deep learning: using complementary information from 3D imaging(MRI, PET scans), electronic health records, and genomic data. Improved on the previous SOTA methods on neurodegenerative diseases like Alzheimer's disease prediction. Explore methods to drive algorithmic and designing architectural advances, and implement hyper-parameter optimization. Design deep learning (2D/3D CNNs, NLP) models to improve the previous state of the art.	
Clinical Scientist: Qure.ai	Sep 2021 - June 2022
Designed clinical protocol and patient selection for clinical trials. Planned and executed clinical studies for 2 FDA approvals for medical imaging AI products. Managed clinical affairs and wrote clinical development plans.	
Deep learning and Data analysis: Deep learning AI models for medical images, and analysis of classification/ segmentation models.	
Benchmarking products & measured patient data shifts to guide new model updates.	
Manager: Dr. Pooja Rao, Ph.D. Neuroscience, Co-founder of Qure.ai	
Junior Resident: Lok Nayak Hospital	Apr 2020 - Apr 2021
Clinical rotation at Lok Nayak Hospital and GB Pant Institute of Postgraduate Medical Education & Research(GIPMER), Delhi	

TEACHING EXPERIENCE

CS170 Intro to Computer Science	Aug 2025 - Dec 2025
with Dr Julian Abigail, Emory University	
CS170 Intro to JavaScript	Jan 2025 - Apr 2025
with Dr Julian Abigail, Emory University	
Neuromatch Academy: Neuroscience summer school	June 2022 - July 2022
Teaching Assistant: International neuroscience summer school, taught Computational Neuroscience and Deep Learning course	

PROJECTS

Distributed control of decentralized Multi-robot system for efficient blood pumping in bionic heart : Solved as two sub-problems: 1. Reward engineering based on fluid dynamics and max-flow between agents. 2. Learn optimal coordination policy amongst robots using reinforcement learning(Q-learning) algo. Our solution improved power efficiency by 4% over the baseline.

Remote health, patting and activity tracking in dogs: Proof of concept device : Design dog vests with touch sensors to understand patting patterns, along with motion tracking and remote pet activity recognition using machine learning. Built animal interaction prototype with advisor: Dr. Melody Moore Jackson

Surgical behavior emergence using reinforcement learning in physics simulation: Built my own custom scalable Multi-agent reinforcement learning environment of a 4-arm (6 degrees of freedom each) surgical robot, using the mujoco physics simulator to model robot kinematics. Performed reward engineering for reinforcement learning algorithms to learn arm coordination using surgical arms.

Semi-supervised surgical tool detection and localization on endoscopic videos : Using SurgToolLoc data by Intuitive Surgical, Trained ensemble of UNET models on Using video level labels to detect+track surgical instruments in the endoscopic video at the frame level, achieved an average-F1 score of 0.52

Robotic control via kinematics for suturing demonstration: Path planning using Jacobians, Forward, inverse kinematics of 5 DOF robot to perform the 4 steps of suturing: Aligning, Insertion of the needle, picking the needle from the other end, and realigning. Design end-effector to allow more efficient needle holding and auto-alignment.

Cancerous brain cell detection using microscopic images: Implemented pipeline for training and segmenting images using U-Net and Detectron model. Final model achieved 0.313 IOU

Android app for images based eye retinopathy detection: Javascript-based app to detect diseases using eye's retina images on phone with Google Cloud integration. Downloaded over 50+ times on Google Play Store. The final model achieved 0.95 accuracy and, 0.92 F1 score.

Detection and localization of medical catheters on 2D x-ray images: Created ensemble of 5 image classification AI models, with the final model reaching a 0.86 F1 score, with GRAD-CAM explainable AI for model predictions

COMPETITION AND HACKATHONS

MIT Hack 4 Rare Disease Hackathon: Built AI solution for drug re-purposing for Neurofibromatosis, a rare neurodegenerative disease [🔗](#)

Prague Healthcare Hackathon: Built AI solution for live health and visitor monitoring in ICU patients from CCTV video.

OSIC Pulmonary Fibrosis Progression Competition: Top 5% selected teams

Sartorius - Cell Instance Segmentation competition: Top 15% selected teams

LEADERSHIP

- General secretary, Azad Medicos Association (Student union), Maulana Azad Medical College, India - 2018
- Founding member, Gurukool: promote undergrad leadership & research. Maulana Azad medical college, India - 2017

SKILLS SUMMARY

Skills: Bio-statistics | Clinical study design | Medical regulatory | Clinical Affairs | Machine learning

AI/ML: Computer vision | Natural language | Large language models | Deep learning

Programming: Java | Python | R | MongoDB | SQL | Git | Pytorch