

Elizabeth Bailey

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EDUCATION

Ph.D. (Expected June 2020) Planetary Science, California Institute of Technology

thesis advisor: Prof. Konstantin Batygin

S.B. Mathematics, Massachusetts Institute of Technology

Spring 2014

RESEARCH INTERESTS

Broad interests in planetary science, with a focus on orbital and interior dynamics. Recent work has used numerical and analytic techniques to address the origins of hot Jupiters and the interior dynamics of Uranus and Neptune. Additional interests include galaxy dynamics, planetary surface morphology, and the origin of life.

ACADEMIC APPOINTMENTS

Heising Simons Foundation 51 Pegasi b Fellow, University of California, Santa Cruz **starting July 2020**

NASA FINESST Graduate Fellow, California Institute of Technology **2019-present**

Graduate Research Assistant, California Institute of Technology **2014-2019**

Undergraduate Research Assistant, Massachusetts Institute of Technology **2012-2014**

SELECTED HONORS AND AWARDS

Heising-Simons Foundation 51 Pegasi b Postdoctoral Fellowship **2020**

Raynor Duncombe Prize for Outstanding Research in Dynamical Astronomy, AAS/DDA **Spring 2018**

Earth-Life Science Institute (ELSI) travel award, Tokyo Institute of Technology **Winter 2016**

TEACHING EXPERIENCE

Graduate Teaching Assistant, Caltech

Planetary Structure and Evolution, Geo 131 - graduate level course **Spring 2018**

Astrobiology, Geo/Astro 159 - graduate level. Designed and supervised student research projects. **Spring 2018**

Planetary Physics, Geo/Astro 137 - graduate level course **Winter 2017**

Introduction to Earth and Environment, Geo 1 - undergraduate level course **Spring 2016**

Undergraduate Teaching Assistant, MIT

6.163 Strobe Project Lab (high-speed imaging lab) **Spring 2013**

PUBLICATIONS

E. Bailey, K. Batygin, & S. Naoz (*in review*), Long-term tidal evolution of the highly eccentric hot Jupiter HAT-P-2b.

E. Bailey, K. Batygin (2018), The hot Jupiter period-mass distribution as a signature of in situ formation, *The Astrophysical Journal Letters*, 866:1

E. Bailey, M. E. Brown, K. Batygin (2018), Feasibility of a resonance-based search for Planet Nine, *The Astronomical Journal*, 156:2

B. A. Black, J. T. Perron, D. Hemingway, **E. Bailey**, F. Nimmo, and H. Zebker (2017), Global drainage patterns and the origins of topographic relief on Earth, Mars, and Titan, *Science*, 356:6339, 727-731

E. Bailey, K. Batygin, & M. E. Brown (2016), Solar obliquity induced by Planet Nine, *The Astronomical Journal*, 152:5

OUTREACH

Caltech FUTURE of Physics symposium - Presentation to undergraduate womxn considering applying to graduate programs in the physical sciences - “Dynamics of Planetary Systems” **Fall 2019**
SMARTnight, Hamilton Elementary, Pasadena Unified School District - Presentation to k-12 students, “Planet Nine and the Solar System” **Spring 2019**
Presentation to Girl Scout Troop 775 - “Planetary Tour” - received honorary troop membership **Spring 2018**
Lunch talk to fellow tenants of San Gabriel Valley Management - “All About Planet Nine” **Summer 2017**
Exhibit Docent - Memphis Zoo, Memphis, Tennessee. Designed and performed regular public lectures focusing on specific planet-scale impacts of human activity on biodiversity, with a focus on individual actions. **2008-2009**
Exhibit Docent - Pink Palace Museum of cultural and natural history, Memphis, Tennessee. **2007**

CAMPUS ENGAGEMENT

“Healthy Love is...” campaign, Caltech campus - Created campus-wide passive programming campaign, in collaboration with the Caltech Office of Equity and Title IX, to alert Caltech community members to the common signs of domestic abuse, and direct individuals to resources. **2019-2020**
Caltech Student Life & Housing Faculty Board committee - student representative **2017-2018**

PROFESSIONAL SERVICE

Referee for *MNRAS*, *A&A*
 Reviewer for National Research, Development and Innovation Office (NRDI), Hungary

SELECTED PRESS

“Scientists Question Popular Planet Formation Theory” - Sky and Telescope **Winter 2019**
“‘Hot Jupiter’ Exoplanets May be Born Uncomfortably Close to Their Stars”- Discover Magazine **Winter 2019**
“The mysterious ‘Planet Nine’ might be causing the whole solar system to wobble”- Washington Post **Summer 2016**
“Planet Nine may have tilted entire solar system except the sun”- New Scientist **Summer 2016**

INVITED LECTURES

International Space Science Institute, Bern, 2nd Ice Giants Workshop **March 2, 2020**
University of California, Santa Cruz, Planetary Lunch Seminar **December 2, 2019**
University of California, Los Angeles, Planetary Science Seminar **June 7, 2019**
Interstellar Probe Exploration Workshop, Explorers Club, NYC **October 11, 2018**

CONFERENCE PRESENTATIONS

E. Bailey, D. J. Stevenson. Thermodynamically Governed Interior Models of Uranus and Neptune. AGU Fall Meeting, San Francisco, CA, USA, December 2019.
E. Bailey, K. Batygin, S. Naoz. The Multiple Origins of Hot Jupiters. EPSC-DPS Joint Meeting, Geneva, Switzerland, September 2019.
E. Bailey, D. J. Stevenson. Thermodynamically Governed Interior Models of Uranus and Neptune. EPSC-DPS Joint Meeting, Geneva, Switzerland, September 2019.
E. Bailey, K. Batygin. The hot Jupiter period-mass distribution as a signature of in-situ formation. AAS/Division on Dynamical Astronomy (DDA) Meeting, Boulder, CO, USA, June 2019.
E. Bailey, K. Batygin. The hot Jupiter period-mass distribution as a signature of in-situ formation. Meeting of the American Astronomical Society (AAS), Seattle, WA, USA, January 2019.

P. C. Brandt, R. L. McNutt Jr, K. Mandt, [and 83 others, including **E. Bailey**]. Interstellar Probe: The Compelling Science Case, Strawman Payload and Resources. AGU Fall Meeting, Washington, DC, USA, December 2018.

E. Bailey, K. Batygin. The hot Jupiter period-mass distribution as a signature of in-situ formation. AAS/Division for Planetary Science (DPS) Meeting, Knoxville, TN, USA, October 2018.

E. Bailey, S. Naoz, K. Batygin. Probing the parameters of the HAT-P-2 system. AAS/Division on Dynamical Astronomy (DDA) Meeting, San Jose, CA, USA, April 2018.

E. Bailey, D. J. Stevenson. Impactor-Delivered Versus Home-Grown Amino Acids in the Prebiotic Earth Environment. AGU Fall Meeting, New Orleans, LA, USA, December 2017.

E. Bailey, M. E. Brown, K. Batygin. Mean-Motion Resonances and the Search for Planet Nine. AAS/Division for Planetary Science (DPS) Meeting, Provo, UT, USA, October 2017.

E. Bailey, M. E. Brown, K. Batygin. The Role of Resonances in the Search for Planet Nine. AAS Division on Dynamical Astronomy (DDA) Meeting, London, June 2017.

E. Bailey, K. Batygin, M. E. Brown. Solar Obliquity Induced by Planet Nine. AAS/Division for Planetary Sciences (DPS) Meeting, Pasadena, CA, USA, October 2016.

E. Bailey, D. J. Stevenson. Quantifying impactor delivery of amino acids during the timespan relevant to emergence of life. Fourth ELSI International Symposium, Tokyo, Japan, January 2016.

E. Bailey, D. J. Stevenson. Modeling Ice Giant Interiors Using Constraints on the H₂-H₂O Critical Curve. AGU Fall Meeting, San Francisco, CA, USA, December 2015.

E. Bailey, S. Tikoo, O. Jagoutz, L. Royden, B. P. Weiss. New paleomagnetic results from Ladakh, Western Himalaya support multi-stage collision scenario between India and Eurasia. AGU Fall Meeting, San Francisco, CA, USA, December 2014.

M. Sori, **E. Bailey**, J. T. Perron, P. J. Huybers, O. Aharonson, A. Limaye. Ages and Accumulation Rates of the Martian Polar Layered Deposits Estimated From Orbital Tuning. AGU Fall Meeting, San Francisco, CA, USA, December 2013.