Eric Zhu

ezhu2009@gmail.com
https://github.com/EricZhu718

Education

University of Maryland, College Park *Sept 2021 - May 2025*

- BS in Computer Science with Honors and in Mathematics
- GPA: 3.98/4.0, STEM GPA: 4.0/4.0, Dean's List (5x)
- Honors Thesis (Ongoing): "Neural Radiance Fields for Visual Hindsight Experience Replay"
    - Advisor: Dr. Abhinav Shrivastava / Mara Levy

Relevant Coursework:
Cognitive Robotics, Robotics, Intro to Robotics, Computer Vision, Deep Learning, Advanced Data Structures, Algorithms, Data Science, Computer Systems, Discrete Math, Linear Algebra with Proofs, Multivar Calculus, Advanced Calculus, Ramsey Theory, Research with Faculty, CS Honors Seminar, Computational Methods

Relevant Experience

UMD Perception and Intelligence Group, *Research Intern* *College Park, Maryland*

- Applied neural radiance fields for object generalization in behavior cloning on real world robot and in Pybullet simulation *Sept 2022 - present*
- Created custom Pybullet simulations for robotic pick and place tasks
- Trained neural radiance fields to bring Hindsight Experience Reply into the visual domain
- Trained reinforcement learning algorithms on classic robot control tasks such as Metaworld and Farama-Robotics
- Developed code to interface real world UR5 robotic arm with desktop

Amazon Robotics, *Software Development Engineer Intern* *North Reading, Massachusetts*

- Used React.js and Typescript to create visual web app maps to visualize warehouse robot positions for Amazon warehouse workers *June 2023 - Aug 2023*
- Used Amazon Web Services to retrieve real-time robot position data for a web application

UMD Perception and Robotics Group, *Computer Vision Research Intern* *College Park, Maryland*

- Developed self-supervised neural network for depth estimation using Pytorch *Feb 2022 - Aug 2022*
- Applied YOLOv5 object detector for detecting hoops for drones

University of Maryland Baltimore (UMB), School of Medicine, *Statistics Intern* *Baltimore, Maryland*

- Performed statistical analysis on maternal depression *June 2020 - Aug 2020*
- Coauthored a paper accepted by the journal Plos One
- Collected data for project CHAMP, an intervention project to promote a healthy lifestyle among preschoolers in low-income households

Publications

Under Review for IROS 2025

- NeRF-Aug: Data Augmentation for Robotics with Neural Radiance Fields
- Eric Zhu, Mara Levy, Matthew Gwilliam, Abhinav Shrivastava,
- Project website can be accessed at https://nerf-aug.github.io/

Under Review for Honors Thesis

- Hindsight Experience Replay in the Visual Domain With Novel View Synthesis Network
- Eric Zhu, Mara Levy, Matthew Gwilliam, Abhinav Shrivastava

PLOS ONE, Second Author *Jan 2022*

- Wang Y, **Zhu E**, Hager ER, Black MM (2022) Maternal depressive symptoms, attendance of sessions and reduction of home safety problems in a randomized toddler safety promotion intervention trial, *PLoS One.* 2022; 17(1): e0261934.

Relevant Teaching Experience

Teaching Assistant, *CMSC 351: Algorithms* *Jan 2024 - Dec 2025*

- Supported the course instructor by holding weekly office hours to assist the students with understanding course material, homework questions and grading homework (~10 hours per week)

Teaching Assistant, *CMSC 132: Object Oriented Design 2* *Aug 2022 - Dec 2022*

- Led discussion section and office hours twice a week
- Provided hand-on assistance with programming assignments
- Graded worksheets and exams (~10 hours per week)

Personal Projects

Backpropagation in Numpy *March 2023 - April 2023*

- Wrote from scratch a program to perform backpropagation without any premade machine learning modules
- Program trained on MNIST and attained 96% accuracy

Location History App *Dec 2022 - Jan 2023*

- Developed an ios app in Swift to record the user's various locations every day

Movie Box Office Machine Learning Revenue Predictions *Sept 2022 - Dec 2022*

- Implemented k nearest neighbor, random forest, and artificial neural network models to predict box office revenue of upcoming movies
- Project was made using Pytorch, Numpy, Matplotlib, and Pandas python packages

Online Turn-Based Board Game *June 2021 - Aug 2021*

- Created an online website for a popular card-based board game
- Used Javascript, HTML, and CSS to create an GUI with animations

Super Mario Brothers Game *March 2019 - June 2019*

- Wrote from scratch Super Mario Brothers in Java featuring death animations, gravity, and collision detection as Mario moves around the map
- Features the ability to make its own levels and save the level to a file

Awards

Dean's List, *5x recipient, given to students with high academic achievement* 2021-2024

Honor Society of Phi Kappa Phi 2024-present

FTC Robotics, *Team won 3rd in Maryland, qualified for Worlds* Mar 2021

American Invitational Math Exam (AIME) qualifier 2019, 2020, 2021

National Merit Scholar 2020

Relevant Coursework

CMSC 848J - Cognitive Robotics (A+) Spring 2024

- Class about applying machine learning to robotics under Dr. Yantian Zha
- Final group project on creating a robotic affordance network to predict object-level affordances from demonstration

CMSC 499A - Independent Research (A+) Spring 2024

- Credit for interning at a research lab

MATH 206 - Intro to Matlab (A+) Fall 2023

- Class about learning the mathematics software Matlab

CMSC 499A - Independent Research (A+) Fall 2023
- Credit for interning at a research lab

MATH 410 - Advanced Calculus (A+) Fall 2023
- Proof-based calculus class about convergence of sequences and delta-epsilon proofs

CMSC 498E - Robotics (A+) Fall 2023
- Undergraduate version of graduate robotics class CMSC 756 taught by Dr. Dinesh Manocha
- Learned robotics dynamics such as DH parameters, transformation matrices, and configuration space
- Learned path planning techniques such as voronoi marching, convex decomposition, and A star grid traversal

ENME 480 - Intro to Robotics (A+) Fall 2023
- Learned robotics dynamics such as DH parameters, transformation matrices, and configuration space
- Worked in a group of 4 to create a final project using a UR3 robotic arm to pick up blocks and stack them on top of each other to make a tower
- Physics modeling such as lagrange and control theory

CMSC 499A - Independent Research (A+) Spring 2023
- Credit for interning at a research lab

CMSC 472 - Intro to Deep Learning (A+) Spring 2023
- Course dedicated to neural networks and applying them to real world scenarios
- Final project about generating audio from videos of musician performance

CMSC 426 - Computer Vision (A+) Spring 2023
- Course about analyzing videos and photos being both classical and machine learning methods

STAT 400 - Applied Probability and Statistics I (A+) Spring 2023
- Course on statistics and probability and common distributions

CMSC 499A - Independent Research (A) Fall 2022
- Credit for interning at a research lab

CMSC 398H - Honors Seminar (A) Fall 2022
- Course given only to CS honors students were researchers would present their research

CMSC 320 - Intro to Data Science (A+) Fall 2022
- Learned a board overview of machine learning techniques including k-nn, k-means, PCA, decision trees, and random forests
- Did final project on using data science to analyze movie performance at the box office

CMSC 351 - Algorithms (A) Fall 2022
- Learned about algorithms and algorithmic efficiency

CMSC 330 - Programming Languages (A+) Fall 2022
- Learned functional programming and programming from a theoretical perspective
- Languages covered were Ruby, Ocaml, and Rust

Math 401- Applications of Linear Algebra (A+) Fall 2022
- Singular value decomposition, image compression, principal component analysis, ocr
- Applied linear algebra to graph partitions

Math858R / CMSC 752 - Ramsey Theory and Its Applications (A) Spring 2022
- Doctoral class about graph theory, combinatorics, and colorings and their applications to theoretical computer science
- Monochromatic Structures in large complete graphs

Math 405 - Linear Algebra (A+) Spring 2022
- Proof-based linear algebra course on linear algebra from an abstract perspective

CMSC 216 - Computer Systems (A+) Spring 2022

- Class about low level programming in C and assembly

Math 341H - Multivariable Calculus, Linear Algebra, and Differential Equations II Honors (A+) Spring 2022
- Proof-based honors class with a unified approach to all three subjects with an emphasis on ordinary differential equations

Math 340H - Multivariable Calculus, Linear Algebra, and Differential Equations I Honors (A+) Fall 2021
- Proof-based honors class with a unified approach to all three subjects
- Dr. Wong taught spectral graph theory the last 5 weeks of the semester

HNUH 258A - Big Data in Agriculture (A+) Fall 2021
- University Honors class on using R programming to analyze trends in agriculture
- Did final project on analyzing raster soil moisture data and graphing its effects on Chinese rice production

CMSC 250 - Discrete Mathematics (taken with high school dual enrollment) (A) Spring 2021
- Class about combinatorics and number theory in computer science

Technical Skills

- **Packages**: Pytorch, D3rlpy, Stable-Baselines3, Opencv2, Pandas, Numpy, Sklearn, Pybullet, Matplotlib, Socket
- **Programming languages**: Python, Matlab, Java, C, Javascript/CSS/HTML, Swift