Jerry Zhao

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Education

University of Michigan - Ann Arbor

M.S. in Computer Science Engineering (GPA: 4.00) — *May 2025*

B.S. in Computer Science, B.S. in Psychology (GPA: 3.96) — *Apr. 2023*

Academic Honors

Outstanding Instructional Aide Award — *2023*

University Honors — *2019 – 2023*

James B. Angell Scholar — *2021, 2022*

EECS Scholar — *2021, 2022*

Teaching Experience

Graduate Student Instructor, University of Michigan COE

EECS 493 User Interface Development — *FA 2022, WN 2023, WN/FA 2024, WN 2025*

EECS 587 Parallel Computing — *FA 2024*

EECS 484 Database Management Systems — *SP 2024*

EECS 485 Web Systems — *FA 2023*

- Led the instructional team by delegating and overseeing grading tasks, mentoring fellow teaching assistants, and evaluating their performance to ensure effective delivery of course material.
- Optimized assignment specs, rubrics, and solution codebase, improving clarity and efficiency for students and faculty.
- Taught weekly lab sessions to engage 60+ students in doing hands-on exercises with new programming concepts & languages.
- Provided targeted support during office hours to help students debug and refine code, resulting in a 40%+ improvement in grades and higher course satisfaction scores.
- Designed fair and equitable exams aligned with course objectives to effectively assess student understanding, and graded exams by analyzing students' code and reasoning to evaluate the correctness and depth of their solutions.

Course Developer, University of Michigan COE

Course Material Improvement for EECS 493 — *May – Aug. 2024*

- Built a website using HTML, CSS, and JS to host course materials (including syllabus, assignment specs, schedule, and exam dates), providing students with a centralized and user-friendly resource.
- Automated the website's build and deployment process via a custom GitHub Actions workflow in YAML, ensuring seamless updates and reliability through GitHub Pages.
- Enhanced course assignments by implementing new features with CSS/Bootstrap and JS/Vue, improving alignment with user-centered design principles and enhancing the learning experience.
- Authored comprehensive specifications and documentation for updated assignments using Markdown, ensuring clarity and ease of use for students and instructors.

Curriculum Redesign for EECS 493 — *May – Aug. 2022*

- Developed the spec, rubric, and solution for 4 coding assignments to evaluate students' proficiency in front-end development using HTML, CSS, JavaScript, and modern libraries/frameworks.
- Designed a comprehensive group capstone project, including detailed guidelines and evaluation criteria, to holistically assess students' mastery of user-centered design principles.
- Planned the course schedule strategically, coordinating lecture topics, exam dates, and project deadlines to ensure a balanced and effective learning experience.

Program Advisor, University of Michigan OCCE *Jun. – Aug. 2024*

- Mentored 200+ middle and high school students, introducing them to college education and engineering career opportunities through hands-on guidance and support.
- Facilitated interactive classroom activities and collaborative group projects, fostering students' academic growth and enthusiasm for engineering.
- Organized and led extracurricular, community-building, and mental wellness activities, creating a holistic and inclusive college experience for participants.

Peer Tutor *Sept. 2019 – Apr. 2022*

- Tutored freshmen and sophomores in computer science concepts, homework, and projects, leading to over 20% improvement in their grades.
- Guided students on exam preparation, coding assessments, course selection, and long-term academic planning, earning consistent positive feedback for mentorship quality and impact.

Professional Experience

Software Engineer, Nouri *Jun. – Sep. 2024*

- Developed a web application using *React*, *Python*, and *Google Cloud (GCP)/Firebase* to streamline the process from recipe creation to grocery shopping.
- Optimized user engagement by prompt engineering GPT-3.5 to generate tailored recipes and grocery lists based on user preferences, leveraging *Python* and *Google Cloud Functions*.
- Architected and integrated user authentication and document-oriented data models in *Firebase*, ensuring secure and efficient data management.
- Deployed to *Firebase Hosting* and *Google Cloud Run* via an automated CI/CD pipeline with *GitHub Actions*, improving application reliability and developer efficiency.

Software Engineer Intern, MoreThinks Solutions *Jun. – Sep. 2024*

- Built a social media platform for influencers to promote partnered products, leveraging *Qwik/TypeScript* and *AWS* for responsive and scalable performance.
- Developed a highly interactive UI using *Qwik* and *Tailwind*, incorporating advanced *CSS* animations to align with Figma prototypes.
- Architected a serverless backend with *AWS CDK*, integrating *API Gateway*, *Lambda*, and *CloudFront* to deliver fast, globally distributed content.

Software Engineer Intern, Intel *May – Jul. 2021*

- Designed and implemented a relational database in *SQL* to track and manage manufacturing tool installations, improving data accuracy and operational efficiency.
- Automated data updates and validation using *Pandas* and *SQLAlchemy* in an ETL pipeline, ensuring high data integrity and availability.
- Documented comprehensive database maintenance and update processes, enabling seamless handoffs and long-term usability.

Research Experience

Static Hot Path Prediction | 🤗 *2024*

- Implemented the Ball-Larus path profiling algorithm in *LLVM (C++)* to dynamically identify the hot paths of a program, generating a dataset and providing the ground truth for training and evaluating deep learning models.
- Fine-tuned the BERT model using *PyTorch (Hugging Face Transformers)* to statically predict hot paths from a program's LLVM IR, significantly outperforming previous models with an AUROC of 0.99.

Flirting Sentiment Analysis | *2024*

- Engineered an LSTM and a BERT model using *TensorFlow* and *PyTorch (Hugging Face Transformers)* to detect subtle cues of flirting in text, achieving a best-in-class accuracy of 95%.
- Enhanced model accuracy by 20%+ through rigorous hyperparameter tuning and innovative data preprocessing (word embedding) methods.

Parallel SCS | *2023*

- Created two novel parallel dynamic programming algorithms in *MPI*, *OpenMP*, and *CUDA* for the shortest common supersequence problem, reducing time complexity from $O(n^2)$ to $O(n)$ through data dependency analysis.
- Optimized memory access, branching, and synchronization to achieve near-linear speedup and efficiency close to 1.

Surgment | *Umich Lifelong Learning Lab* *2023*

- Developed an interactive, video-based surgical education platform with *React*, *Django*, and *SQLite* to enable surgeons to efficiently create quizzes from surgical recordings.
- Created a novel few-shot-learning-based pipeline to segment surgery scenes with 92% accuracy, enabling efficient sketch-based frame retrieval and generation of visual questions and feedback.

JVA Dashboard | *Umich Lifelong Learning Lab* *2022*

- Developed a web app with *React*, *Django*, and *MySQL* to enhance surgeons' visuospatial skills by analyzing their eye-tracking data, resulting in improved surgical performance.
- Innovated an interactive visualization of eye-tracking data using *D3.js* to clearly illustrate the surgeons' sight divergence during a surgery.

Robux Scam Education | *2022*

- Developed an immersive web app via a user-centered design process to educate users on manipulative techniques in a "Free Robux" scam, enhancing their ability to identify such schemes.
- Conducted contextual inquiries to identify usability gaps in existing internet safety tools and defined user requirements for the design.
- Designed, tested, and iteratively refined prototypes from low-fidelity sketches to high-fidelity Figma designs to a full-stack web app using *Flask*, *Vue.js*, and *Bootstrap*, improving usability at each stage.
- Established a significant increase in user internet safety awareness through pre- and post-product surveys.

Personal Projects

DB Client | *Java (SpringBoot, Lombok, Resilience4j), Tomcat, Gradle, Docker, TypeScript, AWS* *2024*

- Developed a REST API server with *SpringBoot* for CRUD operations on *Amazon DynamoDB*, with retry strategies for enhanced reliability.
- Optimized a key-value data model to efficiently store and update user-submitted resume data in *DynamoDB*.
- Deployed containerized server on *AWS Fargate* with an infrastructure setup using *CDK* (*VPC*, *ELB*, *Route 53*, *ACM*), achieving sub-200ms response times for large payloads.

Fakebook DB | *Oracle SQL, Java, JDBC* *2023*

- Designed a relational database for a fictional social media platform, Fakebook, using an ER diagram to model data and enforce constraints.
- Wrote *SQL* scripts to create, load, and manage normalized database relations in an *Oracle* database, ensuring data integrity and reducing redundancy.
- Developed a *Java* application using *JDBC* to execute *SQL* queries, retrieve complex relational data, and store results in optimized data structures.

Network File Server | *C++* *2022*

- Developed a fault-tolerant, multi-threaded network file server with a hierarchical file system supporting CRUD operations.
- Enhanced concurrency by leveraging reader-writer locks and fine-grained hand-over-hand locking to traverse file system inodes in parallel, reducing contention.
- Designed a custom TCP-based communication protocol with POSIX sockets to ensure reliable and efficient client-server interaction.

Virtual Memory Pager | *C++* *2022*

- Developed a pager to manage virtual address spaces, handling physical memory, swap space, and disk operations.
- Implemented advanced paradigms including copy-on-write sharing, memory pinning, and the clock algorithm for efficient page replacement.

C++ Thread Library | *C++* *2022*

- Developed a thread library supporting thread creation, synchronization, and scheduling for multiprocessor x86 systems running Linux.
- Ensured kernel-level atomicity using disable-interrupts and test-and-set locks, with context switching managed via timer and inter-processor interrupts.
- Designed interfaces for mutexes, condition variables, and thread management using RAII and the pImpl paradigms.

Chocolate | *HTML, CSS/Bootstrap, Vue.js, Firebase, Figma* *2021*

- Created a web app suggesting three random daily activities in Ann Arbor with relevant details and map integration.
- Implemented the frontend with *Vue.js* and *Bootstrap*, leveraging *Google Maps API* for location tracking and *Firebase* for account management.
- Garnered positive user feedback for the app's utility and user-friendly design.

Search Engine | *Hadoop, SQLite, Python/Flask, HTML/Jinja2, CSS/Bootstrap, JS/React* *2021*

- Designed a scalable search engine inspired by early Google, featuring a segmented inverted index and tf-idf scoring via *Hadoop* MapReduce.
- Implemented a *Flask*-based REST API with PageRank integration to deliver ranked JSON search results.
- Built an interactive UI for query submission and result display using *React*, *Jinja2* templates, and *Bootstrap*.

Technical Skills

Languages: C, C++, Java, Python, Go, TypeScript, JavaScript, HTML, CSS, SQL, Assembly, R
Web Dev: Spring Boot, Django, Flask, Node, React, Next.js, Vue.js, jQuery, D3.js, Tailwind, Bootstrap, Figma
Databases: MySQL, SQLite, Oracle SQLPlus, MongoDB, Firestore, DynamoDB, Neptune, JDBC
Systems & HPC: LLVM, Hadoop, MPI, OpenMP, CUDA
AI & Data Science: PyTorch, TensorFlow/Keras, NumPy, Panadas, Matplotlib
Testing: Pytest, JUnit, Cypress
DevOps & Tools: AWS, Google Cloud (GCP), Docker, GitHub Actions, Git, CMake, Maven