Jessica L. Birky

Contact

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Research Interests

Data analysis, modeling and machine learning ; large stellar surveys, stellar spectroscopy and low mass stars ; stellar populations, dynamics and structure of the galaxy ; developing open source tools/code.

Education

University of California, San Diego 2015 - 2019
Major : Physics, Minor : Mathematics GPA : 3.3

Scholarships and Awards

Dean's List	2018
Frances Hellman Research Scholarship, 5000 USD *(declined)*	2017
Physics Chair Challenge Award, 300 USD *(×2)*	2016, 2017
SJND Mathematics Award	2015
Denise Cervelli - Maddix Mathematics Scholarship, 1700 USD	2014
M.M. Holm Science Scholarship, 2300 USD	2013

Research Experience

Max Planck Institute für Astronomie Jul 2017 - Aug 2017
Research Intern, Advisor : David Hogg (NYU/MPIA/Simons) *Heidelberg, Germany*
Trained and tested data-driven spectral models for M dwarfs in the APOGEE survey using The Cannon ; successfully trained models for determining spectral type, temperature and metallicity.

University of California, San Diego May 2016 - Present
Undergraduate Researcher, Advisor : Adam Burgasser (UCSD) *La Jolla, CA*
Developing apogee_tools, a pipeline for forward modeling telluric absorption in APOGEE sources, and testing high resolution model grids (PHOENIX, BT-Settl). Tested various methods for determining stellar parameters from spectra. Also contributing to development of the SpeX Prism Library Analysis Toolkit (SPLAT).

University of California, Berkeley Jun 2014 - Aug 2014
Lab Assistant, Advisors : Desire Whitmore, Stephen Leone (UCB) *Berkeley, CA*
Assisted the preparation of quantum dot samples for laser spectroscopy experiments ; programmed python scripts for basic data analysis.

Publications

Birky, J., Hogg, D. W., Mann, A., Data-Driven Spectral Models for APOGEE M Dwarfs (*In Prep.*)

Conference Presentations

Birky, J., Hogg, D. W., Burgasser, A. (2018 January). **Data-Driven Spectral Models for APOGEE M Dwarfs**. Poster presentation at AAS Meeting 231, Washington DC.
[DOI: 10.5281/zenodo.1146909]

Birky, J., Aganze, C., Burgasser, A., Theissen, C., Schmidt, S., Stassun, K., Teske, J., Bird, J. (2017 January). **Modeling Stellar Parameters for High Resolution Late-M and Early-L Dwarf SDSS/APOGEE Spectra**. Poster presentation at AAS Meeting 229, Grapevine TX.
[DOI: 10.5281/zenodo.1116626]

Birky, J., Aganze, C., Burgasser, A., Theissen, C., Schmidt, S., Stassun, K., Teske, J. (2016 October). **Identification of H-band Absorption Lines in High Resolution APOGEE Spectra of the Lowest Mass Stars**. Poster presentation at the SACNAS Conference, Long Beach CA.

Talks

Data Driven Models for APOGEE M dwarfs 2017
Stars Group Meeting & Milky Way Group Meeting, MPIA

Identification of H-band Absorption Lines in APOGEE Spectra of the Lowest Mass Stars 2016
Summer Undergraduate Research Conference, UCSD

Telescope Time Awarded

Co-I : **IRTF iShell** - 2 nights (PI : Adam Burgasser) 2018A
Training the Cannon : Calibrating APOGEE Observations of Ultracool Dwarfs

Co-I : **APOGEE 2.5-meter** - Fibers for ancillary survey (PI : Adam Burgasser) 2017 - 2018
APOGEE-2 Survey of the Lowest-Mass Stars and Brown Dwarfs : Composition, Chemistry and Companions

Software Contributions

Burgasser, A. J., Splat Development Team, *The SpeX Prism Library Analysis Toolkit (SPLAT) : A Data Curation Model*, Bull. Astr. Soc. India, 00, 1-6, 2017 (arXiv:1707.00062)

Organizations

Sloan Digital Sky Survey (SDSS) - Faculty and Student Team (FAST) Member 2016 - Present
American Astronomical Society (AAS) - Junior Member 2016 - Present
Society for the Advancement of Chicanos and Native Americans in Science 2016 - Present

Events Participated

Gaia Sprint, *Internationales Wissenschaftsforum Heidelberg, Germany* Jul 2017
Hack workshop for building collaborations and projects related to the Gaia survey.

CUWIP, *UC Los Angeles, CA* Jan 2017
Conference for Undergraduate Women in Physics

Engineering Experience

UCSD Human Powered Submarine Team Sep 2015 - Mar 2017
Propulsion and Hull Design Teams *La Jolla, CA*
Designed 3D hull profiles using Matlab and Solidworks, performed fluid analysis using Xfoil. Also designed double scotch-yoke propulsion mechanism, CADed Solidworks models, and prototyped using 3D printing. Worked on manufacturing and testing of submarine hull and drive train prototype, and performed underwater mechanical tests.

Skills

Programming	*Proficient :* Python, Mathematica
	Familiar : Matlab, C++, Processing
Software	*Proficient :* LaTeX, Unix, Git
	Familiar : Solidworks, Illustrator
Astro Tools	*Proficient :* The Cannon, Starfish, Emcee, Astropy, Splat, Topcat, MESA
Languages	English *(fluent)*, German *(limited working proficiency)*

Relevant Coursework

Physics
Classical Mechanics (4A, 110A-B)
Thermodynamics/Statistical Mechanics (4B)
Electricity & Magnetism (4C, 2CL lab, 100A)
Optics & Special Relativity (4D, 2DL lab)
Quantum Mechanics (4E)
Computational Physics (105A-B)
Stellar Astrophysics (160)

Mathematics
Multivariable Calculus (20C)
Vector Calculus (20E)
Linear Algebra (31AH)
Differential Equations (20D)
Numerical Methods (170A)
Probability Theory (180A)
Mathematical Reasoning (109)

References

Adam Burgasser (UCSD) - aburgasser@ucsd.edu
David Hogg (NYU/MPIA/Simons) - dwhogg@nyu.edu