MAYUKHMALA JANA

AI for Cancer Research | Immuno-Oncology | Computational Pathology
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Research profile

I develop AI methods to study cancer and its immune environment. My background combines first-author computational imaging research, collaborative immuno-oncology studies and nearly three years building production machine-learning workflows at Accenture. In my PhD, I work with pathologists and oncologists to turn biological questions into models, experiments and interpretable evidence.

Research record: Three peer-reviewed journal articles, including one first-author paper; five first-author IEEE conference papers; first-author meeting abstracts at ASCO, ESMO and USCAP.

Selected media coverage and public recognition

Winship Cancer Institute highlighted my ASCO 2026 research and presentation. Research I coauthored was covered by Emory News, the University of Minnesota, Medical Xpress, OncoDaily, EurekAlert! and The Cancer Letter.

ResearchHub cofounder Patrick Joyce shared ReproImmuneAge. The Telegraph mentioned my cultural participation (June 2023).

Coverage sources and links: https://mayukhmalajana.github.io/#media

Education

PhD, Biomedical Engineering | Georgia Tech and Emory University
August 2024–present; expected August 2029. Wallace H. Coulter Department of Biomedical Engineering. Adviser: Anant Madabhushi.

BTech, Electronics and Communication Engineering | University of Calcutta
2017–2021. CGPA: 9.70/10; ranked 1st in a cohort of 40.

Doctoral research and funded team projects

PhD Researcher | Madabhushi Lab, Georgia Tech–Emory | August 2024–present

- Co-developed and validated **VISTA**, an AI method for virtual immune-cell staining; second author of the European Journal of Cancer study. Contributed data preparation, model development, experiments, validation, survival analysis and writing.
- Led analyses, scientific interpretation and visualization for **VAIP and VIPER**, reported in first-author ASCO and ESMO meeting abstracts on cancer prognosis and immunotherapy response.
- Designed spatial analyses of macrophage organization in ovarian cancer and tested associations with disease-free survival in **154 training and 210 independent test patients**, retaining the training-derived cutoff. Presented the work at Rivkin/OCRA in October 2026.
- Developing **XenoCAVILIS** and related multimodal approaches connecting tissue images with spatial molecular data. Ongoing research examines immune and stromal biology and evaluates image-derived interpretations against measured assays.

Research Assistant | Winship Cancer Institute, Emory University | July 2024–present. Concurrent appointment supporting the doctoral cancer research described above.

Core Computational Pathology Team Member | HistoRisk AI | August 2025–present. Contribute computational analysis, model development and validation for breast-cancer risk research. Team selected and funded through the Emory Innovation Challenge FY2026.

Peer-reviewed journal articles

Aggarwal A, Madill M, **Jana M**, Pathak T, Starr TK, Winterhoff B, Tessier KM, Erickson BK, Nelson AC, Lou E, Madabhushi A, Bazzaro M. STAR (Stroma-Tumor AI Risk) assessment: association of AI-derived tumor-stroma proportion with patient survival provides added prognostic value beyond KELIM in epithelial ovarian cancer. BJC Reports. 2026. PMID: 41652007.

Aggarwal A, **Jana M**, Singh A, Dam T, Maurya H, Pathak T, Orsulic S, Yang K, Chute D, Bishop JA, Faraji F, Thorstad WM, Koyfman S, Steward S, Shi Q, Sandulache V, Saba NF, Lewis JS Jr, Corredor G, Madabhushi A. Artificial intelligence-based virtual staining platform for identifying tumor-associated macrophages from hematoxylin and eosin-stained images. European Journal of Cancer. 2025;220:115390. PMID: 40158294.

Jana M, Das A. Multimodal Medical Image Fusion Using Two-Stage Decomposition Technique to Combine the Significant Features of Spatial Fuzzy Plane and Transformed Frequency Plane. IEEE Transactions on Instrumentation and Measurement. 2023;72:5005910. DOI: 10.1109/TIM.2023.3240222.

Peer-reviewed conference papers

Jana M, Das A. Multimodal Medical Image Fusion Using Deep Learning Models in Fuzzy Domain. IEEE ICCCMLA. (2023) DOI: 10.1109/ICCCMLA58983.2023.10346826.

Jana M, Roy P. Low Light Scene Enhancement for Object Detection and Tracking Using Multiscale Decomposition and Fusion. IEEE ICORT. (2023) DOI: 10.1109/ICORT56052.2023.10249164.

Jana M, Basu S, Das A. Fusion of Multimodal Images Using Parametrically Optimized PCNN and DCT-Based Fourier Analysis. IEEE DELCON. (2022) DOI: 10.1109/DELCON54057.2022.9753411.

Jana M, Basu S, Das A. NSCT-DCT Based Fourier Analysis for Fusion of Multimodal Images. IEEE UPCON. (2021) DOI: 10.1109/UPCON52273.2021.9667618.

Jana M, Roy P. Multi-Target Tracking Using Ramanujan Sum-Based DWT. IEEE ICORT. (2021) DOI: 10.1109/ICORT52730.2021.9581552.

Public research software

Four public MATLAB implementations accompany my published imaging and signal-processing research:

Two-stage multimodal medical-image fusion (TIM, 2023)

PCNN and Fourier-analysis image fusion (DELCON, 2022)

NSCT–DCT image fusion (UPCON, 2021)

Ramanujan-sum wavelet target tracking (ICORT, 2021)

Published meeting abstracts

Jana M, Aggarwal A, Shanbhogue N, Pathak T, Badve SS, Thorat MA, Toro P, Lewis JS Jr, Wasman J, Teknos TN, Pan Q, Shi Q, Schmitt NC, Steward-Tharp SM, Saba NF, Orsulic S, Bazzaro M, Corredor G, Madabhushi A. Virtual AI-informed immunocyte profiling (VAIP) from H&E as a predictor of multi-cancer prognosis. ASCO Annual Meeting 2026, abstract 3118. DOI: 10.1200/JCO.2026.44.16_suppl.3118.

Gandhi S, Deshmukh SK, Canning MT, Trapani D, Wu S, Leone JP, Kalinsky K, Roussos Torres ET, Badve SS, **Jana M**, Madabhushi A, Almahfouz S, Al-Shakshir H, Lustberg MB, Takabe K, Curigliano G, Sledge GW Jr, Kalinski P. Real-world evaluation of CXCL9/10 with PD-L1 and TMB as predictors of pembrolizumab benefit in triple-negative breast cancer (TNBC). ASCO Annual Meeting 2026, abstract 1125. DOI: 10.1200/JCO.2026.44.16_suppl.1125.

Schwartz M, Ji X, Switchenko JM, Canning MT, Kalinsky K, Lei L, **Jana M**, Singh A, Madabhushi A, Gandhi S. Trends in immunotherapy use and survival outcomes by metastatic pattern in metastatic triple-negative breast cancer. ASCO Annual Meeting 2026, abstract 1127. DOI: 10.1200/JCO.2026.44.16_suppl.1127.

Jana M, Shanbhogue N, Castano PT, Pathak T, Lewis J, Wasman J, Teknos T, Shi Q, Pan Q, Schmitt N, Steward-Tharp S, Saba N, Corredor G, Madabhushi A. AI informed virtual immunocyte profiling from H&E images predicts immunotherapy response (VIPER) in head and neck squamous cell carcinoma. ESMO Congress 2025, abstract 1405P. DOI: 10.1016/j.annonc.2025.08.2037.

Jana M, Madabhushi A, Aggarwal A, Pathak T, Corredor G, Gilmore H, Montero A, Harbhajanka A. Computationally Derived Collagen Architecture Patterns from H&E Images Identifies Ultra-Low Risk MammaPrint Category in Early-Stage Luminal A Breast Cancer. USCAP 2025, abstract 171. DOI: 10.1016/j.labinv.2024.102395.

Madill M, Aggarwal A, **Jana M**, Pathak T, Winterhoff B, Starr T, Tessier K, Erickson B, Nelson A, Lou E, Madabhushi A, Bazzaro M. STAR (Stroma-Tumor AI Risk) Assessment: Association of AI-derived tumor-stroma proportion with patient survival provides added prognostic value beyond KELIM in epithelial ovarian cancer. AACR Special Conference in Cancer Research: Advances in Ovarian Cancer Research 2025, abstract B042. DOI: 10.1158/1538-7445.OVARIAN25-B042.

Aggarwal A, Corredor G, **Jana M**, Pathak T, Steward-Tharp S, Sandulache V, Shi Q, Lewis J, Madabhushi A. AI Virtual Staining Approach for Identifying M2 Tumor-Associated Macrophages in H&E Images of HPV-Associated Oropharyngeal Squamous Cell Carcinoma. USCAP 2025, abstract 1128. DOI: 10.1016/j.labinv.2024.103363.

Oral presentations and posters

Cell-Type-Specific Immune Aging from Routine H&E is Associated with Immunotherapy Response and Survival in NSCLC. Rapid-fire oral presentation, Georgia Tech Immunoengineering Symposium, November 5, 2026.

Jana M, Corredor G, Pathak T, Orsulic S, Bazzaro M, Madabhushi A. AI-Derived Macrophage-Wall Architecture Around Tumor Nests on H&E Stratifies Disease-Free Survival in HGSOC. Poster P140, 16th Biennial Rivkin Ovarian Cancer Research Symposium, presented by OCRA, Philadelphia, PA, October 16–18, 2026. **Presented.**

Jana M, Corredor G, Pathak T, Orsulic S, Bazzaro M, Madabhushi A. AI-Derived Macrophage-Wall Architecture Around Tumor Nests on H&E Stratifies Disease-Free Survival in HGSOC. Winship Scientific Symposium, Emory University, Atlanta, GA, November 2, 2026. Presented.

Khalighi S, **Jana M**, Madabhushi A. Multiscale Spatial Architecture of CD8+ Tumor-Infiltrating Lymphocytes Redefines Immune Hot and Cold Phenotypes in High-Grade Serous Ovarian Cancer. Cell Bio 2026, San Diego, CA, December 12–15, 2026. **Accepted co-authored poster; upcoming.**

Industry and earlier research experience

Machine Learning Engineering Analyst | Accenture | August 2021–June 2024

Designed, deployed and monitored production machine-learning workflows for entity matching, data mastering and data quality using Python, TAMR and Azure DevOps. Worked with technical and business teams to translate requirements into operational pipelines. Received **Exemplify Client-Centricity recognition**.

Research and teaching | University of Calcutta | 2020–2024

Led algorithm development and experimental evaluation in multimodal medical-image fusion, producing first-author work in IEEE Transactions on Instrumentation and Measurement and IEEE conference proceedings. Contributed to DST-SERB project SUR/2022/005169; combined research with Digital Image Processing teaching.

Research and Development Intern | DRDO, Integrated Test Range, Chandipur
July–December 2021; April–October 2022. Developed multi-target tracking methods and low-light image-enhancement and fusion approaches, respectively, leading to first-author ICORT papers in 2021 and 2023.

Undergraduate Summer Research Intern | IIT Kharagpur
June 2019; July–August 2020. Worked on embedded-system design and programming in 2019, and antenna design and simulation using HFSS in 2020.

Visiting Researcher | Jadavpur University | 2018–2019. Undergraduate visiting research alongside BTech studies at the University of Calcutta.

Teaching and research mentoring

Georgia Tech | Teaching Assistant. Biomedical Systems and Modeling (2025): supported approximately **140 students** and delivered modeling and simulation lectures. Intro to Bioinformatics (2026): supported approximately **44 students** learning sequence analysis and computational algorithms.

University of Calcutta | Digital Image Processing | July 2023–July 2024. Developed lectures, course materials and practical assignments; provided individualized support to undergraduate engineering students.

Madabhushi Lab | Research mentoring. Mentor undergraduate and high-school researchers and collaborate with interns on computational-pathology projects.

Peer review, recognition and professional service

Journal reviewer: Cancer Cell; The Lancet Digital Health (September 2026–present); IEEE Transactions on Instrumentation and Measurement; Expert Systems with Applications.

Recognition: Session best-paper recognition, IEEE ICORT 2021; Accenture Exemplify Client-Centricity recognition.

Memberships: IEEE; IEEE Photonics student chapter; Associate Member, American Association for Cancer Research; Winship Cancer Institute trainee member (2026).

Service: IEEE Calcutta Student Branch and IEEE Photonics Society STEX volunteer; Alumni Cultural Representative, Radio Physics and Electronics, University of Calcutta.

Technical capabilities

AI and imaging: Deep learning, multimodal learning, computer vision, graph models, foundation-model evaluation and medical-image analysis.
Cancer research: Computational pathology, virtual staining, spatial transcriptomics and proteomics, spatial cell analysis, biomarker evaluation and survival analysis; Xenium, Visium and Visium HD.
Scientific software and ML systems: Python, R, MATLAB, PyTorch, TensorFlow, scikit-learn, OpenCV, Git, Docker, Linux/HPC, TAMR and Azure DevOps.