

# HELIA GOHARBAVANG

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## EDUCATION

**Doctor of Philosophy in Electrical Engineering**, University of Houston, TX, GPA: 3.852 August 2026  
Related coursework: GPU Programming, Computer Vision, Machine Learning, Adv. Computer Architecture

**Bachelor of Science in Electrical Engineering**, Tehran Polytechnic, GPA: 3.55 September 2021  
Thesis project: "DAQ-LoRa: A data acquisition system with a central controller"

## WORK EXPERIENCE

**Research Assistant** August 2022 - Present  
*University of Houston, Scalable Tissue Imaging and Modeling Lab (STIM-Lab)*

- Contributor to the "tiralib" repository, a tissue imaging, reconstruction, and analysis library
- Developer of the 3D tools of the "tensor" repository, a visualization and processing program for 2D and 3D tensor fields
- Developer of the "glOrthoview", a visualization program for orthographic slices of a 3D volume using OpenGL

**Teaching Assistant**

- GPU and Heterogeneous Programming, *University of Houston* Spring 2024
- Advance Computer Programming, *Tehran Polytechnic* Fall 2017

## PROJECTS

**Tensor Voting**, Developing a new analytical theory for tensor voting, including CUDA-based software for repairing, refining, and visualizing gigavoxel-scale 3D tensor fields

**GPU-Programming**, GPU-accelerated vesselness filter for vascular network enhancement, developed a parallel ray tracer as a class assignment

**3D Segmentation and Skeletonization**, Performed and implemented state-of-the-art vascular segmentation and centerline extraction methods on several large-scale microvascular datasets and evaluated the results

**CNNs and Machine Learning**, Blood glucose level estimation using images of test strips, responsible AI in primary healthcare using adversarial learning, implemented vision transformers, clustering, semantic segmentation, object detection, autoencoders

**Visualization Programs**, Visualization tools for 3D tensor fields, 3D visualization toolkit for large-scale microvasculature data using OpenGL (glOrthoView)

**Embedded Systems and Hardware Programming**, Experience programming Arduino UNO and Raspberry Pi, integrating various sensors, actuators, and long-range communication technologies for IoT and robotic projects

## TECHNICAL STRENGTHS

<b>Computer Languages</b>	Python, C, C++, MATLAB, HTML
<b>Quantitative Skills</b>	Optimization, Profiling, Statistical Analysis, Signal Processing
<b>Tools</b>	CUDA, Git, CMake, Blender, Slicer3D, MeshLab
<b>Libraries</b>	Keras, OpenCV, PyTorch
<b>Others</b>	Fluent in English, Persian, German (B2 Niveau)

## PUBLICATIONS

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**Goharbavang, H.**, Baige, O., Chen, G., Mayerich, D. (2024). Closed-Form GPU-Accelerated Tensor Voting with Refinement **Manuscript under review**

**Goharbavang, H.**, Wythe, J., Chen, G., Mayerich, D. (2024). Segmentation and Modeling of Large-Scale Microvascular Networks: A Survey. **Manuscript submitted for publication**

Niger, M., **Goharbavang, H.**, Ahn, T., Alley, E., Wythe, J., Chen, G., Mayerich, D. (2024). GPU-Accelerated RSF Level Set Evolution for Large-Scale Microvascular Segmentation. **Manuscript submitted for publication**