Michael Peng

Broaderator.com (Updated 2024-12-31)

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Education

University of California, San Diego — 2024 – December 2025 (expected)
M.S. in Computer Science — **GPA**: 4.00/4.00

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
Platforms	Windows, macOS, Linux, iOS, Google Cloud, AWS, Oracle Cloud, Firebase, GitHub, GitLab

Work Experience

Software Engineering Intern — May 2024 – Dec 2024
Mosaic ATM — Leesburg, VA

- Led 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 >200 unit, integration, and end-to-end tests using `vitest`, Playwright, and `pytest`
- Pioneered test automation and resolved >10 QA Jira tickets for COMETTS, a TFM (Traffic Flow Management) training tool deployed at 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 pipeline results at NASA Ames Research Center and AIAA AVIATION 2024

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), which teaches unit testing, memory management, object-oriented design, linked lists, binary search trees, debugging, and exceptions 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

Authorship Attribution and Imitation 2024
- Gathered a dataset of 14,314 Discord messages from 10 consenting users across 38 channels
- Fine-tuned `DistilGPT2`, `Llama3.2-3B`, and `gemma-7b` using HuggingFace and Unsloth.ai on dataset chunks for authorship imitation
- Fine-tuned `DistilBERT`, `DeBERTa-v3`, and `XLM-RoBERTa Large` using HuggingFace on message-author pairs for authorship attribution, reaching a top accuracy of 62.1% on the held-out test set

Wikipedia Search Engine ("ask485") 2023
- Collaborated with a team of 3 developers to build a search engine for Wikipedia pages utilizing tf-idf and PageRank
- 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 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 via 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
Association for Computing Machinery at UC San Diego Curriculum
- Guided >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 – 2024
FIRST Alumni and Mentors Network at Michigan Website
- Led 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