Willow Hughes

Bellingham, WA | willownoamhughes@gmail.com | linkedin.com/in/willow-hughes | github.com/willowhughes

About Me

Machine learning researcher and software engineer with a passion for applying deep learning and data science to complex, real-world problems.

Education

MS **Western Washington University** — *Bellingham, WA*
Computer Science, AI/ML Specialization | 4.00 GPA — *Jan 2026 – Mar 2027*

BS **Western Washington University** — *Bellingham, WA*
Computer Science, Pre-Masters and Honors Curriculum | 3.84 GPA — *Jan 2023 – Dec 2025*

Experience

Deep Learning Research Assistant — *Bellingham, WA*
Hutchinson Machine Learning Research Group — *Dec 2025 – Present*

- Developing deep learning models (U-Net, CNN, SuperPoint Transformer) in PyTorch for LiDAR-based Maya site detection
- Processing geospatial remote sensing data and collaborating with archaeologists to address domain-specific challenges

Undergraduate Research Assistant — *Bellingham, WA*
Western Washington University — *Oct 2024 – Dec 2025*

- First author on research paper investigating Test-Driven Development in CS education; submitted to ITiCSE 2026 conference

Software Engineering Intern — *Seattle, WA*
Premera Blue Cross — *Jun 2024 - Aug 2024*

- Led cloud migration of a C#/SQL web application to Azure, coordinating with Microsoft engineers to assist with strategy
- Built CI/CD (YAML) pipelines and IaC (Bicep) templates for core services, reducing deployment time by >40%
- Implemented authentication and authorization with Azure Entra ID; documented migration process and presented findings to internal stakeholders

Skills

Tools & Frameworks: PyTorch, NumPy, Git, Linux/Unix, Azure, AWS, GCP, CI/CD, IaC (Bicep)

Areas: Deep Learning, Computer Vision, Geospatial Intelligence, NLP, Data Pipelines, Cloud Engineering, DevSecOps

Coursework: Machine Learning, Deep Learning, Statistics, Data Structures and Algorithms, Operating Systems

Projects

Conversational AI Spanish Tutor (Python, TypeScript, Flask, AI APIs)

- Designed and building a real-time voice AI system integrating STT, LLM, and TTS APIs with a Python/Flask backend and React frontend
- Optimizing the end-to-end inference pipeline to achieve sub-second voice response latency

Deep Neural Network from Scratch (Python, NumPy)

- Implemented forward/backpropagation, gradient descent, and layer abstractions in pure NumPy to understand deep learning fundamentals

Multithreaded Image Processing Application (C, POSIX Threads)

- Developed a C program utilizing POSIX threads to implement a Laplacian edge detection algorithm on PPM images
- Engineered an efficient image filtering pipeline, achieving up to a ∼70% runtime reduction through optimized thread synchronization and workload distribution

Multi-Client Chat Application (C, Sockets)

- Implemented scalable TCP chat server supporting 255+ concurrent clients with real-time message routing, event-driven architecture, and non-blocking I/O using select() for efficient multi-threaded performance

Involvement

Competitive Programming Club — *Jan 2024 – Present*
Orchestra & Band Involvement — *2013 – Present*

- Played in orchestras for 8 years and actively perform in bands