Daniel Foreman-Mackey

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Center for Cosmology and Particle Physics, Department of Physics, New York University
Citizenship: Canadian

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.

Academic awards

James Arthur Graduate Fellowship (2014)
Horizon Fellowship in the Natural & Physical Sciences (2012)
Henry M. MacCracken Fellowship (2010)
NSERC Undergraduate Summer Research Award (2007)

Refereed publications

Weisz, D. R., Johnson, L. C., **Foreman-Mackey, D.**, *et al.*, 2015, *The High-Mass Stellar Initial Mass Function in M31 Clusters*, ApJ accepted, arXiv:1502.06621

Bernhard Schölkopf, B., Hogg, D. W., Wang, D., **Foreman-Mackey, D.**, Janzing, D., Simon-Gabriel, C.-J., & Peters, J., 2015, International Conference on Machine Learning accepted, (arXiv:1505.03036)

Foreman-Mackey, D., Montet, B. T., Hogg, D. W., Morton, T. D., Wang, D., & Schölkopf, B., 2015, *A systematic search for transiting planets in the K2 data*, ApJ accepted, (arXiv:1502.04715)

Barclay, T., Quintana, E. V., Adams, F. C., *et al.* (incl. DFM), 2015, *The Five Planets in the Kepler-296 Binary System All Orbit the Primary: A Statistical and Analytical Analysis* ApJ accepted, (arXiv:1505.01845)

Angus, R., Aigrain, S., **Foreman-Mackey, D.**, & McQuillen, A., 2015, *Calibrating gyrochronology using Kepler asteroseismic targets*, MNRAS, **450**, 1787 (arXiv:1502.06965)

Barclay, T., Endl, M., Huber, D., **Foreman-Mackey, D.**, *et al.*, 2014, *Radial Velocity Observations and Light Curve Noise Modeling Confirm That Kepler-91b is a Giant Planet Orbiting a Giant Star*, ApJ, **800**, 46 (arXiv:1408.3149)

Foreman-Mackey, D., Hogg, D. W., & Morton, T. D., 2014, *Exoplanet population inference and the abundance of Earth analogs from noisy, incomplete catalogs* ApJ, **795**, 64 (arXiv:1406.3020)

Dawson, R. I., Johnson, J. A., Fabrycky, D. C., **Foreman-Mackey, D.**, *et al.*, 2014, *Large Eccentricity, Low Mutual Inclination: The Three-dimensional Architecture of a Hierarchical System of Giant Planets* ApJ, **791**, 89 (arXiv:1405.5229)

Dorman, C. E., Widrow, L. M., Guhathakurta, P., Seth, A. C., **Foreman-Mackey, D.**, *et al.*, 2013, *A New Approach to Detailed Structural Decomposition from the SPLASH and PHAT Surveys: Kicked-up Disk Stars in the Andromeda Galaxy?*, ApJ, **779**, 103 (arXiv:1310.4179)

Weisz, D. R., *et al.*, 2013, *The Panchromatic Hubble Andromeda Treasury. IV. A Probabilistic Approach to Inferring the High-mass Stellar Initial Mass Function and*

Other Power-law Functions, ApJ, **762**, 123 (arXiv:1211.6105)

Brewer, B. J., **Foreman-Mackey, D.**, & Hogg, D. W., 2013, *Probabilistic Catalogs for Crowded Stellar Fields*, AJ, **146**, 7 (arXiv:1211.5805)

Foreman-Mackey, D., Hogg, D. W., Lang, D., & Goodman, J., 2013, *emcee: The MCMC Hammer*, PASP, **125**, 306 (arXiv:1202.3665)

Unrefereed publications & white papers

Montet, B. T., Morton, T. D., **Foreman-Mackey, D.**, *et al.*, 2015, *Stellar and Planetary Properties of K2 Campaign 1 Candidates and Validation of 18 Systems, Including a Planet Receiving Earth-like Insolation*, submitted to ApJ, arXiv:1503.07866

Ambikasaran, S., **Foreman-Mackey, D.**, Greengard, L., Hogg, D. W., & O'Neil, M., 2014, *Fast Direct Methods for Gaussian Processes*, submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence*, arXiv:1403.6015

Montet, B. T., *et al.*, 2014, *Maximizing Kepler science return per telemetered pixel: Searching the habitable zones of the brightest stars*, arXiv:1309.0654

Hogg, D. W., *et al.*, 2014, *Maximizing Kepler science return per telemetered pixel: Detailed models of the focal plane in the two-wheel era*, arXiv:1309.0653

Recent talks & tutorials

The search for single transits, 2015, Sagan Fellows Symposium, Caltech.

Inferring exoplanet populations from noisy, incomplete catalogs, 2015, TESS group meeting, MIT.

Inferring exoplanet populations from noisy, incomplete catalogs, 2015, Institute for Advanced Study, Princeton.

Increasing the sensitivity of Kepler to Earth-like exoplanets, 2015, AAS225, Seattle.

Licenses in the wild, 2015, AAS225, Seattle.

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

An astronomer's introduction to Gaussian processes, 2014, Astronomy Department, University of Texas, Austin.

Inferring exoplanet populations from noisy, incomplete catalogs, 2014, Astronomy Department, University of Texas, Austin.

Inferring exoplanet populations from noisy, incomplete catalogs, 2014, Astronomy Department, University of Washington.

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

Inferring exoplanet populations from noisy, incomplete catalogs, 2014, Physics Department, University of Delaware.

Inferring exoplanet populations from noisy, incomplete catalogs, 2014, Physics Department, Queen's University, Kingston, Canada.

Exoplanet population inference, 2014, Max-Planck-Institut für Astronomie, Heidelberg, Germany.

Hierarchical inference for astronomers, 2014, Strasbourg Observatory, France.

Exoplanet population inference, 2014, ExoStat conference, Carnegie Mellon University.

An astronomer's introduction to Gaussian processes, 2014, Bayesian Computing for
   Astronomical Data Analysis (Summer school at Penn State University).
The rate of Earth analogs, 2014, NASA Ames.
An astronomer's introduction to Gaussian processes, 2014, Harvard–Smithsonian Center for
   Astrophysics.
Large-scale systematic characterization of transiting exoplanets, 2014, Astronomy
   Department, Oxford University.
Practical data analysis using MCMC, 2014, Astronomy Department, University of
   Hertfordshire.
Practical data analysis using MCMC, 2013, Astronomy Department, UCSC.
From pixels to aliens (Public Talk), 2013, Astronomy on Tap, NYC.
A noise model for Kepler light curves, 2013, MPIA, Heidelberg, Germany.
Data analysis using MCMC, 2013, Astronomy Department, Columbia University.
Probabilistic detection of exoplanet candidates, 2013, CCPP, NYU.
Data analysis using MCMC, 2013, Physics Department, Vanderbilt University.

Popular open-source software
emcee — MCMC sampling in Python. Popular in astronomy; the paper has 319 citations
   as of 2015-05-12. `dfm.io/emcee`
George — Blazingly fast Gaussian processes for regression. Implemented in C++ and
   Python bindings. Joint work with applied mathematicians at NYU. `dfm.io/george`
triangle.py — Simple corner plots (or scatterplot matrices) in Python.
   `github.com/dfm/triangle.py`

Professional service & activities
American Astronomical Society — Full Member
Active Referee — Astrophysical Journal, Astronomical Journal, Journal of Statistical
   Software