Nathan Zhao

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EDUCATION

Stanford University, School of Engineering | *B.S. in Computer Science* | Stanford, CA — Sep. 2023 – Jun. 2026

- **Relevant Coursework**: Transformers United V3, Computer Organization & Systems, Polya Problem Solving Seminar, Modern Mathematics: Discrete Methods, Introduction to Probability Theory, Machine Learning, Design and Analysis of Algorithms, Deep Learning for Computer Vision
- **International/National Honors**: 3x AIME Qualifier, USA Computing Olympiad Gold **(International Top 2000)**, 2x US National Chemistry Olympiad Finalist **(National Top 50)**, 2x USA Biology Olympiad Semifinalist **(National Top 10%)**, *Facebook Hacker Cup* 2nd Round Qualifier, Coca-Cola Scholarship Finalist, President's Volunteer Service Award Bronze
- **Research Recognitions**: Yale Science & Engineering Most Oustanding Exhibit Award, Philadelphia Region Junior Science and Humanities Symposium Finalist, Delaware Valley Science Fair Category 1st, New Castle County Science Fair Category 2nd
- **Presented in Research Conferences**: American Physics Society March Meeting, MIT Undergraduate Technology Research Conference, Society of Engineering Science Annual Technical Meeting, Sigma Xi Student Research Conference

TECHNICAL EXPERIENCE

Stanford Cardiac MRI Research Group | *Undergrad Researcher* | Stanford, CA — September. 2023 – Present

∗ Developing RegressionCNN with Pytorch to find Right Ventricular insertion points for American Heart Association Segmentation model, implementing keypoint transformations with affine matrices. Designed batch submission system in Bash

University of Delaware | *Computational Materials Research Intern* | Newark, DE — Feb. 2021 – Dec. 2022

∗ Led independent investigation and ran quantum simulations in Linux supercomputer for exploring anistropy with Prof. Hossain
∗ Processed and visualized large amounts of text data with MATLAB using data science and data analysis libraries. Preprint live on ChemXriv regarding research with application in flexible electronics; Conducted additional research on defective phosphorene

Purdue University | *Biochemistry Research Intern* | West Lafayette, IN — June 2022 – Aug. 2022

∗ Analyzed inhibitor/enzyme activity data of *Ustilago maydis* Cdc14 Phosphatase with wet lab procedures and Excel
∗ Modeled protein homologs and optimized inhibitors using industry drug-discovery tool Molecular Operating Environment

Upwork | *Full-stack Developer & Freelancer* | Newark, DE — Jul. 2020 – Nov. 2020

∗ Utilizing prior experiences in competitive programming with data structures and algorithms knowledge, developed ad hoc programming problems, test cases, and solutions to train Natural Language Processing model in solving similar problems
∗ Developed dynamic web applications for various initiatives and nonprofits using React and Bootstrap

PROJECTS

Commissions Website | *Independent Full-Stack Project* | Stanford, CA — Dec. 2023 – Jan. 2024

· Built a fullstack project with the Next.js/Tailwind/React development package with Stripe to accept real payments for various commission types, Firebase to display a creative writing/music portfolio, and MailJet for email notifications. Express, Node.

Trackgrounds | *Independent Full-Stack Project* | Stanford, CA — Nov. 2023 – Dec. 2023

· Harnessed Next.js/Tailwind/React development package to create fullstack webapp displaying animated graphics according to user's currently playing songs from the Spotify API. Pending API quota extension request for expanding webapp user-base

Arbitrage Bet Finder | *Independent CLI Project* | Stanford, CA — Sep. 2023 – Oct. 2023

· Utilized Odds API in Python to request in-season sports' bookmakers pricing data. Calculated 100+ regions' no-risk arbitrages
· Wrote-up strategy for arbitrage betting accounting for vigorish, describing implict odds, and created CLI installation

LittleLemon API Project | *Meta Back-End Developer Capstone* | Newark, DE — May 2023 – Aug. 2023

· Employed software development lifecycle with the CI/CD pipeline to develop a Django REST app for HTTP methods.
· Designed RESTful APIs, utilizing version control, unit testing, and relational database schema for big data in MySQL
· Explored software engineering practices such as Docker, Kubernetes, cloud computing, and scalable server architectures

Reducing Educational Inequality | *Independent NLP Project* | Newark, DE — Nov. 2022 – Apr. 2023

· Developed a model with HuggingFace BERT transformers with token-masks to match related videos, articles, and problems together to formulate a curriculum recommendation system, assisting self-studying and acting as a pedagogical tool for classes
· Engineering a retriever-reranker model pipeline in Pytorch, processed data with an unsupervised model to generate candidates for similar course content, then passed candidates through supervised model for more specific pruning. Weights & Biases

Calculating Wheat Yield and Disease | *Independent CV Project* | Newark, DE — Jun. 2020 – Mar. 2021

· Implemented YOLOv5 object detection computer vision model on Colab GPU with Tensorflow and HuggingFace
· Cleaned wheat head image dataset, utilizing pandas and OpenCV to format YAML data into Darknet annotations for labeling
· Assessed model accuracy in comparison to existing object detection models such as EfficientDet-D7x with mAP@[.5:.95]

WeSee | *Computer Vision-based Android App* | Newark, DE — Jun. 2020 – Dec. 2020

· Utilizing Kotlin and XML, with on-device computations with PyTorch object detection model to quickly characterize images from video stream. Applied image transformations and bitmappings for data preprocessing to reduce model inference time

SKILLS & INTERESTS

Computer Languages: MATLAB, Python, Java, Kotlin, HTML, CSS, JavaScript, LaTeX, Bash, Excel, C, C++ | **Tools**: Keras, Tensorflow, sklearn, PyTorch, OpenCV, pandas, Firebase, React Native, React.js, Selenium, Git, Django, REST APIs, SQL, Next.js, Tailwind, Stripe | **Languages**: English, Spanish, Mandarin | **Interests**: Finance, Algorithms, Distributed Systems, Low Latency