Hudson Liu

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Education

Gilman School — Baltimore, MD
High School Diploma — Aug. 2021 – Jun. 2025

Johns Hopkins University — Baltimore, MD
Visiting Student, Future Scholars — Aug. 2024 – Jun. 2025

Community College of Baltimore County — Baltimore, MD
Concurrent Enrollment (No High School Credits) — Aug. 2020 – Jun. 2025

Experience

Intern, Solo Developer of MISST Project — Sleep Staging w/ ResNets — June 2024 – Aug. 2024
Johns Hopkins University School of Medicine — Oct. 2022 – June 2023

- Presented as First Author at 7th Annual Johns Hopkins Sleep & Circadian Research Day Symposium, June 12th, 2023
- Project GitHub Repo: github.com/Johns-Hopkins-CISRE/MISST

ASPIRE Intern — Image Synthesis of Microstructures w/ DDPMs — June 2023 – Present
JHU Applied Physics Laboratory

- Published paper on Diff-PFM as second author in Journal of "Metallography, Microstructure & Analysis", DOI: doi.org/10.1007/s13632-024-01130-w.
- Presented twice as sole author at ASPIRE Student Showcase.
- Results were presented @ APL AI Symposium & Integrated Computational Materials and Enginnering (ICME) for Defense conference.
- APL News published an article highlighting Diff-PFM: [LINK].

Member of Team 11695 (DeJava) — Robot Design & Coding — Sep. 2022 – May 2023
FIRST Tech Challenge — Sep. 2021 – May 2022

- Designer of robot's 3-axis lift mechanism, fully modeled in Fusion 360. Incorporated turntable mechanism with 3 drawer slides rigged in a cascading fashion.
- Programmed the mechanum chassis' holonomic drive code & autonomous portion of robot movement.

Team Member — Programmer — Mar. 2023 – Oct. 2023
NASA/JAXA 3rd & 4th Kibo Robot Programming Challenge (Kibo-RPC) — Mar. 2022 – Oct. 2022

- 4th Kibo-RPC (Team Salcedo): Placed 1st Nationally, Represented USA internationally.
- 3rd Kibo-RPC (Team MonkEEEEE): Placed 3rd in NASA's National Competition.

NASA App Development Challenge 2022 — Oct. 2022 – Dec. 2022
Member of Team Solstice

- Trained neural network on predicting rover paths on lunar terrain.
  - Outperformed A* & other pathfinding algorithms.
  - Allowed real-time generation of optimal paths.
- Partnered with Bridges program to teach inner city kids about basics of designing simulation softwares.

Team Member — ML Developer — Feb. 2022 – Apr. 2022
Kaggle Happywhale Competition

- Used OpenCV for detecting contours of whale fins.
- Developed a contrastive loss CNN for contour classification.
- Created a novel K-Medoids algorithm that utilized iterative outlier removal for unbiased clustering of image vectors.

Volunteer — Feb. 2022 – Apr. 2022
CME Classification for NASA Heliophysics Division

- Identified and labeled coronal mass ejections for ML models.
  - Dataset was part of the larger helioanalytics effort at NASA.

Intern — June 2022 – Aug. 2022
I&I Tech Internship at Gilman School

- Configured device management system (Jamf Pro).
- Worked with CTY program to provide IT support.

Projects

RCM Layer | *Python, TensorFlow, Keras, Matplotlib, Sphinx* Feb. 2023 – Apr. 2023

- Created a novel theoretical neural network architecture, RCM (Recurrent Complete Multidigraph), outperforming dense layers.
- Developed a Keras implementation of RCMs as a layer
- Published as open-source project, [LINK]

++C Esolang (PostC) | *C++* Jul. 2022 – Aug. 2022

- Created a new esolang, ++C: a postfix-based esolang based on C++ syntax
- Wrote ++C article on Esolang wiki, [LINK]

Activities/Extracurriculars

JV Cross Country/JV Indoor Track/JV Outdoor Track, Gilman School Nov. 2021 – Nov. 2022

2nd Chair Alto Saxophone, Peabody Wind Orchestra Aug. 2021 – June 2022

Co-Founder & Co-President of AI Club, Gilman School Aug. 2022 – May 2023

Technical Skills

Languages: Python, Java, C/C++, HTML/CSS, Lua
Developer Tools: Git, Anaconda, Docker, Neovim, Arch Linux
Libraries: Keras, PyTorch, TensorFlow, Pandas, NumPy, Matplotlib, DearPyGUI