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Muhammad Faizyab Ali Chaudhary

Research Interests

Medical Image Analysis
Lung Imaging, Quantitative Computed Tomography

Deep Learning
Image Generative Models, Deformable Image Registration, Semi-supervised Learning

Clinical Focus
COPD, Small Airways Disease, Exacerbations

Academic Appointments

Heersink School of Medicine, University of Alabama at Birmingham — Birmingham, AL
Instructor – Center for Lung Analytics and Imaging Research (CLAIR) — 2024 – present

Roy J. Carver Department of Biomedical Engineering, University of Iowa — Iowa City, IA
Graduate Research Assistant – The Reinhardt Biomedical Imaging Lab — 2019 – 2024

Department of Electrical Engineering, Lahore University of Management Sciences — Lahore, PB
Research Assistant – Algorithms in Theory and Practice Lab — 2018 – 2019

Department of Life Sciences, Lahore University of Management Sciences — Lahore, PB
Research Assistant – Biomedical Informatics & Engineering Research Laboratory — 2017 – 2018

Education

Roy J. Carver Department of Biomedical Engineering, University of Iowa — Iowa City, IA
Ph.D. in Biomedical Engineering — 2019 – 2024
- Advisor: *Prof. Joseph M. Reinhardt*
- Dissertation: *Hearing the Unheard: Single volume surrogates of regional lung function*

Roy J. Carver Department of Biomedical Engineering, University of Iowa — Iowa City, IA
M.S. in Biomedical Engineering — 2019 – 2023
- Advisor: *Prof. Joseph M. Reinhardt*

Department of Electrical Engineering, University of Engineering & Technology — Lahore, PB
B.S. in Electrical Engineering — 2013 – 2027
- Advisor: *Prof. Safee U. Chaudhary and Prof. Khalid M. Hasan*
- Thesis: *Theatre for in silico oncology (TISON)*

Awards and Honors

- **SPIROMICS Young Investigator**, *A Multicenter COPD Study* — 2024 – present
- **Featured Emerging Investigator**, *American Journal of Respiratory and Critical Care Medicine* — 2025
- **Distinguished Reviewer**, *IEEE Transactions on Medical Imaging* — 2024
- **Honorable Mention**, *PhD Student Excellence Award College of Engineering* — 2023
- **Nominee**, *Graduate Research Excellence Award in Physical Sciences* — 2023
- **Summer Fellow**, *Deep Learning in Medical Imaging (DLMI), ÉTS Montréal* — 2022
- **Roy J. Carver Ph.D. Fellowship**, *University of Iowa* — 2019 – 2024
- **Undergraduate Research Grant**, *Higher Education Commission of Pakistan* — 2016
- **National Winner**, *Present Around the World Challenge by IET* — 2016
- **Dean's List of Honor**, *University of Engineering and Technology Lahore* — 2014

Selected Publications

1. **Chaudhary, M. F. A.**, Awan, H. A., Gerard, S. E., Bodduluri, S., Comellas, A. P., Barjaktarevic, I., Barr, R. G., Cooper, C. B., Galban, C. J., Han, M., Curtis, J. L. et. al. Deep learning estimation of small airways disease from inspiratory chest CT: clinical validation, repeatability, and associations with adverse clinical outcomes in COPD. ***American Journal of Respiratory and Critical Care Medicine***, 2025 Mar; 13.
2. **Chaudhary, M. F. A.**, Gerard, S. E., Christensen, G. E., Cooper, C. B., Schroeder, J. D., Hoffman, E. A., Reinhardt, J. M. LungViT: Ensembling cascade of texture sensitive hierarchical vision transformers for cross-volume chest CT image-to-image translation. ***IEEE Transactions on Medical Imaging***, 2024 Feb 19
3. Gerard, S. E., **Chaudhary, M. F. A.**, Herrmann, J., Christensen, G. E., San Jose Estepar, R., Reinhardt, J. M., Hoffman, E. A. Direct estimation of regional lung volume change from paired and single CT images using residual regression neural network. ***Medical Physics***, 2023 Sep; 50(9):5698–5714.
4. **Chaudhary, M. F. A.**, Hoffman, E. A., Guo, J., Comellas, A. P., Newell, J. D., Nagpal, P., Fortis, S., Christensen, G. E., Gerard, S. E., Pan, Y., Wang, D. et. al. Predicting severe chronic obstructive pulmonary disease exacerbations using quantitative CT: a retrospective model development and external validation study. ***The Lancet Digital Health***, 2023 Feb 1; 5(2):e83–92.
5. **Chaudhary, M. F. A.**, Aguilera, S. M., Nakhmani, A., Reinhardt, J. M., Bhatt, S. P., Bodduluri, S. Uncertainty-aware test-time adaptation for inverse consistent diffeomorphic lung image registration. ***Proceedings of the 2025 IEEE 22nd International Symposium on Biomedical Imaging (ISBI)***, 2025 Apr 14 (pp. 1–5). IEEE.
6. Awan, H. A., **Chaudhary, M. F. A.**, El-Sokkary, A. D., Hoffman, E. A., Comellas, A. P., Guo, J., Barjaktarevic, I. Z., Barr, R. G., Bhatt, S. P., Bodduluri, S., Bowler, R. P. et. al. Lung quantitative computed tomography textures are associated with systemic inflammation and mortality in COPD. ***Chest***, 2025 Apr 22.
7. Fortis, S., Guo, J., Nagpal, P., **Chaudhary, M. F. A.**, Newell, J. D. Jr., Gerard, S. E., Han, M. K., Kazerooni, E. A., Martinez, F. J., Barjaktarevic, I. Z., Barr, R. G. Association of ground-glass opacities with systemic inflammation and progression of emphysema. ***American Journal of Respiratory and Critical Care Medicine***, 2024 Dec 15; 210(12):1432–40.
8. Amudala Puchakayala, P. R., Sthanam, V. L., Nakhmani, A., **Chaudhary, M. F. A.**, Kizhakke Puliyakote, A., Reinhardt, J. M., Zhang, C., Bhatt, S. P., Bodduluri, S. Radiomics for improved detection of chronic obstructive pulmonary disease in low-dose and standard-dose chest CT scans. ***Radiology***, 2023 Jun 20; 307(5):e222998.

For a complete list of publications, please visit my Google Scholar profile.

Patents

Chaudhary, M. F. A., Reinhardt, J. M., Gerard, S. E. and Hoffman, E. A., University of Iowa Research Foundation, 2023. Context-Aware Volumetric Style Transfer for Estimating Single Volume Surrogates of Lung Function. **U.S. Patent Application 17/891,222**.

Invited Talks

- **Meet the Expert on Generative AI**, *American Thoracic Society (ATS) Meeting* — May 2025
- **Deep Learning for Survival Prediction**, *COPDGene Spring Meeting* — May 2025
- **Single Volume Surrogates of Lung Function**, *The Lung GVHD Consortium* — April 2025
- **On the Possibility of 4DCTs in SPIROMICS**, *SPIROMICS Spring Meeting* — April 2025
- **Single Volume Surrogates of Lung Function**, *PIG Seminar, University of Iowa* — November 2024
- **Lung Imaging in Alpha-1**, *Alpha-1 Foundation Meeting* — November 2024
- **Generative Adversarial Networks for Lung Function**, *AIMI Seminar, UT Austin* — October 2024

Peer Review

Journals

IEEE Transactions on Medical Imaging
Frontiers in Medicine
Journal of Imaging
Journal of Personalized Medicine
Academic Radiology
British Journal of Radiology

Conferences

IEEE International Symposium on Biomedical Imaging (ISBI)
Medical Image Computing and Computer Assisted Intervention (MICCAI)

Mentoring

Ph.D.

AKM Shahariar Azad Rabby, *University of Alabama at Birmingham*
Pratim Saha, *University of Alabama at Birmingham*
Stephanie M. Aguilera, *University of Alabama at Birmingham*

Undergraduate

Ella K. Nail, *University of Iowa*
Dominic J. L. Rivas, *University of Iowa*

Skills

Deep Learning

Python – PyTorch, MONAI, TorchIO, TensorFlow

Statistical Analysis

R – stats, lmtest, caret, glmnet, mass, ggpubr, ggplot2 dplyr, tidyr; Python – Scikit-Learn, Lifelines, Scikit-Survival

Image Processing

Python – ITK, SimpleITK, SciPy, Scikit-Image, TorchVision