Helya Goharbavang

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EDUCATION

University of Houston, Houston, TX — Aug 2022 - May 2027 (Expected)
Doctor of Philosophy in Electrical Engineering, **GPA**: 3.83
- **Awards**: $4,000 presidential fellowship, 2022-2024 (1 of 4 recipients in ECE dept.)
- **Relevant Courses**: Computer Vision, Adv. Machine Learning, Adv. Computer Architecture, GPU Programming

Tehran Polytechnic, Tehran, Iran
Bachelor of Science in Electrical Engineering, **GPA**: 3.55 — Sep 2016 - Sep 2021
- **Thesis**: Developed DAQ-LoRa, a data acquisition system with a central controller in LabView
- **Honors**: Ranked top 0.2% (483rd in 162,879) in Iran's National University Entrance Exam

WORK EXPERIENCE

University of Houston, Houston, TX
Research Assistant — Aug 2022 - Present
- Developing parallel tensor-based algorithms for 3D skeletonization in C++/Python
- Parallelized tensor voting in CUDA, optimizing memory and achieving 10× speedup, 24% higher accuracy
- Built an open-source library of 10+ published algorithms for modeling microvascular networks
- Assessed performance of algorithms on 3 newly collected gigavoxel-scale images using cluster computing

Teaching Assistant — Spring 2024
- GPU & Heterogeneous Programming

Ronix Tools, Tehran, Iran
Team Lead Intern — May 2020 - Jan 2021
- Led a team of 10+ in Content Production for a 3-month campaign
- Created and translated 100+ technical documents (English/German)

TECHNICAL SKILLS

Programming Languages	Python, C/C++, MATLAB
Quantitative Skills	Data Structures, Algorithms, Optimization, Software Design, Linear Algebra
Tools	CUDA, Git, CMake, OpenGL, Linux, Blender, MeshLab
Libraries	PyTorch, Keras, TensorFlow, OpenCV, matplotlib, Numba
Web Development	HTML, CSS, JavaScript

PROJECTS

Machine Learning and CNNs: Developed CNN-based models (U-Net, vision transformers, autoencoders) for medical image analysis, improving segmentation accuracy by 2-10% | Implemented Responsible AI using adversarial learning for primary healthcare using TensorFlow and Pandas

Tensor Voting: Developed a CUDA-based software for repairing, refining, and visualizing gigavoxel-scale 3D tensor fields | Enhanced performance by precomputing and optimizing host-device memory transfers

Visualization Programs: Created interactive open-source 3D visualization toolkit for large-scale microvasculature datasets and tensor fields using C++/OpenGL

Embedded Systems and Hardware Programming: Developed IoT-based systems using Arduino, Raspberry Pi, and multiple sensors and actuators | Integrated real-time web-based robotic navigation

PUBLICATIONS

Closed-Form GPU-Accelerated Tensor Voting with Refinement, Goharbavang et al., 2025 *International Symposium on Biomedical Imaging (ISBI)* (Under review)

GPU-Accelerated RSF Level Set Evolution for Large-Scale Microvascular Segmentation, Niger M., Goharbavang H., et al., 2025 *IEEE Transactions on Visualization and Computer Graphics (TVCG)* (Under review)

ADDITIONAL

Languages	English, Persian (Native), German (C1)
Leadership	EE basketball team captain - 1st place in university championship (*Tehran Polytechnic*)
Arts	Piano, Persian Calligraphy