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Brief Research Interest Statement:

My research delves into both theoretical and observational aspects of extrasolar planets. As a lead developer of the PHOENIX model atmosphere code, I am responsible for maintaining and expanding its abilities to predict and interpret the atmospheric properties of exoplanets and brown dwarfs. My theoretical work is used extensively in ground-based direct-imaging planet search programs, in particular as a lead co-investigator for the new Gemini Planet Imager Survey. I am also heavily involved in programs focused on spectroscopy of extrasolar planets, from transiting to directly imaged. By comparing theoretical model spectra to real photometric and spectroscopic observations, a variety of planet properties can be deduced. Atmospheric structure (horizontal and vertical run of temperature and pressure), surface gravities, chemical composition, and global wind patterns are a few examples of the kinds of planet properties we seek through model-observation comparisons.

Employment:

2019–present Professor (University of Arizona)
2013–2019 Associate Professor (University of Arizona)
2012–2013 Astronomer (Lowell Observatory)
2006–2012 Assistant Astronomer (Lowell Observatory)
2004–2006 Postdoctoral Research Associate
(UCLA Astronomy Dept.)
2002–2004 Postdoctoral Research Associate
(Wichita State University)

Education:

1996 – 2002 Ph.D. Physics
University of Georgia (Supervisor: Dr. Peter H. Hauschildt)
1991 – 1996 B.S. Mathematics and B.S. Physics/Astronomy
University of Georgia

Honors and Awards:

2010 AAAS Newcomb Cleveland Prize (for the direct imaging of exoplanets)
2008 Beatrice M. Tinsley Visiting Scholar (Univ. of Texas, Austin)
2002 James L. Carmon Scholarship
2002 The Cummings Award for Outstanding Graduate Student and Teaching Assistant
1995 L. L. Hendren Scholarship for Outstanding Physics Student
1995 Ted L. Simons Award for Outstanding Physics Student

Recent Publications

Ren, B., and 72 colleagues 2019. An Exo-Kuiper Belt with an Extended Halo around HD 191089 in Scattered Light. *The Astrophysical Journal* 882, 64.

Nielsen, E. L., and 65 colleagues 2019. The Gemini Planet Imager Exoplanet Survey: Giant Planet and Brown Dwarf Demographics from 10 to 100 au. *The Astronomical Journal* 158, 13.

Greenbaum, A. Z., and 53 colleagues 2019. Performance of the Gemini Planet Imager Non-redundant Mask and Spectroscopy of Two Close-separation Binaries: HR 2690 and HD 142527. *The Astronomical Journal* 157, 249.

Briesemeister, Z. W., and 8 colleagues 2019. High Spatial Resolution Thermal Infrared Spectroscopy with ALES: Resolved Spectra of the Benchmark Brown Dwarf Binary HD 130948BC. *The Astronomical Journal* 157, 244.

Lothringer, J. D., Barman, T. 2019. The Influence of Host Star Spectral Type on Ultra-hot Jupiter Atmospheres. *The Astrophysical Journal* 876, 69.

Richey-Yowell, T., Shkolnik, E. L., Schneider, A. C., Osby, E., Barman, T., Meadows, V. S. 2019. HAZMAT. V. The Ultraviolet and X-Ray Evolution of K Stars. *The Astrophysical Journal* 872, 17.

Peacock, S., Barman, T., Shkolnik, E. L., Hauschildt, P. H., Baron, E. 2019. Predicting the Extreme Ultraviolet Radiation Environment of Exoplanets around Low-mass Stars: The TRAPPIST-1 System. *The Astrophysical Journal* 871, 235.

Miles, B. E., Skemer, A. J., Barman, T. S., Allers, K. N., Stone, J. M. 2018. Methane in Analogs of Young Directly Imaged Exoplanets. *The Astrophysical Journal* 869, 18.

Parke Loyd, R. O., and 6 colleagues 2018. HAZMAT. IV. Flares and Superflares on Young M Stars in the Far Ultraviolet. *The Astrophysical Journal* 867, 70.

Wang, J. J., and 54 colleagues 2018. Dynamical Constraints on the HR 8799 Planets with GPI. *The Astronomical Journal* 156, 192.

Lothringer, J. D., Barman, T., Koskinen, T. 2018. Extremely Irradiated Hot Jupiters: Non-oxide Inversions, H⁻ Opacity, and Thermal Dissociation of Molecules. *The Astrophysical Journal* 866, 27.

Piskorz, D., and 11 colleagues 2018. Ground- and Space-based Detection of the Thermal Emission Spectrum of the Transiting Hot Jupiter KELT-2Ab. *The Astronomical Journal* 156, 133.

Esposito, T. M., and 57 colleagues 2018. Direct Imaging of the HD 35841 Debris Disk: A Polarized Dust Ring from Gemini Planet Imager and an Outer Halo from HST/STIS. *The Astronomical Journal* 156, 47.

Greenbaum, A. Z., and 53 colleagues 2018. GPI Spectra of HR 8799 c, d, and e from 1.5 to 2.4 μm with KLIP Forward Modeling. *The Astronomical Journal* 155, 226.

Gardner, T., and 19 colleagues 2018. Precision Orbit of δ Delphini and Prospects for Astrometric Detection of Exoplanets. *The Astrophysical Journal* 855, 1.

Lothringer, J. D., and 11 colleagues 2018. An HST/STIS Optical Transmission Spectrum of Warm Neptune GJ 436b. *The Astronomical Journal* 155, 66.

Wang, J. J., and 51 colleagues 2018. Automated data processing architecture for the Gemini Planet Imager Exoplanet Survey. *Journal of Astronomical Telescopes, Instruments, and Systems* 4, 018002.

Bell, T. J., and 13 colleagues 2017. The Very Low Albedo of WASP-12b from Spectral Eclipse Observations with Hubble. *The Astrophysical Journal* 847, L2.

Christiansen, J. L., and 57 colleagues 2017. Three's Company: An Additional Non-transiting Super-Earth in the Bright HD 3167 System, and Masses for All Three Planets. *The Astronomical Journal* 154, 122.

Piskorz, D., and 8 colleagues 2017. Detection of Water Vapor in the Thermal Spectrum of the Non-transiting Hot Jupiter Upsilon Andromedae b. *The Astronomical Journal* 154, 78.

Rajan, A., and 60 colleagues 2017. Characterizing 51 Eri b from 1 to 5 μm : A Partly Cloudy Exoplanet. *The Astronomical Journal* 154, 10.

Ruffio, J.-B., and 51 colleagues 2017. Improving and Assessing Planet Sensitivity of the GPI Exoplanet Survey with a Forward Model Matched Filter. *The Astrophysical Journal* 842, 14.

Follette, K. B., and 55 colleagues 2017. Complex Spiral Structure in the HD 100546 Transitional Disk as Revealed by GPI and MagAO. *The Astronomical Journal* 153, 264.

Rameau, J., and 54 colleagues 2017. An Optical/Near-infrared Investigation of HD 100546 b with the Gemini Planet Imager and MagAO. *The Astronomical Journal* 153, 244.

Johnson-Groh, M., and 51 colleagues 2017. Integral Field Spectroscopy of the Low-mass Companion HD 984 B with the Gemini Planet Imager. *The Astronomical Journal* 153, 190.

Chilcote, J., and 63 colleagues 2017. 1-2.4 μm Near-IR Spectrum of the Giant Planet β Pictoris b Obtained with the Gemini Planet Imager. *The Astronomical Journal* 153, 182.

Piskorz, D., and 12 colleagues 2016. Evidence for the Direct Detection of the Thermal Spectrum of the Non-Transiting Hot Gas Giant HD 88133 b. *The Astrophysical Journal* 832, 131.

Nielsen, E. L., and 46 colleagues 2016. Dynamical Mass Measurement of the Young Spectroscopic Binary V343 Normae AaAb Resolved With the Gemini Planet Imager. *The Astronomical Journal* 152, 175.

Millar-Blanchaer, M. A., and 57 colleagues 2016. Imaging an 80 au Radius Dust Ring around the F5V Star HD 157587. *The Astronomical Journal* 152, 128.

Moses, J. I., and 8 colleagues 2016. On the Composition of Young, Directly Imaged Giant Planets. *The Astrophysical Journal* 829, 66.

Wang, J. J., and 53 colleagues 2016. The Orbit and Transit Prospects for β Pictoris b Constrained with One Milliarcsecond Astrometry. *The Astronomical Journal* 152, 97.

- Galicher, R., and 10 colleagues 2016. The International Deep Planet Survey. II. The frequency of directly imaged giant exoplanets with stellar mass. *Astronomy and Astrophysics* 594, A63.
- Konopacky, Q. M., and 56 colleagues 2016. Discovery of a Substellar Companion to the Nearby Debris Disk Host HR 2562. *The Astrophysical Journal* 829, L4.
- Konopacky, Q. M., and 6 colleagues 2016. Astrometric Monitoring of the HR 8799 Planets: Orbit Constraints from Self-consistent Measurements. *The Astronomical Journal* 152, 28.
- Cauley, P. W., Redfield, S., Jensen, A. G., Barman, T. 2016. Variation in the Pre-transit Balmer Line Signal Around the Hot Jupiter HD 189733b. *The Astronomical Journal* 152, 20.
- Macintosh, B., Graham, J., Barman, T. et al. colleagues 2015. *Discovery and spectroscopy of the young Jovian planet 51 Eri b with the Gemini Planet Imager*. *Science*, 360, 54
- Rajan, A., Barman, T., Soummer, R., Brendan Hagan, J., Patience, J., Pueyo, L., Choquet, É., Konopacky, Q., Macintosh, B., Marois, C. 2015. *Characterizing the Atmospheres of the HR8799 Planets with HST/WFC3*. *The Astrophysical Journal* 809, L33.
- Barman, T. S., Konopacky, Q. M., Macintosh, B., Marois, C. 2015. *Simultaneous Detection of Water, Methane and Carbon Monoxide in the Atmosphere of Exoplanet HR8799b* in press (ArXiv e-prints arXiv:1503.03539)
- Wu, Y.-L., Close, L., Males, J., Barman, T. S., et al. 2015. *New Extinction and Mass Estimates from Optical Photometry of the Very Low Mass Brown Dwarf Companion CT Chamaeleontis B with the Magellan AO System* *The Astrophysical Journal* 801, 4.
- Crossfield, I. J. M., et al. 2015. *A nearby M star with three transiting super-Earths discovered by K2* ArXiv e-prints arXiv:1501.03798.
- Chilcote, J., Barman, T. S. et al. 2015. *The First H-band Spectrum of the Giant Planet β Pictoris b* *The Astrophysical Journal* 798, LL3.
- Shkolnik, E. L., Rolph, K. A., Peacock, S., Barman, T. S. 2014. *Predicting Ly α and Mg II Fluxes from K and M Dwarfs Using Galaxy Evolution Explorer Ultraviolet Photometry* *The Astrophysical Journal* 796, LL20.
- Ingraham, P., et al. 2014. *Gemini Planet Imager Spectroscopy of the HR 8799 Planets c and d* *The Astrophysical Journal* 794, LL15.
- Shkolnik, E. L., Barman, T. S. 2014. *HAZMAT. I. The Evolution of Far-UV and Near-UV Emission from Early M Stars* *The Astronomical Journal* 148, 64.
- Macintosh, B., et al. 2014. *First light of the Gemini Planet Imager* *Proceedings of the National Academy of Science* 111, 12661-12666.
- Biddle, L. I., et al. 2014. *Warm ice giant GJ 3470b - II. Revised planetary and stellar parameters from optical to near-infrared transit photometry* *Monthly Notices of the Royal Astronomical Society* 443, 1810-1820.
- Barman, T. S. 2014. *Astronomy: A new spin on exoplanets* *Nature* 509, 41-42.

Lockwood, A. C., Johnson, J. A., Bender, C. F., Carr, J. S., Barman, T. S. , Richert, A. J. W., Blake, G. A. 2014. *Near-IR Direct Detection of Water Vapor in Tau Boötis b* The Astrophysical Journal 783, LL29.

Madhusudhan, N., Knutson, H., Fortney, J. J., Barman, T. S. 2014. *Exoplanetary Atmospheres Protostars and Planets VI* 739-762.

Konopacky, Q. M., Barman, T. S. , Macintosh, B. A., Marois, C. 2013. *Detection of Carbon Monoxide and Water Absorption Lines in an Exoplanet Atmosphere*. Science 339, 1398-1401.