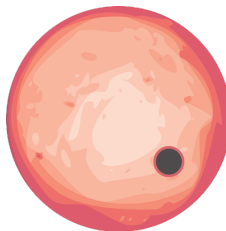


# Zachory K. Berta-Thompson

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## Research Interests:

I use small telescopes to discover transiting exoplanets and large telescope to study these planets' atmospheres. My work makes practical advances toward the long-term goal of searching for life around other stars.

## Teaching Statement:

My goal is to nurture seeds of curiosity into lifelong scientific mindsets. I believe engaging hands-on with the beautiful mysteries of the Universe is the best way for students of diverse backgrounds and strengths to cultivate a passion for discovery and a willingness to explore.

## Academic Experience:

University of Colorado at Boulder, Assistant Professor, 2016–  
Massachusetts Institute of Technology, Torres Fellow for Exoplanet Research, 2013–2016  
Harvard University, Ph.D. in Astronomy, 2008–2013  
Princeton University, A. B. in Astrophysical Sciences with Highest Honors, 2003–2007

## Ongoing Collaborations:

Co-I on the JWST Transiting Exoplanet Community Early Release Science Program (2017–)  
Collaborator on the NASA Transiting Exoplanet Survey Satellite (TESS) science team (2013–)  
Collaborator on the MEarth Project, a search for planets transiting nearby small stars (2008–)

## Honors:

NSF CAREER Award (2020–)  
MIT Spot Awards, for Art of Astrophysics & Astrophysics Outreach events (2014 & 2015)  
Induction to Rockford Public Schools Hall of Fame, Rockford, MI (2014)  
First Place Student Poster Prize at Cool Stars 17 in Barcelona, Spain (2012)  
Harvard University Certificate of Distinction in Teaching (spring 2010 & spring 2011)  
Harvard University Merit Fellowship (2011)  
Princeton Alumni Weekly "Tiger of the Week" (2009)  
Election to Sigma Xi & Phi Beta Kappa (2007)

## Favorite Telescopes:

*Small Telescopes (essential for discovery and confirmation of interesting new exoplanets):*  
extensive experience using small (<0.5m) telescopes for published academic research  
*Large Space Telescopes (essential for characterization of exoplanet atmospheres):*  
substantial experience observing with the Hubble & Spitzer Space Telescopes

**Talks:**

invited Rocky Exoplanets in the Era of JWST, NASA Goddard, Nov. 2019  
invited AAS, Denver, CO, Jun. 2018  
invited Planet Habitability and the Search for Life, Leiden, Netherlands, Apr. 2018  
invited Bay Area Exoplanets Meeting, NASA Ames, Mountain View, CA, Mar. 2018  
colloquium University of California Berkeley, Berkeley, CA, Mar. 2018  
colloquium Jet Propulsion Lab Astrophysics, Pasadena, CA, Feb. 2018  
contributed AAS, National Harbor, MD, Jan. 2018  
invited Habitable Worlds 2017, Laramie, WY, Nov. 2017  
colloquium University of California Los Angeles, Los Angeles, CA, Jun. 2017  
invited Breakthrough Discuss, Stanford, CA, Apr. 2017  
colloquium University of Texas Austin, TX, Apr. 2017  
colloquium University of Wyoming, WY, Mar. 2017  
contributed Exoclines, Quest University, British Columbia, Canada, Aug. 2016  
invited Exoplanets I Conference, Davos, Switzerland, Jul. 2016  
invited University of Toledo Colloquium, Toledo, OH, Apr. 2016  
invited Harvard-Smithsonian Small-Scale Seminar, Cambridge, MA, Feb. 2016  
invited MIT Physics IAP Colloquium, Cambridge, MA, Jan. 2016  
contributed Extreme Solar Systems, Waikoloa, HI, Dec. 2015  
invited TESS Team Meeting, Cambridge, MA, Sep. 2015  
contributed From Super-Earths to Brown Dwarfs, IAP, Paris, France, Jun. 2015  
invited CHEOPS Science Workshop, Madrid, Spain, Jun. 2015  
colloquium University of Washington Astrophysics, Seattle, WA, May 2015  
invited TESS Team Meeting, Cambridge, MA, May 2015  
invited Hogg/Blanton group meeting, NYU, New York, NY, Mar. 2015  
invited Atmosphere Science (CHEOPS, TESS, K2) workshop, Berlin, Mar. 2015  
colloquium Amherst College, Physics & Astronomy, Amherst, MA, Nov. 2014  
colloquium JHU/STScI Planets, Life, & the Universe Lecture, Baltimore, MD, Nov. 2014  
colloquium Université de Montréal Astronomy Dept., Montréal, Canada, Oct. 2014  
invited Observatoire Astronomique Exoplanet Seminar, Geneva, Switz., Jun. 2014  
invited Boston University Space Physics Seminar, Boston, MA, Mar. 2014  
contributed AAS, Washington, DC, Jan. 2014  
contributed AAS, Long Beach, CA, Jan. 2013  
contributed MIT Astrophysics Brown Bag Lunch Talk, Cambridge, MA, Dec. 2012  
invited Brown Astrophysics Seminar Series, Providence, RI, Nov. 2012  
contributed Extreme Solar Systems, Jackson Hole, WY, Sep. 2011  
colloquium Wellesley College REU Summer Colloquium, Wellesley, MA, Aug. 2011  
colloquium Harvard-Smithsonian REU Summer Colloq., Cambridge, MA, Jun. 2011  
invited Low-Mass Stellar Science (Large Surveys), AAS, Boston, MA, May 2011  
invited Habitability of Terrestrial Planets, AAS, Seattle, WA, Jan. 2011  
invited NASA Goddard Space Flight Center Exoplanets Club, Nov. 2010  
invited TESS Team Meeting, Washington, D.C., Jan. 2010  
contributed American Astronomical Society (AAS), Washington, D.C., Jan. 2010  
contributed Unsinkable Planets Exeter Exoplanet Workshop, Exeter, U. K., Sep. 2009

### Posters:

Transiting Exoplanets with JWST, STScI, Baltimore, MD, Nov. 2015  
Exoplanet Statistics Focus Meeting, IAU, Honolulu, HI, Aug. 2015  
AAS, Boston, MA, Jun. 2014  
Habitable Worlds across Space & Time, Baltimore, MD, Apr. 2014  
Exoclimates III, Davos, Switzerland, Feb. 2014  
Cool Stars 17, Barcelona, Spain, Jun. 2012  
AAS, Seattle, WA, Jan. 2011  
Towards Other Earths, Porto, Portugal, Oct. 2009

### Teaching Experience:

CU Boulder — ASTR1030: an accelerated introduction to modern astrophysics & planetary science, emphasizing quantitative reasoning, scientific thought, and interactive engagement with astrophysical concepts through labs and telescope observations (S17, F19)  
CU Boulder — ASTR2600: an introduction to scientific computing in Python, emphasizing creativity and curiosity in coding as a craft, making use of in-class computational tutorials and a final N-body gravitational dynamics project to synthesize techniques (F16, S19)  
CU Boulder — ASTR3400: an undergraduate course in astronomical research methods, with a focus on hands-on discovery with data from the Kepler and TESS telescopes; see [zkbt.github.io/henrietta/](https://zkbt.github.io/henrietta/) for more details (F18)  
CU Boulder — ASTR5810: a graduate-level introduction to planetary atmospheres, emphasizing important concepts for understanding Earth, Solar System, and exoplanet atmospheres and hands-on practice with grad school research skills (F17, S20)  
MIT — “Crafting the Cosmos”, Independent Activities Period, (January 2016)  
creating a new six-session non-credit course for MIT undergrads, designed to pair basic astrophysics concepts (e.g. the curvature of space-time) with hands-on craft activities (knitting the Schwarzschild metric with yarn), intended to inspire student creativity and to develop a growth mindset ([bit.ly/craftingcosmos](https://bit.ly/craftingcosmos))  
Teaching Assistant:  
Harvard Univ. “Methods of Observational Astronomy” (F10, S11)  
developing a hands-on astrophysics lab course with Prof. Edo Berger and co-leading field trips to use professional telescopes at Mt. Hopkins, AZ  
Princeton Univ. “The Universe (Astro for Non-Majors)” (S06, S07)  
leading sections & tutoring, Profs. Chris Chyba, Michael Strauss, J. Richard Gott

### Refereed Publications:

(as Z. K. Berta until 2013)

**(48)** J. Libby-Roberts, **Z. K. Berta-Thompson** and 10 others, “The Featureless Transmission Spectra of Two Super-puff Planets”, 2020, *The Astronomical Journal*, 159, 2.

**(47)** C. Lamman, C. Baranec, **Z. K. Berta-Thompson** and 10 others, “Robo-AO M Dwarf Multiplicity Survey: Catalog”, accepted 2020, arXiv:2001.05988.

**(46)** J. Rodriguez and many others including **Z. K. Berta-Thompson** “The First Habitable Zone Earth-Sized Planet From TESS II: Spitzer Confirms TOI-700 d”, submitted 2020, arXiv:2001.00954

- (45) H. Diamond-Lowe, **Z. K. Berta-Thompson**, D. Charbonneau, J. Dittmann, E. Kempton, "Simultaneous Optical Transmission Spectroscopy of a Terrestrial, Habitable-Zone Exoplanet with Two Ground-Based Multi-Object Spectrographs", submitted 2019, arXiv:1909.09104.
- (44) I. Crossfield and many others including **Z. K. Berta-Thompson** "A Super-Earth and Sub-Neptune Transiting the Late-type M Dwarf LP 791-18", 2019, *The Astrophysical Journal Letters*, 883, 1.
- (43) W. Waalkes, **Z. K. Berta-Thompson**, and 6 others "Ly $\alpha$  in the GJ 1132 System: Stellar Emission and Planetary Atmospheric Evolution", *The Astronomical Journal*, 158, 1.
- (42) L. Bouma and many others including **Z. K. Berta-Thompson** "WASP-4b Arrived Early for the TESS Mission", 2019, *The Astronomical Journal*, 157, 6.
- (41) A. Shporer and many others including **Z. K. Berta-Thompson** "TESS Full Orbital Phase Curve of the WASP-18b System", 2019, *The Astronomical Journal*, 157, 5.
- (40) C. Froning and 12 others including **Z. K. Berta-Thompson** "A Hot Ultraviolet Flare on the M Dwarf Star GJ 674", 2019, *The Astrophysical Journal Letters*, 871, 2.
- (39) R. Vanderspeck and 46 others including **Z. K. Berta-Thompson**, "TESS Discovery of an ultra-short-period planet around the nearby M dwarf LHS 3844", 2019, *The Astrophysical Journal Letters*, 871, 2.
- (38) K. Ment and 29 others including **Z. K. Berta-Thompson**, "A second planet with an Earth-like composition orbiting the nearby M dwarf LHS 1140", 2019, *The Astronomical Journal*, 157, 1.
- (37) E. Kempton and many others including **Z. K. Berta-Thompson**, "A Framework for Prioritizing the TESS Planetary Candidates Most Amenable to Atmospheric Characterization", 2018, *Publications of the Astronomical Society of the Pacific*, 130, 993.
- (36) J. Bean, K. Stevenson, N. Batalha, **Z. K. Berta-Thompson**, and many others, "The Transiting Exoplanet Community Early Release Science Program for JWST", 2018, *Publications of the Astronomical Society of the Pacific*, 130, 993.
- (35) K. Collins and many others including **Z. K. Berta-Thompson**, "The KELT Follow-up Network and Transit False-positive Catalog: Pre-vetted False Positives for TESS", 2018, *The Astronomical Journal*, 156, 5, 234.
- (34) J. Irwin, D. Charbonneau, G. Esquerdo, D. Latham, J. Winters, J. Dittmann, E. Newton, **Z. K. Berta-Thompson**, P. Berlind, M. Calkins, "Four New Eclipsing Mid M-dwarf Systems from the New Luyten Two Tenths Catalog", 2018, *The Astronomical Journal*, 156, 4, 140.
- (33) X. Bonfils and 21 others including **Z. K. Berta-Thompson**, "Radial velocity follow-up of GJ1132 with HARPS. A precise mass for planet b and the discovery of a second planet", 2018, *Astronomy & Astrophysics*, 618, A142.
- (32) H. Diamond-Lowe, **Z. K. Berta-Thompson**, D. Charbonneau, E. Kempton, "Ground-based Optical Transmission Spectroscopy of the Small, Rocky Exoplanet GJ 1132b", 2018, *The Astronomical Journal*, 156, 2, 42.
- (31) F. Dai, J. Winn, **Z. K. Berta-Thompson**, R. Sanchis-Ojeda, S. Albrecht, "Stellar Obliquity and Magnetic Activity of Planet-hosting Stars and Eclipsing Binaries Based on Transit Chord Correlation", 2018, *The Astronomical Journal*, 155, 4, 177.

- (30) J. A. Dittmann, J. Irwin, D. Charbonneau, X. Bonfires, N. Astudillo-Defru, R. Haywood, **Z. K. Berta-Thompson**, E. R. Newton, J. Rodriguez, J. Winters, T-G. Tan, J-M. Almenara, F. Bouchy, X. Delfosse, T. Forveille, C. Lovis, F. Murgas, F. Pepe, N. Santos, S. Udry, "A temperate rocky super-Earth transiting a nearby cool star", 2017, *Nature*, 544, 7650, 333
- (29) A. Youngblood, K. France, R. O. P. Loyd, A. Brown, J. Mason, C. Schneider, M. Tilley, **Z. K. Berta-Thompson**, A. Buccino, C. Froning, S. Hawley, J. Linsky, P. Mauas, S. Redfield, A. Kowalski, Y. Miguel, E. Newton, S. Rugheimer, A. Segura, A. Roberge, "The MUSCLES Treasury Survey IV: Scaling Relations for Ultraviolet, Ca IIR, and Energetic Particle Fluxes from M Dwarfs", 2017, *The Astrophysical Journal*, 843, 1, 31.
- (28) J. A. Dittmann, J. Irwin, D. Charbonneau, **Z. K. Berta-Thompson**, E. R. Newton, "A Search for Additional Bodies in the GJ 1132 Planetary System from 21 Ground-based Transits and a 100 Hour Spitzer Campaign", 2017, *The Astrophysical Journal*, 154, 4, 142.
- (27) J. A. Dittmann, J. Irwin, D. Charbonneau, **Z. K. Berta-Thompson**, E. Newton, D. Latham, C. Latham, G. Esquerdo, P. Berlind, M. Calkins, "Discovery and Precise Characterization by the MEarth Project of LP661-13, an Eclipsing Binary Consisting of Two Fully Convective Low-mass Stars", 2017, *The Astrophysical Journal*, 836, 1, 124
- (26) L. Schaefer, R. Wordsworth, **Z. K. Berta-Thompson**, D. Sasselov, "Predictions of the Atmospheric Composition of GJ 1132b", 2016, *The Astrophysical Journal*, 829, 2, 63
- (25) E. R. Newton, J. Irwin, D. Charbonneau, **Z. K. Berta-Thompson**, J. A. Dittmann, "The Impact of Stellar Rotation on the Detectability of Habitable Planets around M Dwarfs", 2016, *The Astrophysical Journal Letters*, 821, 1, L19
- (24) **Z. K. Berta-Thompson**, J. Irwin, D. Charbonneau, E. R. Newton, J. A. Dittmann, N. Astudillo-Defru, X. Bonfils, M. Gillon, E. Jehin, A. A. Stark, B. Stalder, F. Bouchy, X. Delfosse, T. Forveille, C. Lovis, M. Mayor, V. Neves, F. Pepe, N. C. Santos, S. Udry, A. Wunsche "A rocky planet transiting a nearby low-mass star", 2015, *Nature*, 527, 204-207
- (23) E. R. Newton, J. Irwin, D. Charbonneau, **Z. K. Berta-Thompson**, J. A. Dittmann, A. A. West "The rotation and Galactic kinematics of mid M dwarfs in the Solar Neighborhood", *The Astrophysical Journal*, 821, 2, 93
- (22) A. West, K. Weisenbruger, J. Irwin, **Z. K. Berta-Thompson**, J. Dittmann, J. S. Pineda "An Activity-Rotation Relationship and Kinematic Analysis of Nearby Mid-to-Late-type M Dwarfs", 2015, *The Astrophysical Journal*, 812, 3
- (21) P. W. Sullivan, J. N. Winn, **Z. K. Berta-Thompson**, D. Charbonneau, D. Deming, C. D. Dressing, D. W. Latham, A. M. Levine, P. R. McCullough, T. Morton "The Transiting Exoplanet Survey Satellite: Simulations of Planet Detections and Astrophysical False Positives", 2015, *The Astrophysical Journal*, 807, 77
- (20) P. K. G. Williams, E. Berger, J. Irwin, **Z. K. Berta-Thompson**, D. Charbonneau, "Simultaneous Multiwavelength Observations of Magnetic Activity in Ultracool Dwarfs. IV. The Active, Young Binary NLTT 33370 AB (=2MASS J13142039+1320011)", 2015, *The Astrophysical Journal*, 799, 192
- (19) G. R. Ricker, J. N. Winn, R. Vanderspek and 58 others including **Z. K. Berta-Thompson**, "Transiting Exoplanet Survey Satellite," (2015), *Journal of Astronomical Telescopes, Instruments, and Systems* 1(1), 014003

- (18) J. Dittmann, J. Irwin, D. Charbonneau, **Z. K. Berta-Thompson**, "Trigonometric Parallaxes for 1507 Nearby Mid-to-late M Dwarfs" 2014, *The Astrophysical Journal*, 784, 156
- (17) L. Kreidberg, J. Bean, J.-M. Désert, B. Benneke, D. Deming, K. Stevenson, S. Seager, **Z. K. Berta-Thompson**, A. Seifahrt, D. Homeier, "Clouds in the atmosphere of the super-Earth exoplanet GJ1214", 2014, *Nature*, 505, 7841, 69-72
- (16) E. Newton, D. Charbonneau, J. Irwin, **Z. K. Berta-Thompson**, B. Rojas-Ayala, K. Covey, J. Lloyd, "Near-infrared Metallicities, Radial Velocities, and Spectral Types for 447 Nearby M Dwarfs" 2014, *The Astronomical Journal*, 147, 1
- (15) **Z. K. Berta**, J. Irwin, D. Charbonneau, "Constraints on Planet Occurrence around Nearby Mid-to-late M Dwarfs from the MEarth Project" 2013, *The Astrophysical Journal*, 775, 91
- (14) **Z. K. Berta**, J. Irwin, D. Charbonneau, C. Burke, E. Falco, "Transit Detection in the MEarth Survey of Nearby M Dwarfs: Bridging the Clean-First, Search-Later Divide" 2012, *The Astronomical Journal*, 144, 145
- (13) R. Foley, M. Kromer, H. Marion and 20 others including **Z. K. Berta**, "The First Maximum-light Ultraviolet through Near-infrared Spectrum of a Type Ia Supernova" 2012, *The Astrophysical Journal*, 753, 1
- (12) **Z. K. Berta**, D. Charbonneau, J.-M. Désert, E. Kempton, P. McCullough, C. Burke, J. Fortney, J. Irwin, P. Nutzman, D. Homeier "The Flat Transmission Spectrum of the Super-Earth GJ1214b from Wide Field Camera 3 on the Hubble Space Telescope" 2012, *The Astrophysical Journal*, 747, 35
- (11) J. Irwin, S. Quinn, **Z. K. Berta**, D. Latham, G. Torres, C. Burke, D. Charbonneau, J. Dittmann, G. Esquerdo, R. Stefanik, A. Oksanen, L. Buchhave, P. Nutzman, P. Berlind, M. Calkins, E. Falco, "LSPM J1112+7626: detection of a 41-day M-dwarf eclipsing binary from the MEarth transit survey" 2011, *The Astrophysical Journal*, 742, 123
- (10) J. Bean, J.-M. Désert, P. Kabath, B. Stalder, S. Seager, E. Kempton, **Z. K. Berta**, D. Homeier, S. Walsh, A. Seifahrt, "The Optical and Near-Infrared Transmission Spectrum of the Super-Earth Planet GJ1214b: Further Evidence for a Metal-Rich Atmosphere" 2011, *The Astrophysical Journal*, 743, 92
- (9) **Z. K. Berta**, D. Charbonneau, J. Bean, J. Irwin, C. J. Burke, J.-M. Désert, P. Nutzman, E. E. Falco, "The GJ1214 Super-Earth System: Stellar Variability, New Transits, and a Search for Additional Planets" 2011, *The Astrophysical Journal*, 736, 1
- (8) J.-M. Désert, J. Bean, E. Miller-Ricci Kempton, **Z. K. Berta**, D. Charbonneau, J. Irwin, J. Fortney, C. J. Burke, P. Nutzman, "Observational evidence for a metal rich atmosphere on the super-Earth GJ1214b" 2011, *The Astrophysical Journal Letters*, 731, 2
- (7) J. A. Carter, J. N. Winn, M. J. Holman, D. Fabrycky, **Z. K. Berta**, C. J. Burke, P. Nutzman, "The Transit Light Curve Project. XIII. Sixteen Transits of the Super-Earth GJ 1214b" 2011, *The Astrophysical Journal*, 730, 2
- (6) J. Irwin, **Z. K. Berta**, C. J. Burke, D. Charbonneau, P. Nutzman, A. A. West, E. E. Falco, "On the Angular Momentum Evolution of Fully Convective Stars: Rotation Periods for Field M-dwarfs from the MEarth Transit Survey" 2011, *The Astrophysical Journal*, 727, 56

- (5) J. Irwin, L. Buchhave, **Z. K. Berta**, and 13 others "NLTT 41135: A Field M Dwarf + Brown Dwarf Eclipsing Binary in a Triple System, Discovered by the MEarth Observatory" 2010, *The Astrophysical Journal*, 718, 2
- (4) D. Charbonneau, **Z. K. Berta**, J. Irwin, C. J. Burke, P. Nutzman, L. A. Buchhave, C. Lovis, X. Bonfils, D. W. Latham, S. Udry, R. A. Murray-Clay, M. J. Holman, E. E. Falco, J. N. Winn, D. Queloz, F. Pepe, M. Mayor, X. Delfosse, T. Forveille, "A super-Earth transiting a nearby low-mass star", 2009, *Nature*, 462, 7275
- (3) F. Pont, G. Hébrard, J. M. Irwin, and 24 others including **Z. K. Berta** "Spin-orbit misalignment in the HD 80606 planetary system" 2009, *Astronomy & Astrophysics*, 502, 2
- (2) J. Irwin, D. Charbonneau, **Z. K. Berta**, and 14 others "GJ 3236: A New Bright, Very Low Mass Eclipsing Binary System Discovered by the MEarth Observatory", 2009, *The Astrophysical Journal*, 701, 2
- (1) **Z. K. Berta**, R. Jimenez, A. F. Heavens, B. Panter, "The role of spin in the formation and evolution of galaxies" 2008, *Monthly Notices of the Royal Astronomical Society*, 391, 197