Amir Reza (Austin) Vazifeh

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EDUCATION

Princeton University

*Ph.D., **Electrical & Computer Engineering*** *2023 - 2028*

- GPA 3.9/4.0; Ph.D. Fellowship in Natural Sciences and Engineering
- **Research**: Computational Imaging & Optics, AI in Healthcare, Computer Vision, Neural Rendering

Sharif University of Technology

*B.S., **Electrical Engineering**, Minor in **Physics*** *2018 - 2022*

- GPA 18.83/20; Top 10% of class; Academic Achievement Award (2019-2020); 12^{th}/134K in National Entrance Exam
- **Research**: AI in Healthcare, Wearable Sensors, Analog/Digital Circuit Design, Embedded Systems

EXPERIENCE

Princeton University (Biomedical Imaging Group) Princeton, NJ

***Graduate Researcher** (Advisor: Prof. Jason Fleischer; Collaborate with Prof. Felix Heide)* *2024 - Present*

- Developed unsupervised video-based resolution enhancement in fiber endoscopy with implicit neural representations
- Created a framework for manifold learning and alignment for personalized multi-lead ECG analysis.
- Implemented an algorithm for snapshot hyperspectral imaging with implicit neural representations

Waters Corporation (Industry PhD Partnership) Remote, US

Computer Vision and Machine Learning Researcher *2024 - 2026*

- Design and implement a deep learning cell counting and viability detection system on brightfield and phase microscopy, robust to focal plane variations and staining strategies
- Driving Waters' next-generation imaging platform, recognized by senior leadership up to SVP level

Institute of Science and Technology Austria Vienna, Austria

***Research Intern** (among 3% accepted applicants) (Advisor: Prof. Sandra Siegert)* *Summer 2023*

- Implemented 3D instance segmentation of microglia cells using classical computer vision techniques.

EPFL University (Integrated Neurotechnologies Lab) Geneva, Switzerland

***Research Intern** (among 2% accepted applicants) (Advisor: Prof. Mahsa Shoaran)* *Summer 2022*

- Analyzed phase-amplitude cross-frequency coupling in EEG signals.

Sharif University of Technology (Biosen Group)

***Undergraduate Researcher** (Advisors: Profs. Mohammad Fakharzadeh & Daryoosh Vashayee)* *2020 - 2022*

- Designed a low-power wearable ECG patch for long-term cardiac monitoring with ML-based arrhythmia detection
- Researched energy harvesting materials and techniques for wearable medical devices.

TEACHING & MENTORSHIP

Princeton University

Teaching Assistant & Mentor *2024 - Present*

- TA for Biomedical Imaging (ECE 452), Machine Learning & Pattern Recognition (ECE 435/535); Research Mentor

Sharif University of Technology

Teaching Assistant *2020 - 2022*

- TA for Intro to ML, Signals & Systems, Computer Architecture, Applied Electronics in Bioengineering

PUBLICATIONS

- **To be submitted**: Stain-Free Cell Viability Assessment with Deep Learning, A. R. Vazifeh, et al. *Frontiers in Optics*
- **Under Review**: Manifold Learning for Personalized and Label-Free Detection of Cardiac Arrhythmias, A. R. Vazifeh, J. W. Fleischer. For *Informatics in Medicine Unlocked* arXiv:2506.16494
- **Accepted**: Manifold Alignment for Label-Free Cell Phenotyping in Multimodal Microscopy, A. R. Vazifeh, J. W. Fleischer. For *Optical Biophotonics Congress 2026 — Microscopy, Histopathology and Analytics (Microscopy)*
- Seeing Through Fibers: Unsupervised Image Reconstruction in Fiber Bundle Imaging Systems, A. R. Vazifeh, et al. *Optics Express*, Feb 2026
- An open-source retrospective analysis of hypertrophic and dilated cardiomyopathy using machine learning and electrocardiogram data, A. Altintepe, et al. *Diagnostics*, Feb 2026
- Snapshot Hyperspectral Imaging via Compressive Sensing and Implicit Neural Representation, J. Boondicharern, A. R. Vazifeh, J. W. Fleischer. *Computational Optical Sensing and Imaging*, Aug 2025
- Advancing Personalized Healthcare: Progress in Energy Harvesting Materials of Self-Powered Wearable Devices, P. Bhatnagar, et al. *Progress in Materials Science* (Impact Factor: 40), Aug 2023
- Design and Implementation of an Ultralow-Power ECG Patch and Smart Cloud-Based Platform, B. Baraeinejad, et al. *IEEE Trans. on Instrumentation and Measurement*, Apr 2022

SKILLS

Programming & ML - Python (PyTorch, TensorFlow, Sklearn, OpenCV, NumPy, SciPy), C++
Cloud & Data - AWS (S3, EC2), Large-scale data analysis, Distributed/Parallel computing
Hardware - Circuit Analysis & Board Design (Altium, HSPICE, Proteus), HDL (MIPS Assembly, Verilog)
Other - Git, LaTeX, HTML, CSS, Reviewer for IEEE Journal of Biomedical and Health Informatics (JBHI)