# Monica G. Bobra

## Senior Research Data Scientist

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### Summary

I have 13 years of experience working as a data scientist. I develop novel machine learning algorithms and apply them to image and time series data to glean scientific insights and inform public decision-making. I develop open datasets and open source scientific software for data-intensive research. I provide expertise to the scientific community on data science workflows by giving talks, organizing conferences, mentoring students, and serving on committees and boards.

### Education

**University of New Hampshire, Durham NH**

M.S. Physics

JANUARY 2010

**Boston University, Boston MA**

B.A. Astronomy

B.S. Communication

MAY 2004

### Skills

Python (scientific software stack including NumPy, SciPy, pandas, Matplotlib, SunPy, statsmodels, scikit-learn, PyTorch, TensorFlow, Dask and more)

Machine learning with image data (CNNs), metadata (SVMs, Random Forests) and time series data (RNNs, LSTMs) together with interpretability tools

Statistical Modeling (VARs, Gaussian Process)

Data Visualization (D3.js, Vega-Altair)

Cloud computing (AWS, GCP)

Git (and continuous integration, e.g. Travis)

SQL

### Awards

American Astronomical Society Solar Physics Division Popular Media Award (2021)

NASA Group Achievement Award — Solar Dynamics Observatory Team (2017)

Robert H. Goddard Exceptional Achievement for Science Award (2016)

NASA Space Grant Fellowship (2008 - 2009)

NASA Group Achievement Award — Hinode Team (2007)

### Experience

**Tomorrow.io** / Senior Research Data Scientist

MAY 2022 - PRESENT, MOUNTAIN VIEW CA

Developing weather forecasts using machine learning algorithms, along with with gridded geospatial data, that enable public and private customers – such as local governments and commercial airlines – to make automated decisions to protect and optimize their infrastructure

Leading the Python open source scientific software community by organizing conferences such as SciPy (2022) and serving as a Data Science Editor for the Journal of Open Source Software

**Stanford University** / Research Scientist

APRIL 2010 - JULY 2021, STANFORD CA

Published several first-author studies about developing space weather forecasts using machine learning algorithms, along with multi-spectral image data taken by NASA satellites, that enabled the NOAA Space Weather Prediction Center to protect public infrastructure – such as satellites and power grids – and garnered media attention from outlets such as *The Mercury News* and *Scientific American*

Led two large interdisciplinary teams of data scientists and engineers to develop space weather predictions using novel machine learning algorithms as PI and Co-I of NSF and NASA grants ($1.8M total award)

Led the development of open software and open data as Vice-Chair of the Board for SunPy, an open-source Python package for data-intensive research, and Editor for the Journal of Open Source Software

Presented talks and organized public conferences such as Machine Learning in Heliophysics (2019), Python in Astronomy (2020), and COSPAR Data Science Workshops (2021)

Developed data visualizations to communicate scientific insights

Wrote science policy to inform the direction of data science at a federal level as a member of the National Academy of Sciences Heliophysics Mid-Decadal Committee (2020)

**Harvard-Smithsonian Center for Astrophysics** / Astrophysicist

OCTOBER 2005 - AUGUST 2007, CAMBRIDGE MA

Developed and published a numerical model that accurately predicts space weather as observed by NASA satellites

Developed open source scientific software to analyze image data taken by the NASA/JAXA Hinode and NASA TRACE satellites