Matthews Ma

C (647) 287 5887 ► m238ma@uwaterloo.ca *www.matthews.ma* **()** github.com/Keraisyn/

Education

University of Waterloo

Software Engineering, Honours, Co-op (BSE 2021-2026)

- Coursework: Machine Learning, Data Structures & Algorithms, Operating Systems, Databases, Testing
- Mathematics Endowment Fund: Executive Director (F22), Secretary (F23), Director ('22-'24)
- Animusic Ensembles: Conductor (F23, W24)

Kyoto University

KUINEP Exchange Term (October 2024 - February 2025)

Skills

Languages: Python, C++, C, TypeScript, Java, SQL Technologies: PyTorch, OpenCV, React, Express, Tailwind, Firebase, AWS, Docker, Jenkins, PostgreSQL

Experience

University of Waterloo Bioinformatics Lab

ML Research Assistant (Supervised by Professor Ming Li)

- Adapted deep learning *de novo* peptide sequencing algorithms as score functions for database search.
- Implemented different techniques of in silico digestion of protein databases and compared their effects on the number of identified peptides for various search engines.

Kyoto University Natural Language Processing Lab

ML Research Assistant (Supervised by Professor Chenhui Chu)

- Drove the design of a multi-party conversational agent prototype which proactively speaks and responds in groups based on the whole dialogue situation.
- Deployed a real-time streaming Gradio interface based on a cascading system of Speech Transcription to Large Language Models to Text-to-Speech with an average end-to-end latency of 1050ms.

Huron Digital Pathology

Software Engineering Intern

- Spearheaded development of a scalable C++ library to detect preparation errors and scanning defects of biopsy slides, reducing manual QA time by 30 minutes per machine daily.
- Implemented an extended focus imaging algorithm, combining multiple tissue scans to create a single ultraclear composite image which keeps thick tissues entirely in focus.
- Setup an in-house vcpkg registry for custom packages, reducing environment setup time by 50%.

Ford Motor Company

Software Engineering Intern

- Developed the Ford Pro features \square and gallery \square page templates used by 30+ vehicle models with React.
- Created shared mobile responsive components in TypeScript, achieving 100% test coverage using Jest.

Projects

Lofi Music Generator

A Java program that procedurally generates and plays lofi jazz music with custom synths with digital mixer.

- Developed melody generation algorithm for continuous original music based on jazz music theory.
- Created a mixer GUI that allows customization of pan and volume in real-time as the music is playing.

Tuesday Night Tempo

A fun interactive rhythm game that uses a acoustic drum set as a controller.

- Configured Arduino Leonardo and microphones to detect acoustic input and act as an HID controller.
- Developed audio processing system in C++ to detect and distinguish between drum and cymbal sounds.

October 2024 - February 2025

March 2025 - April 2025

September 2023 – December 2023

January 2023 - April 2023

Kyoto, Japan

Waterloo, Canada