Amir Reza Vazifeh

amir.vazifeh@princeton.edu | conavaz@partner.waters.com | amirrezavazifeh.github.io | +1 609-255-6150

EDUCATION

Princeton University 2023 – 2028
Ph.D., Electrical & Computer Engineering

- GPA 3.9/4.0 | Ph.D. Fellowship in Natural Sciences and Engineering | ECE Graduate Student Award for Excellence in Service (2026)
- **Research:** Computational Imaging & Optics | Computer Vision | AI in Healthcare | Signal Processing
- **Coursework:** Deep Learning Networks | Machine Learning & Pattern Recognition | Statistical Machine Learning | Computer Vision | Imaging the Invisible | Biomedical Imaging | Nonlinear Optics | Digital Signal Processing | Advanced Wireless Systems | Computational Finance in C++

Sharif University of Technology 2018 – 2022
B.S., Electrical Engineering, Minor in Physics

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

EXPERIENCE

Princeton University (Imaging Physics Lab) 2023 – Present
Graduate Researcher — Advisor: Prof. Jason Fleischer; Collaborator: Prof. Felix Heide *Princeton, NJ*

- Developing unsupervised video-based image reconstruction in fiber endoscopy using implicit neural representations
- Implementing an algorithm for snapshot hyperspectral imaging with implicit neural representations
- Creating a framework for manifold learning and alignment for personalized multi-lead ECG analysis

Waters Corporation (Industry PhD Partnership) 2024 – Present
Computer Vision and Machine Learning Researcher *Remote, US*

- Designing and implementing 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 Summer 2023
Research Intern (among top 3% of applicants) — Advisor: Prof. Sandra Siegert *Vienna, Austria*

- Implemented 3D instance segmentation model for microglia cells

EPFL (Integrated Neurotechnologies Lab) Summer 2022
Research Intern (among top 2% of applicants) — Advisor: Prof. Mahsa Shoaran *Geneva, Switzerland*

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

Sharif University of Technology (Biosen Group) 2020 – 2022
Undergraduate Researcher — Advisors: Profs. Mohammad Fakharzadeh & Daryoosh Vashaee *Tehran, Iran*

- 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

PATENTS

Cell Viability Assessment — U.S. Provisional Patent Application
Assignee: Waters Corporation — *Filed:* June 2026
Inventors: Christian Zeigler, **Amir Reza Vazifeh**, Sornanathan Meyyappan, Richard Jeske, Jason W. Fleischer

PUBLICATIONS

- **Under review:** Label-Free Cell Counting and Viability Prediction Using Brightfield Imaging and Deep Learning, **A. R. Vazifeh**, C. Zeigler, S. Meyyappan, R. Jeske, J. W. Fleischer. *arXiv*, 2026
- Neural Fields for Single-Shot Image Reconstruction in Fiber Bundle Imaging Systems, **A. R. Vazifeh**, J. W. Fleischer. *Frontiers in Optics*, 2026
- AI-Enabled Label-Free Cell Viability Assessment from Brightfield Imaging, **A. R. Vazifeh** et al. *Frontiers in Optics*, 2026
- Manifold Alignment for Label-Free Cell Phenotyping in Multimodal Microscopy, **A. R. Vazifeh**, J. W. Fleischer. *Optica Biophotonics Congress — Microscopy, Histopathology and Analytics*, 2026
- Seeing Through Fibers: Unsupervised Image Reconstruction in Fiber Bundle Imaging Systems, **A. R. Vazifeh** et al. *Optics Express*, 2026
- Manifold Learning for Personalized and Label-Free Detection of Cardiac Arrhythmias, **A. R. Vazifeh**, J. W. Fleischer. *Informatics in Medicine Unlocked*, 2026
- An Open-Source Retrospective Analysis of Hypertrophic and Dilated Cardiomyopathy Using Machine Learning and Electrocardiogram Data, A. Altintepe et al. *Diagnostics*, 2026
- Snapshot Hyperspectral Imaging via Compressive Sensing and Implicit Neural Representation, J. Boondicharern, **A. R. Vazifeh**, J. W. Fleischer. *Optica Imaging Congress — Computational Optical Sensing and Imaging*, 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), 2023
- Design and Implementation of an Ultralow-Power ECG Patch and Smart Cloud-Based Platform, B. Baraeinejad et al. *IEEE Transactions on Instrumentation and Measurement*, 2022

TEACHING & MENTORSHIP

Princeton University 2024 – 2026
Teaching Assistant & Research Mentor *Princeton, NJ*

- TA for Biomedical Imaging (ECE 452) and Machine Learning & Pattern Recognition (ECE 435/535)
- Research mentor, Princeton Laboratory Learning Program (LLP) — mentored high school students in research (Summer 2025)

Sharif University of Technology 2020 – 2022
Teaching Assistant *Tehran, Iran*

- TA for Introduction to Machine Learning, Signals & Systems, Computer Architecture, and Applied Electronics in Bioengineering

SKILLS

- **Programming & ML:** Python (PyTorch, TensorFlow, Sklearn, OpenCV, NumPy, SciPy, Pandas), 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

PEER REVIEW

- *IEEE Journal of Biomedical and Health Informatics* (JBHI)
- *The Journal of Supercomputing* (Springer Nature)