Emily Sandford

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Appointments

Gonville & Caius College, University of Cambridge, Cambridge, UK
Research Fellow 2020 - Present

Education

Columbia University, New York, NY
Ph.D., Astronomy 2020
Dissertation: "The Shapes of Planet Transits and Planetary Systems"
Supervisor: Prof. David Kipping
M.A., M.Phil., Astronomy 2016, 2017
Supervisors: Prof. David Kipping, Prof. Kathryn Johnston, Dr. Andreas Küpper

Yale University, New Haven, CT
B.Sc., Physics, Cum Laude, with distinction in the Physics major 2014
Supervisor: Prof. Marla Geha

Publications

11. **E. Sandford**, D. Kipping, & M. Collins. The Multiplicity Distribution of *Kepler*'s Exoplanets. MNRAS, 2019, 489, 3162.
10. **E. Sandford**, N. Espinoza, R. Brahm, & A. Jordán. Estimation of Singly-Transiting K2 Planet Periods with Gaia Parallaxes. MNRAS, 2019, 489, 3149.
9. Z. Penoyre & **E. Sandford**. Higher Order Harmonics in the Light Curves of Eccentric Planetary Systems. MNRAS, 2019, 488, 4181.
8. Z. Penoyre & **E. Sandford**. The Spaceline: A Practical Space Elevator Alternative Achievable with Current Technology. In prep.
7. **E. Sandford** & D. Kipping. Shadow Imaging of Transiting Objects. AJ, 2019, 157, 42.
6. D. Kipping, **E. Sandford**, & T. Jansen. Over 2000 *Kepler* Phase Curves from `Phasma`. RNAAS, 2018 2b, 14.
5. **E. Sandford** & D. Kipping. Know the Planet, Know the Star: Precise Stellar Densities from *Kepler* Transit Light Curves. AJ, 2017, 154, 288.
4. **E. Sandford**, A. H. W. Küpper, K. V. Johnston, & J. Diemand. Quantifying Tidal Stream Disruption in a Simulated Milky Way. MNRAS, 2017, 470, 522.
3. D. Kipping, C. Cameron, J. D. Hartman, J. R. A. Davenport, J. M. Matthews, D. Sasselov, J. Rowe, R. J. Siverd, J. Chen, **E. Sandford** et al. No Conclusive Evidence for Transits of Proxima b in MOST Photometry. AJ, 2017, 153, 93.
2. D. Kipping & **E. Sandford**. Observational Biases of Transiting Planets. MNRAS, 2016, 463, 1323.
1. D. Kipping, G. Torres, C. Henze, A. Teachey, H. Isaacson, E. Petigura, G. W. Marcy, L. A. Buchhave, J. Chen, S. T. Bryson, & **E. Sandford**. A Transiting Jupiter Analog. ApJ, 2016, 820, 112.

Scientific Talks

11. On Planetary Systems as Ordered Sequences. Invited seminar, Yale University, March 2021.
10. Computational Linguistics for Exoplanetary Systems. Invited talk, Machine Learning in Science & Engineering, Columbia University Data Science Institute, December 2020.
9. Shadow Imaging of Transiting Objects. Invited seminar, University of California, Berkeley, August 2020.
8. Planetary Systems as Ordered Sequences. Invited seminar, University of Cambridge, October 2019.
7. Linguistic Modeling of *Kepler*'s Exoplanets. Contributed talk, Extreme Solar Systems IV, Reykjavik, Iceland, August 2019.
6. Shadow Imaging of Transiting Objects. Invited seminar, Pennsylvania State University Center for Exoplanets and Habitable Worlds, March 2019.
5. How to Read a Light Curve. Seminar, Cambridge Institute of Astronomy, January 2019.
4. Shadow Imaging of Transiting Objects. Contributed talk, Diversis Mundi, Santiago, Chile, March 2018.
3. Shadow Imaging of Transiting Objects. Invited seminar, Pontifícia Universidad Católica de Chile, Santiago, Chile, March 2018.
2. Know the Star, Know the Planet: Precise Stellar Parameters with *Kepler*. Contributed talk, Kepler/K2 Science Conference IV, Mountain View, CA, June 2017.
1. Know the Star, Know the Planet: Precise Stellar Parameters with *Kepler*. Contributed talk, 229th Meeting of the American Astronomical Society, Grapevine, TX, January 2017.

Posters

3. Shadow Imaging of Transiting Objects. Exoplanets II, Cambridge, UK, July 2018.
2. Machine Learning Identification of Dwarf Galaxy Satellites around Milky Way Analogs. 223rd Meeting of the American Astronomical Society, Washington, DC, January 2014; Tri-State Astronomy Conference, City University of New York, September 2013.
1. The Distribution of Wolf-Rayet Stars in NGC 6744. 221st Meeting of the American Astronomical Society, Long Beach, CA, January 2013.

Teaching and Advising

Research Mentor, American Museum of Natural History Science Research Mentoring Program 2017-2018
Project: The Kepler Atlas, an interactive 3D model of *Kepler*'s exoplanet discoveries
Students advised: Christopher Ambrus, Catherine Atalig, James Hamue, and Caroline Klewinowski

Instructor:	Columbia University Astronomy UN1904, Astronomy Lab II	2016-2017
	Astronomy UN1903, Astronomy Lab I	2015
T.A.:	Astronomy W3986, Astrostatistics (with Prof. D. Kipping)	Fall 2016
	Astronomy W4260, Modeling the Universe (with Prof. M. Mac-Low)	Fall 2016
	Astronomy W1753, Another Earth (with Prof. D. Schiminovich)	Spring 2015

Awards/Prizes

Columbia University President's Global Innovation Fund Grant, for study in Santiago, Chile	2018
Columbia University Dean's Fellowship	2014 - 2020
Honorable Mention, National Science Foundation Graduate Research Fellowship	2016
American Astronomical Society Chambliss Student Poster Award	2014
Yale College Dean's Office Science, Technology, and Research Scholars Fellowship	2013 - 2014
National Merit Scholarship	2010 - 2014

Open-Source Code Development

Lead developer:

`EightBitTransit`, a `Python` package which generates light curves of arbitrary transiting shapes, and infers the transiting shape which produced an arbitrary light curve. 2018

Contributing developer:

`single`, a `Python` package which fits single-transit events using stellar density information 2019

`OoT`, a `Python` package which generates self-consistent planet light curves including transits, secondary eclipses, tides, reflections, and relativistic beaming. 2019

`SEDBuilder`, a `Python` package which collates archival photometric data points for any object with a 2MASS ID and generates its SED. 2018

Kepler Atlas, a `javascript`-implemented interactive 3D model of *Kepler*'s exoplanet discoveries. 2018

Public Outreach

Cool Worlds YouTube channel contributor 2016 - Present

Cambridge Creative Encounters 2020

Cambridge Behind the Curtains 2020

Sky & Telescope freelance contributor 2018

Astrobites staff writer 2016 - 2018

Columbia Astronomy public outreach talk, "Oh, the Planets You'll Go!" 2017

Service

Astrobites editorial committee chair 2018 - 2019

Astrobites vision committee chair 2018 - 2019

Columbia Astronomy graduate student representative to faculty meetings 2017 - 2019

Columbia Astrophysics Laboratory computing committee member 2017 - 2018

Mentor, Columbia Astronomy graduate mentorship program 2016 - 2018

Columbia Astronomy graduate admissions committee member 2016 - 2017