AMARESWARARAO KAVURI, Ph.D.

Assistant Professor, Department of ECE, NITK Surathkal, P. O. Srinivasnagar, Mangalore - 575 025 Karnataka, India.

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Education & Research Experience

2022 – 2025	**Postdoctoral Associate**, Duke University Medical Center, Durham, NC, USA Department: Radiology
Mentors	Dr. Ehsan Abadi, Dr. W. Paul Segars, & Dr. Ehsan Samei
2016 – 2022	**Doctor of Philosophy**, University of Houston, Houston, Texas, USA Department: Biomedical Engineering. CGPA:3.94/4
Thesis Advisor	Dr. Mini Das
Thesis title	Perceptually relevant measurements in tomosynthesis imaging
2009 – 2011	**Master of Technology**, Indian Institute of Technology Kharagpur, West Bengal, India Major: Visual Information and embedded systems. CGPA:8.21/10 Department: Electronics & Electrical communications engineering
Thesis Advisor	Dr. Sudipta Mahapatra
Thesis title	RCM-BR: An energy efficient transport protocol for multimedia delivery in wireless networks
2005 – 2009	**Bachelor of Technology**, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India Department: Electronics and communication Engineering, CGPA: 75.6%

Research Interests

I am interested in medical imaging research with focus on the following areas

- ❖ Virtual imaging trials
- ❖ Medical Image analysis
- ❖ Medical image perception
- ❖ Psychophysics
- ❖ Eye-tracking system
- ❖ Visual attention
- ❖ Computer aided diagnosis
- ❖ Image processing

Teaching Plans

My training and research specialties in *Medical Imaging* and *Image Processing* allow me to offer both introductory and advanced courses in these areas such as

- ❖ Image science
- ❖ Digital image processing
- ❖ Medical Image analysis
- ❖ Introduction to medical imaging
- ❖ Biostatistics
- ❖ AI in medical Imaging
- ❖ Computer aided diagnosis

Journal Publications

[1] **Kavuri, A.**, & Das, M. (2020). Relative contributions of anatomical and quantum noise in signal detection and perception of tomographic digital breast images. IEEE transactions on medical imaging, 39(11), 3321-3330. 10.1109/TMI.2020.2991295 (Impact factor: 10.048)

[2] Nisbett, W. H., **Kavuri, A.**, & Das, M. (2020). On the correlation between second order texture features and human observer detection performance in digital images. Scientific Reports, 10(1), 1-14. 10.1038/s41598-020-69816-z (Impact factor: 4.38)

[3] Fredette, N. R., **Kavuri, A.**, & Das, M. (2019). Multi-step material decomposition for spectral computed tomography. Physics in Medicine & Biology, 64(14), 145001. 10.1088/1361-6560/ab2b0e (Impact factor: 2.88)

[4] **Kavuri, A.**, & Das, M. (2024) Examining the influence of digital Phantom models in virtual imaging trials for tomographic breast imaging. Journal of Medical Imaging 12(1) 015501 (31 December 2024) https://doi.org/10.1117/1.JMI.12.1.015501 (Impact factor: 1.9)

[5] Tushar, F.I., Vancoillie, L., McCabe, C., **Kavuri, A.**, Dahal, L., Harrawood, B., Fryling, M., Zarei, M., Sotoudeh-Paima, S., Ho, F.C. and Ghosh, D., Luo S , Segars WP , Abadi E , Lafata KJ , Samei E , Lo JY (2024). VLST: Virtual Lung Screening Trial for Lung Cancer Detection Using Virtual Imaging Trial. arXiv preprint arXiv:2404.11221. Medical Image analysis (Under review)

[6] **Kavuri, A.**, & Das, M. (2025). Interaction of signal and background in visual attention mechanisms in tomosynthesis image interpretation. JOSA A (In preparation)

[7] **Kavuri, A.**, Fryling, M., Felice, N., P. Clark, D., Samei, E., & Abadi E. (2025). User-Friendly End-to-End CT Simulation: Deploying a Dockerized Software with Sample Scanner Models. Medical Physics (In preparation)

[8] **Kavuri, A.**, Segars, W. P., Xu, X., Lynch, D. A., McAdams, H. P., Samei, E., & Abadi E. (2025). Assessing the sources of variability in Emphysema quantification with CT scans: a virtual imaging study. Academic Radiology (Under review)

Conference Proceedings

[1] **A. Kavuri**, F. Ho, M GhojoghNejad, S. Sotoudeh Paima, P. W. Segars, E. Samei, E. Abadi (2024, March). Quantitative accuracy of lung function measurement using parametric response mapping: A virtual imaging study. In Medical Imaging 2024: Computer Aided Diagnosis. International Society for Optics and Photonics

[2] S. Sotoudeh-Paima, F. Ho, M. Ghojogh Nejad, **A. Kavuri**, B. O'Sullivan-Murphy, D. Lynch, P. W. Segars, E. Samei, E. Abadi, (2024, March). Development and application of a virtual imaging trial framework for longitudinal quantification of emphysema in CT. In Medical Imaging 2024: Physics of Medical Imaging. International Society for Optics and Photonics

[3] F. I. Tushar, C. McCabe, **A. Kavuri,** L. Dahal, L. Vancoillie, B. Harrawood, M. Fryling, M. Zarei, S. Sotoudeh-Paima, F. Ho, K. J. Lafata, S. Luo, E. Abadi, W. P. Segars, E. Samei, J. Y. Lo, (2024, March). Virtual NLST: towards replicating national lung screening trial. In Medical Imaging 2024: Physics of Medical Imaging. International Society for Optics and Photonics

[4] Andrade, D., **Kavuri, A.**, & Das, M. (2022, March). Sources of image texture variation in tomographic breast imaging. In Medical Imaging 2022: Image Perception, Observer Performance, and Technology Assessment. SPIE. 10.1117/12.2614334

[5] Torrico, R., **Kavuri, A.**, Lewis, C., & Das, M. (2019, April). Single-exposure contrast enhanced spectral mammography. In Medical Imaging 2019: Physics of Medical Imaging (Vol. 10948, p. 1094802). International Society for Optics and Photonics. 10.1117/12.2513515

[6] **Kavuri, A.**, Fredette, N. R., & Das, M. (2018, March). Interaction of anatomic and quantum noise in DBT power spectrum. In Medical Imaging 2018: Image Perception, Observer Performance, and Technology Assessment (Vol. 10577, p. 105770G). International Society for Optics and Photonics. 10.1117/12.2295218

[7] Nisbett, W. H., **Kavuri, A.**, & Das, M. (2018, March). Investigating the contributions of anatomical variations and quantum noise to image texture in digital breast tomosynthesis. In Medical Imaging 2018: Physics of Medical Imaging (Vol. 10573, p. 105730H). International Society for Optics and Photonics. 10.1117/12.2294981

[8] Fredette, N. R., **Kavuri, A.**, & Das, M. (2018, March). A sensitivity analysis on parameters that affect a multi-step material decomposition for spectral CT. In Medical Imaging 2018: Physics of Medical Imaging (Vol. 10573, p. 105734K). International Society for Optics and Photonics. 10.1117/12.2294956

[9] Nisbett, W. H., **Kavuri, A.**, Fredette, N. R., & Das, M. (2017, March). On the impact of local image texture parameters on search and localization in digital breast imaging. In Medical Imaging 2017: Image Perception, Observer Performance, and Technology Assessment (Vol. 10136, p. 1013607). International Society for Optics and Photonics. 10.1117/12.2256113

Conference Presentations

[1] **A. Kavuri**, F. Ho, E. Samei, W. P. Segars, E. Abadi, (2024, April) Finite element modeling of patient- and disease-specific lung respiration for the assessment of lung function. Virtual imaging trials in medicine

[2] **A. Kavuri**, F. Ho, M GhojoghNejad, S. Sotoudeh Paima, P. W. Segars, E. Samei, E. Abadi (2024, March). Quantitative accuracy of lung function measurement using parametric response mapping: A virtual imaging study. In Medical Imaging 2024: Computer Aided Diagnosis. International Society for Optics and Photonics

[3] **A. Kavuri**, MG Nejad, S Sotoudeh-Paima, HP McAdams, DA Lynch, PW Segars, E Samei, E Abadi (2023, May). Effects Of Intra-patient End-inspiration Variability In Emphysema Quantification: A Virtual Imaging Study. ATS

[4] A**mar Kavuri,** Milo Fryling, Nicholas Felice, Darin P. Clark, Ehsan Samei, Ehsan Abadi (2023, July). A Dockerized CT Simulator with a User-Friendly Graphical User Interface: Development and Initial Demonstration, AAPM

[5] **Kavuri, A.**, Fredette, N. R., & Das, M. (2018, March). Interaction of anatomic and quantum noise in DBT power spectrum. In Medical Imaging 2018: Image Perception, Observer Performance, and Technology Assessment (Vol. 10577, p. 105770G). International Society for Optics and Photonics.

[6] **Amareswararao Kavuri**, Nathaniel Fredette, and Mini Das, "Understanding noise power spectrum in light of human observer detection in tomosynthesis," Medical Image Perception Society (MIPS) XVII Conference (2017).

[7] Martinez, D., **Kavuri, A.**, Nisbett, W., & Das, M. (2018). Building Blocks for Machine Learning in Medical Imaging. Bulletin of the American Physical Society, 63.

Invited talks

[1] **Amar Kavuri.** Characterizing medical image backgrounds using human image perception, Geophysical imaging, Texas A&M university, College Station, Texas, November 2018.

[2] **Amar Kavuri.** Characterizing medical image backgrounds using human image perception, Department of Biomedical Engineering, University of Houston, Houston, Texas, October 2018.

Sponsored Projects

2022–2026 Title: Accuracy and Precision in CT Quantification of COPD Through Virtual Imaging Trials

Role: Postdoctoral Associate

Awarded by National Institutes of Health

Mentoring Experience

Spring 2018	Independent project, Dylan Martinez (University of Houston). Development of webcam-based eye-tracking system.
Spring 2023	Independent study, Jerry Worthy (Duke). Modeling lung respiration for use in virtual imaging trials
Fall 2023	Independent study, Zhuohan Zhou (Duke). Modeling lung respiration with emphysema for use in virtual imaging trials
Spring 2024	Independent project, Bennett Bierman (Duke). Enhancing user friendly graphical user interface for CT simulator
Spring 2024	Independent project, Darsh Mandera (Duke). Segmenting air-trapping in lung CT using nn-unet model for virtual patient model development.
Spring 2024	Group project, Ahmad Choudhary (Duke). Finite element modeling of lung compression for multi-modality imaging simulation
Spring 2024	Group project, Angela Predolac (Duke). Finite element modeling of lung compression for multi-modality imaging simulation

Awards and Achievements

- Abstract scholarship, American thoracic society (ATS) conference, Washington DC, 2023.
- Cullen graduate student success fellowship, University of Houston 2020,2021.
- Publication highlighted in a Feature article in Nature Review ("X-Ray Images in Full Color",2020).
- Robert F. Wagner all conference best student paper award, (Image perception Observer performance and technology assessment) SPIE medical imaging 2018.
- Student scholarship award, American society of Indian Engineers and architects (ASIE), Houston 2018.
- Student scholar award, MIPS XVII 2017 conference.
- Intel Innovation Award, April 2015 for the idea of extendable display for handheld devices.
- Intel recognition award, June 2013 for the development of flawless software interface between GNSS and cellular modem
- MHRD scholarship for graduate studies, Govt of India (2009-2011).
- Secured 99.39 percentile in an all-India entrance master's qualifying exam GATE in 2009.

- Student scholarship, KAMMA Sangham, Hyderabad, India (2006-2009).
- Student scholarship, Sri Kakatiya student welfare society, Guntur, India (2006-2009).
- Topper of Division (among 6000 students) in EAMCET-2005, awarded by rotary club Narasaraopet, India.
- Topper of class of 60 in X (2002-2003).

Positions held

Sep2022–Feb2025 **Postdoctoral Associate,** Carl E Ravin advanced imaging laboratories, Duke University
Developed a GUI for easy use of CT Simulator.
Developed scanner models that represent Siemens and GE CT scanners.
Evaluated the variability of quantitative CT biomarkers for Emphysema.
Developed the respiration model for lung motion.
Mentored undergraduate students.

Sep2016–Aug2022 **Graduate Research Assistant,** Imaging Physics laboratory, University of Houston
Evaluated the impact of phantom structures in finding the optimal configurations of digital breast tomosynthesis system by simulating x-ray images and conducting human observer studies to detect abnormalities.
Implemented and evaluated image processing filters to reduce quantum noise and improve diagnostic performance.
Developed a GUI tool to conduct psychophysical studies using eye-tracking system.
Analyzed eye gaze data to understand visual attention stages during image interpretation task.
Developed a simulation software for X-ray phase contrast imaging.
Mentored undergraduate and master's students.

July2011–July2016 **Embedded software engineer**, Intel mobile communications, Bangalore, India
Achieved high quality wireless solutions by integrating software for mobile phones (custom and android) and debugging complex system anomalies.
Developed Proof of concept for running multiple Operating Systems on single mobile platform.
Developed software systems for Intel GPS receivers in handheld devices especially A-GNSS across multiple mobile platforms.
Developed interface between Intel wireless Bluetooth solution and 12 lead ECG, Blood Glucose and physical activity measurement sensors for mobile healthcare solution.
Delivered training sessions for global teams and clients on Intel GNSS solutions and Intel IDI communication protocol.

June 2010 - May 2011 **Teaching Assistant**, Indian Institute of Technology Kharagpur, West Bengal, India
Computer communication laboratory – Taught and guided undergraduate and graduate students to conduct lab experiments as well as evaluated student's lab work.
Computer communication & Networking – Assisted Professor Dr. Sudipta Mahapatra in conducting exams and evaluating students' assignments

Professional Membership

- Member, Society of Photo-optical instrumentation engineers (SPIE)
- Member, American society of Indian engineers Houston (ASIE)
- Member, American Thoracic society (ATS)
- Member, American Association of Physicists in Medicine (AAPM)

Certifications

- Associate level, Center for the Integration of Research, Teaching and Learning, 2022

Community Involvement

- Reviewer, Sensors, Multidisciplinary Digital Publishing Institute (MDPI) 2024 – present
- Reviewer, Journal of nondestructive test, Multidisciplinary Digital Publishing Institute (MDPI) 2023 – present
- Reviewer, Journal of Applied Sciences, Multidisciplinary Digital Publishing Institute (MDPI) 2023 – present
- Reviewer, Medical Physics, American Association of Physicists in Medicine.2022-present
- International Committee member, Duke University Postdoctoral Association 2023-present

- Volunteered as judge for the North Carolina Student Academy of Science 2023,2024.
- Volunteered as judge for Science & Engineering Fair of Houston 2020, 2021 and 2022.
- Volunteered to demonstrate IR imaging, Chevron Girls Engineering the Future STEM 2019, University of Houston.
- Volunteered as judge for Gulf Coast TAME Divisional Competition 2018, 2022 University of Houston.
- Volunteer service, North south foundation 2017, University of Houston.
- Volunteered for International Conference on Communication, Computers and Devices (ICCCD) 2010 organized by Department of E & ECE, IIT Kharagpur.