Shaokang Jiang

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Education

University of California San Diego — La Jolla, CA
M.S. in Computer Science and Engineering, Advised by Michael Coblenz — *2022-2025 (expected)*
Planned thesis: Usability analysis of coding assistant tools

University of Wisconsin-Madison — Madison, WI
B.S. in Computer Science, GPA: 4.00/4.00, graduated with distinction in the major — *Graduated 2021*

Research Experience

Graduate Student Researcher — April 2024 – now
University of California San Diego (supervised by Michael Coblenz)

- A usability analysis of Copilot with a paper targeting ICSE 2026, and a separate project leveraging LLMs to assist novice programmers in detecting security risks.
- Designed an experiment using an eye tracker to evaluate the costs and benefits of Copilot for programmers new to React. Piloted it with 5 programmers, incorporating iterative improvements. The full study is undergoing.
- Designed and implemented a more universal eye-tracking platform for native VSCode to collect user interaction data across in-editor events and developed a VSCode extension to assist with the experiment.
- Developed VSCode extensions utilizing prompt-engineered GPTs that integrates static security analysis, user background, and project structure as inputs, producing two visual interfaces to assist novice programmers in detecting and understanding OWASP risks in code. The extension is undergoing iterative internal design.

Graduate Student Researcher — April 2024 – October 2024
University of California San Diego (supervised by Steven Dow)

- Found LLM-driven conversational cues significantly increased the topical diversity of generated ideas and conversations, while modality had no significant impact. The paper was submitted to **CSCW 2025**.
- Redesigned and deployed an online meeting platform. Implemented separate interfaces for facilitators and participants, integrated Firebase for real-time communication, Daily.js for meetings, and GPT-based cues. Resolved bugs left by previous teams and iteratively refined the platform based on pilot feedback, enabling 86 meetings.
- Organized and transcribed data for a 2 (cue vs. no cue) x 2 (in-person vs. remote) experiment with 172 participants. Worked closely with Jude and other group members. Led and performed quantitative data analysis on the generated ideas and conversations. Wrote the design decisions, implementation, and data analysis sections of the paper.
- For another workshop management project, designed and developed a 4-component workshop management system for real-time user engagement with socket.io, electron, DDNS, MailJet and prompt-engineered GPTs to foster a better, more engaging conversation experience.

Graduate Student Researcher — April 2024 – now
University of California San Diego (supervised by Kristen Vaccaro and Deepak Kumar)

- Collaborated with three other group members to assess political polarization on YouTube shorts and longs.
- Developed a high-accuracy algorithm in JavaScript and Python (using Hugging Face) to detect whether a video (a short-form video) is a clip of another (a long-form video), outperforming existing solutions, and implemented a concurrent pool management tool to fully utilize a multicore cloud server using Javascript.
- Developed a stateless interactive rating and data collection system with CI/CD integration using GitHub Actions and Cloudflare Workers for data storage, enabling users to label the political leaning of long and short videos based on transcripts and some pairing information.
- Assessed methods for measuring the leanings of media houses, utilizing AllSides and other existing models.

Researcher — April 2024 – now
Independent (supervised by Jimmy Koppel and Michael Coblenz)

- Found that users assisted by LLM chatbots were less confident and more confused, while those using tutorials had a better understanding of the code structure but struggled with low-level coding challenges based on the survey.
- A between-subjects study involving 15 experienced software engineers that compared the effectiveness of tutorials and LLM chatbots in helping users learn an unfamiliar codebase.
- Restructured the study, discussed, designed, and implemented an analysis plan with both qualitative and quantitative components, transcribed, coded, and utilized NLP to analyze the recordings, and wrote and submitted a paper to **Plateau 2025**.

HCI Research Course Project September 2023 – December 2023

University of California San Diego

- Investigated whether an avatar appearing in the ChatGPT interface would help create a better communication environment between humans and machines, particularly in terms of alleviating loneliness. Added an avatar to the ChatGPT interface and found no significant difference in a 10 people pilot study.

Graduate Student Researcher January 2023 – September 2023

University of California San Diego (supervised by Michael Coblenz)

- Found that autocomplete speeds up information acquisition but may not increase productivity. Published and presented the paper at **FSE 2024**.
- Assessed the costs and benefits of IDE-based autocomplete for programmers working with an unfamiliar API.
- Designed and executed a between-subject experiment with 32 participants using an eye tracker.
- Found that participants who used autocomplete learned more while spending less time reading documentation, although autocomplete did not significantly reduce the number of keystrokes required to complete tasks.
- Developed an user interaction tracking platform for VSCode for the web, integrating Tobii Eye Tracker 5 to capture eye movement and user interactions across in-editor events, with a JavaScript frontend and C# backend; reduced frontend-backend communication latency to one-tenth of the existing solution, tested over 80 hours with 33 users.

Usability of PL Course Project September 2022 – December 2022

University of California San Diego

- Investigated whether Python Type Hints are helpful for competitive programmers.
- Designed and executed an experiment, containing tasks and interview, with 4 participants.
- Found that Python type hints were not significantly more useful for competitive programmers in terms of task completion time and debugging time. Open coded of interview results and transcripts indicated programmers feel adding type hints and the popped out autocomplete suggestions to be annoying.

Publications

- Shaokang Jiang and Michael Coblenz. **An Analysis of the Costs and Benefits of Autocomplete in IDEs**. Proceedings of the ACM on Software Engineering (FSE 2024) (25% acceptance rate)
- Jude Rayan, Shaokang Jiang, Nishant Balaji, Jinmao Wang, Ian Gross, Cole Biehle, Steven P. Dow. **LLM-Driven Conversational Cues Across Different Meeting Modalities Increase Topical Diversity of Generated Ideas**. Under review. Proceedings of the ACM on Human-Computer Interaction (PACM HCI) (CSCW 2025)
- Shaokang Jiang, Jimmy Koppel, Michael Coblenz. **Questions Before Answers? A Comparison of Codebase Chatbots and Tutorials for Codebase Learning**. Accepted. Plateau Workshop (Plateau 2025)

Other Experience

Teaching Assistant September 2024 – now

University of California San Diego

- TA for the Usability of Programming Languages course (CSE291) with Michael Coblenz for one quarter. And TA for the Antisocial Computing (CSE 291) with Kristen Vaccaro for one quarter.
- Lead class, discussions and office hours, graded assignments, and provided personalized advice to students.
- Received an 'Excellent' rating from the instructor for both courses, and a 90%+ student recommendation rate.

Software Engineer June 2024 – September 2024

Pullscription

- Worked closely with Jago, the founder and CEO, to discuss, suggest, design, and implement the system structure for the organization's blog and shopping website, including both the customer and supplier end. The aim was to create an easy-to-maintain structure that is fast for users to access and optimized for SEO.
- Utilized Nginx and Docker to deploy the system on a server with CI/CD pipeline spported by GitHub Actions.
- Deployed and integrated the Matomo tracking system with a focus on privacy concerns and wrote unit tests.
- Collaborated closely with the team and provided guidance in implementing the website.
- Integrated Stripe for payment processing and Auth0 with JWT for authentication into the website, and wrote tests.
- Worked with the design team to create and implement a blog site using Nuxt with TypeScript and a shopping site for publishing and managing comic books, embedding abstract content of weekly news into the main website.

Teaching Assistant January 2024 – June 2024

University of California San Diego

- Sole TA for Compilers (CSE 131) with Yufei Ding for one quarter, and Introduction to Data Visualization (DSC 106) with Sam Lau for another quarter.
- Designed course components, created assignments, built grading scripts, made and graded exams, homework, and projects. Provided suggestions for course content and collected student feedback. Managed course logistics.
- Received an 'Excellent' rating from the instructor for both courses, and a 90%+ student recommendation rate.

Teaching Assistant September 2023 – December 2023

University of California San Diego

- Sole TA for the Usability of Programming Languages course (CSE291) with Michael Coblenz for one quarter.
- Discussed course content with the professor, graded assignments, led discussions during lectures on specific course content, and provided personalized advice to students.
- Guided group projects on various topics related to the usability of programming languages or software engineering and gain insights through discussions. Conducted office hours to assist students.
- A 100% student recommendation rate, while the professor rating was not applicable.

Teaching Assistant January 2023 – June 2023

University of California San Diego

- Major TA for Java and Data Structure courses (DSC30) with Soohyun Liao for two quarters.
- Proposed, and developed new and innovative assignments and projects for the course, in collaboration with the professor. Graded students' assignments, held office hours and conducted all discussion sections. Taught additional, non-required concepts during discussion sections.
- A 90%+ student recommendation rate, while the professor rating was not applicable.

Volunteer Tutor January 2021 – May 2021

University of Wisconsin-Madison

- Helped students with their coursework related to computer science at the Computer Science Learning Center.

Technical Skills

- **Languages**: Java, Python, Rust, C, C++, C#, HTML/CSS/JavaScript, TypeScript, Matlab, LaTeX, GAMS, Markdown, Haskell, SQL, Embedded JavaScript, Blogger Template Language, Shell
- **Frameworks**: React, Nuxt, Node.js, Vue, Jest, Vitest, JavaServer Pages, Flask, Expo (React Native), JUnit, Svelte, VitePress, Hexo, Electron, Chrome Extensions, VSCode Extensions, Puppeteer, Tampermonkey, JavaFX, Servlets
- **Platforms/Tools**: Git, Docker, GitHub, Google Cloud, Azure, Cloudflare (Workers and KV), Firebase, Oracle Cloud, VS Code, Visual Studio, IntelliJ, Eclipse, Nginx
- **Libraries/Services**: Auth0, Stripe, Matomo, MailJet, Daily.js, Socket.io, TensorFlow, WebGL, NLP.js, echarts, Matplotlib, echarts, PyQt, Pyramid, CherryPy, Three.js, and much more
- **Other Platforms**: Windows, Linux, JIRA, Trello, DevOps, Agile, JMP, Figma, Photoshop, Qualcoder, Taguette, Premiere, Audition, Blender, Excel, Word, PowerPoint

Projects

Highlighted below are selected projects. For a comprehensive portfolio, visit resume.shaokang.me.

HealthCare Chatbot | *Expo, Worker, GitHub, Jest, Vitest, Figma* 2024

- Led a team of five to create a chatbot with CI/CD pipelines using Agile methodologies. Self-delegate leadership roles when necessary. Consulted with experts in health care to understand their needs and requirements.
- Developed a chatbot using Expo to provide healthcare information and answer questions via a fine-turned GPT service. Backend services were built with JavaScript and deployed on Cloudflare Workers to handle user information management, session storage, authentication and token management, using salted hashes for password storage.
- Learned methods for managing disputes and mediation conflicts within a team, including documenting divergence points and finding common ground. Realized the importance of communication in a team.
- Integrated Material Design principles and conducted unit tests using Jest for the Expo app and Vitest for the middleware server. Utilized GitHub Actions for the CI/CD pipeline.

Online interactive shell | *Java Server Page, Servlets, Java, Azure* 2023

- Developed an interactive shell using JSP and Servlets deployed on Azure, enabling students to run Java source code online without accessing the source code, while supporting over 30 users simultaneously. The backend featured a custom connection session management utility to optimize resource usage and ensure seamless session handling.

An economical computer | *Node.js, GAMS, Puppeteer* 2022

- Automatically scraped computer components' performance data weekly using Puppeteer, with GitHub Actions and a cron scheduler, by simulating user behavior.
- Used optimization with preset LP problem-solving to find the best configuration.

Wise grader | *JavaScript, TensorFlow, Tampermonkey* 2021

- Developed and deployed a Tampermonkey script to expedite grading by suggesting scores based on length, N-gram analysis, and topic relevance for dictation questions, using the TensorFlow. The entire system operates locally.

Financial Tutoring website and app | *HTML, Ejs, Worker, JavaScript, echarts, Expo, NLP* 2020

- Designed and led a team to develop a static financial education website for Capital One. The site includes interactive learning tools, such as quizzes and a self-built, stateless learning progress tracking system. It also has various utilities, including a personal expense management app.
- Created detailed implementation guidance for group members and a user manual for the website and learning content. Build CI/CD pipelines and deployed them with GitHub Actions.
- Built front end using embedded JavaScript for the main site and HTML with JavaScript for utility tools. Developed backend with JavaScript and deployed on Cloudflare Workers to handle requests, including the encryption and decryption of learning stage information using AES and crypto and a dynamically rendered quiz system. Users can download their encrypted learning progress and upload it to decode and resume learning, or use the same browser to continue learning. No data is stored on the server considering privacy and budget.
- Developed a cross-platform personal finance app for Capital One that enables users to manage expenses and income via voice and chat interfaces using a local NLU engine, built with Expo for Android and iOS, tested and packaged for both platforms; Designed with JSON import/export for secure, local-only data storage and syncing.
- Followed Agile methodologies, discussed with mentors and communicated with stakeholders to understand their needs and software development stages.

Energy Simulator | *HTML, WebGL, JS, Java, JavaFX, Three.js, echarts* 2020

- Designed and developed a web-based energy simulation tool utilizing jsLPSolver to optimize energy sources based on historical data and project future trends via linear regression.
- Presented results on a static website built with HTML and JavaScript, featuring a 3D energy system simulation using A-Frame and Three.js, with AR functionalities via QR codes, dynamic data visualization, and lightweight localization. Ensured full support for modern browsers and partial support for IE 11.
- Reimplemented most functionalities in JavaFX without 3D representation.

AutoCommenter | *Java, JFrame* 2019

- Designed and developed a local utility program in Java with JFrame to analyze Java code on preset rules and semi-automatically add comments by integrating user input through typing or voice, with voice recognition powered by the iFlyTek API and translation supported by the Baidu Translation API.

HateFate Website | *HTML, Java Server Page, SQL, Java, Servlets* 2017

- Led a four-person team in developing a social networking website that connects users based on shared dislikes, with features including login, email-verified signup, and user pairing. Utilized Material design to create the interface.
- Developed the frontend using HTML and JavaServer Pages (JSP) and built the backend with JSP and SQL for data storage. Deployed on the Azure cloud with an Azure SQL database.
- Developed multiple login methods and utilized cookies to store user information, enabling automatic session recovery. Designed and integrated a custom mail system to handle email verification, password resets, and new match notifications using SMTP.
- Secured the website with SSL encryption and employed a combination of MD5, public/private key encryption, and AES for data security during page forwarding and email verification.

Awards and Activities

- Student volunteer at FSE 2024 July 2024
- Graduated from UW-Madison with distinction in the Major Spring 2021
- Dean's List of College of Letters & Science at UW-Madison for each quarter