Rohan N. Dhamdhere

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Academic and Professional Profile

Biomedical engineering PhD candidate in the Georgia Tech-Emory program developing machine learning methods for cardiovascular risk prediction and clinical decision support. Research spans multimodal medical AI, foundation-model embeddings, retinal imaging, ECGs, echocardiography, CT, radiomics, and survival modeling. Work has been evaluated on real-world clinical cohorts across cardiology, nephrology, hepatology, ophthalmology, and transplant medicine, with 25+ scholarly outputs, 100+ citations, 1 allowed patent, 2 pending patent applications, and translational funding for clinical prototype development.

Education

Georgia Institute of Technology and Emory University | Atlanta, GA
PhD Candidate, Biomedical Engineering | 2022-2026
Advisor: Dr. Anant Madabhushi | GPA: 4.0
Focus: AI-driven cardiovascular risk stratification using routine clinical modalities including retinal imaging, ECG, echocardiography, and CT.

Rochester Institute of Technology | Rochester, NY
MS, Computer Engineering | 2016-2018
GPA: 3.90 | Graduate Scholarship Recipient
Thesis: Meta Learning for Graph Neural Networks

Savitribai Phule Pune University | Pune, India
BE, Electronics and Telecommunication | 2015

Awards and Honors

- **Outstanding Departmental Service Award:** Wallace H. Coulter Department of Biomedical Engineering, Emory University and Georgia Institute of Technology.
- **Georgia Research Alliance Phase 1 Grant:** $50,000 commercialization award for ARiSe retinal risk assessment prototype development, 2025. Role: Co-Investigator / Key Technical Lead.
- **Graduate Scholarship Recipient:** Rochester Institute of Technology, MS in Computer Engineering.
- **Best Outgoing Student:** ECE Department, MIT College of Engineering, Pune University.

Research Appointments

Graduate Researcher, Department of Biomedical Engineering | Georgia Tech and Emory University | 2022-Present

- Developed multimodal AI models for heart transplant rejection surveillance using endomyocardial biopsy histopathology and ECG foundation-model embeddings. A gated fusion model improved C-index over EMB-only modeling (0.66 vs. 0.61) in a held-out cohort and demonstrated significant Kaplan-Meier risk separation.
- Built longitudinal ECG foundation-model approaches for non-invasive cardiac allograft rejection surveillance, achieving 15.1% biopsy reduction at 95.9% sensitivity compared with 6.9% for a clinical baseline.
- Developed retinal vascular AI biomarkers for cardiovascular risk prediction in chronic kidney disease, outperforming the AHA-PREVENT calculator in the CARE-CKD cohort (C-index 0.70 vs. 0.65; n~800).
- Designed STAR-Echo, a spatiotemporal echocardiography biomarker combining transformer-based video representations and radiomics for MACE prognosis in CKD patients (AUC 0.71).
- Collaborated with cardiology, nephrology, ophthalmology, pathology, and transplant medicine teams on study design, model validation, statistical analysis, and interpretation of clinically deployable AI tools.

Research Assistant, Center for Computational Imaging and Personalized Diagnostics | Case Western Reserve University | 2020-2022

- Developed deep learning and radiomics pipelines for opportunistic hepatic steatosis assessment from low-dose coronary calcium CT.
- Co-invented DeHFT/LARI approaches for automated liver fat quantification from routinely acquired CT, later validated across multi-site cardiovascular outcomes cohorts and associated with an allowed US patent.
- Built coronary CT analysis methods for patient-specific coronary artery disease characterization and radiomic feature extraction.

Research Assistant, Machine Intelligence Laboratory | Rochester Institute of Technology | 2016-2018

- Developed graph neural network, object detection, and computer vision methods for point cloud feature extraction, traffic sign recognition, philately understanding, and medical image classification.
- Collaborated with VisualDx Inc. on machine learning methods for clinical skin lesion diagnosis.

Industry and National Laboratory Experience

R&D Data Science Intern | Alcon | Johns Creek, GA | May 2025-August 2025

- Built a vision-language model prototype combining corneal tomography, clinical notes, and patient lifestyle data to support personalized intraocular lens recommendations for cataract surgery.
- Evaluated model behavior on a 450-patient cohort, including hallucination scoring and clinician-facing output assessment.

Research Associate | Oak Ridge National Laboratory | Oak Ridge, TN | 2018-2020

- Developed machine learning and computer vision algorithms for building and grave-site detection in satellite imagery.
- Built semi-supervised workflows using limited labeled data and deployed large-scale automated counting pipelines for geospatial analysis.

Selected Publications and Scholarly Output

1. Manandhar S, **Dhamdhere R**, Bahadur T, Margulies KB, Peyster EG, Madabhushi A. Multimodal Fusion of Biopsy and Electrocardiogram Data for Rejection Risk Prediction After Heart Transplantation. *The Journal of Heart and Lung Transplantation*. 2026;45(5):612-613.
2. **Dhamdhere R**, Manandhar S, Modanwal G, Margulies KB, Peyster EG, Madabhushi A. Longitudinal Electrocardiographic Surveillance for Cardiac Allograft Rejection After Heart Transplantation. *Journal of Cardiac Failure*. Under review, 2026.
3. **Dhamdhere R**, Modanwal G, Mutha P, Medina S, Arepalli S, Rahman M, Al-Kindi S, Madabhushi A, CRIC Study Investigators, et al. Fundus Photograph-Derived Computational Features Predict Risk of Cardiovascular Events in the Chronic Renal Insufficiency Cohort Clinical Observational Study. *Kidney360*. 2025.
4. Modanwal G, **Dhamdhere R**, Rajagopalan S, Walker J, Khera A, de Lemos JA, Peshock R, Browning J, Joshi P, Neeland IJ, et al. Opportunistic Hepatic Steatosis Assessment in Low-Dose Coronary Artery Calcium CT Using Liver Adipose-Radiomic Index (LARI). *EBioMedicine*. 2025.
5. **Dhamdhere R**, Modanwal G, Makhlouf MHE, Shafiabadi Hassani N, Bharadwaj S, Fu P, Milioglou I, Rahman M, Al-Kindi S, Madabhushi A. STAR-Echo: A Novel Biomarker for Prognosis of MACE in Chronic Kidney Disease Patients Using Spatiotemporal Analysis and Transformer-Based Radiomics Models. *MICCAI*. 2023.
6. Modanwal G, **Dhamdhere R**, Khera A, de Lemos JA, Peshock R, Browning J, Joshi P, Neeland I, Al-Kindi S, Madabhushi A. QuLF-CT: A Radiomics-Based Tool for Quantification of Liver Fat Fraction on Cardiac CT. *JACC: Advances*. 2024.
7. **Dhamdhere R**, Bharadwaj S, Aggarwal A, Mutha P, Shi W, Marteau B, Madabhushi A, Wang MD. Interpretable Survival Risk Prediction for High-Grade Glioma Patients via Radiomic Features from Peritumoral Region. *IEEE EMBC*. 2024.
8. Guo X, Dam T, **Dhamdhere R**, Modanwal G, Madabhushi A. UNETVL: Enhancing 3D Medical Image Segmentation with Chebyshev KAN Powered Vision-LSTM. *IEEE ISBI*. 2025.
9. Lunga D, **Dhamdhere R**, Walters S, Bragg L, Makkar N, Urban M. Learning to Count Grave Sites for Cemetery Observation Models with Satellite Imagery. *IEEE Geoscience and Remote Sensing Letters*. 2020.
10. Dominguez M, **Dhamdhere R**, Petkar A, Jain S, Sah S, Ptucha R. General-Purpose Deep Point Cloud Feature Extractor. *IEEE WACV*. 2018.

Full publication list available at: https://rohand24.github.io/research

Intellectual Property and Commercialization

- **Allowed Patent:** Deep-learning-based hepatic fat assessment. Inventors: Modanwal G, Al-Kindi S, Walker J, **Dhamdhere R**, Rajagopalan S, Madabhushi A. Published as US 20240420320 A1; notice of allowance October 2025.
- **Patent Application:** Medical analysis using spatiotemporal analysis and transformer-based models. Inventors: **Dhamdhere R**, Al-Kindi S, Modanwal G, Madabhushi A. Published as US 20250118435 A1; filed September 2024.
- **Patent Application:** Systems for Cardiovascular Risk Assessment Using Vessel Geometry (ARiSe). Inventors: **Dhamdhere R**, Madabhushi A. Covers retinal vessel geometry-based cardiovascular risk assessment technology.
- **Georgia Research Alliance Phase 1 Grant:** $50,000 commercialization award for ARiSe retinal risk assessment prototype development, 2025. Role: Co-Investigator / Key Technical Lead.

Teaching, Mentoring, and Leadership

Co-President, Graduate Student Advocacy Board | BME, Georgia Tech and Emory | 2024-Present

- Organized student-faculty town halls on PhD training, student welfare, and departmental policy.
- Helped restart the Mock Quals mentorship program pairing senior and junior PhD students.
- Represented graduate student concerns related to teaching assistantships, health insurance, and program transparency.

Teaching Assistant and Mentor

- Teaching Assistant, Bioengineering Statistics, Georgia Tech.
- Teaching Assistant, Deep Learning, Rochester Institute of Technology.
- Mentored junior researchers on medical data validation, reproducible analysis, model evaluation, and interpretation of clinical AI models.

Technical Skills

- **Programming and analysis:** Python, MATLAB, C++, statistical modeling, reproducible research workflows.
- **Machine learning:** PyTorch, CNNs, vision transformers, graph neural networks, foundation models, vision-language models, multimodal fusion, survival analysis.
- **Medical data:** ECG, retinal fundus imaging, echocardiography, CT, histopathology, DICOM, NIfTI, radiomics, longitudinal clinical data.
- **Research methods:** Cohort curation, model validation, Kaplan-Meier analysis, Cox modeling, concordance index, ablation studies, clinical collaborator-facing reporting.

Media and Recognition

- Featured Innovator, *Emory Health Digest*, Summer 2025, for AI-enabled retinal imaging work in cardiovascular risk assessment.