# Joshua Zhang

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## EDUCATION

**University of Washington** — Seattle, WA
*Intended Bachelor of Science in Electrical and Computer Engineering* — *June 2026*

**Monta Vista High School** — Cupertino, CA
*GPA: 3.9, Relevant Courses: APCS A, Linear Algebra, Calculus 1-3, AP Physics C* — *June 2023*

## EXPERIENCE

**Department of Homeland Security** — June 2023 - Aug. 2023
*Summer Intern* — *Washington D.C.*
- Performed an in-depth research study evaluating the precision of Vicuna-GPTQ in document processing, leveraging 74 distinct prompts for comprehensive assessment.
- Improved the accuracy of Large Language Model(LLM) document processing by 30+% connecting it with a **ChromaDB** Vector Database, demonstrating the practical applicability of LLMs for document processing and information retrieval.
- Integrated Text-Generation-Webui with **LangChain** using an proxied OpenAI server, allowing Vicuna to communicate with LangChain tools.
- Created the baseline framework in **Python** for future information retrieval research within the OCIO branch of the DHS.

**FweefwopCTF Web Developer** — May 2021 – June 2022
*Monta Vista High School* — *Cupertino, CA*
- Helped run Capture the Flag competition with 70 unique problems, 600+ participants from 28 different countries, and 40,000+ submissions.
- Developed 15 web problems with unique exploits using **PHP, Python, Javascript, SQLITE**, and more.
- Set up **Docker Containers**, giving each individual problem its own secure environment.

## PROJECTS

**Spotify Recommender** | *Python, Flask, Scikit-learn, NextJS, React, Typescript, Tailwind*
- Applied One Hot Encoding, MinMax, and Z-score to normalize columns of data.
- Used Cosine, Euclidean, and Manhattan distance formulas to generate vector embeddings for 12,000 songs.
- Created a Flask API server in **Python** to fetch song recommendations.
- Built a frontend using **React**, giving users a graphical visualization of songs and their recommendations.

**Racketeer Games Blog** | *Nuxt, Vue 3, Tailwind, Firebase, Javascript*
- Developed a blog site using **Typescript** with User login/signup, Likes, Read/Post, and commenting features.
- Constructed a WYSIWYG editor with text, video, and image formatting options similar to Google Docs.
- Designed a dynamic tag system with auto-fill functionality, enabling selection from existing tags or creation of new ones, while facilitating efficient post search by tags.

**WildEye AI** | *Flask, Tensorflow, NextJS, React, Typescript, Tailwind*
- Trained a model based on **Tensorflow** Inception_V3 capable of identifying 90 different animal species from photographs with an 86% test accuracy.
- Used **Javascript, Python**, and **SQL** to build a NextJS & Flask, allowing users to browse the image database.

**Identifying NEOs using Tensorflow in NASA WISE data** | *Tensorflow, Python*
- Used **Tensorflow** to identify 40+ Near Earth Objects (NEOs) within NASA's WISE database via an image subtraction technique that identified movement within different photos.
- Identified synthetic NEOs with 96% accuracy and real NEOs with 91% accuracy.

## TECHNICAL SKILLS

**Languages**: Typescript, Javascript, Python, Java, C++, SQL, HTML/CSS, Bash
**Frameworks**: React, Next, Vue, Nuxt, Tailwind, Tensorflow, PyTorch
**Developer Tools**: Git, VSCode, Visual Studio, Microsoft Azure, Firebase, Eclipse, Burp Suite
**Libraries**: Pandas, NumPy, Matplotlib, Scikit-Learn, SciPy, Seaborn, BeautifulSoup
**Awards**: USAPhO Top 400 (2021, 2022), National Cyber Scholar (2022, 2023)