

# HELIA GOHARBAVANG

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## EDUCATION

**Doctor of Philosophy in Electrical Engineering**, University of Houston, TX

August 2022 - Present

GPA: 3.83

Expected graduation date: May 2027

**Bachelor of Science in Electrical Engineering**, Tehran Polytechnic

September 2016 - September 2021

GPA: 3.55

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*
- Advance Computer Programming, *Tehran Polytechnic*

Spring 2024

Fall 2017

**Team Lead**

May 2020 - January 2021

*Ronix Tools Company*

- Managed a team of 10+ employees in the Content Production department for a three-month campaign
- Created and translated technical content (English/German)

## 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

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

**CNNs and Machine Learning**, Responsible AI in primary healthcare using adversarial learning, Blood glucose level estimation using medical images, implemented vision transformers, autoencoders, semantic segmentation, object detection

**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

**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

**Computer Languages**

Python, C, C++, MATLAB, JavaScript

**Quantitative Skills**

Optimization, Profiling, Statistical Analysis, Signal Processing

**Tools**

CUDA, Git, CMake, OpenGL, Linux, Blender, Slicer3D, MeshLab

**Libraries**

OpenCV, matplotlib, Eigen, Keras, TensorFlow, PyTorch

**Others**

Fluent in English, Persian, German (B2 Niveau)

## SELECTED COURSES

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<b>Computer Engineering</b>	Advanced Computer Architecture, Advanced Computer Programming
<b>Artificial Intelligence</b>	Advanced Machine Learning, Computer Vision
<b>Parallel Programming</b>	GPU and Heterogeneous Programming
<b>Signal Processing</b>	Digital Image Processing, Stochastic Processing, Estimation Theory

## 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**