

# Willow Hughes

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## About Me

Developer enthusiastic about building high-quality software systems, with expertise in machine learning and data engineering.

## Education

MS	<b>Western Washington University</b> <i>Computer Science, AI/ML Specialization</i>	Bellingham, WA Jan 2026 – Mar 2027
BS	<b>Western Washington University</b> <i>Computer Science, Pre-Masters and Honors Curriculum   3.84 GPA</i>	Bellingham, WA Jan 2023 – Dec 2025

## Experience

<b>Deep Learning Research Assistant</b> <i>Hutchinson Machine Learning Research Group</i>	Bellingham, WA 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	
<b>Undergraduate Research Assistant</b> <i>Western Washington University</i>	Bellingham, WA Oct 2024 – Dec 2025
• First author on research paper investigating Test-Driven Development in CS education; submitted to ITiCSE 2026 conference	
<b>Software Engineering Intern</b> <i>Premera Blue Cross</i>	Seattle, WA Jun 2024 - Aug 2024
• Migrated a C#/SQL web application to Azure	
• 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 and authored a guide on the internal Premera wiki	
• Worked with Microsoft engineers to refine the cloud migration strategy and reported findings to internal teams	

## Skills

**Programming Languages:** Python, Java, C, C#, SQL, JavaScript

**Tools:** Git, Linux/Unix, Azure, NumPy, PyTorch, CI/CD, IaC, Android Studio, Windows

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

## Projects

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

- Building a real-time voice conversation system for language learning with Python/Flask backend and React frontend
- Currently optimizing the STT -> LLM -> TTS pipeline to achieve <1s voice response

### Deadwood Board Game (Java, Maven, JavaFX, FXML)

- Built a digital board game featuring a JavaFX GUI with real-time updates, and XML-based game data parsing

### 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

<b>Competitive Programming Club</b>	Jan 2024 – Present
<b>Orchestra &amp; Band Involvement</b>	2013 – Present
• Played in orchestras for 8 years and actively perform in bands	