

IPSA S. YADAV

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SUMMARY

3rd-year PhD candidate at Emory University with 6 years of research experience in deep learning, computational biology, and multi-modal data integration. Skilled in PyTorch, TensorFlow, computer vision, generative models, graph neural networks, foundation model fine-tuning, and large-scale distributed training. Research spans building multi-modal pipelines integrating histopathology, spatial biology, molecular/genomic, and imaging (MRI) data to model complex biological processes across multi-institutional cohorts (2,000+ whole-slide images, 71-site federated learning). Seeking a Research Scientist Internship at the intersection of AI and biology, with a focus on foundation model development, multi-modal biological modeling, or computational biology.

EDUCATION

EMORY UNIVERSITY <i>PhD, Computer Science and Biomedical Informatics</i>	Atlanta, GA January 2028
Focus: Multi-modal AI for biological systems – integrating imaging, spatial biology, and molecular data in translational oncology	
CASE WESTERN RESERVE UNIVERSITY <i>Master of Science, Biomedical Engineering</i>	Cleveland, OH December 2021
UNIVERSITY OF MUMBAI <i>Bachelor of Engineering, Biomedical Engineering</i>	Mumbai, India June 2019

RESEARCH EXPERIENCE

MADABHUSHI LAB, Emory University <i>PhD Researcher</i>	Atlanta, GA August 2023 – Present
- Designed multi-modal fusion pipelines integrating histopathology (H&E), multiparametric MRI, and genomic/molecular features to model biological heterogeneity across tumor types; improved molecular subtype classification AUC vs. single-modality baselines. - Built spatial biology algorithms (PyTorch) modeling tumor-immune microenvironment interactions on 2,000+ whole-slide images across 5 tissue types; validated with Cox regression ($p < 0.01$). First-author podium at USCAP 2025. - Developed multi-institutional data integration framework (4 sites) combining pan-modal biological data — imaging, molecular, and clinical — for robust, generalizable model development. - Co-authored ASCO Educational Book chapter (2025) on integrating imaging, histopathology, and molecular data for AI-driven treatment personalization in head & neck cancer.	
BRAIN IMAGE COMPUTING LAB, Case Western Reserve University <i>Graduate Research Assistant</i>	Cleveland, OH June 2020 – July 2023
- Developed DL and radiomics models for tumor segmentation and molecular subtype classification in brain and head & neck cancers (PyTorch, TensorFlow); co-authored multi-institutional medulloblastoma study published in <i>Radiology: AI</i> (2024). - Integrated multi-parametric MRI radiomic features with digital pathology and molecular data for multi-modal glioma classification. - Led radiomics and computational pathology projects for glioblastoma classification; first-authored 2 SPIE Medical Imaging proceedings on DL-based tumor classification. - Core contributor to Nature Communications federated learning study: trained distributed DL models for rare cancer boundary detection across 71 institutions and 7,000+ participants — demonstrating large-scale distributed training and multi-site data coordination.	
IN-MED PROGNOSTICS, AI/ML startup developing proprietary medical imaging analysis platforms <i>Biomedical Engineer</i>	San Diego, CA January 2022 – December 2022
- Independently designed and shipped AI models for neuroimaging and digital pathology (stroke characterization, brain tumor subtyping) in a fast-paced startup with minimal supervision — from data pipeline to validated prototype. - Built automated tissue segmentation and quantitative feature extraction pipelines; delivered production-ready tools for scalable biological data analysis.	

TECHNICAL SKILLS

- Languages & Frameworks:** Python, PyTorch, TensorFlow, Keras, MATLAB, R, Git, Linux/HPC, SLURM
- ML & AI:** Generative models, Graph Neural Networks, Foundation Model fine-tuning, large-scale distributed training, federated learning, multi-modal fusion, Computer Vision (CNNs, ViTs, U-Net)

- *Biological Data Modalities*: Whole-slide image analysis (H&E, IHC), Spatial Biology, Molecular/Genomic Data Integration, Radiomics (MRI/CT), multi-scale tissue-to-molecular modeling, Digital Pathology pipelines (OpenSlide, QuPath)

SELECT PUBLICATIONS

Book Chapters

- Yadav I, Song B, Tsai JC, Madabhushi A, Kann BH. "Artificial Intelligence for Head and Neck Squamous Cell Carcinoma: From Diagnosis to Treatment." ASCO Educational Book. 2025;45(3):e472464.

Peer-Reviewed Journal Articles

- Bareja R, Ismail M, Martin D, Nayate A, Yadav I, et al. "nnU-Net-based Segmentation of Tumor Subcompartments in Pediatric Medulloblastoma Using Multiparametric MRI: A Multi-institutional Study." *Radiology: Artificial Intelligence*. 2024;6(5):e230115.
- Pati S, Baid U, Edwards B, et al. [incl. Yadav I] "Federated learning enables big data for rare cancer boundary detection." *Nature Communications*. 2022;13:7346.

Peer-Reviewed Conference Proceedings

- Elayavalli SR, Yadav I, Cookson GT, Khalighi S, et al. "Non-Invasive Molecular Classification of Gliomas Using Explainable AI and Radiomic Features from Multi-Sequence MRI." *SPIE Medical Imaging*. 2025.
- Yadav I, Ismail M, Statsevych V, Hildebrandt V, Madabhushi A. "A 2D U-NET Combined Model Based on Lesion Size for Automated Stroke Lesion Segmentation." *SPIE Medical Imaging 2023. Proc. SPIE* 12465.
- Yadav I, Ismail M, Statsevych V, Hill V, Correa R, Ahluwalia M, Tiwari P. "A Radiomics Approach to Distinguish Non-Contrast Enhancing Tumor from Vasogenic Edema on Multi-Parametric MRI for Glioblastoma." *SPIE Medical Imaging 2022. Proc. SPIE* 12033.

Conference Abstracts

- Khalighi S, Elayavalli S, Pathak TB, Yadav I, Madabhushi A, et al. "Multimodal Explainable AI for Molecular Subtyping of Gliomas Using Radiology and Pathology Integration." 2025.
- Verma R, Rauf Y, Yadav I, et al. "Radiomic Features from Lesion Habitat Predict Response to Nivolumab and Bevacizumab in Recurrent Glioblastoma." *Neuro-Oncology*. 2021;23(Suppl_6):vi141.
- Verma R, Rauf Y, Yadav I, et al. "Prediction of Response to Nivolumab and Bevacizumab in Recurrent Glioblastoma via Radiomic Analysis." *Neuro-Oncology Advances*. 2021;3(Suppl_4):iv6.

PRESENTATIONS & HONORS

- Podium Presentation (First Co-Author): "Tumor Stromal Proportion (TSP) is an Independent Prognostic Marker in Vulvar Squamous Cell Carcinoma (VSCC): A Multi-Institutional Clinicopathologic and Molecular Assessment from the FLGTCC." *USCAP* 2026.
- Podium Presentation (First Author): "AI-Driven Spatial Analysis of TILs as a Prognostic Biomarker across Pan-HPV p16+ Squamous Cell Carcinomas." *USCAP* 2025.
- Podium Presentation (First Co-Author): "Neighborhood-Based Spatial Metrics in Vulvar SCC." *USCAP* 2025.
- Poster Presentation (First Co-Author): "Spatial TIL Analysis in VSCC." *USCAP* 2025. 2nd Prize, ISGyP Trainee Poster Competition.
- Poster Presentation (Co-Author): "Pan-Omic Modeling in Gliomas for Molecular Diagnostics." *USCAP* 2025.

SELECT PROJECTS

- AI-Driven Spatial Analysis of Tumor-Infiltrating Lymphocytes (TILs) in HPV+ Squamous Cell Carcinomas: Developed and validated spatial biomarker algorithms for digital H&E slides enabling risk stratification across multiple HPV-driven tumor sites.
- Integrated Spatial Radiomic-Pathomic Modeling in Gliomas: Combined whole slide image digital pathology features with radiomic MRI data to enhance molecular diagnostics and tumor classification.
- Radiomics-Based Glioblastoma Tumor Classification: Applied computational pathology and radiomics to distinguish non-contrast enhancing tumor from vasogenic edema using multi-parametric MRI.
- Diabetic Retinopathy Classification Using Deep CNN: Developed ResNet and VGG16 models for automated grading of digital retinal pathology images.