Becky Nevin

Researcher and Data Scientist

Boulder, CO
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STATISTICAL AND DATA SKILLS

Data Science and Machine Learning: Scikit-learn, Pandas, Jupyter ecosystem; skilled in supervised and unsupervised machine learning techniques and model validation.

Satellite Imaging and Deep Learning: Strong background in astrophysical imaging, including segmentation, coordinate systems, designing pipelines for image analysis, and computer vision. Hands-on experience with geospatial data workflows, including xarray, Dask, and Rasterio.

Statistics and Scientific Modeling: Causal inference, Bayesian probability, MCMC sampling, uncertainty quantification, and incorporating probabilities into predictive models.

Software Development Tools: Python, Git, Docker, Kubernetes, SQL, DevOps workflow tools (i.e., Github actions), and cloud/high-performance computing.

RESEARCH AND DATA EXPERIENCE

Deepskies Lab, Fermilab National Accelerator Laboratory - *Postdoctoral Fellow*

SEPTEMBER 2022 - PRESENT

- **Uncertainty Quantification in Pixel-to-Pixel Tasks:** Evaluating U-Nets' correlated uncertainty calibration in Earth Observations and cosmological datasets.
- **Research Leadership:** Led a project on uncertainty predictions in Bayesian deep learning (neurIPS 2024). Created DeepUQ, a software package for uncertainty quantification.
- **CI/CD Experience:** Improved testing coverage and module development for DeepBench (JOSS paper). Contributed to release cycles.
- **Educational Contributions:** Created tutorials on ML/statistical methods (e.g., NumPyro, simulation-based inference, NNs). Mentored junior members.
- **DevOps Expertise:** Built a PostgreSQL data transfer service on Kubernetes with GitHub-integrated testing.

Harvard & Smithsonian | Center for Astrophysics, Boston - *Postdoctoral Fellow*

AUGUST 2019 - AUGUST 2022

- **Mentorship & Advising:** Supervised three students on PhD and undergraduate research projects.
- **Research Leadership:** Led MergerMonger, an end-to-end pipeline for identifying merging galaxies in images using SQL queries, data engineering, image segmentation, and statistical analysis. Produced publicly available catalogs and multiple peer-reviewed papers (1, 2).
- **Simulated Spectroscopic Data:** Simulated mock integral field spectroscopy data for galaxy analysis, integrating radiative transfer models and using the ppxf (Penalized Pixel-Fitting) method to derive kinematic and stellar population properties (3).

University of Colorado, Boulder *- PhD in Astrophysics*

AUGUST 2013 - JUNE 2019

- **AGN Outflows & Spectral Modeling:** Conducted research on AGN-driven outflows using longslit spectroscopy, including observations I personally collected 🙂. Developed a velocity model for different positions in the outflow and applied MCMC to fit the model to the data. Additionally, modeled emission lines using multi-Gaussian fits to extract detailed spectral properties.
- **Research & Grants:** Designed and led imaging/spectroscopic projects, securing NSF, supercomputer, and telescope grants.
- **High-Performance Computing:** Optimized large-scale simulations and data processing on HPC systems.
- **Science Communication**: Designed and led several planetarium talk series and science communication workshops for graduate students across the university.