# 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
- **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

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

- ∗ Developing Regression CNN using **Pytorch** and testing various models to find RV/LV insertion points for AHA Segmentation
- ∗ Designed batch submission system and implemented keypoint transformations to emulate functionals with affine matrices

**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 anistropy with Prof. Zubaer 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

- ∗ Collected inhibitor/enzyme activity data with wet lab procedures and used **Excel** to extrapolate features and results from data
- ∗ Modeled protein homologs using industry **Molecular Operating Environment**, problem solving in optimizing inhibitors

**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 in **Python** to request bookmaker pricing data. Calculated no-risk arbitrages in 100+ regions
- · Wrote-up strategy for **arbitrage betting** with my project, including accounting for vigorish with betting threshold

**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 REST** 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 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 for classes
- · Utilizing 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

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

- · Utilized **Tensorflow** 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

## 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