

Robert C. Morehead— Curriculum Vitae

Department of Physics & Astronomy
Texas Tech University
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Education

The Pennsylvania State University
Doctoral Candidate, Astronomy & Astrophysics
Dissertation: *Understanding Exoplanet Populations with Simulation-Based Methods*
Advisor: Eric B. Ford
University Park, PA
2013 – 2016

University of Florida
Master of Science, Astronomy
Gainesville, FL
2009 – 2013

Columbia University
Bachelor of Science, Astrophysics
New York, NY
2006 – 2009

South Puget Sound Community College
Olympia, WA
2004 – 2006

Research

Transiting exoplanets, multiple transiting planet systems and their architectures, planet population inference, planet candidate validation, approximate Bayesian computation

Research Experience

Preston Gott Observatory
Observatory Director
Lubbock, TX
2016 -

The Pennsylvania State University
Graduate Research Assistant
University Park, PA
2015 - 2016

The Pennsylvania State University
National Science Foundation Graduate Research Fellow
University Park, PA
2013 – 2016

University of Florida
National Science Foundation Graduate Research Fellow
Gainesville, FL
2011 – 2013

The University of Florida
 Graduate Research Assistant

Gainesville, FL
 2011

Teaching Experience

Texas Tech University Instructor ASTR 1400 Solar System Astronomy ASTR 2401 Observational Astronomy	Lubbock, TX 2016-
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The Pennsylvania State University Instructor of Record Astronomy 001 The Astronomical Universe	University Park, PA 2015
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Center for Astrostatistics Workshop Assistant Bayesian Computing for Astronomical Data Analysis Workshop	University Park, PA 2014
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University of Florida Co-Instructor Python Coding for Astronomers Workshop	Gainesville, FL 2012
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University of Florida Graduate Teaching Assistant AST 1022L Astronomy Laboratory Instructor 6 Sections AST 3018 Astronomy and Astrophysics 1 Assistant 1 Section AST 2037 Life in the Universe Guest Lectures	Gainesville, FL 2009 - 2010
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Awards and Honors

Homer F. Braddock and Nellie H. and Oscar L. Roberts Fellowship	2013
National Science Foundation Graduate Research Fellowship	2011
Ruth Hay and Hans Schrader Astronomy Fellowship	2009
Phi Theta Kappa	2005

Public Outreach

The Pennsylvania State University
Outreach Committee Member (2 years)

University Park, PA
2013-Pesent

AstroNight 2013, 2014, and 2015

Multiple astronomy demonstrations and presentations for
300-500 community members

AstroFest 2014, 2015

Four night event with multiple astronomy demonstrations
and presentations for 2,000+ community members

Planetarium Volunteer

30-60 minute programs on the night sky

Gainesville, FL
2009-2013

University of Florida

Outreach Committee Member (3 years)

Public Observing Volunteer

Comets, Meteors, and Meteorites School Visit

Wiles Elementary School 2013

Highsprings Community School 2011

Starry Night 2009, 2010, 2011, 2012

Multiple astronomy demonstrations and presentations for
1,000 – 3,000 community members

New York, NY
2007-2009

Columbia University

Public Observing Volunteer

Public Talks:

Strange New Worlds: The Planets of the Kepler Mission

Central Pennsylvania Observers, State College, PA

October 2013

Ferguson Observatory, Sonoma County, CA

May 2012

Alachua Astronomy Club, Gainesville, FI

November 2011

Podcast:

Tides: More Than What Floats Your Boat

International Year of Astronomy 365 Days of
Astronomy Podcast, May 2009

Professional Activities

Referee:

The Astrophysical Journal

Memberships:

The American Astronomical Society

The American Physical Society

The *Kepler* Multibody/Transit Timing Variation Working Group

The Statistical and Applied Mathematical Sciences Institute's Bayesian
Characterization of Exoplanet Populations Group

Lead Developer:

SimpleABC, a Python package for approximate Bayesian computation,
<https://github.com/rcmorehead/simpleabc>

Organizing Committee Chair:

The Emerging Researchers in Exoplanet Science Symposium,
University Park, PA, May 28-29, 2015

Appearances at Conferences, Schools, and Symposia

Invited Talks:

SimpleABC: A Python Package for Approximate Bayesian Computation
Statistics and Exoplanets Hackday, IAU General Assembly, Honolulu, HI,
August 2015

Contributed Talks:

*Architectures of Kepler Planet Systems with Approximate Bayesian
Computation*, Emerging Researchers in Exoplanet Science
Symposium II, Ithaca, NY, June 2016

*Implications for the False-Positive Rate in Kepler Planet Systems from
Transit Duration Ratios*, Emerging Researchers in Exoplanet Science
Symposium, University Park, PA, May 2015

*Implications for the False-Positive Rate in Kepler Planet Systems from
Transit Duration Ratios*, American Astronomical Society, AAS Meeting #225,
Seattle, WA, January 2015

Simple-ABC: A Python Package for Approximate Bayesian Computation,
2nd Workshop on Modern Statistical and Computational Methods for
Analysis of Kepler Data, Pittsburgh, PA, USA, June 2014

The Mutual Inclination Distribution of Kepler Multiple Planet Systems and Testing Stellar Cohabitation, Exoplanets in Multi-Body Systems in the Kepler Era, Aspen, CO, February 2013

Telescope Experience

Rosemary Hill Observatory 0.8m
Exoplanet transit photometry

Gran Telescopio CANARIAS 10.0m
Multicolor photometry, exoplanet transit photometry (queue observing)

MDM Observatory 2.1m
MDM Observatory 1.3m

Teaching and Public Outreach Observatories:
The Preston Gott Observatory
The Pennsylvania State University Observatory
University of Florida Campus Teaching Observatory
Rutherford Observatory, Columbia University

Publications

Peer-Reviewed Publications with Significant Contribution

Vetting Kepler Planet Candidates in the Sub-Jovian Desert with Multiband Photometry

Colón, K. D., **Morehead, R. C.**, Ford, E. B.

Monthly Notices of the Royal Astronomical Society, Volume 452, Issue 3, pp. 3001-3009 (2015).

Transit Timing Observations from Kepler - VII. Confirmation of 27 Planets in 13 Multiplanet Systems via Transit Timing Variations and Orbital Stability

Steffen, J. H., Fabrycky, D. C., Agol, E., et al. (including **Morehead, R. C.**)

Monthly Notices of the Royal Astronomical Society, Volume 428, Issue 2, pp. 1077-1087 (2013).

Constraining the False Positive Rate for Kepler Planet Candidates with Multicolour Photometry from the GTC

Colón, K. D., Ford, E. B., **Morehead, R. C.**

Monthly Notices of the Royal Astronomical Society, Volume 426, Issue 1, pp. 342-353. (2012).

Transit Timing Observations from Kepler. II. Confirmation of Two Multiplanet Systems via a Non-Parametric Correlation Analysis

Ford, E. B., Fabrycky, D. C., Steffen, J. H., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 750, Issue 2, article id. 113, 18 pp. (2012).

Architecture and Dynamics of Kepler's Candidate Multiple Transiting Planet Systems

Lissauer, J. J., Ragozzine, D., Fabrycky, D. C., et al. (including **Morehead, R. C.**)
The Astrophysical Journal Supplement, Volume 197, Issue 1, article id. 8,
26 pp. (2011).

The Distribution of Transit Durations for Kepler Planet Candidates and Implications for Their Orbital Eccentricities

Moorhead, A. V., Ford, E. B., **Morehead, R. C.**, et al.
The Astrophysical Journal Supplement, Volume 197, Issue 1, article id. 1,
15 pp. (2011).

A Closely Packed System of Low-Mass, Low-Density Planets Transiting Kepler-11

Lissauer, J. J., Fabrycky, D. C., Ford, E. B., et al. (including **Morehead, R. C.**)
Nature, Volume 470, Issue 7332, pp. 53-58 (2011).

Kepler-9: A System of Multiple Planets Transiting a Sun-Like Star, Confirmed by Timing Variations

Holman, M. J., Fabrycky, D. C., Ragozzine, D., et al. (including **Morehead, R. C.**)
Science, Volume 330, Issue 6000, pp. 51-54 (2010).

Five Kepler Target Stars That Show Multiple Transiting Exoplanet Candidates

Steffen, J. H., Batalha, N. M., Borucki, W. J., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 725, Issue 1, pp. 1226-1241 (2010).

Discovery of a Low-Mass Companion to a Metal-Rich F Star with the MARVELS Pilot Project

Fleming, S. W., Ge, J., Mahadevan, S., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 718, Issue 2, pp. 1186-1199 (2010).

Other Peer-Reviewed Publications

Architecture of Kepler's Multi-Transiting Systems II. New Investigations with Twice as Many Candidates

Fabrycky, D. C., Lissauer, J. J., Ragozzine, D., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 790, Issue 2, article id. 146, 12 pp. (2014).

Planetary Candidates Observed by Kepler IV: Planet Sample from Q1-Q8 (22 Months)

Burke, C. J., Bryson, S. T., Mullally, F., et al. (including **Morehead, R. C.**)
The Astrophysical Journal Supplement, Volume 210, Issue 2,
article id. 19, 12 pp. (2014).

Planet Occurrence within 0.25 AU of Solar-Type Stars from Kepler

Howard, A. W., Marcy, G. W., Bryson, S. T., et al. (including **Morehead, R. C.**)
The Astrophysical Journal Supplement, Volume 201, Issue 2,
article id. 15, 20 pp. (2012).

Almost All of Kepler's Multiple-Planet Candidates Are Planets

Lissauer, J. J., Marcy, G. W., Rowe, J. F., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 750, Issue 2, article id. 112, 15 pp. (2012).

Kepler's First Rocky Planet: Kepler-10b

Batalha, N. M., Borucki, W. J., Bryson, S. T., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 729, Issue 1, article id. 27, 21 pp. (2011).

Ground-Based Multisite Observations of Two Transits of HD 80606b

Shporer, A., Winn, J. N., Dreizler, S., et al. (including **Morehead, R. C.**)
The Astrophysical Journal, Volume 722, Issue 1, pp. 880-887 (2010).

Conference Abstracts

Architectures of Kepler Planet Systems with Approximate Bayesian Computation

Morehead, R. C., Ford, E. B.

American Astronomical Society, ESS meeting #3, #118.05 (2015).

Using Approximate Bayesian Computation to Probe Multiple Transiting Planet Systems

Morehead, R. C.

IAU General Assembly, Meeting #29, #2257552 (2015).

New Constraints on the False Positive Rate for Short-Period Kepler Planet Candidates

Colón, K. D., **Morehead, R. C.**, Ford, E. B.

American Astronomical Society, AAS Meeting #225, #105.03 (2015).

Implications for the False-Positive Rate in Kepler Planet Systems from Transit Duration Ratios

Morehead, R. C., Ford, E. B.

American Astronomical Society, AAS Meeting #225, #105.02 (2015).

A Test of Stellar Cohabitation in Multiple Transiting Planet Systems

Morehead, R. C., Ford, E. B.

American Astronomical Society, AAS Meeting #221, #343.04 (2013).

Enhancing Multiple-Transiting Planet System Validation with Transit Duration Ratios

Morehead, R. C., Ford, E. B., Prša, A., et al.

American Astronomical Society, ESS meeting #2, #28.01 (2011).

Validation of Candidate Multiple-Transiting Planet Systems and Assessing Possible False Positives Based on Photometric Observables

Morehead, R., Ford, E. B., Kepler Science Team

American Astronomical Society, AAS Meeting #217, #140.09 (2011).

The Distribution of Orbital Eccentricities for Kepler Planet Candidates

Moorhead, A., Ford, E. B., **Morehead, R.**, et al.

American Astronomical Society, AAS Meeting #217, #103.06 (2011).

The Architectures of Planetary Systems from Transit Observations

Ford, E. B., Fabrycky, D. C., Holman, M. J., et al. (including **Morehead, R. C.**)

American Astronomical Society, AAS Meeting #217, #103.05; Bulletin of the American Astronomical Society, Vol. 43, (2011).

Status of a Program Monitoring Optical Lunar Surface Transients

Crotts, A. P. S., Berger, A., Cecil, G., et al. (including **Morehead, R. C.**)

40th Lunar and Planetary Science Conference, id.2373 (2009).