


# Seiya Kozakai

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## ACADEMICS

### University of Michigan

M.S.E. ECE in Signal & Image Processing and Machine Learning

B.S.E. Computer Engineering

Ann Arbor, MI

Expected May 2025

May 2, 2024

## EXPERIENCE

### Johns Hopkins Applied Physics Laboratory (APL) May 2023 - Aug 2023, May 2024 - Aug 2024

Algorithm Development Engineer Intern Summer 2024 (Secret Clearance)

Laurel, MD

- Worked on ML for a multi-spectral shallow water target detection system mounted to a Coastal Reconnaissance UAV.
- Researched effects such as ghosting, stray light, and light absorption to improve training data viability by ~62%, exploring various techniques such as thresholding and localized image mean values.
- Successfully built a pipeline to estimate data using PCA and Bayesian MAP estimation.
- Developed algorithms to remove unwanted light streaks that covered over 66% of the image (90% reduction).
- Integrated a MLFLOW server with a MINIO bucket (AWS S3) and a PostgreSQL database for streamlined training.

Acoustic Algorithms Engineer Intern Summer 2023 (Secret Clearance)

Laurel, MD

- Worked on a vertical-line array to detect ships and submarines using a Least-Squares Target Motion Analysis.
- Developed a novel custom API in C, binding our C++ Libraries and algorithms with Python data readers.
- Created unit tests for software projects using Pytest and GoogleTest, speeding development 1 month ahead.
- Authored 10+ merge requests on real-world Navy projects for beamforming and mine detection systems.

### NCKU Intelligent Information Retrieval Laboratory

June 2022 - September 2022

Deep Learning AI Intern

Tainan, Taiwan

- Analyzed recent developments in AI and deep learning research, such as the rise of transformers, with professor Chiang Jung-Hsien in National Cheng Kung University (NCKU).
- Implemented models such as CNN (Resnet) and GAN for image enhancement with 43% less parameters.

## PROJECTS

**New Leaf** — *React, Python 3.12, Flask, SQLite, AWS EC2*

January 2024 - April 2024

- Built a full-stack web application for new parents to promote community building and expert parental advice.
- Created a recommendation algorithm based on user actions for advanced search and personalized results.

**LazyTune** — *C/C++, Python3.11, DSP, RTOS, Tkinter*

September 2023 – December 2023

- Designed and built a Digital Synthesizer using a Raspberry Pi 4 and a Teensy 4.1 (Arduino).
- Developed an audio system using the PJRC Audio Library tool, creating a signal chain with a 12-band Vocoder and selectable effects (reverb, bit crush, etc) controlled via touchscreen GUI and knobs.
- Custom built a Pitch Shift tool, paired with note detection to produce Autotune. Implemented via a Phase Vocoder approach, adjusting small segments and recombining via Overlap and Add.
- Achieved low-latency audio processing of less than 11ms, while using less than 8MB RAM.

## SKILLS

### Languages

English (native), Japanese (native, JLPT N1), Chinese - Mandarin (Proficient)

### Technical Languages

C++ (C++ 17), C, Python, Julia, MATLAB, Rust, Java, JavaScript, Verilog HDL

### Tools & Frameworks

Linux, Git, Docker, ARMv8 & x86\_64, Jupyter, Pytorch, Probability & Matrix Algebra

### Hobbies

Piano (2010), Calligraphy (2010), Violin (2013), Guitar (2022)