Michael Peng

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Education

University of California, San Diego 2024 – December 2025 (expected)
M.S. in Computer Science

University of Michigan, Ann Arbor 2021 – 2024
B.S.E. in Computer Science, Minor in Entrepreneurship **GPA**: 4.00/4.00

Technologies

Languages	Python, C++, Julia, R, HTML/CSS, Rust, Java, JavaScript, TypeScript, Swift, Kotlin, SQL, LaTeX
Libraries	React (Next.js, Remix, Vike), Svelte, Flask, FastAPI, Tailwind, Pandas, Tidyverse
Platforms	Windows, macOS, Linux, iOS, Google Cloud, AWS, Oracle Cloud, Firebase, GitHub, GitLab

Work Experience

Software Engineering Intern May 2024 – Present
Mosaic ATM

- Leading full-stack design and development of novel platform for optimizing, simulating, and executing multi-UAV imaging missions using SQLite, Python, REST, React, and TypeScript
- Wrote >190 unit, integration, and end-to-end tests using `vitest`, Playwright, and `pytest`
- Pioneering test automation for QA work on COMETTS, a TFM (Traffic Flow Management) training tool built for the FAA

Drone Routing Research Intern 2023 – 2024
Aerial Vantage Publication

- Designed and applied algorithms in Python to build automated AI/ML pipeline for optimizing UAV agricultural imaging operations in collaboration with specialists from Aerial Vantage
- Built novel binary time-series prediction algorithm for crop distribution maps that achieved 75% accuracy on Michigan counties, exceeding conventional model performance (SVM, Decision Trees)
- Presented SBIR Phase I results to NASA stakeholders at Ames Research Center
- Presented paper describing Phase I results at AIAA AVIATION 2024 in Las Vegas

Computer Science Teaching Assistant 2022 – 2024
University of Michigan Course website

- Hosted a Lab class and Office Hours for EECS 280 (Programming and Intro Data Structures), taught in C++
- Customized lecture content beyond faculty expectations with Kahoots and review of autograded work
- Started team effort to add Generative AI feedback to lab worksheets; built prototype using Python, Streamlit, and LangChain

Residential Community Peer Mentor 2022 – 2023
Living ArtsEngine, University of Michigan Program website

- Hosted gatherings, planned formal events, and ran a technical workshop for 87 first-year students who lived together
- Started collaborative chat bot ("LAE OpenBot") for the community's Discord server, written in TypeScript using Discord.js
- Supported interdisciplinary students in creative team projects with group dynamics, leadership, organization, communication, and the creative process
- Advised and empowered first-year students in academics and college life

Software Development Intern June 2022 – August 2022
State Street Boston, MA

- Migrated 3 critical tools for securities trading & post-trade reporting written in C# from SQL Server to Oracle Database
- Delivered thorough test suite for new database layer without being asked to do so
- Inspected SQL Server database for migration and advised database administrators on schema changes

COVID-19 Research Intern 2020 – 2021
Brandeis University Publication

- Prepared datasets for a team that predicted COVID-19 case trends for each state in the United States
- Implemented algorithm to estimate mobility between U.S. states using Geopandas and Python
- Crafted the team's website to visualize predictions stored in Airtable

Product Development Intern Summer 2019
Codio, Inc. Examples

- Collaborated with a 5-person team using Scrum and Jira to write programming assessments for the initial release of Codio's Global Assessments Library
- Invented automated tool to fix assessments for compliance with conventions, boosting product quality

Projects

Wikipedia Search Engine ("ask485") 2023

- Collaborated with a team of 3 developers to build a search engine for Wikipedia pages that utilizes tf-idf and PageRank to generate results

- Designed and wrote key components of a MapReduce pipeline for tf-idf scores and the search engine's web frontend in Flask

Cooperative House Work Schedule Optimizer ("Shifter") Documentation 2023 – Present
- Initiated novel application of linear programming to Escher Cooperative House's work schedule generation
- Consulted Work Managers to design well integrated solution in Google Apps Script (TypeScript)
- Wrote script that reads shift preferences from Google Sheets and generates work schedules optimized for preferences
- Script built the initial housewide work schedule for 166 house members in Fall 2023 and Winter 2024

Airline Disruption Recovery Research Advisor: Max Z. Li 2023 – Present
- Launched data-driven investigation into Southwest Airlines' scheduling crisis in December 2022
- Collaborating with researchers from Michigan, MIT, and Harvard to dissect flight records and model network disruption
- Integrating flight records from FAA SWIM, NASA Sherlock, and DOT BTS using DuckDB SQL and Pandas in Python to study initial disruption propagation
- Built novel agent-based model to simulate propagation of disruption through Southwest's flight network and evaluate recovery strategies
- Conference papers presented at ICAS 2024 and nominated for Best Student Paper Award at IWAC 2024

Dog Breed Classification Machine Learning Model 2023
- Constructed, evaluated, and refined a Convolutional Neural Network for dog breed classification using NumPy and PyTorch in Python
- Incorporated transfer learning, data augmentation, residual connections, batch normalization, and weight decay to tweak model for optimal validation performance

Class Discovery and Enrollment Toolkit ("CourseKit") Link 2021 – Present
- Constructed 3 iterations of a thoroughly tested backtracking algorithm in F# and C++ that finds all feasible schedules given courses to take at the University of Michigan and ranks them according to each user's preferences
- Built and collaboratively launched a schedule optimizer platform using React (Remix), TypeScript, and AWS DynamoDB, delivering optimal schedules to >500 Michigan students
- Built the backend of the enrollment trend predictor using Python and MySQL on AWS, with >300 users

Organization Lineage Tracker ("HysTree") Presentation 2022
- Collaborated with 3-person team as part of Michigan Open UX (MOUX) to research user needs and develop full prototype of organizational lineage tracking platform in Figma
- Led organizational outreach to Living ArtsEngine for user research, enabling team to identify customer pain points
- Designed intuitive UI for tree editing and spreadsheet importing processes in Figma

Professional Relations Management Browser Extension ("Plinq") 2022
- Collaborated with an interdisciplinary team from V1 Product Studio to design, build, and market a web browser extension in React (Next.js) that helps people chronicle and maintain their professional relationships
- Reverse-engineered internal LinkedIn APIs and developed an embedded user interface to help users import connections from LinkedIn

Relational Database Manager ("SillyQL") 2022
- Planned and developed a relational database manager with syntax resembling SQL using modern C++ and Test-Driven Development
- Profiled, analyzed, and tuned program for optimal performance

COVID-19 Prediction Machine Learning Model Website 2020 – 2021
- Independently created and tuned a Recurrent Neural Network for COVID-19 transmission prediction in R, combining state-of-the-art mechanistic and statistical techniques from academia
- Developed a web-based visualization of COVID-19 transmission per variant in the United States

Andover Robotics Club Attendance Management System Link 2021
- Designed and built original web platform for attendance tracking and COVID-19 contact tracing for Andover High School's robotics club using Svelte and Firebase within 24 hours
- Used by all members of the robotics club for the 2020–2021 school year

High School Schedule Platform ("PreMatch") Link 2018 – 2021
- Founded and co-developed a website (Python/Flask, HTML/CSS/JS), Discord chat-bot (Ruby), and iOS app (Swift) to help Andover High School students share and navigate their complex schedules on a daily basis
- Website hosted on Google App Engine showed >1,100 students their classmates before each school year started
- iOS app in Swift showed >500 students their classes on any given day, facilitating academic planning

Microprocessor Emulator ("csim6502") GitHub 2018
- Designed and implemented a complete emulator of the MOS 6502 microprocessor in maintainable, expressive C++ using strict Test-Driven Development within 2 weeks

Activities

Workshop Mentor ("Hack Squad") 2024 – Present
ACM at UCSD Curriculum
- Guiding >80 UC San Diego students through a 6-week course on full-stack web development, covering HTML, CSS, JavaScript, React, Express.js, MongoDB, and Vercel

Student Organization Webmaster 2022 – Present
FIRST Alumni and Mentors Network at Michigan Website

- Leading website committee to maintain and improve famnm.club (HTML, Bootstrap, SCSS) for volunteers, robotics teams, and corporate sponsors
- Led committee to bring Lighthouse performance and accessibility scores from ≈ 84 to ≈ 97
- Transitioned build system from Jekyll (Ruby) to Astro (TypeScript), which reduced payload size by over 80%, reduced loading times, and improved codebase maintainability

Project Leader, Education Committee Member, Project Committee Member 2022 – 2024
Michigan Data Science Team Bus Project Report

- Refined introductory Python, Pandas, and Matplotlib tutorials and checkpoints for new members
- Led a team to investigate bus service quality at the University of Michigan using 1.97 GB of tracking records on Google Cloud BigQuery
- Contributed to projects on COVID-19 trends, Reddit r/place activity, reinforcement learning

Chief Software Officer & Team Leader 2019 – 2021
Andover Robotics Club GitHub

- Oversaw software engineering in Java & Kotlin using Android Studio for three *FIRST* Tech Challenge (FTC) robotics teams
- Built common codebase and documentation site to help club posterity with programming
- Created and marketed web browser extension (HTML, TypeScript) that helped top FTC teams in Massachusetts record, share, and analyze other teams' performance for alliance selection during competitions in 2020