

# Parisa Boodaghi Malidarreh

*Ph.D. candidate, UTA*

Citations as of November 15, 2025: [225](#)

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## Profile

- Highly focused and motivated scientist with expertise in Deep Learning, Computer Vision, and Multimodal Modeling. Hands-on experience in developing generative and representation learning frameworks using transformers, GANs, VAEs, and diffusion models, with applications in high-dimensional imaging and multimodal integration. Collaborative and data-driven professional who communicates results clearly and contributes meaningfully to advancing innovative AI research and cross-functional projects.

## Education

2022–2025 **Ph.D. Computer Science**, *The University of Texas at Arlington, USA*

Dissertation: "Representation Learning: From Computer Vision to Applications in Computational Biology".

Supervisor: Dr. Jacob Luber

Expected graduation: December 2025

2018–2021 **Master of Electrical Engineering**, *Iran University of Science and Technology, Iran*

2012–2017 **Bachelor of Electrical Engineering**, *Babol Noshirvani University of Technology, Iran*

## Professional Experience

2022–Present **Graduate Research Assistant, University of Texas at Arlington**, Department of Computer Science and Engineering, Multi-Interprofessional Center for Health Informatics (MICHI)

### - Dual Codebook VQ (Deep Generative Model):

- Developed Dual Codebook VQGAN, a novel image reconstruction framework achieving state-of-the-art results with 50% fewer codevectors than prior models.
- Scaled experiments on large-scale datasets (MS-COCO, ADE20K), reducing reconstruction error by up to 57%, demonstrating an improved efficiency–accuracy tradeoff.
- Built reproducible training pipelines with PyTorch Lightning and integrated experiment tracking for cross-project comparisons.

### - Spatiotemporal Dynamics of Single-Cell Imaging:

- Built a machine learning pipeline for modeling spatiotemporal dynamics in live single-cell imaging datasets.
- Implemented deep-learning-based segmentation (Cellpose) and XGBoost regression to predict developmental patterns at scale.
- Delivered robust tools for analyzing high-dimensional biological imaging data, providing workflows reusable across multiple datasets.

Summer 2025 **Internship, Merck & Co.**, *Merck Research Laboratory, South San Francisco*

- Conducted computational pathology research on Codex multiplex imaging for biomarker discovery and single-cell phenotyping.
- Performed in-depth dataset analysis of an in-house immune cell phenotyping model, uncovering critical class imbalance challenges that limited immune detection accuracy.

- Developed domain-specific data augmentation methods to address tissue heterogeneity and enhance model generalization.
- Enhanced detection of isolated immune cells within tumor clusters, with 60% performance gains across evaluated tissue cores, supporting downstream biomarker analysis.
- Applied the KRONOS foundation model to Codex imaging, benchmarking it against the in-house immune phenotyping model.

## Skills

### Programming and technologies

Python and libraries (Pytorch Lightning, Matplotlib, OpenSlide, OpenCV, Pillow), MATLAB, Git, AWS, L<sup>A</sup>T<sub>E</sub>X

### Deep Learning

Transformer, GAN, Autoencoders (VQVAE, VAE, VQGAN), U-Net, CNN, Vision Transformer, Representation Learning, Contrastive Learning, Self-Supervised Learning

## Highlighted Publications

(\* denotes co-first authorship)

- 1 **Parisa Boodaghi Malidarreh**, Jillur Rahman Saurav, Thuong Le Hoai Pham, Amir Hajighasemi, Anahita Samadi, Saurabh Shrinivas Maydeo, Mohammad Sadegh Nasr, and Jacob M. Luber. [Dual Codebook VQ: Enhanced Image Reconstruction with Reduced Codebook Size](#), 2025, In preparation for submission to *CVPR 2026*.
- 2 **Parisa Boodaghi Malidarreh\***, Mohammad Sadegh Nasr, Dongdong Li, Paul Yi, Vishwa Perakh, Amal Isaiah, and Jacob M Luber. [A Novel PGS for Pediatric Sleep Disordered Breathing Trained on ABCD Suggestive SNPs Outperforms PGS Catalog](#). 2024.
- 3 Biraaj Rout\*, Priyanshi Borad\*, **Parisa Boodaghi Malidarreh\***, Mohammad Sadegh Nasr, Jillur Rahman Saurav, Jai Prakash Veerla, Kelli Fenelon, Theodora Koromila, and Jacob M Luber. [Predicting Future States with Spatial Point Processes in Single Molecule Resolution Spatial Transcriptomics](#). *IJMS*, 2025.
- 4 Kelli D Fenelon\*, Priyanshi Borad\*, Biraaj Rout\*, **Parisa Boodaghi Malidarreh\***, Mohammad Sadegh Nasr, Jacob M Luber, and Theodora Koromila. [Su \(H\) Modulates Enhancer Transcriptional Bursting in Prelude to Gastrulation](#). *Cells*, 13(21):1759, 2024.

## Posters, and Invited Talks

- 1 Biraaj Rout\*, Priyanshi Borad\*, **Parisa Boodaghi Malidarreh\***, Mohammad Sadegh Nasr, Jillur Rahman Saurav, Jai Prakash Veerla, Kelli Fenelon, Theodora Koromila, and Jacob M Luber. [Predicting Future States with Spatial Point Processes in Single Molecule Resolution Spatial Transcriptomics](#). *ISBI, Poster*, 2024.
- 2 **Parisa Boodaghi Malidarreh**. Combining imaging and omics in various settings [talk]. *Department of Bioengineering, Johns Hopkins University*, 2023. Baltimore, Maryland.
- 3 **Parisa Boodaghi Malidarreh**. Deep learning robustness in medical imaging [talk]. *University of Maryland Medical Intelligent Imaging (UM2ii) Center*, 2023. Baltimore, Maryland.

## Social Media

**LinkedIn**, <https://www.linkedin.com/in/Parisa-Boodaghi>

**Google Scholar**, <https://www.scholar.google.com/in/Parisa-Boodaghi>

## Other Publications

(\* denotes co-first authorship)

- 1 Helen Shang, Yi Ding, Vidhya Venkateswaran, Kristin Boulier, Nikhita Kathuria-Prakash, **Parisa Boodaghi Malidarreh**, Jacob M Lubner, and Bogdan Pasaniuc. [Generalizability of PGS313 for breast cancer risk in a Los Angeles biobank](#). *Human Genetics and Genomics Advances*, 5(3), 2024.
- 2 Neel R Vora, Amir Hajighasemi, Cody T Reynolds, Amirmohammad Radmehr, Mohamed Moharned, Jillur Rahman Saurav, Abdul Aziz, Jai Prakash Veerla, Mohammad S Nasr, Hayden Lotspeich, Partha Sai Guttikonda, Thuong Pham, Aarti Darji, **Parisa Boodaghi Malidarreh**, et al. [A Platform-Agnostic Physiological Signal Compression Approach for Resource-Constrained Computational Headwear](#). In *2024 IEEE 20th International Conference on Body Sensor Networks (BSN)*, pages 1–4. IEEE, 2024.
- 3 Helen H Shang, Mohammad Sadegh Nasr, Jai Prakash Veerla, Jillur Rahman Saurav, Amir Hajighasemi, **Parisa Boodaghi Malidarreh**, Manfred Huber, Chace Moleta, Jitin Makker, and Jacob M Lubner. [Histopathology slide indexing and search—are we there yet?](#) *NEJM AI*, 1(5):Alcs2300019, 2024.
- 4 Michael Robben, Amir Hajighasemi, Mohammad Sadegh Nasr, Jai Prakesh Veerla, Anne M Alsup, Biraaj Rout, Helen H Shang, Kelli Fowlds, **Parisa Boodaghi Malidarreh**, Paul Koomey, et al. [The state of applying artificial intelligence to tissue imaging for cancer research and early detection](#). *arXiv preprint arXiv:2306.16989*, 2023.
- 5 Amir Hajighasemi, MD Saurav, Mohammad S Nasr, Jai Prakash Veerla, Aarti Darji, **Parisa Boodaghi Malidarreh**, Michael Robben, Helen H Shang, and Jacob M Lubner. [Multimodal pathology image search between H&E slides and multiplexed immunofluorescent images](#). *arXiv preprint arXiv:2306.06780*, 2023.
- 6 Iskender Akkurt, **Parisa Boodaghi Malidarreh**, and Roya Boodaghi Malidarreh. [Simulation and prediction of the attenuation behaviour of the KNN–LMN–based lead-free ceramics by FLUKA code and artificial neural network \(ANN\)–based algorithm](#). *Environmental Technology*, 44(11):1592–1599, 2023.
- 7 Mohammad Sadegh Nasr, Amir Hajighasemi, Paul Koomey, **Parisa Boodaghi Malidarreh**, Michael Robben, Jillur Rahman Saurav, Helen H Shang, Manfred Huber, and Jacob M Lubner. [Clinically relevant latent space embedding of cancer histopathology slides through variational autoencoder based image compression](#). In *2023 IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, pages 1–5. IEEE, 2023.
- 8 Roya Boodaghi Malidarreh, Iskender Akkurt, **Parisa Boodaghi Malidarreh**, and Seher Arslankaya. [Investigation and ANN-based prediction of the radiation shielding, structural and mechanical properties of the Hydroxyapatite \(HAP\) bio-composite as artificial bone](#). *Radiation Physics and Chemistry*, 197:110208, 2022.
- 9 Abualkasim Bakeer\*, Ihab S Mohamed\*, **Parisa Boodaghi Malidarreh\***, Intissar Hattabi, and Lantao Liu. [An artificial neural network-based model predictive control for three-phase flying capacitor multilevel inverter](#). *IEEE Access*, 10:70305–70316, 2022.
- 10 **Parisa Boodaghi Malidarreh**, Davood Arab Khaburi, and Jose Rodriguez. [Capacitor voltage imbalance reduction in flying capacitor modular multilevel converters by using model predictive control](#). In *2020 11th Power Electronics, Drive Systems, and Technologies Conference (PEDSTC)*, pages 1–4. IEEE, 2020.