Daniel Foreman-Mackey

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Associate Research Scientist, Center for Computational Astrophysics, Flatiron Institute

Education

PhD 2015, Department of Physics, New York University. Advisor: Hogg
MSc 2010, Department of Physics, Queen's University, Canada. Advisor: Widrow
BSc 2008, Department of Physics, McGill University, Canada.

Positions

Associate Research Scientist, Flatiron Institute, 2017–present.
Sagan Postdoctoral Fellow, University of Washington, 2015–2017.

Selected invited talks & tutorials

Advanced probabilistic modeling, 2021, Tutorial, Harley Wood Winter School of Astronomy, Australia.

Open-source software for probabilistic data analysis in astronomy, 2021, Seminar, Instituto de Astrofísica, Portugal.

Gaussian processes & stellar variability, 2021, Seminar, CARMENES Team Meeting.

Extending JAX with custom C++ & CUDA, 2021, Invited Talk, IRIS-HEP Topical Meeting, CERN.

Open source software for probabilistic data analysis, 2020, Invited Talk, OzGrav Early Career Researcher Symposium, Australia.

The why & how of exoplanet, a domain-specific PyMC3 extension, 2020, Contributed Talk, PyMC Con.

A modular ecosystem for probabilistic data analysis, 2019, Invited Talk, Open Digital Infrastructure in Astronomy conference, Kavli Institute for Theoretical Physics.

Exoplanet population inference, a tutorial, 2019, Invited Talk, Exostar19 conference, Kavli Institute for Theoretical Physics.

Astronomy as a testbed for statistical method development, 2019, Colloquium, Center for Statistics and Machine Learning, Princeton.

Data-driven discovery in the astronomical time domain, 2018, Colloquium, Institute for Theory and Computation, Harvard-Smithsonian Center for Astrophysics.

Data-driven discovery in the astronomical time domain, 2018, Colloquium, University of California, Santa Cruz.

A practical introduction to Gaussian Processes for astronomy, 2017, Invited Talk, Statistical Challenges in Astrophysics, University of New South Wales, Australia.

Data-driven discovery in the astronomical time domain, 2017, Interdisciplinary Colloquium, CIERA, Northwestern University.

Long-period transiting planets & their population, 2016, Invited talk, Exoplanets I, Davos.

Long-period transiting planets & their population, 2016, Invited talk, Statistical Challenges of Modern Astrophysics, Carnegie Mellon.

Long-period transiting planets & their population, 2016, Colloquium, Villanova.

Scalable Gaussian processes & the search for transiting exoplanets, 2015, Data Science at the LHC, CERN, Geneva.

Discovery & characterization of transiting exoplanets & their population, 2015, Colloquium,

University of Washington.

Hierarchical inference for exoplanet population inference, 2015, IAU Symposium, Honolulu.

Data-driven models, 2015, Extreme precision radial velocities, Yale.

Population inference from noisy & incomplete catalogs, 2015, Local Group Astrostatistics, University of Michigan.

Time series analysis, Gaussian Processes, and the search for exo-Earths, 2014, PyData NYC conference, New York.

Introduction to Gaussian Processes, probabilistic graphical models, and deep learning, 2014, Astro Hack Week, University of Washington.

An astronomer's introduction to Gaussian processes, 2014, Bayesian Computing for Astronomical Data Analysis (Summer school at Penn State University).

Popular open-source software

emcee — 1188 stars / 403 forks

The Python ensemble sampling toolkit for affine-invariant MCMC [docs]

exoplanet — 148 stars / 41 forks

Fast & scalable MCMC for all your exoplanet needs! [docs]

corner.py — 368 stars / 197 forks

Make some beautiful corner plots [docs]

celerite2 — 40 stars / 4 forks

Fast & scalable Gaussian Processes in one dimension [docs]

celerite — 172 stars / 38 forks

Scalable 1D Gaussian Processes in C++, Python, and Julia [docs]

daft — 612 stars / 115 forks

Render probabilistic graphical models using matplotlib [docs]

Grants

NSF-CDS&E (PI: Agol) *Development of fast, multi-dimensional Gaussian Processes for Exoplanet discovery and beyond*, $471,048.00, 2019–2022

NSF-AAG (PI: Agol), *Collaborative Research: Masses and architectures of (potentially habitable) exoplanet systems*, $491,950, 2016–2018

K2 Guest Observer – Cycle 3 (PI: Penny), *Free-Floating and Bound Planet Mass Measurements with K2: Ground- and Space-Based Photometry, Event Detection and Modeling*, $84,000, 2016–2017

K2 Guest Observer – Cycle 3 (PI: Hogg), *Ultra-precise photometry in crowded fields: A self-calibration approach*, $100,000, 2016–2017

XSEDE (PI: Foreman-Mackey), *A systematic search for transiting exoplanets using K2*, 100,000 CPU hours, 2015–2016

Honors

Kavli Fellow, 2015.

Sagan Postdoctoral Fellowship, 2015–2017.

James Arthur Graduate Fellowship, 2014.

Horizon Fellowship in the Natural & Physical Sciences, 2012.

Henry M. MacCracken Fellowship, 2010.
NSERC Undergraduate Summer Research Award, 2007.

Professional service & activities
Topic Editor — Journal of Open Source Software
Active Referee — AAS Journals, MNRAS, PASP, Journal of Statistical Software, Journal
  of Open Source Software