

# Monica G. Bobra

## Senior Research Data Scientist

San Francisco Bay Area | mbobra@alum.mit.edu | [mbobra.github.io](https://mbobra.github.io)

---

### Summary

I have 13 years of experience working as a data scientist in earth and space science. I develop novel machine learning algorithms and apply them to images and time series data to glean scientific insights. 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, Skorch, PyTorch, 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

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

Predicting terrestrial weather using machine learning algorithms with multi-frequency radiometry and radar data taken by the NASA Global Precipitation Measurement mission and simulated data from the future Tomorrow.io constellation of satellites that will launch from 2023-2025

Leading the 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 predicting space weather using machine learning algorithms with multi-spectral image data taken by the NASA Solar Dynamics Observatory and ESA/NASA Solar and Heliospheric Observatory satellites, which pioneered a new data-driven field of heliophysics research and garnered media attention from outlets such as *The Mercury News* and *Scientific American*

Led two large interdisciplinary teams to predict space weather using novel machine learning algorithms as Principal Investigator of a NSF grant and Co-Investigator of a NASA grant (total award of \$1,796,867)

Led the Python in Heliophysics community as Vice-Chair of the SunPy Board and an Editor for the Journal of Open Source Software

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

Wrote science policy to inform the direction of data science in solar and space physics 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 of the solar magnetic field that accurately replicates images of the solar atmosphere taken by the JAXA/NASA Hinode and NASA TRACE satellites

Designed and conducted flight hardware tests and flight operations for the JAXA/NASA Hinode X-Ray Telescope and developed open source scientific software to analyze image data taken by the spacecraft