Ashe Neth

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Research Interests

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

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

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

Presentations

Pronoun Logic Queer in AI @ NAACL 2024

Presented Pronoun Logic in Mexico City, Mexico at Queer in AI at The Nations of the Americas Chapter of the Association for Computational Linguistics (**Queer in AI @ NAACL 2024**)

Research Experience

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 Aloi, Assistant Teaching Professor, WPI and Brad Miller, Senior Fellow, WPI June 2024 - Present

- 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

Teaching Assistant for RBE 100X at WPI Sep. 2024 - Present

Help teach the introdcutory 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

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 Interop 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 Raycasting Library - 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

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

Skills

- C/C++
- CUDA
- ASM
- nvPTX
- OpenGL
- Linux
- Windows
- Docker
- Python
- PyTorch
- NodeJS
- Typescript
- React
- HTML/CSS
- SQL
- AWS
- LaTeX
- Java