

# Elizabeth Bailey

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## EDUCATION

- Ph.D. Planetary Science**, California Institute of Technology **2020**  
Dissertation: *Interior and Orbital Dynamics at the Innermost and Outermost Reaches of Planetary Systems*  
*co-advisors*: Profs. K. Batygin, D. J. Stevenson
- S.B. Mathematics**, Massachusetts Institute of Technology **2014**  
Thesis (in Earth, Atmospheric, and Planetary Science): *Testing models of ultra-fast India-Asia convergence: new paleomagnetic results from Ladakh, Western Himalaya*  
*advisor*: Prof. B. P. Weiss

## ACADEMIC APPOINTMENTS

- Heising-Simons Foundation 51 Pegasi b Postdoctoral Fellow** **2020-present**  
University of California, Santa Cruz - Department of Astronomy & Astrophysics
- NASA FINESST Graduate fellow** **2019-2020**  
California Institute of Technology - Division of Geological and Planetary Sciences
- Graduate research assistant** **2014-2019**  
California Institute of Technology - Division of Geological and Planetary Sciences
- Undergraduate research assistant** **2012-2014**  
Massachusetts Institute of Technology - Department of Earth, Atmospheric, and Planetary Sciences

## SELECTED HONORS AND AWARDS

- Raynor Duncombe Prize for Outstanding Research in Dynamical Astronomy**, AAS/DDA **2018**  
**Earth-Life Science Institute (ELSI) travel award**, Tokyo Institute of Technology **2016**

## FIRST-AUTHOR PUBLICATIONS

4. **Bailey, E.** & D. J. Stevenson, (2021). Thermodynamically governed interior models of Uranus and Neptune, *The Planetary Science Journal*, 2 64 <https://doi.org/10.3847/PSJ/abd1e0>
3. **Bailey, E.**, K. Batygin (2018), The hot Jupiter period-mass distribution as a signature of in situ formation, *The Astrophysical Journal Letters*, 866:1, L2 <https://doi.org/10.3847/2041-8213/aade90>
2. **Bailey, E.**, M. E. Brown, K. Batygin (2018), Feasibility of a resonance-based Planet Nine search, *The Astronomical Journal*, 156:2 <https://doi.org/10.3847/1538-3881/aaccf4>
1. **Bailey, E.**, K. Batygin, & M. E. Brown (2016), Solar obliquity induced by Planet Nine, *The Astronomical Journal*, 152:5 <https://doi.org/10.3847/0004-6256/152/5/126>

## ADDITIONAL PUBLICATIONS

2. Martin, C. R., O. Jagoutz, R. Upadhyay, L. H. Royden, M. P. Eddy, **E. Bailey**, C. I. O. Nichols, B. P. Weiss (2020). Paleocene latitude of the Kohistan-Ladakh arc indicates multi-stage India-Eurasia collision. *PNAS* 117:47; pp. 29487-29494 <https://doi.org/10.1073/pnas.2009039117>
1. Black, B. A., 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 <https://doi.org/10.1126/science.aag0171>

## TEACHING EXPERIENCE

### Graduate Teaching Assistant, Caltech

Astrobiology [Geo/Astro 159]. Graduate level course.

Designed and supervised student research projects.

Spring 2018

Planetary Structure and Evolution [Geo 131]. Graduate level course.

Graded assignments and led office hour discussions.

Spring 2018

Planetary Physics [Geo/Astro 137]. Graduate level course.

Graded assignments and led office hour discussions.

Winter 2017

Introduction to Earth and Environment [Geo 1]. Undergraduate level course.

Graded assignments, ran hands-on laboratory demonstrations,

Carried out 1-on-1 instruction in the field.

Spring 2016

### Undergraduate Teaching Assistant, MIT

6.163 Strobe Project Lab. (high-speed imaging)

Ran hands-on student lab-based classes in the outreach-focused MIT Edgerton Center.

Spring 2013

## INVITED LECTURES

**Yale Department of Astronomy**, Exoplanet and Stellar Astrophysics Seminar

Upcoming Spring 2021

**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

**Exoplanetary Science Initiative (ESI) Symposium**, NASA Jet Propulsion Laboratory

March 25, 2019

**Interstellar Probe Exploration Workshop**, Explorers Club, NYC

October 11, 2018

## SELECTED OUTREACH

SkypeAScientist

Fall 2020-ongoing

**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

Departmental team member - AIP TEAM-UP program

January 2021-present

Co-organizer, UC Santa Cruz Planetary Lunch Seminar ("Plunch")

2020-present

Domestic violence awareness campaign, Caltech campus

2019-2020

Caltech Student Life & Housing Faculty Board committee - student representative

2017-2018

## PROFESSIONAL SERVICE

Referee for *MNRAS*, *A&A*, *PSJ*

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

<b>“Their Stars”</b> - Discover Magazine	<b>Winter 2019</b>
<b>“The mysterious ‘Planet Nine’ might be causing the whole solar system to wobble”</b> - Washington Post	<b>Summer 2016</b>
<b>“Planet Nine may have tilted entire solar system except the sun”</b> - New Scientist	<b>Summer 2016</b>

## CONFERENCE ABSTRACTS

C. Martin, O. E. Jagoutz, R. Upadhyay, L. Royden, M. P. Eddy, **E. Bailey**, C. I. O. Nichols, B. P. Weiss. Paleocene latitude of the Kohistan-Ladakh Arc indicates multi-stage India-Eurasia Collision. Geological Society of America 2020 Annual Meeting.

**E. Bailey**. Investigating the Possible Role of Chitin Deposition in the Shuram-Wonoka  $\delta^{13}\text{C}$  Excursion. AGU Fall Meeting, San Francisco, CA/Zoom, December 2020.

C. Martin, O. E. Jagoutz, R. Upadhyay, L. Royden, M. P. Eddy, **E. Bailey**, C. I. O. Nichols, B. P. Weiss. Paleocene Latitude of the Kohistan-Ladakh Arc Indicates Multi-Stage India-Eurasia Collision. AGU Fall Meeting, San Francisco, CA/Zoom, December 2020.

**E. Bailey**, D. J. Stevenson. Hydrogen-water demixing in the deep interiors of Uranus and Neptune: Implications for heat flow and atmospheric composition. Bay Area Planetary Science Meeting, 2020.

**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 H<sub>2</sub>-H<sub>2</sub>O 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.