ZAIN JERATH

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EDUCATION

Northwestern University   **Evanston, IL**

M.S. in Computer Science   *June 2025*
- Specialization in Artificial Intelligence and Machine Learning

B.S. in Computer Science, Minor in Data Science   *June 2024*
- 3.73 / 4.0 GPA, cum laude

PROFESSIONAL EXPERIENCE

NASA   **Greenbelt, MD**

Software Engineer Intern   *July - September 2022*
- Supported the Global Modeling and Assimilation Office in the maintenance of GEOS software infrastructure.
- Built images using Docker and Singularity to package and test a model used by over **200** GMAO employees.
- Developed containerized models to run on both M1 MacBooks and the NCCS Discover Cluster.
- Optimized speed of isolated build and run in user spaces by **53%** by utilizing Kubernetes and AWS.

OMPS Intern   *June - September 2021*
- Devised Python scripts that modeled LiDar data alongside satellite data in order to detect UV-absorbing aerosols.
- Automated the retrieval of **4000+** aerosol profiles in order to estimate vertical distribution of Saharan dust.
- Improved data collection from 2-D to 3-D by combining tropospheric aerosol profiles with spacial satellite data.

OMPS Intern   *July - September 2019*
- Enhanced the visualization of Ozone Mapping and Profiler Suite measurements through NumPy and Matplotlib.
- Created a Python model to filter radiance data that improved cloud detection techniques with **98.2%** accuracy.

RESEARCH

Northwestern University   **Evanston, IL**

Research Assistant (Prof. Zach Wood-Doughty)   *January 2023 - Present*
- Conducting research on the use of Machine Learning methods in causal analyses of MIMIC-III clinical data.
- Investigating **a new method** of text generation in natural language processing for causal inference modeling.
- Leveraging semi-synthetic data distributions with text classification models to conduct correlation analyses.

Research Assistant (Prof. Christopher Riesbeck)   *December 2023 - Present*
- Building an LLM-powered system to automate introductory C++ tutoring for CS211 Professors at Northwestern.
- Collaborating with **200+** students to establish a pattern recognition framework for diagnosing coding-related issues.
- Applying concept hierarchies and rubber duck debugging to provide more consistent and efficient mentoring.

PROJECTS

[PhotoApp](#)   **June 2023**
- Designed a **three-tier** cloud-native app using AWS services, Node.js and Express.js server, and Python client.
- Instituted MySQL database for metadata storage and used Google's Geocoding API to increase search flexibility.
- Packaged and deployed using AWS Elastic Beanstalk/EC2 and extracted pdf data using API Gateway + Lambda.

[NBANewsletter](#)   **May 2023**
- Led a **team of 7** in developing a language model platform that revolutionizes basketball insights.
- Integrated Django, Next.js, and the NBA and OpenAI APIs to feed the model real-time data and sportsbook lines.
- Boosted scalability and performance by incorporating Selenium, Firebase, Google Cloud, and RESTful principles.

[SignSense](#)   **March 2023**
- Generated a real-time sign language detector by leveraging Tensorflow's Object Detection module with Python.
- Collected over **150** images of ASL hand poses and employed LabelImg to annotate for training and testing.
- Incorporated transfer learning to train a **deep learning** model and detect in real time using PyTorch and OpenCV.

TECHNICAL SKILLS

Programming Languages: Python, C, C++, C#, Java, SQL(My, Postgres), JavaScript, Ruby, Typescript, HTML, CSS
Technologies/Frameworks: Git, AWS (RDS, S3, etc.), GCP, Linux, Docker, Bash, React, Django, Node.js, Npm, CLion
General: AI, Natural Language Processing, REST APIs, Embedded Systems, Cloud Infrastructure, Machine Learning
Interests: Effective Altruism, Deep/Reinforcement Learning, Probabilistic Modeling, Computer Vision, AI for Healthcare