Greg Lucas, PhD
Senior Software Engineer
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Technical leader designing and deploying **real-time** operational **data processing** systems. Utilizing **serverless technologies, Docker containers,** and **AWS** cloud infrastructure for deployments. Applying **data fusion**, **machine learning,** and **visualization** techniques to gain insights into the data. Avid contributor to the open source **Python** community in my free time, specifically a **maintainer** of the Matplotlib and Cartopy visualization packages.

Experience

Senior Software Engineer - University of Colorado, LASP	2019 - Present
Mendenhall Postdoctoral Fellow - United States Geological Survey	2017 - 2019
Graduate Research Assistant - University of Colorado	2012 - 2017
Member of the Technical Staff - Sandia National Laboratories	2009 - 2013

Project Leadership
Mentor students and early-career staff, define project directions, and write grants. Create Jira tickets and follow best-practices for agile software development (version control and CI/CD).

- **Real-time data processing** system receiving satellite beacon data for space weather early warnings involving a **cross-functional** team in satellite operations and science. Leveraging **Docker** and serverless **Lambda Functions** to process binary packet streams.

- Designed and implemented a 4D data visualization pipeline in **Python** using GPUs in the **cloud** to take advantage of 100s of GBs of simulation data. Deployed using **Docker containers** with infrastructure created and managed using **AWS CDK**. enlil.swx-trec.com

- Created a full stack geospatial app using **D3.js** for the visualization frontend and running scientific models on-demand with **API Gateway** and a Python **Lambda Function**, giving users the first ever interactive experience with this model and data. msis.swx-trec.com

- Lead of the **High Performance Computer** environment in the cloud for space weather modeling, where I have won grants bringing in over a million dollars to the organization.

Research / Machine Learning
Applied research solving complex problems using the scikit-learn, dask, and tensorflow libraries.

- Trained a deep neural network using **Tensorflow** that produces >80% accurate magnetic field predictions compared to 50% accuracy using standard linear techniques. Poster link

- Created a once-per-century geomagnetic hazard map for the power grid by fitting **CDFs** to the data and extrapolating with a **bootstrap statistical analysis.** Paper link

- Applied **K-means clustering** and **wavelet analysis** to analyze 4TB of data from a spatially distributed array of 31 instruments to identify environmental factors. This reduces the number of scrubbed launches potentially saving millions of dollars. Paper link

- Parallelized legacy code for a **1000x speed-up** which led to smaller risk error bounds.

Education

PhD Aerospace Engineering Sciences, University of Colorado	2017
MS Medical Physics, University of Wisconsin	2010
BS Nuclear Engineering, University of Wisconsin	2010
Minor Computer Science, University of Wisconsin	2009