Alex Herron

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GitHub | LinkedIn | Website

EXPERIENCE

- **NASA (Goddard Institute for Space Studies)** *July 2023 - Present*
  Scientific Programmer New York, NY
  - Operate at the intersection of research scientists and software engineers, producing software, data pipelines, and algorithms to facilitate scientific research and analysis
  - **GISS Surface Temperature Anomaly Detection and Analysis (GISTEMP)**
    - GISTEMP is the most frequently cited research output of NASA GISS. Its output is the primary metric used by climate scientists to measure climate change, and is the benchmark for international organizations (e.g., IPCC)
    - Developed anomaly detection algorithm with 2x speed over existing solution
    - Completely refactored GISTEMP to use modern languages and libraries such as NumPy to improve maintainability and reduce complexity – reduced lines of code by 90% and eliminated Fortran
  - **Climate Model Processing**
    - Climate model outputs are converted to an international standard set by the Coupled Model Intercomparison Project (CMIP) to be comparable against results from other labs and models.
    - Completely automated the standardization process and reduced completion time from 2 weeks to 2 days
    - My processing pipeline now used for the output of every climate experiment run at GISS
  - **ResNet-based Climate Model Emulator**
    - Achieved *state of the art* results in precipitation predictions (surpassing best-published result) by leading the development of a ResNet-based deep learning model emulating NASA's Global Climate Model
    - Reduced modeling time from 2 months to 5 minutes, while achieving comparable results and accuracy, resulting in significant computational cost and resource savings
  - **Climate Chatbot**
    - Developing an innovative chat interface bridging climate science and AI, enabling natural language queries for complex climate model data analysis and visualization using LangChain and advanced language model APIs
    - Accepted for presentation at the 2024 *Conference on Neural Information Processing Systems (NeurIPS)* and the 2024 *American Geophysical Union (AGU)* Fall Meeting

- **Nuance Communications / Microsoft** *Summer 2022*
  Research Engineering Intern Burlington, MA
  - Developed and maintained machine learning tools written in Python for central research team
  - Designed command line tool to analyze cluster CPU / GPU usage of Nuance researchers, using slurm
  - Implemented robust unit and integration testing for tools using pytest

- **NASA (Goddard Institute for Space Studies)** *Summer 2020*
  Research Intern (Atmospheric Science) New York, NY (Remote)
  - Conducted comparative analysis of cloud water measurement methods (radar, LiDAR, and probe)
  - Proposed new method with superior performance at cloud edges, subsequently implemented
  - Received *Group Achievement Award* for contributions to the ACTIVATE mission

- **Lamont-Doherty Earth Observatory** *Summer 2019*
  Research Intern (Physical Oceanography) Palisades, NY
  - Analyzed 15-year freshwater transport rates using data from autonomous floats
  - Overturned previous findings by proving central axis of Bay of Bengal as primary freshwater pathway
  - Published findings as first author in *Deep Sea Research I*

EDUCATION

- **New York University**: Graduate School of Arts and Science | Center for Data Science *Class of 2023*
  - **Master of Science, Data Science; GPA: 3.8 / 4.0**

- **Columbia University**: School of Engineering and Applied Science *Class of 2020*
  - **Bachelor of Science, Applied Physics**; History Minor
  - Heavyweight Rowing Team, elected Captain

SKILLS AND INTERESTS

- **Technical Skills**: Python (primary language), Linux, Git, MATLAB, SQL, Azure, AWS, Shell Scripting, High Performance Computing, Big Data Management (Petabyte-scale), Machine Learning
- **Interests**: Running, Reading (Fantasy, Sci-Fi), Sports (Football, Basketball, Baseball), Cooking, Photography

PUBLICATIONS

- **Freshwater transport by eddies within the Bay of Bengal's central axis** *2022*
  Alexander J. Herron, Shannon M. Bohman, Arnold L. Gordon, Deep Sea Research I