

Mary Zhao

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EDUCATION

Carnegie Mellon University – Pittsburgh, PA
B.S. in Electrical & Computer Engineering

Aug 2025 - May 2029

The Bear Creek School – Seattle, WA

June 2025

Honors: National Merit Commended, Nancy Price Scholarship, National Honor Society, AP Scholar with Distinction

GPA: 3.99 (unweighted), Summa Cum Laude

TECHNICAL SKILLS

Best Languages: Python, C, Java, Golang

Other Languages: C++, SQL, JavaScript, HTML/CSS

Developer Tools: IntelliJ, Visual Studio Code, Git, PostgreSQL, Docker, Debian (Linux)

Cloud Services: Google Compute Engine, Cloud Run, Cloud SQL, Cloud Storage

Coursework: Fundamentals of Programming (CMU Fall '25), Principles of Imperative Computation (CMU Spring '26), Intro to AI (CMU Fall '25), Concepts of Robotics (CMU Spring '26), AP Computer Science A

CS Knowledge: Arrays, Hashing, Linked List, Queue, Stack, Heap, Binary Search, Sorting, Tree, Graphs, Object-Oriented Design, COVM, PyTorch, NumPy, scikit-learn

PROJECTS

Machine Learning for 3D Magnetic Field Sensors (Python, PyTorch, CUDA, Embedded Systems) Apr 2026 - Present

- Developing PyTorch-based neural network models to reconstruct 3D magnetic field vectors from MTJ sensor arrays. Research project under Dr. Jian-Gang Zhu (ABB Professor, Carnegie Mellon ECE).
- Building a programmable calibration system to generate labeled magnetic field datasets across varying strengths and orientations.
- Optimizing real-time inference pipelines on embedded processors to reduce nonlinear distortion and improve sensing accuracy and range.
- Evaluating reconstruction performance using RMS magnitude and angular direction error metrics against polynomial calibration baselines.

Carnegie Mellon Racing – Driverless Software Architecture Team: LiDAR-Camera Calibration Module (Python, CUDA, Docker, Linear Algebra) Sep 2025 - Present

- Developing an automated LiDAR-to-Camera calibration system that **improves perception accuracy and spatial alignment across the driverless vehicle's vision stack**.
- Designed a **RANSAC-based routine** for precise extrinsic transformation (3D→2D).
- Implemented **YOLO-based 2D detection** and **PointNet feature extraction** on LiDAR point clouds.
- Leveraging **CUDA-accelerated parallel computing** for calibration and point cloud operations.
- Containerized pipelines with **Docker** for reproducible experiments; integrated with CMU Racing's **Driverless Vision (DV) Desktop**.

Tutoring Web App (Golang, Node.js, HTML/CSS, Google Cloud Run, Docker)

Jan 2025 - Present

- Built a web application to help students find their tutors, <http://www.tutoring123.org>. This app allows upperclassmen to tutor underclassmen within the same school.
- **Built and deployed** full-stack tutoring platform using **Go, Node.js, PostgreSQL, Docker, and Google Cloud Run**.
- Implemented REST APIs, authentication middleware, secure form handling, and persistent cloud-hosted storage.
- same school.

Essay Editing Web App (React, Node.js, HTML/CSS, AI)

Jul 2025 - Present

- **Built a full-stack** peer-to-peer college admissions essay editing platform using Replit's AI pair programming tools.
- Designed user flows for uploading essays, browsing editors by credentials, and Stripe-integrated payments.
- Applied **React** (frontend) and **Node.js** (backend) to deliver a streamlined UX.

Redis-like In-Memory Database (Redis, Golang)

Aug 2025 - Dec 2025

- **Built a Redis-style in-memory key-value store** from scratch in **Go**, implementing core data structures, command parsing, leveraging Golang's goroutines to handle concurrent requests with low latency.

InAPickle – Social Decision-Making iOS App (*SwiftUI, Xcode, Product Design, UI/UX*)

Jul 2026 – Present

- Designed and prototyped a social iOS app that helps users collect friend feedback on photos, captions, and sounds before posting.
- Built a SwiftUI prototype with a home feed, custom friend circles, create flow, section-based voting, and a “Pickle Studio” for viewing results and refining post ideas.
- Designed flexible feedback modes, including pick-count controls and ranking flows for photos, captions, and sound choices.
- Iterated on visual identity, card layouts, audio preview interactions, and creator-focused user flows for a polished Gen Z mobile experience.