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

- **International/National Honors**: USA Computing Olympiad Gold **(International Top 2000)**, 3x AIME Qualifier with Distinction **(National Top 2.5%)**, 2x US National Chemistry Olympiad Finalist **(National Top 50)**, 2x USA Biology Olympiad Semifinalist **(National Top 10%)**, USA Math Talent Search, *Facebook Hacker Cup* 2nd Round Qualifier, *Google Code Jam* 2nd Round Qualifier
- **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, Delaware BioGENEius Honorable Mention, American Society of Materials 3rd Place Material Science Award
- **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 for exploring 2D materials' anistropy with Prof. Zubaer Hossain
- ∗ Processed and visualized big data, drafted first-author paper for potential publication the Journal of Applied Physics regarding research with great application in flexible electronics; continued additional research on defective phosphorene

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 websites for various nonprofit groups and local initiatives with various web application frameworks from Django to React, integrating both backend and dynamic frontend functionalities according to specific client requests

PROJECTS

LittleLemon API Project | *Meta Back-End Developer Capstone* | Newark, DE   May 2023 – Aug. 2023
- ∗ Developed Django App using CI/CD pipeline to respond to HTTP methods, including list methods with pagination, filtering, and searching. Implemented user and token authorization/authentication systems with Django Rest Framework with API viewsets
- ∗ Implemented MySQL databases alongside Django, with data serializers used to validate and sanitize multipart JSON data
- ∗ Developing RESTful APIs, utilized version control, unit testing methods, and database schema for big data infrastructures
- ∗ Explored practices such as virtualization, containerization, cloud computing, and varying types of N-tier 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 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] and F-score metrics, considering possible improvements in hardware and training approach with random cropping

WeSee | *ML-based Android App* | Newark, DE   Jun. 2020 – Dec. 2020
- ∗ Using Kotlin, utilized on-device computations with PyTorch RCNN object detection model to quickly characterize images from video stream. Various transformations were applied to make data more processable in order to reduce model inference time
- ∗ Following inference, text-to-speech would announce the object name, allowing blind users to identify over 1000 different objects
- ∗ App interface designed to be accessible for the blind with necessary controls connected to full-screen and volume button inputs

CharterHacks Hackathon | *Founder & Director within ACM Club* | Newark, DE   Jun. 2020 – Present
- ∗ Ideated hackathon, developed logistics, and guided team in contacting sponsors and marketing. Implemented project deadlines, promoted critical thinking to solve logistical problems, and collaborated with subordinates in weekly brainstorming meetings
- ∗ Programmed hackathon site and designed engaging introductory workshops in areas from machine learning to video game design
- ∗ 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 | **Tools**: Tensorflow, Keras, sklearn, PyTorch, OpenCV, pandas, Firebase, React Native, React.js, HuggingFace, Selenium, Git, Django, REST APIs, SQL | **Languages**: English, Spanish, Mandarin | **Interests**: Bioinformatics, Distributed Systems, Materials, Social Entrepreneurship, Healthcare