Hudson Liu

443-882-5497 | github.com/hudson-liu | hudsonliu0@gmail.com

EDUCATION

California Institute of Technology (Caltech) — Pasadena, CA
Undergraduate in Computer Science — Sept. 2025 – June 2029

Johns Hopkins University — Baltimore, MD
Visiting Student ("Future Scholars" Scholarship) — Aug. 2024 – Dec. 2024

Gilman School — Baltimore, MD
High School Diploma — Sept. 2021 – June 2025

EXPERIENCE

Intern | Journal Article on Image Synthesis — June 2023 – Apr. 2025
JHU Applied Physics Laboratory — *(Multiple Terms)*
- Second author of journal article in "Metallography, Microstructure & Analysis"
  * Editor's Choice 2025 Award.
  * DOI: doi.org/10.1007/s13632-024-01130-w.
- Contributions:
  * Main developer of machine learning section, the Diff-PFM model—a DDPM for simulating microstructure evolution.
  * Orchestrated MLOps for training on HPC (using 6 Nvidia H100 GPUs) with HuggingFace Accelerate and WandB.
- Presented twice as sole author at ASPIRE Student Showcase.
- Results were presented @ APL AI Symposium & Integrated Computational Materials and Engineering (ICME) for Defense conference.
- Featured in an APL News article.

Intern | Poster Presentation on Sleep Staging with 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 Research Symposium.
- Independently developed the MISST open-source project, a fully-integrated API for using custom-trained ResNets to classify murine polysomnograms.
- Trained model achieved accuracy of 87.6% (w/ a Cohen's Kappa of 0.74) on a dataset of ∼10 hrs. of PSG data.

Team Member | 1st-Place Nationally in NASA's 4th Kibo-RPC — Mar. 2023 – Oct. 2023
National Aeronautics and Space Administration (NASA) — Mar. 2022 – Oct. 2022
- Participated in the "NASA/JAXA 3rd & 4th Kibo Robot Programming Challenge" (Kibo-RPC).
- 4th Kibo-RPC (Team Salcedo): Placed 1st Nationally, Represented USA internationally.
- 3rd Kibo-RPC (Team MonkEEEEE): Placed 3rd in NASA's National Competition.

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.
- Wrote K-Medoids algorithm utilizing iterative outlier removal for unbiased clustering of image vectors.

PROJECTS

RCM Layer | *Python, TensorFlow, Keras, Matplotlib, Sphinx*
- Experimental neural network architecture using TensorFlow core, named RCM for "Recurrent Complete Multidigraph."
- Published as open-source project.

Arch Linux Dotfiles Repo. | *Arch Linux, Chezmoi, Git-LFS, GNU Stow*
- Fully-reproducible Linux dotfiles system using shell scripts and Chezmoi integration.
- Received 68 stars on GitHub repository.

TECHNICAL SKILLS

- Completed Coursework (Math): Linear Algebra, Multivariable Calculus, Differential Equations
- Completed Coursework (CS): Advanced OOP in Java, C++ Programming, Data Structures

Languages: Python, Java, Lua, Bash/Shell
Developer Tools: Git, Anaconda, Docker, Neovim, Arch Linux
Libraries: Keras, PyTorch, TensorFlow, Pandas, NumPy, Matplotlib, Seaborn