# Abdullah-Al-Zubaer Imran

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## Research Interests

Artificial Intelligence, Computer Vision, Medical Imaging

## Positions

**Primary (Academic):**

**University of Kentucky (UK)** — **Lexington, KY, USA**
*Assistant Professor*, Department of Computer Science — Aug 2022–present
*Lighthouse Beacon Foundation Scholar*
*Faculty Affiliate*, Markey Cancer Center (MCC)/Cancer Research Priority Initiative
*Faculty Affiliate*, Center for Clinical and Translational Science (CCTS)
*Faculty Affiliate*, UNITE–Research Priority Area

**Stanford University** — **Stanford, CA, USA**
*Postdoctoral Scholar*, Radiological Sciences Laboratory (RSL) — Jul 2020–Jul 2022

**University of California, Los Angeles (UCLA)** — **Los Angeles, CA, USA**
*Teaching Assistant*, Department of Computer Science — Oct 2018–Jun 2020
*Graduate Student Researcher*, Computer Graphics & Vision Laboratory — Sep 2017–Jun 2020

**North South University** — **Dhaka, Bangladesh**
*Lecturer*, Department of Electrical & Computer Engineering — Jan 2017–Sep 2017

**Delaware State University (DSU)** — **Dover, DE, USA**
*Research Assistant*, Medical Imaging & Simulation Laboratory — Aug 2014–Dec 2016

**Ahsanulllah University of Science & Technology** — **Dhaka, Bangladesh**
*Lecturer*, Department of Computer Science & Engineering — Nov 2013–Jul 2014

**Northern University Bangladesh** — **Dhaka, Bangladesh**
*Lecturer*, Department of Computer Science & Engineering — Sep 2012–Nov 2013

**Secondary (Corporate Research):**

**Tencent Medical AI** — **Palo Alto, CA, USA**
*Research Intern* — Jun 2019–Dec 2019

**Philips Research** — **Cambridge, MA, USA**
*Research & Development Intern* — Jun 2018–Sep 2018

**VoxelCloud, Inc.** — **Los Angeles, CA, USA**
*Visiting PhD Researcher* — Sep 2017–Jun 2018

## Education

**University of California, Los Angeles (UCLA)** — **Los Angeles, CA, USA**
*Ph.D. in Computer Science* — Jun 2020
Thesis title: *From fully-supervised, single-task to scarcely-supervised, multi-task deep learning for medical image analysis.*
Thesis advisor: Dr. Demetri Terzopoulos (Distinguished Professor and Chancellor's Professor of Computer Science).
Thesis committee: Professors Song-Chun Zhu, Guy Van den Broeck, and Kai-Wei Chang.

**Delaware State University (DSU)** — **Dover, DE, USA**
*M.S. in Computer Science* — Aug 2016
Thesis title: *Estimation of breast anatomical descriptors from mastectomy CT images.*
Thesis advisors: Dr. David Pokrajac (formerly Professor of Computer Science at DSU) and Dr. Predrag Bakic (formerly Professor of Radiology at the University of Pennsylvania).

**Rajshahi University of Engineering & Technology (RUET)** — **Rajshahi, Bangladesh**
*B.S. in Computer Science & Engineering* — Sep 2012
Thesis title: *Automatic extraction of road networks from high-resolution satellite images.*
Thesis Advisor: Dr. Boshir Ahmed (Professor of Computer Science & Engineering).
*President Gold Medal Winner as the Top Graduating Candidate.*

## Research Funding

- *ConduitGen: Physics-guided Generative AI for Geologically Realistic Cave Conduit Generation*
  PI: **A. Imran**
  Co-PI/Co-I(s): J. Zhu (UK)
  Sponsor/Program: UK College of Engineering Lighthouse Beacon Foundation Scholar Program
  Amount: $10,000
  Duration: 07/01/25–06/30/2026

- *A Deep-Learning-Based Metric for Comprehensive CT Image Quality Assessment*
  PI: J. Zhang
  Co-PI/Co-I(s): **A. Imran,** J. Lee, H. Ganesh (UK)
  Sponsor/Program: Radiology Pilot Grant
  Amount: $30,000
  Duration: 06/01/25–05/31/26

- *DiffNA: Reliable Generative Medical AI with Conditional Noise and Anatomy Guidance*
  PI: **A. Imran**
  Sponsor/Program: UNITE–Research Priority Area, University of Kentucky
  Amount: $49,716
  Duration: 08/01/24–07/31/25

- *CLIMBS: Climate Resilience through Multidisciplinary Big Data Learning, Prediction & Building Response Systems*
  PI: R. Andrews
  Co-PI/Co-I(s): **A. Imran**, A. Erhardt, J. Fox, S. Bryson, J. Zhu (UK) and many others
  Sponsor/Program: National Science Foundation: EPSCoR RII–Track 1
  Amount: $24,000,000 (State-matched 20%)
  Duration: 07/01/24–06/30/29

- *Det-a-Air: Object-Level Generative AI for Enhanced Aircraft Inspection*
  PI: **A. Imran**
  Sponsor: Boeing Project Program, UK College of Engineering
  Total award: $9,000
  Duration: 02/2024–01/2025

- *Generative Dermatology AI for Bias-Free Diagnosis*
  PI: **A. Imran**
  Sponsor: UNITE–Research Priority Area, University of Kentucky
  Total award: $49,265
  Duration: 07/2023–06/2024

- *Privacy Preserving Protest Dynamics with Social Media Images*
  PI: **A. Imran**
  Co-PI(s)/Co-I(s): N. Sakib, S. Cheung (UK)
  Sponsor: Igniting Research Collaborations, University of Kentucky
  Total award: $29,990
  Duration: 07/2023–12/2023

- *CT Acquisition Technique for Radiation Dose and Image Quality Optimization of Pediatric Examinations*
  PI: **A. Imran**
  Co-PI(s)/Co-I(s): J. Zhang (UK)
  Sponsor: Igniting Research Collaborations, University of Kentucky
  Total award: $31,990
  Duration: 07/2023–02/2024

- *Self-supervised CT image segmentation*
  PI: **A. Imran**
  Sponsor: UK College of Engineering – Undergraduate Research Fellowship
  Total award: $2500 (50% cost sharing with PI)
  Duration: 09/2023–12/2023

- *AI-based Workflow for Improved Computer Vision and Medical Imaging*
  PI: **A. Imran**
  Sponsor: UK College of Engineering
  Total award: $373,000
  Duration: 2022–2025

## Selected Awards and Honors

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|---|---|
| Lighthouse Beacon Foundation Scholar Award | 2025 |
| 3rd place in the 2023 MICCAI LDCTIQA Challenge | 2023 |
| 6th place in the MIDRC mRALE Mastermind Challenge | 2023 |
| CMBBE: Imaging & Visualization Best Paper Award for the 2019–2020 Biennium | 2021 |
| Stanford Bio-X Travel Award | 2021 |
| AAPM Expanding Horizons Travel Grant | 2020 |
| AAAI 2020 Student Travel Scholarship | 2020 |
| LabeX Primes Fellowship | 2019 |
| UCLA Graduate Division Fellowship | 2017–2019 |
| NVIDIA Best Paper Award at 2018 MICCAI Deep Learning in Medical Image Analysis (DLMIA) | 2018 |
| Machine Learning Summer School (MLSS 2018) Travel Stipend | 2018 |
| President Gold Medal as the Top Graduating Candidate at RUET | 2014 |
| Student of the Year Award at RUET | 2009, 2011 |

## Publications

**Patents and Patent Applications:**

1. "Patient anatomy and task specific automatic exposure control in computed tomography."
   **A. Imran**, A. Wang, D. Pal, S. Wang, E. Zucker, B. Patel.
   *U.S. Patent No. 12,067,715*, issued Aug 20, 2024.

2. "Patient anatomy and task specific automatic exposure control in computed tomography."
   **A. Imran**, A. Wang, D. Pal, S. Wang, E. Zucker, B. Patel.
   *U.S. Patent No. 12,002,204*, issued Jun 4, 2024.

**Chapters in Books:**

1. "Multi-adversarial variational autoencoder nets for simultaneous image generation and classification."
   **A. Imran**, D. Terzopoulos.
   *Deep Learning Applications, Volume 2*, 2021.

**Refereed Journal Publications:**

1. "Domain and task-focused example selection for data-efficient contrastive medical image segmentation."
   T. Ward, A. Moseley, **A. Imran**.
   *Manuscript accepted in the Journal of Machine Learning for Biomedical Imaging (MELBA)*, 2025.

2. "Deep learning advances in breast medical imaging with a focus on clinical readiness and radiologists' perspective."
   O. Oladimeji, **A. Imran**, X. Wang, S. Unnikrishnan.
   *Journal of Image and Vision Computing (IMAVIS)*, 2025.

3. "An effective image despeckling and reconstruction approach using U-Net based model and comparative analysis."
   M. Gokmen, B. Arslan, C. Bumgardner, **A. Imran**.
   *Nature Scientific Reports*, 2025.

4. "TFKT V2: Task-focused knowledge transfer from natural images for computed tomography perceptual image quality assessment."
   K. Rifa, M. Ahamed, J. Zhang, **A. Imran**.
   *Journal of Medical Imaging (JMI)*, 2025.

5. "Low-dose computed tomography perceptual image quality assessment."
   W. Lee, F. Wagner, A. Galdran, Y. Shi, W. Xia, G. Wang, X. Mou, M. Ahamed, **A. Imran**, J. Oh, K. Kim, J. Baek, D. Lee, B. Hong, P. Tempelman, D. Lyu, A. Kuiper, L. Blokland, M. Calisto, S. Hsieh, J. Baek, A. Maier, A. Wang, G. Gold, J. Choi.
   *Medical Image Analysis (MedIA)*, 2025.

6. "Automated estimation of individualized organ-specific dose and noise from clinical CT scans."
   S. Wang, M. Medrano, **A. Imran**, W. Lee, J. Cao, G. Stevens, J. Tse, A. Wang.
   *Physics in Medicine & Biology (PMB)*, 2025.

7. "Task-specific self-supervision for CT image denoising."
   A. Haque, A. Wang, **A. Imran**.
   *Computer Methods in Biomechanics and Biomedical Engineering (CMBBE): Imaging & Visualization*, 2023.

8. "Generalized multi-task learning from substantially unlabeled multi-source medical image data."
   **A. Imran**, A. Haque, A. Wang, D. Terzopoulos.
   *Journal of Machine Learning for Biomedical Imaging (MELBA)*, 2021.

9. "Upstream machine learning in radiology."
   C. Sandino, E. Cole, C. Alkan, A. Chaudhari, A. Loening, D. Hyun, J. Dahl, **A. Imran**, A. Wang, and S. Vasanawala.
   *Radiologic Clinics of North America (RCNA): Artificial Intelligence in Radiology*, 2021.

10. "Fast and automatic segmentation of pulmonary lobes from chest CT using a progressive dense V-network."
    **A. Imran**, A. Hatamizadeh, S. Ananth, X. Ding, N. Tajbakhsh, D. Terzopoulos.
    *Computer Methods in Biomechanics and Biomedical Engineering (CMBBE): Imaging and Visualization*, 2020.
    [Best Paper Award for the 2019-2020 biennium] [Cover Article]

**Peer Reviewed Conference Publications:**

1. "A probabilistic segment anything model for ambiguity-aware medical image segmentation."
   T. Ward, **A. Imran**.
   *Paper accepted at SPIE Medical Imaging: Imaging Informatics*, 2026.

2. "U-KAN-Seg: Improving universal text-Driven CT image segmentation with Kolmogorov-Arnold networks."
   K. Rifa, J. Zhang, **A. Imran**.
   *Paper accepted at SPIE Medical Imaging: Image Processing*, 2026.

3. "Towards memory-efficient foundation models in medical imaging: A federated learning and knowledge distillation approach."
   A. Mahanipour, **A. Imran**, H. Khamfroush.
   *The Second Workshop on GenAI for Health: Potential, Trust, and Policy Compliance, NeurIPS*, 2025.

4. "EarthScape: A multimodal dataset for surficial geologic mapping and earth surface analysis."
   M. Massey, N. Munia, **A. Imran**.
   *Paper unaccepted after being **accepted** at NeurIPS*, 2025.

5. "Federated reprogramming knowledge distillation for medical image classification."
   A. Mahanipour, **A. Imran**, H. Khamfroush.
   *MICCAI Workshop on Distributed, Collaborative and Federated Learning (DeCaF)*, Daejeon, South Korea, 2025.

6. "Improving brain disorder diagnosis with advanced brain function representation and Kolmogorov-Arnold Networks."
   T. Ward, **A. Imran**.
   *Medical Imaging with Deep Learning (MIDL)*, Salt Lake City, UT, USA, 2025.

7. "Classification-integrated diffusion model for improved fairness in skin lesion diagnosis."
   N. Munia, **A. Imran**.
   *IEEE Engineering in Medicine and Biology Society Conference (EMBC)*, Copenhagen, Denmark, 2025.

8. "Annotation-efficient task guidance for medical segment anything."
   T. Ward, **A. Imran**.
   *IEEE International Symposium on Biomedical Imaging (ISBI)*, Houston, TX, USA, 2025.

9. "Prompting medical vision-language models to mitigate diagnosis bias by generating realistic dermoscopic images."
   N. Munia, **A. Imran**.
   *IEEE International Symposium on Biomedical Imaging (ISBI)*, Houston, TX, USA, 2025.

10. "Swin-KAT: Advancing Swin Transformer with Kolmogorov-Arnold Network for CT image quality assessment."
    K. Rifa, J. Zhang, **A. Imran**.
    *IEEE International Symposium on Biomedical Imaging (ISBI)*, Houston, TX, USA, 2025.

11. "Task-focused knowledge transfer from natural images for CT image quality assessment."
    K. Rifa, M. Ahamed, J. Zhang, **A. Imran**.
    *SPIE Medical Imaging: Image Perception, Observer Performance, and Technology Assessment*, San Diego, CA, USA, 2025.

12. "DermDiff: Generative diffusion model for mitigating racial biases in dermatology diagnosis."
    N. Munia, **A. Imran**.
    *MICCAI Workshop on Advancing Data Solutions in Medical Imaging AI (ADSMI)*, Marrakesh, Morocco, 2024.

13. "Privacy preserving protest dynamics."
    C. Archbold, U. Hassan, N. Sakib, S. Cheung, **A. Imran**.
    *16th IEEE International Workshop on Information Forensics and Security (WIFS)*, Rome, Italy, 2024.

14. "Automatic detection of breast cancer lumpectomy margin from intraoperative specimen mammography."
M. Ahamed, B. McFarland, X. Wang, J. Chen, **A. Imran**.
*International Workshop on Breast Imaging (IWBI)*, Chicago, IL, USA, 2024.

15. "PolyCL: Context-aware contrastive learning for image segmentation."
A. Moseley, **A. Imran**.
*IEEE International Symposium on Biomedical Imaging (ISBI)*, Athens, Greece, 2024.

16. "Personalized, scout-based dose estimation for prospective optimization of CT tube current modulation."
M. Medrano, S. Wang, **A. Imran**, G. Stevens, J. Tse, A. Wang.
*SPIE Medical Imaging: Physics of Medical Imaging*, San Diego, CA, USA, 2024.

17. "Retrospective tube current modulation optimization of individualized organ-level CT dose and image quality."
S. Wang, M. Medrano, **A. Imran**, G. Stevens, J. Tse, A. Wang.
*SPIE Medical Imaging: Physics of Medical Imaging*, San Diego, CA, USA, 2024.

18. "Multimodal contrastive learning for prospective personalized estimation of CT organ doses."
**A. Imran**, S. Wang, D. Pal, S. Dutta, E. Zucker, A. Wang.
*Medical Image Computing and Computer Assisted Intervention (MICCAI)*, Singapore, 2022.
[Top 13%]

19. "Joint learning with local and global consistency for improved medical image segmentation."
M. Ahamed, **A. Imran**.
*Medical Image Understanding and Analysis (MIUA)*, Cambridge, UK, 2022.

20. "LightSeg: Efficient yet effective medical image segmentation."
H. Jahan, **A. Imran**.
*IEEE International Symposium on Biomedical Imaging (ISBI)*, Kolkata, India, 2022.

21. "Personalized CT organ noise estimation from scout images."
**A. Imran**, D. Pal, S. Wang, S. Dutta, E. Zucker, A. Wang.
*SPIE Medical Imaging: Physics of Medical Imaging*, San Diego, CA, USA, 2022.

22. "3D deep neural network to automatically identify TSC structural brain pathology based on MRI."
M. Shabanian, **A. Imran**, A. Siddiqui, R. Davis, J. Bissler.
*SPIE Medical Imaging: Image Processing*, San Diego, CA, USA, 2022.

23. "Noise2Quality: Non-reference, pixel-wise assessment of low-dose CT images."
A. Haque, A. Wang, **A. Imran**.
*SPIE Medical Imaging: Image Perception, Observer Performance, and Technology Assessment*, San Diego, CA, USA, 2022.

24. "Efficient ATR using contrastive learning."
A. Purpura-Pontoniere, **A. Imran**, T. Bhattacharya.
*SPIE Defense: Automatic Target Recognition*, Orlando, FL, USA, 2022.

25. "Personalized CT organ dose estimation from scout images."
**A. Imran**, S. Wang, D. Pal, S. Dutta, B. Patel, E. Zucker, A. Wang.
*Medical Image Computing and Computer Assisted Intervention (MICCAI)*, Strasbourg, France, 2021.
[Top 13%]

26. "Window-Level is a strong denoising surrogate."
A. Haque, A. Wang, **A. Imran**.
*MICCAI Machine Learning in Medical Imaging (MLMI)*, Strasbourg, France, 2021.

27. "SSIQA: Multi-task learning for non-reference CT image quality assessment with self-supervised noise level prediction."
**A. Imran**, D. Pal, B. Patel, A. Wang.
*IEEE International Symposium on Biomedical Imaging (ISBI)*, Nice, France, 2021.

28. "MultiMix: Sparingly supervised, extreme multitask learning from medical images."
**A. Imran**, A. Haque, A. Wang, D. Terzopoulos.
*IEEE International Symposium on Biomedical Imaging (ISBI)*, Nice, France, 2021.

29. "Progressive adversarial semantic segmentation."
**A. Imran**, D. Terzopoulos.
*International Conference on Pattern Recognition (ICPR 2020)*, Milan, Italy, 2021.

30. "Partly supervised multitask learning."
**A. Imran**, C. Huang, H. Tang, W. Fan, Y. Xiao, D. Hao, Z. Qian, D. Terzopoulos.
*IEEE International Conference on Machine Learning and Applications (ICMLA)*, Miami, FL, USA, 2020.

31. "Fully-automated analysis of scoliosis from spinal X-ray images."
**A. Imran**, C. Huang, H. Tang, W. Fan, K. Cheung, M. To, Z. Qian, D. Terzopoulos.
*IEEE Symposium on Computer Based Medical Systems (CBMS)*, Rochester, MN, USA, 2020.

32. "Multi-adversarial variational autoencoder networks."
**A. Imran**, D. Terzopoulos.
*IEEE International Conference on Machine Learning And Applications (ICMLA)*, Boca Raton, FL, USA, 2019.

33. "Semi-supervised multi-task learning with chest X-ray images."
**A. Imran**, D. Terzopoulos.
*MICCAI Machine Learning in Medical Imaging (MLMI)*, Shenzhen, China, 2019.

34. "Automatic segmentation of pulmonary lobes using a progressive dense V-network."
**A. Imran**, A. Hatamizadeh, S. Ananth, X. Ding, N. Tajbakhsh, D. Terzopoulos.
*MICCAI Deep Learning in Medical Image Analysis (DLMIA)*, Granada, Spain, 2018.
[NVIDIA Best Paper Award]

35. "Characterization of adipose compartments in mastectomy CT images."
**A. Imran**, P. Bakic, D. Pokrajac.
*SPIE Medical Imaging: Physics of Medical Imaging*, Houston, TX, USA, 2018.

36. "Optimization of the simulation parameters for improving realism in anthropomorphic breast phantoms."
**A. Imran**, P. Bakic, A. Maidment, D. Pokrajac.
*SPIE Medical Imaging: Physics of Medical Imaging*, Orlando, FL, USA, 2017.

37. "Validation of Cooper's ligaments thickness in software phantoms."
A. Kuperavage, **A. Imran**, P. Bakic, A. Maidment, D. Pokrajac.
*SPIE Medical Imaging: Physics of Medical Imaging*, Orlando, FL, USA, 2017.

38. "Estimation of adipose compartment volumes in CT images of a mastectomy specimen."
**A. Imran**, P. Bakic, A. Maidment, D. Pokrajac.
*SPIE Medical Imaging: Physics of Medical Imaging*, San Diego, CA, USA, 2016.

39. "Monte Carlo testing and verifications of numerical algorithm implementations."
D. Pokrajac, **A. Imran**, P. Bakic.
*Telecommunication in Modern Satellite, Cable and Broadcasting Services (TELSIKS)*, Nis, Serbia, 2015.

**Peer Reviewed Abstracts and Short Papers:**

1. "Advancing CT image quality assessment with deep learning: from traditional metrics to clinically informed AI evaluation."
J. Zhang, G. Ge, **A. Imran**.
*Radiological Society of North America (RSNA): Scientific Assembly and Annual Meeting*, 2025.

2. "Differential attention for multimodal crisis event analysis."
N. Munia, J. Zhu, O. Nasraoui, **A. Imran**.
*CVPR 2025 Workshop on Multimodal Foundation Models (MMFM)*, 2025.

3. "Automated intraoperative lumpectomy margin detection using SAM-incorporated forward-forward contrastive learning."
T. Ward, B. McFarland, S. Nozad, T. Arshad, H. Nebbache, J. Chen, X. Wang, **A. Imran**.
*Short paper track – Medical Imaging with Deep Learning (MIDL)*, 2025.

4. "Deep learning-based metric vs global noise for CT image quality assessment."
J. Zhang, K. Rifa, C. Weaker, G. Ge, **A. Imran**.
*American Association of Physicists in Medicine (AAPM) Annual Meeting*, 2025.

5. "Decoding earth's surface: The role of multimodal large language models."
M. Massey, **A. Imran**.
*Paper accepted at the WACV Workshop on Computer Vision for Geospatial Image Analysis (GeoCV)*, 2025.

6. "Deep learning-based metric for CT image quality assessment: capabilities and potential clinical applications."
J. Zhang, M. Ahamed, **A. Imran**.
*Radiological Society of North America (RSNA), Scientific Assembly and Annual Meeting*, Chicago, IL, USA, 2024.

7. "Organ-aware, scout-based approach for scout segmentation and prospective, personalized organ CT dose estimation."
M. Medrano, **A. Imran**, S. Wang, A. Wang.
*Radiological Society of North America (RSNA), Scientific Assembly and Annual Meeting*, Chicago, IL, USA, 2023.

8. "FFCL: Forward-Forward contrastive learning for improved medical image classification."
M. Ahamed, J. Chen, **A. Imran**.
*Medical Imaging with Deep Learning (MIDL)*, Nashville, TN, USA, Jul 2023.

9. "Transforming radiology workflows: Pretraining for automated chest X-ray report generation."
   Y. Jiang, S. Gupta, **A. Imran**.
   *Medical Imaging with Deep Learning (MIDL)*, Nashville, TN, USA, Jul 2023.

10. "Pay attention for COVID-19 detection with efficient convolution."
    H. Jahan, **A. Imran**.
    *IEEE International Symposium on Biomedical Imaging (ISBI)*, Kolkata, India, 2022.

11. "Real-time, personalized estimation of CT organ dose from scout images."
    **A. Imran**, S. Wang, D. Pal, S. Dutta, B. Patel, E. Zucker, A. Wang.
    *Radiological Society of North America (RSNA), Scientific Assembly and Annual Meeting*, Chicago, IL, USA, 2021.

12. "Fast Monte Carlo simulation of non-isotropic x-ray source for CT dose calculation."
    S. Wang, **A. Imran**, D. Pal, E. Zucker, A. Wang.
    *American Association of Physicists in Medicine (AAPM) Annual Meeting*, Columbus, OH, USA, 2021.

13. "Self-supervised, semi-supervised, multi-context learning for the combined classification and segmentation of medical images."
    **A. Imran**, C. Huang, H. Tang, W. Fan, Y. Xiao, D. Hao, Z. Qian, D. Terzopoulos.
    *AAAI Conference on Artificial Intelligence*, New York, NY, USA, **34**(10): 13815–13816, 2020.

14. "End-to-End fully automatic segmentation of scoliotic vertebrae from spinal X-ray images."
    **A. Imran**, C. Huang, Tang, W. Fan, K. Cheung, M. To, Z. Qian, D. Terzopoulos.
    *Medical Imaging Meets NeurIPS*, Vancouver, BC, Canada, Dec 2019.

15. "Bipartite distance for shape-aware landmark detection in spinal X-rays."
    **A. Imran**, C. Huang, H. Tang, W. Fan, K. Cheung, M. To, Z. Qian, D. Terzopoulos.
    *Medical Imaging Meets NeurIPS*, Vancouver, BC, Canada, Dec 2019.

16. "Selection of parameters for computer model of breast anatomy through human observer experiments."
    D. Pokrajac, Z. Radovanovic, T. Milosavljevic, V. Stokanovic, S. Weinstein, **A. Imran**, A. Maidment, P. Bakic.
    *European Congress of Radiology (ECR)*, Vienna, Austria, 2018.

17. "Creation of realistic structured backgrounds using adipose compartment models in a test object for breast imaging performance analysis."
    L. Cockmartin, H. Bosmans, K. Bliznakova, D. Pokrajac, **A. Imran**, N. Marshall, A. Maidment, P. Bakic.
    *Radiological Society of North America (RSNA), Scientific Assembly and Annual Meeting*, Chicago, IL, USA, 2016.

18. "Spatial distribution of adipose compartment size, shape and orientation in CT breast Images of a mastectomy specimen."
    **A. Imran**, D. Pokrajac, P. Bakic.
    *IEEE Signal Processing in Medicine and Biology (SPMB)*, Philadelphia, PA, USA, 2015.

**Dissertations**

1. "From fully-supervised, single-task to scarcely-supervised, multi-task deep learning for medical image analysis."
   **A. Imran**.
   *Ph.D. Dissertation*, Computer Science Department, University of California, Los Angeles, CA, USA, June 2020.

2. "Estimation of breast anatomical descriptors from mastectomy CT images."
   **A. Imran**.
   *M.S. Dissertation*, Department of Computer Science, Delaware State University, Dover, DE, USA, August 2016.

3. "Automatic extraction of road networks from high-resolution satellite images."
   **A. Imran**.
   *B.S. Dissertation*, Department of Computer Science and Engineering, Rajshahi University of Engineering and Technology, Rajshahi, Bangladesh, September 2012.

**Creative Works: Cover Illustrations, Etc:**

1. "Lung fissures."
   **A. Imran,** A. Hatamizadeh, S. Ananth, X. Ding, N. Tajbakhsh, D. Terzopoulos.
   *Color image on the cover of the journal Computer Methods in Biomechanics and Biomedical Engineering (CMBBE): Imaging & Visualization*, 9(5–6), December 2020.

**Other Selected Publications:**

1. "Class-N-Diff: Classification-induced diffusion model can make fair skin cancer diagnosis."
   N. Munia, **A. Imran**.
   *arXiv preprint arXiv:2510.16887*, 1–6, October 19, 2025.

2. "A probabilistic segment anything model for ambiguity-aware medical image segmentation."
T. Ward, **A. Imran**.
*arXiv preprint arXiv:2509.05809*, 1–6, September 6, 2025.

3. "Differential attention for multimodal crisis event analysis."
N. Munia, J. Zhu, O. Nasraoui, **A. Imran**.
*arXiv preprint arXiv:2507.05165*, 1–9, July 7, 2025.

4. "Scout-Dose-TCM: Direct and prospective scout-based estimation of personalized organ doses from tube current modulated CT exams."
M. Medrano, S. Wang, L. Sun, **A. Imran**, J. Cao, G. Stevens, J. Tse, A. Wang.
*arXiv preprint arXiv:2506.24062*, 1–20, June 30, 2025.

5. "Detection of breast cancer lumpectomy margin with SAM-incorporated forward-forward contrastive learning."
T. Ward, B. McFarland, M. Ahamed, S. Nozad, T. Arshad, H. Nebbache, J. Chen, X. Wang, **A. Imran**.
*arXiv preprint arXiv:2506.21006*, 1–19, June 26, 2025.

6. "Domain and task-focused example selection for data-efficient contrastive medical image segmentation."
T. Ward, A. Moseley, **A. Imran**.
*arXiv preprint arXiv:2505.19208*, 1–14, May 25, 2025.

7. "Prompting medical vision-language models to mitigate diagnosis bias by generating realistic dermoscopic images."
N. Munia, **A. Imran**.
*arXiv preprint arXiv:2504.01838*, 1–6, April 2, 2025.

8. "EarthScape AI dataset."
M. Massey, **A. Imran**.
*Kentucky Geological Survey, ser. 14, research data*, 2025.

9. "DermDiff: Generative Diffusion Model for Mitigating Racial Biases in Dermatology Diagnosis."
N. Munia, **A. Imran**.
*arXiv preprint arXiv:2503.17536*, 1–11, March 21, 2025.

10. "EarthScape: A Multimodal Dataset for Surficial Geologic Mapping and Earth Surface Analysis."
M. Massey, **A. Imran**.
*arXiv preprint arXiv:2503.15625*, 1–17, March 19, 2025.

11. "Annotation-efficient task guidance for medical segment anything."
T. Ward, **A. Imran**.
*arXiv preprint arXiv:2412.08575*, 1–6, December 11, 2024.

12. "Scout-Net: Prospective personalized estimation of CT organ doses from scout views."
**A. Imran**, S. Wang, D. Pal, S. Dutta, B. Patel, E. Zucker, A. Wang.
*arXiv preprint arXiv:2312.15354*, 1–33, December 23, 2023.

13. "Forward-Forward contrastive learning."
M. Ahamed, J. Chen, **A. Imran**.
*arXiv preprint arXiv:2305.02927*, 1–4, May 4, 2023.

14. "Semi-supervised relational contrastive learning."
A. Purpura-Pontoniere, D. Terzopoulos, A. Wang, **A. Imran**.
*arXiv preprint arXiv:2304.05047*, 1–10, June 13, 2023.

15. "Single image internal distribution measurement using non-local variational autoencoder."
Y. Sarker, **A. Imran**, M. Ahamed, R. Chakrabortty, M. Ryan, S. Das.
*arXiv preprint arXiv:2204.01711*, 1–10, April 2, 2022.

16. "Generalized multi-task learning from substantially unlabeled multi-source medical image data."
A. Haque, **A. Imran**, A. Wang, D. Terzopoulos.
*arXiv:2110.13185*, 1–25, October 25, 2021.

17. "MultiMix: Sparingly supervised, extreme multitask learning from medical images."
A. Haque, **A. Imran**, A. Wang, D. Terzopoulos.
*arXiv:2010.14731*, 1–5, October 28, 2020.

18. "Bipartite distance for shape-aware landmark detection in spinal X-ray images."
**A. Imran**, C. Huang, H. Tang, W. Fan, K.M.C. Cheung, M. To, Z. Qian, D. Terzopoulos.
*arXiv:2005.14330*, 1–3, May 28, 2020.

19. "Progressive adversarial semantic segmentation."
**A. Imran**, D. Terzopoulos.
*arXiv:2005.04311*, 1–9, May 8, 2020.

20. "Partly supervised multitask learning."
**A. Imran**, C. Huang, H. Tang, W. Fan, Y. Xiao, D. Hao, Z. Qian, D. Terzopoulos.
*arXiv:2005.02523*, 1–10, May 5, 2020.

21. "Analysis of scoliosis from spinal X-ray images."
**A. Imran**, C. Huang, H. Tang, W. Fan, K.M.C. Cheung, M. To, Z. Qian, D. Terzopoulos.
*arXiv:2004.06887*, 1–6, April 15, 2020.

22. "Semi-supervised multi-task learning with chest X-ray images."
**A. Imran**, D. Terzopoulos.
*arXiv:1908. 03693*, 1–11, August 10, 2019.

23. "Multi-adversarial variational autoencoder networks."
**A. Imran**, D. Terzopoulos.
*arXiv:1906.06430*, 1–15, June 14, 2019.

24. "Automatic segmentation of pulmonary lobes using a progressive dense V-network."
**A. Imran**, A. Hatamizadeh, S.P. Ananth, X. Ding, D. Terzopoulos, N. Tajbakhsh.
*arXiv:1902.06362*, 1–8, February 18, 2019.

**Selected Posters:**

1. "Class-N-Diff: Classification-induced diffusion can make fair skin cancer diagnosis."
N. Munia, **A. Imran**.
*International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Copenhagen, Denmark, 2025.

2. "Task-focused knowledge transfer from natural images for CT image quality assessment."
K. Rifa, M. Ahamed, J. Zhang, **A. Imran**.
*SPIE Medical Imaging: Image Perception, Observer Performance, and Technology Assessment*, 2025.

3. "Context-aware contrastive pretraining for improved medical image segmentation."
A. Moseley, **A. Imran**.
*Commonwealth Computational Summit (CCS): Artificial Intelligence*, Lexington, KY, USA, October 2023.

4. "Frequency-domain image-to-image translation: A study on breast cancer immunohistochemical imager."
C. Archbold, **A. Imran**.
*Commonwealth Computational Summit (CCS): Artificial Intelligence*, Lexington, KY, USA, October 2023.

5. "Deep learning-based optimization of CT acquisition technique for pediatric examinations."
M. Ahamed, J. Song, J. Zhang, **A. Imran**.
*Commonwealth Computational Summit (CCS): Artificial Intelligence*, Lexington, KY, USA, October 2023.

6. "Forward-Forward contrastive learning."
M. Ahamed, J. Chen, **A. Imran**.
*Medical Imaging with Deep Learning (MIDL)*, Nashville, TN, USA, July 2023.

7. "Transforming radiology workflows: Pretraining for automated chest X-ray report generation."
Y. Jiang, S. Gupta, **A. Imran**.
*Medical Imaging with Deep Learning (MIDL)*, Nashville, TN, USA, July 2023.

8. "Breast cancer lumpectomy specimen margin prediction on radiography."
B. McFarland, M. Ahamed, X. Wang, J. Chen, **A. Imran**.
*Markey Cancer Center Research Day Program*, Lexington, KY, USA, May 2023.

9. "Multimodal contrastive learning for prospective personalized estimation of CT organ doses."
**A. Imran**, S. Wang, D. Pal, S. Dutta, E. Zucker, A. Wang.
*Medical Image Computing and Computer Assisted Intervention (MICCAI)*, Singapore, 2022.

10. "LightSeg: Efficient yet effective medical image segmentation."
H. Jahan, **A. Imran**.
*IEEE International Symposium on Biomedical Imaging (ISBI)*, Kolkata, India, 2022.

11. "Pay attention for COVID-19 detection with efficient convolution."
H. Jahan, **A. Imran**.
*IEEE International Symposium on Biomedical Imaging (ISBI)*, Kolkata, India, 2022.

12. "Personalized CT organ dose estimation from scout images."
**A. Imran**, S. Wang, D. Pal, S. Dutta, E. Zucker, A. Wang.
*Medical Image Computing and Computer Assisted Intervention (MICCAI)*, Strasbourg, France, 2021.

13. "Self-supervised, semi-supervised, multi-context learning for the combined classification and segmentation of medical images."
**A. Imran**, C. Huang, H. Tang, W. Fan, Y. Xiao, D. Hao, Z. Qian, D. Terzopoulos.
*AAAI Conference on Artificial Intelligence*, New York, NY, USA, 2020.

14. "End-to-End fully automatic segmentation of scoliotic vertebrae from spinal X-ray images."
**A. Imran**, C. Huang, Tang, W. Fan, K. Cheung, M. To, Z. Qian, D. Terzopoulos.
*Medical Imaging Meets NeurIPS*, Vancouver, BC, Canada, 2019.

15. "Bipartite distance for shape-aware landmark detection in spinal X-rays."
**A. Imran**, C. Huang, H. Tang, W. Fan, K. Cheung, M. To, Z. Qian, D. Terzopoulos.
*Medical Imaging Meets NeurIPS*, Vancouver, BC, Canada, 2019.

## Research Mentoring

**Current Students**

- Nusrat Munia (PhD, CS, UK)
  Topic: AI Fairness, Multimodal Fusion
- Tyler Ward (PhD, CS, UK)
  Topic: Data-efficient Learning, Medical Image Segmentation
- Kazi Ramisa Rifa (PhD, CS, UK)
  Topic: Image Quality Assessment, Generative AI
- Nishat Nayla (PhD, CS, UK)
  Topic: Continual Learning, Breast imaging

**Former Students/Mentees**

- Matthew Massey (MS, DS, UK)
  Topic: Multimodal Learning, Geologic Mapping
- Cohen Archbold (PhD, CS, UK)
  Topic: Generative Models, Differential Privacy
- Md. Atik Ahamed (PhD, CS, UK)
  Topic: Representation Learning, Image Quality Assessment
- Daniel Song (MS, CS, UK)
  Topic: CT Dose Optimization, Deep Learning
- Aaron Moseley (Undergrad, CS, UK)
  Topic: Medical Image Segmentation, Multitask Learning
- Milin Shah (Undergrad, CS & Finance, UK)
  Topic: Object Detection, Diffusion Models
- Seif Naqvi (K-12, Paul Laurence Dunbar High School)
  Topic: Resource-efficient Scoliosis diagnosis
- Samantha Kelly (Undergrad, BME, UK)
  Topic: Generative Models for Breast Phantoms
- Isabel Berny (BS, CS, Stanford)
  Topic: CT Image Segmentation
- Ayaan Haque (K-12, Saratoga High School)
  Topic: Image Denoising
- Attiano Purpura-Pontoniere (MS, CS, UCLA)
  Topic: Semi-Supervised Diagnostic Classification
- Husne Jahan (AI Engineer)
  Topic: Lightweight Medical Image Segmentation
- Steffen Jung (PhD, Max Planck Institute for Informatics)
  Topic: Generative Models, Evaluation
- Mahdieh Shabanian (MS, BME, UTHSC)
  Topic: Deep Learning, Brain MRI

◇ Ali Momennasab (Undergrad, Cal Poly Pomona)
Topic: Transfer Learning, Image Classification

## Graduate Student Advisory Committee

- Chair, Matthew Massey, MS, Data Science, UK, 2025
  Thesis: "Exploring multimodal AI techniques to support surficial geologic mapping"
- Member, Clifford Parker, PhD, CS, UK, 2024
  Thesis: "Flexible attenuation fields: Tomographic reconstruction from heterogeneous datasets."
- Member, Ethan Coots, MS, CS, UK, 2024
  Thesis: "Tractor front-end loader image classification using CNNs"
- Member, Ankan Bhattacharyya, PhD in progress, CS, UK
- Member, Usman Hassan, PhD in progress, EE, UK
- Member, Cohen Archbold, PhD in progress, CS, UK
- Member, Xiaohui Chen, PhD in progress, CS, UK
- Member, Qin Su, PhD in progress, CpE, UK

## Teaching Experience

**Assistant Professor**

University of Kentucky, Lexington, KY, USA

◇ AI in the World (Spring 2025, Fall 2025)

◇ Machine Learning (Spring 2024, Spring 2025, Spring 2026)

◇ Graphics and Multimedia (Fall 2023)

◇ Advanced Computational Methods for Biomedical Imaging (Spring 2023, Fall 2024, Fall 2025)

◇ Independent Study: Generative Models for Geology (Summer 2024)

**Teaching Assistant**

University of California, Los Angeles, CA, USA

◇ Computational Methods for Medical Imaging (Spring 2020)

◇ Introduction to Computer Science I (Fall 2018–Winter 2020)

**Lecturer**

North South University (NSU), Dhaka, Bangladesh

◇ Discrete Mathematics (Spring 2017–Summer 2017)

◇ Theory of Computation (Spring 2017–Summer 2017)

◇ Management of Information Technology (Summer 2017)

◇ Programming Language I (Spring 2017–Summer 2017)

◇ Data Structures & Algorithms (Spring 2017)

Ahsanullah University of Science & Technology (AUST), Dhaka, Bangladesh

◇ Network Programming (Fall 2013–Spring 2014)

◇ Information Systems Design & Software Engineering (Fall 2013)

◇ Data Structures (Fall 2013)

Northern University Bangladesh (NUB), Dhaka, Bangladesh

◇ Algorithms Design (Summer 2013)

◇ Numerical Methods (Spring 2013–Summer 2013)

◇ Neural Networks (Spring 2013)

◇ Compilers Design (Spring 2013)

◇ Statistics & Queuing System (Fall 2012)

**Guest Lecturer**

- Advanced Data Mining graduate class, Utah State University (Feb 2021)
  *Effective deep learning in medical imaging*
- Deep Learning graduate class, New Mexico State University (Oct 2020)
  *Effective deep learning from limited labeled medical image data*

## Professional Service

**Reviewer/ Program Committee**

- Book Chapters
  - Deep Learning for Computer Vision (DLCV)
- Conferences
  - American Association of Physicists in Medicine (AAPM) Annual Meeting 2022, 2024–2025
  - European Conference on Computer Vision (ECCV) 2024
  - IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2023–2026
  - IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2026
  - IEEE International Symposium on Biomedical Imaging (ISBI) 2020, 2025–2026
  - International Conference on Advances in Electronics Engineering (ICAEE) 2017
  - International Conference on Computer Vision (ICCV) 2023, 2025
  - International Conference on Learning Representations (ICLR) 2022–2023, 2026
  - IEEE International Symposium on Computer Based Medical Systems (CBMS) 2023, 2025
  - Machine Learning for Health (ML4H) 2021
  - Medical Image Computing & Computer Assisted Intervention (MICCAI) 2021–2025
  - Medical Imaging and Computer-Aided Diagnosis (MICAD) 2022
  - Neural Information Processing Systems (NeurIPS) 2022, 2025
- Journals
  - ACM Transactions on Computing for Healthcare (HEALTH)
  - IEEE Access
  - IEEE Journal of Translational Engineering in Health and Medicine (JTEHM)
  - IEEE Transactions on Artificial Intelligence (TAI)
  - IEEE Transactions on Medical Imaging (TMI)
  - Knowledge-Based Systems (KBS)
  - Medical Physics
  - Patterns–Cell Press

**Grant Reviewing**

- NIH Imaging Technology Development (ITD) Study Section Review, 2025
- U.S. Department of Energy Advancements in Artificial Intelligence for Science, 2024
- Neuroscience Research Priority Area Pilot Grant, University of Kentucky, 2023
- NIH Early Career Reviewer Program, Center for Scientific Review, 2024

**Committee/Editorial Experience**

- Senior Program Committee, AAAI 2023-2025
- Area Chair, Medical Image Computing and Computer Assisted Intervention (MICCAI) 2025
- Area Chair, Medical Imaging with Deep Learning (MIDL) 2025–2026

- ◇ Associate Editor, Medical Physics Journal, 2022
- ◇ UK Computer Science Committee on Higher Degrees, 2022–present
- ◇ Advisor, Bangladesh Student Association at UK, 2022–2024
- ◇ Review Editor, Frontiers in Radiology: Artificial Intelligence in Radiology, 2021–present
- ◇ Council Member, RSL Trainee Council, Stanford Medicine, 2021–2022
- ◇ Stanford RSL Seminar Coordinator and Career Development Co-Lead, 2021–2022
- ◇ Stanford Radiology Diversity Committee 2021–2022
- ◇ AAPM Expanding Horizons Review Board–Unit 63, 2021
- ◇ Organizer, Online Machine Learning Journal Club, 2021
- ◇ Program Committee, AI for Healthcare (AI4HC) in Bangladesh, 2020
- ◇ Reviewer, UCLA Engineering Scholarship, 2020

**Professional Memberships**

- ◇ Association for Computing Machinery
- ◇ American Association of Physicists in Medicine
- ◇ Association for the Advancement of Artificial Intelligence
- ◇ IEEE Engineering in Medicine and Biology Society
- ◇ Medical Image Computing and Computer Assisted Intervention
- ◇ Society of Photo-Optical Instrumentation Engineers

## Selected Talks

*Image quality through informatics*
Pediatric Radiology Informatics Course, SPR 2025 — Oct 2025

*Self-supervised learning for effective upstream and downstream medical imaging*
AI Seminar Series, Keck Data Science Institute at Pepperdine University — Apr 2023

*Self-supervised learning in medical imaging: effectiveness & relatedness*
UK Computer Science Keeping Current Seminar — Mar 2023

*On effectiveness of upstream and downstream AI for medical imaging*
Invited talk at Janssen R&D — Jun 2022

*Effective upstream and downstream AI for medical imaging*
Invited talk at the University of Colorado Anschutz — May 2022

*Domain generalization without domain-specific data for medical image segmentation*
Invited talk at Siemens Healthineers — May 2022

*Effective upstream and downstream AI for medical imaging*
Invited talk at the University of Nebraska–Lincoln — Feb 2022

*Effective upstream and downstream AI for medical imaging*
Invited talk at Drexel University — Feb 2022

*Effective upstream and downstream AI for medical imaging*
Invited talk at the University of Alabama at Birmingham — Feb 2022

*Effective upstream and downstream AI for medical imaging*
Invited talk at Saint Louis University — Jan 2022

*Effective AI for medical imaging: upstream and downstream*
Invited talk at the University of Kentucky — Jan 2022

*On effectiveness of upstream and downstream AI for medical imaging*
Invited talk at Florida International University — Dec 2021

*Upstream AI for CT image acquisition*
RSL seminar at Stanford — Jun 2021

*SSIQA: Multi-task learning for non-reference CT image quality assessment …*
Conference talk at IEEE ISBI 2021 Apr 2021

*Partly supervised multi-task learning*
Conference talk at IEEE ICMLA 2020 Dec 2020

*Self-supervised learning in medical imaging*
Joint group meeting at Stanford Sep 2020

*Emerging biomedical imaging technologies*
Webinar keynote at RUET Sep 2020

*Fully-automated analysis of scoliosis from spinal X-Ray images*
Conference talk at IEEE CBMS 2020 Jul 2020

*Data efficient AI for medical imaging*
Invited talk at AI for Healthcare (AI4HC) 2020 Jun 2020

*Multi-adversarial variational autoencoder networks*
Conference talk at IEEE ICMLA 2019, Boca Raton, FL Dec 2019

*Automatic segmentation of pulmonary lobes using a progressive dense V-network*
Conference talk at MICCAI DLMIA 2018, Granada, Spain Sep 2018

*Finite automaton: DFA and NFA*
Open lecture at California State Polytechnic University, Pomona, CA Nov 2016

*Estimation of breast anatomical descriptors from mastectomy CT images*
MS thesis final presentation Jun 2016

*Monte Carlo testing and verification of numerical algorithm implementations*
Conference talk at IEEE TELSIKS 2015, Nis, Serbia Oct 2015

*Diagnosis of brain tumor using MRI scan incorporated adaptive neuro-fuzzy inference system*
42nd Annual honors day presentation, DSU, Dover, DE Apr 2015