# Michael Peng

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Enthusiastic software engineering generalist, reflective instructional aide, and conscientious servant leader.

## Education

**University of Michigan, College of Engineering** — Graduating April 2024 or 2025
*B.S.E. in Computer Science, Minor in Entrepreneurship*

- **GPA** 4.00/4.00
- **Courses** Data Structures & Algorithms, Intro to Machine Learning, Intro to Artificial Intelligence, Web Systems, Operating Systems (planned), Intro to Computer Security (planned), Computer Organization
- **Awards** University Honors, Engineering Honors, Dean's List, Angell Scholar

## Work Experience

**Drone Routing Research Intern** — 2023 – Present
*Aerial Vantage, under NASA contract*

- Designing and applying algorithms to plan optimal routes for drones in agricultural surveying given obstacles, target area, and drone constraints
- Collaborating with a graduate student to specialize and apply Traveling Salesman Problem solutions

**Computer Science Instructional Aide** — 2022 – Present
*Computer Science and Engineering, University of Michigan* — Course website

- Hosting a Lab class and Office Hours for EECS 280 (Programming and Intro Data Structures)
- Pioneering collaborative consolidation of frequently asked questions in office hours for greater efficiency
- Led Lab to achieve the highest median midterm grade out of all 44 Lab classes in Winter 2023

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

- Hosted gatherings, planned events, and ran a technical workshop for 87 first-year students who lived together
- Led a collaborative chat bot project ("LAE OpenBot") for the community's Discord server
- 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*

- Migrated 3 legacy desktop critical tools for securities trading & post-trade reporting written in C# from SQL Server to Oracle Database
- 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 to author 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

**Cooperative House Work Schedule Optimizer (Shifter)** — Documentation — 2023 – Present

- Initiated novel application of linear programming to Escher Cooperative House's work schedule generation
- Consulted current and past Work Managers to design ergonomic, well integrated solution in Google Apps Script
- 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

**Southwest Airlines Scheduling Meltdown Research Project** — Advisor: Max Z. Li — 2023 – Present

- Leading data-driven investigation into Southwest Airlines's scheduling breakdown between December 21 and December 28, 2022
- Founded project group with 3 undergraduates across institutions to collaborate on this investigation
- Integrating flight records from FAA SWIM, NASA Sherlock, and DOT BTS using DuckDB and Pandas to study initial disruption propagation

**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 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
- Wrote and collaboratively launched a schedule optimizer platform using React (Remix), TypeScript, and AWS, delivering optimal schedules to >300 Michigan students in Winter 2023; considered by a panel of entrepreneurial mentors from WCC, Innovate Blue, OptiMize, and Menlo Innovations to be the best venture out of ≈ 70 teams from the Entrepreneurial Creativity course (ALA 223) in Winter 2023
- Built the backend of the enrollment trend predictor using Python and MySQL on AWS, with >300 users in Fall 2022

**Professional Relations Management Browser Extension ("Plinq")** 2022

- Collaborated with a 5-person 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 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
- Drafted a 29-page research article describing the model

**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

**PreMatch.org** Link 2018 – 2021

- Founded and co-developed a website, Discord chat-bot, and iOS app to help Andover High School students understand and apply their complex schedules on a daily basis
- Website (backend in Python) 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 – 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

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

- Leading website committee to manage famnm.club for students, robotics teams, and corporate sponsors
- Emphasizing formal UX (user experience) research, inclusive design thinking, and performance optimization
- Transitioned build system from Jekyll (Ruby) to Astro (TypeScript), which reduced payload size by over 90%, reduced loading time, and improved codebase maintainability

**Project Leader, Education Committee Member, Project Committee Member** 2022 – Present
*Michigan Data Science Team* Project Report

- Refined introductory Python, Pandas, and Matplotlib tutorials and checkpoints for new members
- Led a project that used BigQuery to investigate the reliability of Blue Buses at the University of Michigan
- Contributed to projects on COVID-19 trends, Reddit r/place activity, and Euchre reinforcement learning

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

- Oversaw software engineering in Java & Kotlin 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 that helped top FTC teams in Massachusetts record, share, and analyze other teams' performance for alliance selection during competitions in 2020

## Technologies

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

## Languages

Chinese Mandarin (native), English (fluent), Spanish (conversational)