

Nathan Zhao

☎ 302.513.2743 | ✉ nathanzh@stanford.edu | 📍 Newark, DE

EDUCATION

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

- **Relevant Coursework:** CS 25 Transformers United V3, CS 107 Computer Organization & Systems, MATH 193 Polya Problem Solving Seminar, MATH 61DM Modern Mathematics: Discrete Methods
- **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 Outstanding 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
- **Certificates:** Meta Back-End Developer Professional Certificate, Creating Multi Task Models With Keras, Fine Tune BERT for Text Classification with Tensor Flow, Google Cloud Platform – Reinforcement Learning: Qwik Start

TECHNICAL EXPERIENCE

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

- * Led independent investigation and ran quantum simulations in Linux for exploring 2D anisotropy with Prof. Zubaer Hossain
- * Processed and visualized large amounts of text data with MATLAB using data science and data analysis libraries. Preprint live on ChemRxiv 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

- * Collected inhibitor/enzyme activity data with wet lab procedures and extrapolated features and results from data using Excel
- * Modeled protein homologs using industry drug-discovery software, problem solving in optimizing inhibitor structures

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, Bootstrap, and web sockets

PROJECTS

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

- Utilized Odds API to request bookmaker pricing data. Calculated arbitrages (betting opportunities with no risk and guaranteed awards) with implied odds in head to head, spreads, and totals markets across 100+ bookmakers in various regions.
- Wrote-up strategy for arbitrage betting with my project, including accounting for vigorish with betting threshold, targeting certain bookmakers/less popular sports with higher mispricing probability. Explored call/put options spread trading.

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

- Utilized software development lifecycle using the CI/CD pipeline to develop a Django app for responding to HTTP methods. Implemented authentication systems, relational databases, and unit testing with DRF utilizing generic API viewsets
- Designed RESTful APIs, utilizing version control, automated testing, and database schema for scalable big data infrastructures
- Explored software engineering practices such as Docker, Kubernetes, cloud computing, and varying types of server architectures

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

- Developed a model with HuggingFace transformers to match related videos, articles, and example problems together to formulate a curriculum recommendation system, assisting self-studying and acting as a pedagogical tool within underfunded classes
- Utilizing a retriever-reranker model pipeline, processed data with an unsupervised model to generate candidate list of similar course content, then passed candidates through supervised model for determining whether course content is definitively related
- Implemented optimizations and common practices such as masking, fine-tuning, cross-validation, and hyperparameter sweeping

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

- Utilized Tensorflow and OpenCV to train YOLOv5 compound-scaled object detection machine learning model on personal GPU
- Cleaned wheat head image dataset, utilizing pandas and OpenCV to format YAML data into Darknet annotations for labeling
- Optimized model through feature extraction, designing evaluation metrics, and exploring options for ensembling
- 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

- Using Kotlin for application development, utilized on-device computations with PyTorch object detection model to quickly characterize images from video stream. Applied image transformations for data preprocessing to reduce model inference time
- XML user interface designed to optimize blind user experience for Android operating systems, harnessing haptic controls

CharterHacks Hackathon | *Founder & Director within ACM Club* | Newark, DE Jun. 2020 – Present

- Ideated hackathon and guided team in contacting sponsors and marketing with leadership and teamwork. Enforced time management, promoted critical thinking for problem solving, and conducted analysis of past events for maximized outreach
- Guided participants through project development pipeline and rewarded prizes to the best projects in judging process. Made programming fun for 100+ participants worldwide annually in fun summer weekend event, filled with games and workshops

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, SVN, Django, REST APIs, SQL | **Languages:** English, Spanish, Mandarin | **Interests:** Finance, Distributed Systems, Higher-level Maths, Image Processing