# Haleigh E. Nyberg

NSF Graduate Research Fellow; PhD Candidate, Astrobiology

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## Summary

Computational scientist (Astrobiology PhD candidate, ABD) with deep Python/ML experience — GCM-scale simulation, multivariate time-series forecasting, and pixel-wise neural networks — plus team leadership (two 16-member NASA-partnered Unreal/VR engineering teams) and a record of competitive national funding.

## Education

**Ph.D., Astrobiology** — Purdue University 2023-08 – 2028-05

Earth, Atmospheric, and Planetary Sciences
Advisor: Dr. Stephanie Olson
Dissertation: Computational Modeling of Exoplanetary Habitability
GPA: 3.93/4.0

**B.A., Computational Physics** — University of Montana, Missoula 2019-08 – 2023-05

Physics and Astronomy
Thesis: Advanced High-Altitude Balloon Trajectory Prediction
Minors: Computer Science, Mathematics
GPA: 3.91/4.0

## Research & Professional Experience

**Graduate Research Assistant** — Purdue University, Dept. of Earth, Atmospheric, and Planetary Sciences 2023-08 – present

- Simulate exoplanetary environments using General Circulation Models to assess their potential for hosting an origin of life.
- Develop and apply pixel-wise machine learning algorithms to predict ocean current patterns from varied continental configurations.

**Lead Data Science Researcher** — Purdue University, The Data Mine (Barrios Technology) 2025-01 – present

- Led two 16-member hybrid multi-university student teams developing a dynamic Unreal Engine-based desktop/VR visualization tool for NASA's Lunar Gateway project.

**Machine Learning Researcher** — Purdue University, The Data Mine (John Deere) 2024-08 – 2024-12

- Executed a multivariate time-series forecasting project with John Deere, applying machine learning to inform demand-forecasting strategies.

**Lead Intern** — NASA Montana Space Grant Consortium, University of Montana 2021-05 – 2022-08

- Optimized high-altitude balloon trajectory predictions by implementing dynamic drag-coefficient calculations into existing prediction software, reducing launch costs $283 per launch.

## Skills

**Programming Languages:** Python, NumPy, SciPy, Pandas, Matplotlib, Seaborn, TensorFlow, PyTorch, Keras, scikit-learn, xarray, R, Java, MATLAB, Fortran

**Data Science & Machine Learning:** GCM analysis, Convolutional Neural Networks, Bayesian statistics, Multivariate time-series forecasting (ARIMA, LSTM), PCA, Logistic/Linear Regression, Random Forest, k-means clustering, Gradient Descent, Algorithm Design, Data Structures, Data Mining, Data Visualization

**Climate & Planetary Modeling:** ExoPlaSim, WRF, PlaSim, GCM data analysis (NetCDF), atmospheric dynamics, radiative transfer

**Software & Technologies:** Git/GitHub, Linux/Unix, Jupyter, Overleaf (LaTeX), SLURM/HPC, Unreal Engine, AutoCAD, Microsoft Office, Google Workspace

**Professional:** Agile/Sprint project management, Scientific writing & presentation, Grant proposal writing, Interdisciplinary collaboration, Peer review, Public speaking, Curriculum development, Mentoring