Esther Cheng

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Education

Duke University – Durham, NC August 2022 – May 2026

Bachelor of Science, Computer Science & Psychology (GPA: 3.9)

National Merit Scholar and Dean's List with Distinction

Relevant Coursework: *Data Structures & Algorithms, Computer Architecture, Operating Systems, Design & Analysis of Algorithms, Discrete Math for Computer Science, Human Skills for Software Engineering, Quantitative and Qualitative Methods in User-Centered Research, Fundamentals of Decision Science, Technical and Social Analysis of Information and the Internet*

Work Experience & Organizational Leadership

Deutsche Bank – Cary, NC June 2025 – August 2025

Software Engineer Intern, Global Receipts Platform

- Built transaction success indicator for batch uploads to internal file repository, improving financial auditability
- Contributed to FSM logic for internal depositary receipts portal, enabling robust message handling and discard logic for pending DTC events
- Designed ESG analytics microservice for Deutsche Bank document analysis with sentiment comparison and competitor benchmarking; reduced preprocessing runtime by 90% through optimized NLP and web-scraping pipelines

Duke University Innovation Co-Lab – Durham, NC August 2024 – Present

Software Developer

- Built a student attendance tracking system integrating a card reader, Raspberry Pi, and tablet UI, with full-stack features including authentication, card-tap identity resolution, and REST APIs using MongoDB and Next.js
- Developed an admin dashboard for real-time attendance management, manual overrides, and data visualization, fully integrated with the existing class management system, leading to a 25% increase in staff productivity

Duke University Computer Science Department – Durham, NC January 2024 – Present

Undergraduate Teaching Assistant, ECE/CS 250: Computer Architecture

- Led weekly recitations and office hours for 20+ students, reinforcing concepts in C, MIPS Assembly, and digital logic
- Provided ongoing student support via EDStem, debugging and clarifying architecture and systems-level coursework

Projects

BlueBot | *Python (FastAPI), FastMCP, OpenAI* December 2025

Duke-Specific Chatbot Using Model-Context Protocol (MCP)

- Designed MCP-based course catalog service for an agentic chatbot, enabling real-time course discovery and advising
- Maintained OpenAI vector store to streamline retrieval of course information

AI Course Advisor | *Python (Flask), TypeScript (React), MongoDB, Redis, Docker, Figma, HuggingFace, OpenAI* July 2024

Duke University Code+ Program

- Developed secure Duke SSO authentication with backend-for-frontend architecture using Flask and OAuth
- Integrated GPT-4o (Azure-hosted) with course catalog using retrieval-augmented generation (RAG) and vector embeddings for improved semantic search
- Optimized MongoDB aggregation pipelines with pre-filtering for more accurate prerequisite checks and response times
- Increased chatbot reliability by 15% through prompt engineering and iterative model fine-tuning

Poll Pal | *Node.js, Express.js, React, MongoDB, GoogleMaps API* October 2024

Rideshare and Polling Information for the 2024 Election

- Built voter engagement app displaying candidates by ZIP code and guiding users to polling locations using Google Maps
- Engineered ride-sharing features for polling site transportation to improve accessibility and increase voter turnout

Skills

Languages: Python, TypeScript, Java, JavaScript, Ruby, C, MIPS Assembly, HTML, CSS, YAML, SQL

Libraries/Frameworks: Next.js, Node.js, Express, React, Flask, FastAPI, FastMCP, NLTK, PyTesseract (OCR), PyMuPDF, Dash, REST API, Swagger, Spring/SpringBoot, Redis, MongoDB, PostgreSQL, Tailwind, BigQuery

Tools/Platforms: Git, GCP, Docker, Kubernetes, OpenShift, Helm, CloudRun, Maven, Jira, Postman, Insomnia, Bash, Figma