Benjamin V. Rackham

Department of Astronomy • University of Arizona
933 North Cherry Avenue, Rm. N204 • Tucson, AZ 85721
brackham@as.arizona.edu • (520) 621-1581

EDUCATION

2012 – present *University of Arizona, Tucson, AZ*
Ph.D. in Astronomy & Astrophysics
Astrobiology Minor
Advisor: Dr. Dániel Apai

2005 – 2009 *Westminster College, Salt Lake City, UT*
B.S. in Neuroscience, Honors Degree
Social Science Minor

HONORS AND AWARDS

2014 *Graduate Research Fellowship*, National Science Foundation

2009 *The Trustees' Character Award*, Westminster College Board of Trustees
(One of only three student awards given at graduation)

2008 *The Dr. Barry Quinn and Dr. Bob Warnock Endowed Science Scholarship*, Westminster College

2007 *The Barnett Honors Scholarship*, Westminster College

REFEREED PUBLICATIONS

Rackham, B. V., Apai, D., & Giampapa, M. S. 2018. The Light Source Effect: False Spectral Features and Incorrect Densities for M-dwarf Transiting Planets. *The Astrophysical Journal* 853, 122.

Rackham, B. V., Espinoza, N., Apai, D., et al. 2017. ACCESS I: An Optical Transmission Spectrum of GJ 1214b Reveals a Heterogeneous Stellar Photosphere. *The Astrophysical Journal* 834, 151.

Spake, J. J. et al. (including **Rackham, B. V.**) 2018. Helium detected in the eroding atmosphere of an exoplanet. *Nature* 557, 68.

Publications submitted or under review:

Zhang, Z., Zhou, Y., **Rackham, B. V.**, & Apai, D. The Near-Infrared Transmission Spectra of the TRAPPIST-1 Planets b, c, d, e, f, and g and Stellar Contamination in Multi-Epoch Transit Spectra. *Under review at ApJ*.

Pinhas, A., **Rackham, B. V.**, Apai, D., & Madhusudhan, N. Joint Constraints on Planetary Atmospheres and Stellar Photospheres from Retrievals of Exoplanet Transmission Spectra. *Under review at MNRAS*.

Espinoza, N., **Rackham, B. V.**, Jordán, A. et al. ACCESS: A Featureless Optical Transmission Spectrum for WASP-19b from Magellan/IMACS. *Submitted to MNRAS*.

Publications in preparation:

Rackham, B. V., Apai, D., & Giampapa, M. S. The Light Source Effect II. *Submission expected in Jul. 2018.*

Bixel, A., Apai, D., **Rackham, B. V.**, et al. ACCESS III: Ground-based Optical Transmission Spectroscopy of WASP-4b. *Submission expected in Jul. 2018.*

Rackham, B. V., Apai, D., López-Morales, M., et al. ACCESS IV: A Ground-based Optical Transmission Spectrum of the Ultra-hot Jupiter WASP-103b. *Submission expected in Aug. 2018.*

Rackham, B. V., Apai, D., López-Morales, M., et al. ACCESS V: A Ground-based Optical Transmission Spectrum of WASP-80b. *Submission expected in Sep. 2018.*

CONFERENCE TALKS

Nov 2017 Rackham, B. V. et al. The light source problem: the effect of heterogeneous stellar photospheres on searches for transiting exoplanet biosignatures. Habitable Worlds 2017, Abstract #4032. Laramie, WY.

Apr 2017 Rackham, B. V. et al. The effect of heterogeneous stellar photospheres on searches for transiting exoplanet biosignatures. Astrobiology Science Conference 2017, Abstract #3610. Mesa, AZ.

Dec 2016 Rackham, B. V. et al. An optical transmission spectrum of GJ 1214b suggesting a heterogeneous stellar photosphere. Magellan Science Symposium 2016. Washington, DC.

Oct 2016 Rackham, B. V. et al. An optical transmission spectrum of GJ 1214b suggesting a heterogeneous stellar photosphere. 48th Annual DPS Meeting, Abstract #302.03. Pasadena, CA.

Jun 2015 Rackham, B. V. et al. How can ground-based efforts complement JWST follow-up of exciting TESS planets? Astrobiology Science Conference 2015, Abstract #7491. Chicago, IL.

Oct 2014 Rackham, B. V. et al. An optical transmission spectrum (4000-10000 Å) of the super-Earth GJ 1214b. 46th Annual DPS Meeting, Abstract #104.07. Tucson, AZ.

SEMINARS AND LECTURES

May 2018 Disentangling stellar and planetary signals in transmission spectra. Origins Lecture. Department of Astronomy, University of Arizona. Tucson, AZ.

Nov 2017 The effect of stellar contamination on transmission spectra of low-mass exoplanets. Lunch Talk. ESO Vitacura. Santiago, Chile.

Sep 2017 The transit light source problem: the effect of stellar contamination on transmission spectra of low-mass exoplanets. Earths in Other Solar Systems All-Hands Meeting. Tucson, AZ.

Jul 2017 Effect of stellar contamination on transmission spectra of low-mass exoplanets. Special Exoplanet Seminar. Institute of Astronomy, University of Cambridge. Cambridge, UK.

May 2017 ACCESSing exoplanet atmospheres & constraining stellar photospheres. Origins Lecture. Department of Astronomy, University of Arizona. Tucson, AZ.

Mar 2017 An optical transmission spectrum of GJ 1214b reveals a heterogeneous stellar photosphere. Steward Internal Symposium. Department of Astronomy, University of Arizona. Tucson, AZ.

Sep 2016 Arizona-CfA-Católica Exoplanet Spectroscopy Survey update. Earths in Other Solar Systems All-Hands Meeting. Tucson, AZ.

Sep 2015 Transmission spectroscopy of transiting exoplanets. Earths in Other Solar Systems All-Hands Meeting. Tucson, AZ.

Oct 2014 Exoplanet atmospheres. Steward Internal Symposium. Department of Astronomy, University of Arizona. Tucson, AZ.

Jan 2014 How will we characterize habitable exoplanets? Origins Debate. Department of Astronomy, University of Arizona. Tucson, AZ.

POSTER PRESENTATIONS

May 2016 Rackham, B. V., Apai, D., López-Morales, M., et al. ACCESS: Exploring exoplanet atmospheres through ground-based transmission spectroscopy. NExSS Face-to-Face Meeting. Washington, DC.

Dec 2015 Espinoza, N., Jordán, A., Apai, D., et al. (including Rackham, B. V.). Exploring the diversity of exoplanet atmospheres from the ground with the ACCESS Survey. Extreme Solar Systems III, Abstract #111.21. Waikoloa Village, HI.

Jan 2015 Wells, R. López-Morales, M., Lewis, N., et al. (including Rackham, B. V.). Constraining the atmospheric composition of WASP-18b. AAS Meeting #225, Abstract #257.01. Seattle, WA.

Jun 2014 López-Morales, M., Apai, D., Jordán, A., et al. (including Rackham, B. V.). ACCESS: The Arizona-CfA-Católica Exoplanet Spectroscopy Survey. AAS Meeting #224, Abstract #120.14. Boston, MA.

Mar 2014 Rackham, B. V. Espinoza, N., Apai, D., et al. Exploring the hot Neptune / super-Earth transition via ground-based transmission spectroscopy. Search for Life Beyond the Solar System: Exoplanets, Biosignatures, & Instruments, Abstract #P3.55. Tucson, AZ.

Mar 2014 Espinoza, N., Jordán, A., Rackham, B. V., et al. A ground-based optical transmission spectrum of WASP-31b. Search for Life Beyond the Solar System: Exoplanets, Biosignatures, & Instruments, Abstract #P3.53. Tucson, AZ.

ACCEPTED PI TELESCOPE PROPOSALS

2018B "ACCESS: Probing exoplanet atmospheres and enabling TESS follow-up." Magellan 6.5 m, 1 night

2018A "ACCESS: Probing exoplanet atmospheres from the ground and enabling TESS follow-up from the North and the South." Magellan 6.5 m, 1 night; MMT 6.5 m, 1 night

2014 – 2016 "ACCESS: Probing exoplanet atmospheres from the ground." Magellan 6.5 m, 2.5 nights

2013A "Exploring the haze in the nearby super-Earth GJ 1214b." VATT 1.8 m, 6 nights

SELECTED CO-I TELESCOPE PROPOSALS

2013 – 2018 "ACCESS: The Arizona-CfA-Católica Exoplanet Spectroscopy Survey." (10+ programs, PIs: M. López-Morales, D. Apai, A. Jordán, D. Osip, N. Espinoza, N. Lewis). Magellan 6.5 m, 58 nights

2018A "An Independent Verification of TiO Absorption in WASP-19b." (PI: A. Jordán). VLT 8.2 m, 2 × 0.5 nights

2015B "Inspecting the atmosphere of a transiting hot Jupiter." (PI: F. Rodler). LBT 2 × 8.4 m, 2 nights

2015B "Variability monitoring of ACCESS targets: towards a precise and accurate view of exoplanetary atmospheres." (PI: N. Espinoza). LCOGT 1 m, 50 hours

OBSERVING EXPERIENCE

2014 – 2018	Kuiper 61"/Mont4k	9 nights
2013 – 2017	Magellan/IMACS	14 nights
2013 – 2017	VATT/VATT4K	30 nights
2017B	NTT/SOFI	7 nights
2016A	VATT/VATTSpec	5 nights
2013B	Magellan/MMIRS	4 nights
2013A	Magellan/MIKE	1 night
2012B	MMT/Hectospec	1 night
2012B	KPNO 2.1-m/IR Camera	2 nights

TEACHING EXPERIENCE

Spring 2014 Teaching Assistant for ASTR 170B1, The Physical Universe, University of Arizona. Gave three lectures and led 100+ students in four lab sessions.

Fall 2013 Teaching Assistant for ASTR 202, Life in the Universe, University of Arizona. Gave three lectures and developed an in-class lab for 100+ students.

MENTORING EXPERIENCE

2018 Co-advisor (with Dániel Apai) of undergraduate summer student Jose Perez Chavez

2015 – 2016 Senior graduate student mentor to junior graduate student Peter Senchyna

2014 – 2015	Senior graduate student mentor to junior graduate student Jianwei Lyu
2015	Co-advisor (with Dániel Apai) of undergraduate summer student Xiao Han
2013	Co-advisor (with Dániel Apai) of undergraduate summer student William Nolan
2013	Alumni mentor of Westminster College Honors Undergraduate Hannah Zweifel

OUTREACH ACTIVITIES

Jun 2018	Developed and led activity for 12 middle and high school students with visual impairments as part of Project POEM, which used sonified light curves to explore properties of transiting exoplanets. Mt. Lemmon, AZ.
2016–2017	Partnered with teacher Ramon Muñoz at Changemaker High School to develop and lead activities on exoplanets in math classes through NOAO Project ASTRO Program. Tucson, AZ.
Jan 2015	Astronomy Activity Leader at Family Science Night at Senita Valley Elementary School. Tucson, AZ.
Nov 2014	Developed and instructed activity with Dániel Apai for the Osher Lifelong Learning Institute. Tucson, AZ.
Sep 2013	Invited public lecture for Sonora Astronomical Society. Green Valley, AZ.
Jun 2013	Invited public lecture for Tucson Amateur Astronomy Association. Tucson, AZ.
Mar 2013	Career Day presenter at Southside Community School. Tucson, AZ.

PROFESSIONAL SERVICE

2016	Prospective Student Visit Coordinator, University of Arizona Department of Astronomy
2015 – 2016	Graduate Editor, University of Arizona NSF GRFP Application Support Program
2013 – 2014	Local Organizing Committee, Search for Life Beyond the Solar System: Exoplanets, Biosignatures, & Instruments.