Joseph Quinn

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Education

Vanderbilt University Nashville, TN

B.S. Computer Science & Mathematics *Expected: May 2026*

Coursework: Intermediate Software Design, Program Design and Data Structures, Discrete Structures, Calculus, Linear Algebra, Differential Equations, Computer Architecture

Experience

Oak Ridge National Laboratory Oak Ridge, TN

Machine Learning Research Intern *June 2024 – Aug 2024*

- Enhanced a fluid dynamics model by integrating **axial attention transformers**, reducing parameter count by 60%
- Reduced model training time by 36% through a published research study on hyper-parameter sensitivity
- Executed over 150 multi-node Slurm jobs on Frontier, the **world's fastest supercomputer**, using Distributed Data Parallel and over **350 TB** of HBM2E GPU memory to streamline large-scale model training
- 2024 Department of Energy Cybersecurity and Technology Innovation Conference, **OMNI Research Winner**

Mother to Mother Nashville, TN

Full-Stack Developer *Sep 2023 – Present*

- Developed a client interface and admin portal built to connect corporate donors with local mothers in need
- Achieved a **40% increase** in user registrations by migrating from a manual paper system to a scalable **React PWA**
- Implemented a **Node.js** backend with **Prisma** and **MySQL** for 2,000+ items, cutting processing time by over 20%
- Engineered **RESTful APIs** for robust data management, using **Firebase** authentication for secure JWT validation

Vanderbilt University Nashville, TN

Undergraduate Teaching Assistant *Aug 2024 – Present*

- Supported 300+ **undergraduate students** by leading recitations on Java programming, **object-oriented design**, and algorithm development, clarifying complex concepts and providing personalized guidance to improve proficiency

Projects

Network Visualization - Interactive visualizations of performance metrics for surrogate modeling *June 2024 – Present*

React | *Flask* | *Typescript*

- Utilized **NumPy** to process multi-dimensional numerical simulation experiments from PDEBench's NetCDF datasets
- Built a data processing CLI to normalize and process metrics, automating data workflow and web app integration
- Developed a **Flask API** to manage metric data, enhancing server-side efficiency and **boosting site speeds by 34%**

nnScratch - Fully connected neural network built entirely from scratch *May 2024 – June 2024*

Python | *NumPy* | *Matplotlib*

- Derived **Calculus** fundamentals to manually calculate and implement all loss, activation, and propagation algorithms
- Formulated ground-up architecture, resulting in a **20% faster convergence** time compared to pre-built libraries
- Engineered an automation framework for hyperparameter optimization, enabling a **schema** for dynamic model tuning

Gesture Detection Engine - Model architecture for live ASL recognition *Feb 2024 – March 2024*

PyTorch | *OpenCV* | *MediaPipe*

- Implemented **CNN**, **ANN**, and **ViT** classes, for landmark and image data achieving **97% accuracy** on testing datasets
- Created a preprocessing pipeline class for data normalization and augmentation, reducing error rates by **over 15%**
- Adapted ReLU, Sigmoid, and Leaky ReLU functions with Xavier and He initialization, improving framework flexibility

Technical Skills

Languages: Java, Python, MySQL, JavaScript/TypeScript, HTML/CSS, R
Frameworks: React, Node.js, Prisma, Flask, JUnit
Developer Tools: Git, Firebase, MongoDB, AWS EC2/RDS, Docker, Slurm
Libraries: PyTorch, NumPy, Pandas, Matplotlib, MediaPipe, OpenCV, Scikit-learn
Interests: Film photography, Romance movies, 90's Manga