BENJAMIN T. MONTET

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SCIENTIFIC RESEARCH INTERESTS

Stellar activity and its evolution, data-driven methods to understand stars and their planetary systems, Planetary architectures and populations, M dwarfs and their companions

EDUCATION

2011-2016: California Institute of Technology, Pasadena, CA
Doctor of Philosophy in Astrophysics, defended July 2016
Thesis: "Low-mass Stars and their Companions"
Advisor: John Johnson
Master of Science, Astrophysics, received June 2013

2007-2011: University of Illinois at Urbana-Champaign, Urbana, IL
Bachelor of Science in Physics
Bachelor of Science in Astronomy
Minor in Mathematics
Graduated *summa cum laude*, Bronze Tablet (top 3% of graduating class)

APPOINTMENTS

2019-Present: *Lecturer and Scientia Fellow*, University of New South Wales, Sydney, NSW
2016-2019: *Carl Sagan Fellow*, University of Chicago, Chicago, IL
2014-2016: *Visiting Graduate Student*, Harvard University, Cambridge, MA
2013-2016: *NSF Graduate Research Fellow*, California Institute of Technology, Pasadena, CA
2011-2013: *Graduate Research Assistant*, California Institute of Technology, Pasadena, CA

STUDENTS ADVISED

University of Chicago (* denotes graduate student)
2018-Present: Adina Feinstein* (Chicago), *The* `eleanor` *pipeline for* TESS *Full-Frame Images*; *Using Neural Networks to Characterize Stellar Activity*
2018-2019: Aaron Hamann* (Chicago), *Orbital Precession in the K2-146 System* (with Dan Fabrycky)
2017-2019: Cho Yin Kong (Chicago), *Stellar Magnetic Activity across the Main Sequence*
2017-2018: Callista Christ (Chicago), TESS *Observations of the* Kepler *Field*
2017: Caleb Harada (Maryland), *Photometry of M Dwarfs in Young Moving Groups*
Banneker Institute, Harvard University
2016: Guadalupe Tovar (University of Washington), *Long-Term Photometric Variability in* Kepler
2015-2016: Justin Otor (Princeton), *The Mass and Orbit of Kepler-56d* (2015-2016)

PROPOSALS AND GRANTS

Total competitive funding awarded: $1,498,976 USD ($1,054,326 USD as PI/Science PI)

Principal Investigator, *TESS* Guest Investigator Proposal (Large subcategory)
Performing the Most Comprehensive Exoplanet Survey of the Southern Sky with *TESS* Full Frame Images; Uniform Light Curves Across The Entire Sky From TESS FFIs With eleanor
Awarded $200,000, 2018
Awarded $150,000, 2019

Science PI, NASA Astrophysics Data Analysis Program
Improving the Sensitivity of Radial Velocity Spectrographs with Data-Driven Techniques
Awarded $308,326, 2018

Carl Sagan Postdoctoral Fellowship, NASA Exoplanet Science Institute
Exploring the Diversity of Planetary Systems with *K2*
Awarded $316,000, 2016

Principal Investigator/Science PI on *K2* Proposals
Targeting M dwarfs with *K2*
16,049 targets successfully proposed in Campaigns 0-5, 2013-14
Awarded $75,000 in Campaign 4-5 (as Science PI)

Principal Investigator on *Spitzer* Proposal
LHS 6343: Precise Constraints on the Atmospheric Parameters of an Effectively Isolated Brown Dwarf
Awarded 22.2 hours $5,000, 2014

Co-Investigator on *TESS* Guest Investigator Proposals
Measuring Long Rotation Periods From TESS's Short Light Curves
Awarded $200,000, 2019 (PI Ruth Angus)
Searching For Planets In The Continuous Viewing Zone With TESS Full Frame Image Data
Awarded $50,000, 2018 (PI Elisa Quintana)
Awarded $50,000, 2019 (PI Veselin Kostov)

Co-Investigator on Hubble Space Telescope Proposal
Direct Test of the Brown Dwarf Evolutionary Models Through Secondary Eclipse Spectroscopy of LHS 6343
5 orbits awarded, 2015
Awarded $69,650 (PI John Johnson)

Co-Investigator on *Spitzer* Proposal
Eclipse Observations of a Temperate Transiting Brown Dwarf
Awarded 15.7 hours, 2016 (PI Thomas Beatty)

Co-Investigator on K2 Proposals
Revisiting a Successful Campaign: a Second Term Pursuing Transit Timing of *K2*-discovered Worlds
$35,000 awarded, 2017 (PI Dan Fabrycky)
There and Back Again: Revisiting *K2* Targets for Long-Period and Multiplanet Systems
$40,000 awarded, 2018 (PI Dan Fabrycky)

Competitive Telescope Time Awarded (as PI unless noted)
Gemini-North GRACES
0.7 nights awarded through Gemini FT, 2020 (PI Adina Feinstein)
Gemini-North DSSI
2.9 nights awarded through NOAO, 2014-2015
Gemini-South DSSI
0.7 nights awarded through NOAO, 2016
SMARTS CHIRON
1 night awarded through NOAO, 2015
FLWO TRES
16 nights awarded through CfA, 2014-2016
Magellan Telescopes
5 nights (MIKE, FIRE, PFS) awarded through University of Chicago, 2017-2019
Palomar Observatory PHARO
2 nights awarded through Caltech, 2013
Discovery Channel Telescope DSSI
9 nights awarded through Lowell Obervatory, 2014-15 (PI Evgenya Shkolnik)

TEACHING

Graduate Teaching Assistant, Harvard University
Spring 2015: Astronomy 120: Stellar Physics
Designed and led discussion section, created and graded assignments, created and graded exams

Graduate Teaching Assistant, California Institute of Technology
Spring 2013: Astronomy 1: The Evolving Universe
Designed and led discussion section, created original lectures, created and graded assignments
Winter 2013: Astronomy 126: Galactic Dynamics
Fall 2012: Astronomy 123: Stellar Structure and Evolution

Undergraduate Teaching Assistant, University of Illinois
Fall 2010-Spring 2011: Physics 102: E&M and Modern Physics (2 semesters)
Spring 2010: Physics 211: Mechanics (Laboratory Teaching Assistant)
August 2009-June 2011: Introductory Course Tutor, Department of Physics

Anacapa Visiting Scholar, The Thacher School, Ojai, CA (January, 2016)
Prepared and gave lectures in high school physics, multivariable calculus, and AP computer science
Led sky viewing at Thacher Campus Observatory
Lectured and led discussion about Planet Nine, open to all students

ACADEMIC SERVICE

Referee for (22 articles total)
Astrophysics and Space Science (2019-)
Astronomy and Astrophysics Letters (2017-)
Astronomy and Astrophysics (2016-)
Monthly Notices of the Royal Astronomical Society (2015-)
The Astrophysical Journal (2015-)
Publications of the Astronomical Society of the Pacific (2014-)
The Astronomical Journal (2014-)

Proposal Review Member for
NASA Keck Time Allocation Committee (3 semesters)
NSF Astronomy and Astrophysics Research Grants Program
K2 Guest Observer Program
NASA Earth and Space Science Fellowship Program

2020: SOC Member, "Expanding the Science of *TESS*" Meeting, Sydney
2019: SOC Chair, "Building Early Science with *TESS*" Meeting, Chicago
2019: Co-Organizer "Count all the photons! Best practices for extracting accurate light curves for all objects in the *TESS* FFIs", Splinter Session for TESS Science Conference, Cambridge, MA
2019-2021: MAST Users Group member
2016-2018: K2 Users' Panel Member
2016-2017: Deputy Chair
2017-2018: Chair
2018: SOC Member, "Preparing for *TESS*" Meeting, NYC
2017: K2 Data Re-reduction Table Top Review Panel member
2016: TESS Input Catalog Review Panel member
2016-2017: Exoplanet Journal Club organizer, University of Chicago
2015-2016: Exoplanet Pizza Lunch co-organizer, Harvard-Smithsonian Center for Astrophysics
2012-2014: Astrobites, the Astro-Ph Reader's Digest contributor
All posts can be viewed at www.astrobites.org/author/bmontet

OUTREACH

2017-2019: Astronomy Conversations presenter, Adler Planetarium, Chicago
2017: Astronomy on Tap presenter, Chicago
2017: Contributor, Sky and Telescope
The Most Mysterious Star in the Galaxy, June 2017 (with T. S. Boyajian)
2011-2014: Caltech Astronomy Outreach Volunteer
Visited local classrooms, hosted star viewing parties in downtown Pasadena, helped organize eclipse/transit of Venus observations

HONORS AND AWARDS

Carl Sagan Fellowship, 2016-2019
First prize, SciPy John Hunter Excellence in Plotting Contest, July 2015
NSF Graduate Research Fellowship, May 2012
Chambliss Medal for outstanding poster presentation, 223rd AAS meeting, January 2013
Robert Hetrick Outstanding Senior Thesis Award, UIUC Physics, May 2011
UIUC List of Teachers Ranked as Excellent, Three Semesters
Twice listed as "Outstanding," the highest ranking conferred
Stanley Wyatt Memorial Award (Outstanding Student in Astronomy), May 2011
UIUC Campus Honors Program Outstanding Senior Award, July 2010
Phi Beta Kappa member, Fall 2009

FIRST-AUTHOR AND STUDENT-LED REFEREED PUBLICATIONS

From all papers: 12 first author; 9 second author; NASA ADS h-index of 21; Listed in acknowledgements of an additional 36 papers

15. *Flare Statistics for Young Stars from a Convolutional Neural Network Analysis of* TESS *Data*
Feinstein, A. D., **Montet, B. T.**, et al. 2020, AAS Journals submitted (arXiv:2005.07710)

14. *The Young Planet DS Tuc Ab has a Low Obliquity*
Montet, B. T., **Feinstein, A. D.**, et al. 2020, AJ, 159, 112 (arXiv:1912.03794)

13. *eleanor: An open-source tool for extracting light curves from the* TESS *Full-Frame Images*
Feinstein, A. D., **Montet, B. T.**, et al. 2019, PASP, 131, 094502 (arXiv:1903.09152)

12. *K2-146: Discovery of Planet c, Precise Masses from Transit Timing, and Observed Precession*
Hamann, A. C., **Montet, B. T.**, et al. 2019, AJ, 158, 133 (arXiv:1907:10620)

11. *Observations of the* Kepler *Field with* TESS: *Predictions for Planet Yield and Observable Features*
Christ, C. N., **Montet, B. T.**, & Fabrycky, D. C. 2019, AJ, 157, 235 (arXiv:1810.02826)

10. *Long Term Photometric Variability in* Kepler *Full Frame Images: Magnetic Cycles of Sun-Like Stars*
Montet, B. T., **Tovar, G.**, & Foreman-Mackey, D. 2017, ApJ, 851, 116 (arXiv:1705.07928)

9. *Measuring the Galactic Distribution of Transiting Planets with* WFIRST
Montet, B. T., Yee, J. C., & Penny, M. T. 2017, PASP, 129, 044401 (arXiv:1610.03067)

8. *The Orbit and Mass of the Third Planet in the Kepler-56 System*
Otor, O. J., **Montet, B. T.**, et al. 2016, AJ, 152, 165 (arXiv:1608.03627)

7. *KIC 8462852 Faded Throughout the* Kepler *Mission*
Montet, B. T. & Simon, J. D., 2016, ApJL, 830, 39 (arXiv:1608.01316)

6. *Benchmark Transiting Brown Dwarf LHS 6343 C:* Spitzer *Secondary Eclipse Observations Yield Brightness Temperature and Mid-T Spectral Class*
Montet, B. T., Johnson, J. A., Fortney, J. J., & Desert, J.-M. 2016, ApJL, 822, 6 (arXiv:1603.09343)

5. *Dynamical Masses of Young M Dwarfs: Masses and Orbital Parameters of GJ 3305 AB, the Wide Binary*

Companion to the Imaged Exoplanet Host 51 Eri
Montet, B. T., Bowler, B. P., Shkolnik, E. L., et al. 2015, ApJL, 813, 11 (arXiv:1508.05945)

4. *Stellar and Planetary Properties of K2 Campaign 1 Candidates and Validation of 18 Systems, Including a Planet Receiving Earth-like Insolation*
Montet, B. T., Morton, T. D., Foreman-Mackey, D., et al. 2015, ApJ, 809, 25 (arXiv:1503.07866)

3. *Characterizing the Cool KOIs. VII. Refined Physical Properties of the Transiting Brown Dwarf LHS 6343 C*
Montet, B. T., Johnson, J. A., Muirhead, P. S., et al. 2015, ApJ, 800, 134 (arXiv:1411.4047)

2. *The TRENDS High-contrast Imaging Survey. IV. The Occurrence Rate of Giant Planets around M Dwarfs*
Montet, B. T., Crepp, J. R., Johnson, J. A., et al. 2014, ApJ, 781, 28 (arXiv:1307.5849)

1. *Model-independent Stellar and Planetary Masses from Multi-transiting Exoplanetary Systems*
Montet, B. T. & Johnson, J. A. 2013, ApJ, 762, 112 (arXiv:1211.4028)

OTHER REFEREED PUBLICATIONS

45. *TOI-1338: TESS' First Transiting Circumbinary Planet*
Kostov, V. B., et al. 2020, AJ, 159, 253 (arXiv:2004.07783)

44. *The TRENDS High-contrast Imaging Survey. VIII. Compendium of Benchmark Objects*
Gonzales, E., et al. 2020, ApJ, 893, 27

43. *The Sun is less active than other solar-like stars*
Reinhold, T., et al. 2020, Science, 368, 518 (arXiv:2005.01401)

42. *Wobble: a Data-driven Analysis Technique for Time-series Stellar Spectra*
Bedell, M., et al. 2019, AJ, 158, 164 (arXiv:1808.03652)

41. *Characterization of Low Mass* K2 *Planet Hosts Using Near-Infrared Spectroscopy*
Rodríguez Martínez, R., et al. 2018, AJ, 158, 135 (arXiv:1901.00503)

40. *A Super-Earth and two sub-Neptunes transiting the bright, nearby, and quiet M-dwarf TOI-270*
Gunther, M. N., et al., 2019, Nature Astronomy, 3, 1099 (arXiv:1903.06107)

39. *The L 98-59 System: Three Transiting, Terrestrial-Sized Planets Orbiting a Nearby M-dwarf*
Kostov, V. B., et al. 2019, AJ, 158, 32 (arXiv:1903.08107)

38. *Sounding stellar cycles with Kepler - III. Comparative analysis of chromospheric, photometric, and asteroseismic variability*
Karoff, C., Metcalfe, T. S., **Montet, B. T.**, et al. 2019, MNRAS, 485, 5096 (arXiv:1902.02172)

37. *Transits of Inclined Exomoons - Hide and Seek and an Application to Kepler-1625*
Martin, D. V., Fabrycky, D. C., and **Montet, B. T.**, 2019, ApJL, 875, 25 (arXiv:1901.06366)

36. *A Significant Over-Luminosity in the Transiting Brown Dwarf CWW 89 Ab*
Beatty, T. G., et al. 2018, AJ, 156, 168 (arXiv:1807.11500)

35. *Retired A Stars Revisited: An Updated Giant Planet Occurrence Rate as a Function of Stellar Metallicity and Mass*
Ghezzi, L, **Montet, B. T.**, and Johnson, J. A. 2018, ApJ, 860, 109 (arXiv:1804.09082)

34. *The* GALEX *View of Boyajian's Star*
Davenport, J. R. A., et al. 2017, ApJ, 853, 130 (arXiv:1712.04948)

33. *The influence of metallicity on stellar differential rotation and magnetic activity*

Karoff, C., et al. 2017, ApJ, 852, 46 (arXiv:1711.07716)

32. *Chromospheric Activity of HAT-P-11: An Unusually Active Planet-hosting K Star*
Morris, B. M., et al. 2017, ApJ, 848, 58 (arXiv:1709.03913)

31. *Where Is the Flux Going? The Long-Term Photometric Variability of Boyajian's Star*
Simon, J. D., et al. 2017, ApJ, 853, 77 (arXiv:1708.07822)

30. *The Multiplicity of M-Dwarfs in Young Moving Groups*
Shan, Y., et al. 2017, ApJ, 846, 93 (arXiv:1706.07095)

29. *Disentangling Time-series Spectra with Gaussian Processes: Applications to Radial Velocity Analysis*
Czekala, I., et al. 2017, ApJ, 840, 49 (arXiv:1702.05652)

28. *The TRENDS High-Contrast Imaging Survey. VI. Discovery of a Mass, Age, and Metallicity Benchmark Brown Dwarf*
Crepp, J. R., et al. 2016, ApJ, 831, 136 (arXiv:1604.00398)

27. *Magnetic Field Strengths in Photodissociation Regions*
Balser, D. S., et al. 2016, ApJ, 816, 22 (arXiv:1511.07383)

26. *Tests of the planetary hypothesis for PTFO 8-8695b*
Yu, L., et al. 2015, ApJ, 812, 48 (arXiv:1509.02176)

25. *The Five Planets in the Kepler-296 Binary System All Orbit the Primary: A Statistical and Analytical Analysis*
Barclay, T., et al. 2015, ApJ, 809, 7 (arXiv:1505.01845)

24. *Characterizing the Cool KOIs VIII. Parameters of the Planets Orbiting Kepler's Coolest Dwarfs*
Swift, J. J., **Montet, B. T.**, et al. 2015, ApJS, 218, 26 (arXiv:1503.01115)

23. *A systematic search for transiting planets in the K2 data*
Foreman-Mackey, D., **Montet, B. T.**, et al. 2015, ApJ, 806, 215 (arXiv:1502.04715)

22. *Planets Around Low-mass Stars (PALMS). V. Age-dating Low-mass Companions to Members and Interlopers of Young Moving Groups*
Bowler, B. P., et al. 2015, ApJ, 806, 62 (arXiv:1505.01494)

21. *Characterizing K2 Planet Discoveries: A Super-Earth Transiting the Bright K Dwarf HIP 116454*
Vanderburg, A., **Montet, B. T.**, et al. 2015, ApJ, 800, 59 (arXiv:1412.5674)

20. *WASP-12b and HAT-P-8b are Members of Triple Star Systems*
Betcher, E. B., et al. 2014, ApJ, 788, 2 (arXiv:1307.6857)

19. *Friends of Hot Jupiters. I. A Radial Velocity Search for Massive, Long-period Companions to Close-in Gas Giant Planets*
Knutson, H. A., Fulton, B. J., **Montet, B. T.**, et al. 2014, ApJ, 785, 126 (arXiv:1312.2954)

18. *Stellar Spin-Orbit Misalignment in a Multiplanet System*
Huber, D., et al. 2013, Science, 342, 331 (arXiv:1310.4503)

17. *Characterizing the Cool KOIs. IV. Kepler-32 as a Prototype for the Formation of Compact Planetary Systems throughout the Galaxy*
Swift, J. J., et al. 2013, ApJ, 764, 105 (arXiv:1301.0023)

16. *The TRENDS High-Contrast Imaging Survey. I. Three Benchmark M Dwarfs Orbiting Solar-type Stars*

Crepp, J. R., et al. 2012, ApJ, 761, 39 (arXiv:1210.3000)

NON-REFEREED PUBLICATIONS

50. *"Auxiliary" Science with the WFIRST Microlensing Survey*
Astro2020 Decadal Survey White Paper
Gaudi, B. S. et al. 2019 (arXiv:1903.08986)

49. *A Statistical Comparative Planetology Approach to Maximize the Scientific Return of Future Exoplanet Characterization Efforts*
Astro2020 Decadal Survey White Paper
Checlair, J. H., et al. 2019 (arXiv:1903.05211)

48. *Unbiased inference of the masses of transiting planets from radial velocity followup*
Montet, B. T. 2018, RNAAS, 2, 28 (arXiv:1805.01906)

47. *Maximizing* Kepler *science return per telemetered pixel: Searching the habitable zones of the brightest stars*
A white paper submitted in response to the "*Kepler* Project Office Call for White Papers: Soliciting Community Input for Alternate Science Investigations for the *Kepler* Spacecraft"
Montet, B. T., et al. 2013 (arXiv:1309.0654)

46. *Maximizing* Kepler *science return per telemetered pixel: Detailed models of the focal plane in the two-wheel era*
A white paper submitted in response to the "*Kepler* Project Office Call for White Papers: Soliciting Community Input for Alternate Science Investigations for the *Kepler* Spacecraft"
Hogg, D. W., et al. 2013 (arXiv:1309.0653)

TALKS PRESENTED

Invited Seminars

Macquarie University (Macquarie Park, NSW, March 2020)
University of New South Wales (Sydney, NSW, October 2019)
Space Telescope Science Institute (Baltimore, MD, March 2019)
American Museum of Natural History (New York, NY, February 2019)
Flatiron Institute, Center for Computational Astrophysics (New York, NY, February 2019)
Northwestern University (Evanston, IL, January 2019)
Ohio State University (Columbus, OH, October 2018)
University of New South Wales (Sydney, Australia, September 2018)
McGill University (Montreal, Quebec, January 2018)
University of Notre Dame (South Bend, IN, October 2017)
Observatório Nacional (Rio de Janeiro, Brazil, July 2017)
University of Washington (Seattle, WA, December 2016)
MIT (Cambridge, MA, November 2016)
Northwestern University (Evanston, IL, November 2016)
Harvard-ITC Pizza Lunch Astrostatistics Series (Cambridge, MA, March 2016)
Planetary Science Seminar, Caltech (Pasadena, CA, January 2016)
Center for Integrative Planetary Science, UC Berkeley (Berkeley, CA, December 2015)
Boston University (Boston, MA, November 2015)
University of Chicago (Chicago, IL, October 2015)
University of Delaware (Newark, DE, September 2015)
NASA Ames Research Center (Mountain View, CA, June 2015)

Conference Invited Talks

Observing Long-Term Stellar Photometric Variability
Planet-Star Connections in the Era of TESS and Gaia, KITP (Santa Barbara, CA, May 2019)
Stellar Brightness Variations: building on the solar knowledge, Cool Stars 20 (Boston, MA, July 2018)

The Occurrence Rate of Giant Planets around M dwarfs
WFIRST Special Session, AAS 233 (Seattle, WA, January 2019)

Exoplanet Science with TESS

TASC4/KASC11 Meeting (Aarhus, Denmark, July 2018)

Transiting Planets from WFIRST

Sagan Workshop 2017 (Pasadena, CA, July 2017)

Targeting M Dwarfs with K2

Kepler Town Hall, AAS 224 (Boston, MA, June 2014)

Conference Contributed Talks

Observing Stellar Activity Cycles with Kepler

Stars in Melbourne Meeting (Melbourne, VIC, December 2019)
Sagan Fellow Symposium (Pasadena, CA, November 2017)
Bay Area Exoplanets Meeting (Mountain View, CA, September 2017)
Exoclipse 2017 (Boise, ID, August 2017)
OWL Summer Program (Santa Cruz, CA, July 2017)
Kepler Science Conference IV (Mountain View, CA, June 2017)

Improving the detection efficiency of small planets in transit and RV searches with data-driven approaches

2nd Rencontres du Vietnam on Exoplanetary Science (Quy Nhon, Vietnam, March 2018)

Finding Planetary Systems in TESS Full Frame Images

TESS Science Meeting (Cambridge, MA, February 2018)

Fundamental Parameters of M Dwarfs in Young Moving Groups

Cool Stars 19 (Uppsala, Sweden, June 2016)

Low-mass Stars and Their Companions

AAS 227 (Orlando, FL, January 2016)

Characterizing the Cooler KOIs with K2

K2 Science Conference (Santa Barbara, CA, November 2015)

Transit Timing Posteriors through Importance Sampling

IAU 2015 (Honolulu, HI, August 2015)

A Transit Timing Posterior Distribution Catalog for all Kepler *Planet Candidates*

AAS 225 (Seattle, WA, January 2015)

Transit Timing Posteriors through Importance Sampling

ExoStats 2014 (Carnegie Mellon University, June 2014)

Transit Timing Observations of a Heirarchical Triple M Dwarf System

AAS 224 (Boston, MA, June 2014)

LHS 6343: Precise Constraints on the Mass and Radius of a Transiting Brown Dwarf Discovered by Kepler

AAS 223 (National Harbor, MD, January 2014)

The Occurrence Rate of Giant Planets around M Dwarfs

Modern Statistical and Computational Methods for Analysis of *Kepler* data (SAMSI, Research Triangle Park, NC, June 2013)