

JESSICA L. BIRKY

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RESEARCH INTERESTS	Stars, binary stars, stellar populations. Stellar and planetary dynamics. Large scale surveys, data analysis and modeling, machine learning and data-driven models.			
EDUCATION	PhD in Astronomy – University of Washington 2019 — <i>Interdisciplinary Data Science Track</i>			
	MS in Astronomy – University of Washington 2019 – 2021			
	BS in Physics – University of California, San Diego 2015 – 2019			
RESEARCH POSITIONS	Graduate Student Researcher – University of Washington Aug 2020 – Present <i>VPLanet Group; Advisor : Rory Barnes</i> <i>Seattle, WA</i> Topic : Inferring tidal evolution of binary stars using <i>VPLanet</i>			
	Graduate Student Researcher – University of Washington Aug 2019 – Present <i>DIRAC Institute; Advisor : James Davenport</i> <i>Seattle, WA</i> Topic : Identifying and measuring dynamics of eclipsing binaries in open clusters from <i>TESS</i> , with radial velocity follow-up using <i>APO</i>			
	Undergraduate Researcher – University of California, San Diego May 2016 – May 2019 <i>Cool Star Lab; Advisor : Adam Burgasser</i> <i>La Jolla, CA</i> Topic : Implemented a forward modelling pipeline <i>apogee_tools</i> for inferring atmospheric and kinematic parameters of low-mass stars and brown dwarfs from high resolution spectra			
	Research Intern – Max Planck Institute für Astronomie Summer 2017 & 2018 <i>Stars & Milky Way groups; Advisor : David Hogg</i> <i>Heidelberg, Germany</i> Topic : Trained machine learning models of M dwarf spectra using <i>The Cannon</i> to precisely predict temperatures and metallicities of M dwarfs			
HONORS AND AWARDS	NSF Graduate Research Fellowship 2019 – 2024 UW Astronomy Jacobsen Award 2022 MPIA Summer Intern Fellowship 2017, 18 UCSD Provost Honors 2018, 19 Frances Hellman Research Scholarship (<i>declined</i>) 2017 UCSD Physics Chair Challenge Award ($\times 3$) 2016, 17, 18			
PUBLICATIONS	<i>First-author :</i> [8] Birky, J., Barnes, R. K., 2022, <i>Theoretical Limits in Constraining Tidal Quality Factors of Binary Stars</i> (In prep) [7] Birky, J., Barnes, R. K., Fleming, D. P., 2021, <i>Improved Constraints for Trappist-1 XUV Luminosity Evolution</i> , RNAAS, 5, 122 (arXiv :2105.12562) [paper] [code] [6] Birky, J., Hogg, D. W., Mann, A., Burgasser, A. J., 2020, <i>Temperatures and Metallicities for M dwarfs in the APOGEE Survey</i> , ApJ, 892, 1 (arXiv :2001.04962) [paper] [code] <i>Co-author :</i> [5] Barnes, R. K., Amaral L., Birky J., et. al 2022, <i>History and Habitability of the LP 890-9 Planetary System</i> (In prep)			

- [4] Hsu, C., Burgasser, A. J., et. al (incl. **Birky, J.**) 2022, *Ultracool Dwarf Radial and Rotational Velocity Survey with SDSS/APOGEE High-Resolution Spectrometer* (Submitted ApJ)
- [3] Hsu, C., Burgasser, A. J., et. al (incl. **Birky, J.**) 2021, *The Brown Dwarf Kinematics Project (BDKP). V. Radial and Rotational Velocities of T Dwarfs From Keck/NIRSPEC High-Resolution Spectroscopy* (arXiv :2107.01222) [paper] [code]
- [2] Davenport, J. R. A., Windemuth, D., et. al (incl. **Birky, J.**) 2021, *The Rise and Fall of the Eclipsing Binary, HS Hydra, ApJL* (arXiv :2107.10954) [paper]
- [1] Martin, D. V., El-Badry, K., et al. (incl. **Birky, J.**) 2021, *TOI-1259Ab—a gas giant with 2.6% deep transits and a bound white dwarf companion, Accepted MNRAS* (arXiv :2101.02707) [paper]

TALKS

(* = invited)

- *Precise abundances of M dwarfs : data driven models applied to large scale surveys 2022
Cool Stars 21 Toulouse, France
- ALABI : Active Learning for Accelerated Bayesian Inference 2021
IAU Symposium 362 – Predictive Power of Computational Astrophysics Virtual Conference
- Physical Parameters for 10,000+ M dwarfs in the APOGEE Survey 2019
Sloan Digital Sky Survey Collaboration Meeting Ensenada, Mexico
- Data Driven Models for APOGEE M dwarfs 2017
Stars Meeting & Milky Way Meeting, MPIA Heidelberg, Germany
- Identification of H-band Absorption Lines in APOGEE Spectra of the Lowest Mass Stars 2016
Summer Undergraduate Research Conference, UCSD La Jolla, CA

POSTERS

Birky, J., Barnes, R. K., Davenport, J.R.A. (2023 Jan). *Challenges in Establishing an Accurate Model of Tidal Dissipation for Low-mass Binary Stars*. Poster presentation at AAS 241, Seattle WA

Birky, J., Barnes, R. K., Fleming, D. P. (2022 July). *Constraining the XUV Luminosity Evolution of Low Mass Stars*. Poster presentation at Cool Stars 21, Toulouse France

Birky, J., Davenport, J. R. A, Brandt, T. (2020 January). *Systematic Classification of TESS Eclipsing Binaries*. Poster presentation at AAS Meeting 235, Honolulu HI [poster]

Birky, J., Hogg, D. W., Mann, A. W., Burgasser, A. (2019 January). *Precise Stellar Parameters for 10,000+ APOGEE M dwarfs*. Poster presentation at AAS Meeting 233, Seattle WA [poster]

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 [poster]

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 [poster]

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 national SACNAS Conference, Long Beach CA

TELESCOPE TIME AWARDED

PI : **APO 3.5 meter** – 16 total half nights with ARCES/KOSMOS spectrographs 2022 – 2023
TESS Eclipsing Binaries in Open Clusters Survey

Co-I : **NASA IRTF** – 6 nights with iShell spectrograph (PI : Adam Burgasser) 2018 – 2019
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

OBSERVING EXPERIENCE	Apache Point Observatory 3.5m	
	6 half nights (remote), Instruments : ARCES & KOSMOS	Q1 2023
	8 half nights (remote), Instruments : ARCES & KOSMOS	Q4 2022
	4 half nights (onsite), Instruments : ARCES, KOSMOS, ARCTIC	Q3 2022
	2 half nights (remote), Instruments : ARCES & KOSMOS	Q2 2022
	2 half nights (remote), Instruments : ARCES, TripleSpec, DIS, NICFPS, ARCTIC	Q4 2020
TEACHING POSITIONS	Teaching Assistant :	
	ASTR 150 : The Planets (Instructor : Nicole Kelly)	Spring 2021
	ASTR 150 : The Planets (Instructors : Nicole Kelly, Eric Agol)	Winter 2021
	ASTR 102 : Introduction to Astronomy (Instructor : Scott Anderson)	Fall 2020
MENTORSHIP	Research Mentor :	
	Leah Peterson (UW undergrad, PreMAP program)	Nov 2022 – Present
	John Delker (UW undergrad, PreMAP program)	Nov 2022 – Dec 2022
	Peter Gwartney (UW undergrad ; PhD student University of Alabama)	Jun 2021 – Sept 2022
	Rachel Wong (UW undergrad, graduate 2022)	Jun 2021 – Sept 2022
SERVICE & OUTREACH	Astronomy on Tap – Livestream Manager	Fall 2022 – Present
	Apache Point Observatory – Telescope Allocation Committee	Fall 2020 – Present
	AAS volunteer helper – Foundations of astronomical data science workshop	Jan 2023
	Yakima Valley CC – Outreach talk : Research in modern Astronomy	Nov 2022
	UW Pre-Map program – Research Mentor	Fall 2022
	SOC - VPLanet Workshop Session Lead	Sept 2022
ENGINEERING EXPERIENCE	UCSD Human Powered Submarine Team	Sept 2015 – Mar 2017
	<i>Propulsion and Hull Design Teams</i> Role : designed submarine drive train and hull profile ; perfomed fluid dynamics simulations	<i>La Jolla, CA</i>
SOFTWARE CONTRIBUTIONS	Burgasser, A. J., Splat Development Team (incl. Birky, J.), The SpeX Prism Library Analysis Toolkit (SPLAT) : A Data Curation Model, Bull. Astr. Soc. India, 00, 1-6, 2017 (arXiv:1707.00062)	
PROFESSIONAL DEVELOPMENT	Cool Stars 20.5 – <i>Virtual Conference</i>	Mar 2021
	NExSS Quantitative Habitability Science Workshop – <i>Online workshop</i>	Dec 2020
	online.tess.science – <i>Online workshop</i>	Sep 2020
	TESS Ninja 3 : Expanding the Science of TESS – <i>Sydney, Australia</i>	Feb 2020
	ZTF Collaboration Meeting – <i>UW Seattle, WA</i>	Sept 2019
	Caltech FUTURE of Physics Workshop – <i>Pasadena, CA</i>	Nov 2018
	M33 HST Survey Meeting – <i>Ringberg Castle, Tegernsee, Germany</i>	Jul 2018
	Conference for Undergraduate Women in Physics – <i>Cal Poly Pomona, CA</i>	Jan 2018
	Gaia Sprint – <i>Internationales Wissenschaftsforum Heidelberg, Germany</i>	Jul 2017
	Conference for Undergraduate Women in Physics – <i>UC Los Angeles, CA</i>	Jan 2017
PROFESSIONAL AFFILIATIONS	American Astronomical Society (AAS) Member	2016 – Present
	Society for the Advancement of Chicanos and Native Americans in Science	2016 – Present
	Sloan Digital Sky Survey (SDSS) – Faculty and Student Team (FAST) Member	2016 – 2019
SKILLS	PROGRAMMING	<i>Proficient</i> : Python, C/C++, Mathematica <i>Familiar</i> : Matlab, Processing
	SOFTWARE	<i>Proficient</i> : L ^A T _E X, Unix, Git <i>Familiar</i> : SQL, Solidworks, Illustrator
	LANGUAGES	English (<i>fluent</i>), German (<i>limited working proficiency</i>)
GRADUATE COURSEWORK	Radiative Processes, Thermo/hydrodynamics, Stellar Structure and Evolution, Exoplanets, Interstellar & Intergalactic Medium, Galactic Structure & Dynamics, Astrostatistics, Machine Learning	

REFERENCES

Prof. Rory Barnes (UW/VPL)
Prof. James Davenport (UW/DIRAC)
Prof. David Hogg (NYU/MPIA/Flatiron)
Prof. Adam Burgasser (UCSD)

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