

# Ashe Neth

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## Research Interests

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My research interests include many forms of **parallel computing** such as **high-performance**, **high-throughput**, and **many-task, volunteer computing**, **resource-constrained computing**, and **distributed systems**. My primary work so far has been on finding solutions to computing problems in resource-constrained environments and utilizing them in non-constrained environments. I aim to utilize the mindset that I have acquired while working with both resource-constrained and non-constrained systems to further the field of parallel computing.

## Education

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**B.S. in Computer Science, Worcester Polytechnic Institute (WPI)** June 2023 - May 2025

**Primary Academic advisor:** Rose Bohrer, Assistant Professor, WPI

**Primary Research advisor:** Bashima Islam, Assistant Professor, WPI

**General Education, College of San Mateo** Dec. 2021 - June 2023

## Publications

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*UnIT Pruner* **In Review** - ACM SenSys 2025

**Ashe Neth**, Mohammad Nur Hossain Khan, Subrata Biswas, Asif Salekin, Bashima Islam.

*UnIT Pruner*: Unstructured Inference-Time Pruning for Battery-Free Systems. **In Review** - The ACM Conference on Embedded Networked Sensor Systems (**ACM SenSys 2025**), 2025

**Pronoun Logic** Queer in AI @ NAACL 2024

Rose Bohrer and **Ashe Neth**. Pronoun Logic. Queer in AI Workshop at The Nations of the Americas Chapter of the Association for Computational Linguistics (**Queer in AI @ NAACL 2024**), 2024

## Research Experience

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**Inference-Time Pruning**, advised by Bashima Islam, Assistant Professor, WPI Oct. 2023 - Nov. 2024

- Created and implemented a **dynamic matrix multiplication approximation** algorithm used to create a **novel unstructured inference-time pruning system**, *UnIT Pruner*, for artificial neural networks.
- Created and implemented **three** highly flexible methods for **approximating division** on a variety of different platforms, collectively covering both fixed-point and floating-point.
- Implemented assembly-level branching and division optimizations for CPUs, GPUs, and MCUs during experimentation using **CUDA**, **nvPTX**, **C/C++**, and **ASM**.
- Created a **Python** module that offers *UnIT Pruner* components for **PyTorch**.
- Submitted a full length 12-page paper currently **in review** at The ACM Conference on Embedded Networked Sensor Systems (**ACM SenSys 2025**).

**Computer Science Course Development: RBE 100X**, advised by Vince Aloï, June 2024 - Present  
Assistant Teaching Professor, WPI and Brad Miller, Senior Fellow, WPI

- Developed **learning outcomes** and **course objectives** for a new robotics-based introductory computer science course, RBE 100X, at WPI.
- Designed and created **lab materials** for said course.
- Currently measuring effectiveness of this course relative to existing introductory classes using **Qualtrics**.
- Working on reporting findings in the form of a research paper.

**Pronoun Logic**, in collaboration with Rose Bohrer, Assistant Professor, WPI Jan. 2024 - June 2024

- Used **linear logic** and **linear temporal logic** to create **grammars** for describing personal pronoun descriptors of arbitrary complexity.
- Discussed the **use cases** of said grammars in education and other contexts.
- **Published** a 8-page workshop paper in the Queer in AI Workshop at The Nations of the Americas Chapter of the Association for Computational Linguistics (**Queer in AI @ NAACL 2024**).
- Presented Pronoun Logic in **Mexico City, Mexico** at **Queer in AI at NAACL 2024**.

# Professional Experience

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## Teaching Assistant for RBE 100X at WPI

Sep. 2024 - Present

Help teach the introductory programming course I designed, RBE 100X:

- Lead groups of students through **weekly lab sessions**.
- Teach **fundamental programming concepts** to students new to the field.

## Web Development Assistant at WPI

Aug. 2023 - Present

- Create major improvements to the **security and performance** of my WPI's websites.
- Use **TypeScript, NodeJS, SQL, React, and ExpressJS** to build **new web applications**.

# Selected Projects

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## CUDA ML Library - code available upon request

Jan. 2022 - Jan. 2023

- Created a simple **machine learning framework** using **CUDA**.
- Experimented with several novel optimizer algorithms.
- Experimented with different ways of moving and storing memory on the GPU and its impact on processing speeds.

## CUDA/OpenGL Interoperability Library - code available upon request

Jan. 2022 - Jan. 2023

- Created a **CUDA/OpenGL interoperability library** for simplifying the process of exposing framebuffers to **CUDA** via **OpenGL** pixelbuffers.

## CUDA Libraries - code available upon request

Jan. 2022 - Jan. 2023

- Created a **raycasting library** using my **CUDA/OpenGL interoperability library** for writing to the screen and **CUDA** for the internal logic.
- Experimented with different ways of moving and storing memory on the GPU and its impact on processing speeds.

## Self-Hosted Server

Dec. 2021 - Present

- Built a computer, choosing components specifically for learning applications of **parallel computation** using a data center graphics card (**NVIDIA Tesla K10**).
- Configured the server to use **Ubuntu Server 20.04.3 LTS** and **NVIDIA CUDA Toolkit 10.1**.
- Manage networking between **local subnets** and the **open internet** to allow for remote access to the computing resources.

## NPM Packages - code available upon request

Oct. 2022 - Present

Create and maintain several packages on Node Package Manager (**NPM**) that do the following:

- Abstract away the process of retrying unreliable APIs and other high-importance low-reliability code snippets.
- Manage a pseudo virtual host within a NodeJS process, switching between various HTTP servers.

## Text-To-Speech Virtual Microphone

March 2023 - Present

- Created and self-host an application for utilizing text-to-speech technology such as **Amazon Polly** instead of a physical microphone for taking calls.
- Built using **NodeJS** and **FFmpeg**.

## Live Trading Service

Oct. 2020 - Present

- Run a **live service** arbitrage of virtual items for profit.
- Handle upwards of **300,000** ticks per hour maintaining accurate pricing data.
- Create and sell access to software hosted on **AWS** using **Docker** and **NodeJS**.

# Skills

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|---------|-----------|-----------------------|
| • C/C++ | • OpenGL  | • NodeJS              |
| • CUDA  | • Docker  | • Typescript          |
| • ASM   | • Python  | • Amazon Web Services |
| • nvPTX | • PyTorch |                       |
| • LaTeX | • SQL     |                       |