

# Dr. Rachel A. Smullen

*Metropolis Postdoctoral Fellow*  
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## Education

- 2014–2020 **University of Arizona**, *PhD in Astronomy & Astrophysics*  
"The Formation and Early Evolution of Binaries and Their Environments"
- 2014–2016 **University of Arizona**, *MS in Astronomy*
- 2010–2014 **University of Wyoming**, *B.S. in Physics & B.S in Astronomy*  
Minors in Mathematics, Computer Science, Interdisciplinary Computational Science  
Graduated *summa cum laude*; Member of Honors Program

## Selected Fellowships, Awards, and Honors

- 2020 Metropolis Postdoctoral Fellowship\*
- 2020 NSF Postdoctoral Fellowship\* (Declined)
- 2019-2020 Jamieson Graduate Fellowship\*
- 2017 Department of Astronomy Outstanding Scholarship Award
- 2017 P.E.O. Scholar Award\*
- 2015-2019 National Science Foundation Graduate Research Fellowship\*
- 2014 Department of Physics and Astronomy Outstanding Graduate, University of Wyoming
- 2014 College of Arts and Sciences Outstanding Graduate, University of Wyoming
- 2014 Spitaleri Award for Outstanding Female Graduate Finalist (1 of 6), University of Wyoming
- 2011, '12, '13 Wyoming NASA Space Grant Consortium Undergraduate Research Fellowship\*

*\*Funded fellowships*

## Publications

[ADS link to all refereed publications](#)

### As First Author

- Smullen, R. A.**, Kratter, K. M., Offner, S. S. R., Lee, A. T., & Chen, H. H., 2020, MNRAS, 497, 4517 "The Highly Variable Time Evolution of Star-forming Cores Identified with Dendrograms"
- Smullen, R. A.** & Volk, K., 2020, MNRAS, 97, 1391 "Machine Learning Classification of Kuiper Belt Populations"
- Smullen, R. A.** & Kratter, K. M., 2017, MNRAS, 466, 4480 "The Fate of Debris in the Pluto-Charon System"
- Smullen, R. A.**, Kratter, K. M., & Shannon, A. 2016, MNRAS, 461, 1288 "Planet Scattering Around Binaries: Ejections, Not Collisions"
- Smullen, R. A.**, Kobulnicky, H. A. 2015, ApJ, 808, 166 "Heartbeat Stars: Orbital Solutions for Eccentric Binary Systems"

### As Co-author

- Lee, A. T., Offner, S. S. R., Kratter, K. M., **Smullen, R. A.**, & Li, P. S., 2019, ApJ, 887, 232 "The Formation and Evolution of Wide-Orbit Stellar Multiples In Magnetized Clouds"
- Kobulnicky, H. A., Kiminki, D. C. et al. 2014, ApJS, 213, 34 "Toward Complete Statistics of Massive Binary Stars: Penultimate Results from the Cygnus OB2 Radial Velocity Survey"
- Kobulnicky, H. A., **Smullen, R. A.**, Kiminki, D. C., et al. 2012, ApJ, 756, 50 "A Fresh Catch of Massive Binaries in the Cygnus OB2 Association"

## In Preparation

Smith, T., Kratter, K. M., & **Smullen, R. A.** (*expected submission Fall 2020*) “The Evolution of Planet Populations Due to Dynamical Scattering” \*Undergraduate-led paper

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## Selected Presentations

### Contributed Conference Talks

2020	The Time Evolution of Star-forming Cores (Dissertation Talk)	AAS 235, Honolulu, HI
2019	The Highly Variable Time Evolution of Cores	EWASS 2019, Lyon, France
2019	The Highly Variable Time Evolution of Cores	Zooming in on Star Formation, Nafplio, Greece
2016	The Fate of Debris in the Pluto-Charon System	DDA Meeting, Nashville, TN
2015	The Architecture of Circumbinary Systems	Extreme Solar Systems III, Waikoloa, HI

### Invited Talks

Fall 2019	What We Learn from Binaries at All Scales	UT Austin Cosmos Seminar
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### Local Talks

Spring 2020	Machine Learning Classification of Kuiper Belt Populations	Women in Data Science–Tucson 2020
Spring 2020	A (Practical) Introduction to UA HPC	SO Astro Code Donuts
Fall 2018	OpenACC: How To Accelerate Your Code in Under 10 Lines	SO Code Coffee
Fall 2017	Python + Joblib: Make Your Computer Work Harder, and Save Yourself Time	SO Code Coffee
Fall 2017	An Intro to Machine Learning	SO Code Coffee
Fall 2017	UA High Performance Computing Resources	SO Code Coffee
Fall 2017	Hierarchical Structures in Star Formation Simulations	SO Internal Symposium
Summer 2017	Hierarchical Structures in Star Formation Simulations	MPIA Coffee
Fall 2016	The Fate of Debris in the Pluto-Charon System	SO Internal Symposium
Spring 2016	Planet Scattering Around Binaries	SO Journal Club
Spring 2015	The Architecture of Circumbinary Systems	SO Internal Symposium

### Posters

2020	Machine Learning Classification of Kuiper Belt Populations	PIML 2020, Santa Fe, NM
2019	The Highly Variable Time Evolution of Cores	From Stars to Planets II, Gothenburg, Sweden
2018	Hierarchical Structures in Star Formation Simulations	IHPCSS, Ostrava, Czech Republic
2018	Hierarchical Structures in Star Formation Simulations	SPF 2, Biosphere 2, AZ
2015	The Architecture of Circumbinary Systems	Sagan Workshop, Pasadena, CA
2015	The Architecture of Circumbinary Systems	SPF 1, Biosphere 2, AZ
2014	ESO 243-49’s Small Friends: Finding Satellite Galaxies	AAS 223, Washington, DC
2013	Imaging the Spatial Density Within Starburst Galaxies	AAS 221, Long Beach, CA
2012	New Massive Binaries in the Cygnus OB2 Association	AAS 219, Austin, TX

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## Teaching and Advising

Co-mentored UA undergraduate Trevor Smith on research project	Fall 2018-Spring 2020
TA for ASTR 208 (Energy, Society, and the Environment)	Spring 2018
ATOMM Tutor (Tutoring for astronomy majors and minors)	Fall 2017-Spring 2018, Spring 2020
TA for ASTR 300A (Dynamics and Mechanics in Astrophysics)	Fall 2017

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## Selected Service and Outreach

### Academic and Department Service

Referee for MNRAS	2018–present
Prospective graduate student visit co-organizer (17 students; 3 day visit)	Spring 2017
Colloquium lunch organizer	2016–2018
Local Organizing Committee member, Star and Planet Formation in the Southwest 1	2015

### Diversity, Community, and Outreach

Teen Astronomy Café presentation "Breaking the Solar System (and other ways simulations help us understand the universe)"	Summer 2020
Girl Scout Troop 51 Astronomy Night speaker	Fall 2018
Mentor for junior graduate students	2018–2020
PEO Chapter U and Chapter CS meeting speaker	Spring 2018
Teen Astronomy Café volunteer	2017–2020
Warrior-Scholar Project volunteer/activity developer	Summer 2017
Tucson Women in Astronomy chair	2016–2018
TWA undergraduate mentoring organizer	2016–2018
TIMESTEP volunteer	2016–2018
Project ASTRO classroom astronomer	2016–2018
Senita Valley Elementary School Family Science Night volunteer	Spring 2015
Tucson Women in Astronomy undergraduate mentor	2014–2018
AAS Astronomy Ambassador	2014
Counselor, ExxonMobil Bernard Harris Summer Science Camp (Wyoming Astrocamp)	2011, 2014
Wyoming State Science Fair judge/volunteer	2011–2014
President of the Society of Physics Students, University of Wyoming Chapter	2011–2013
Secretary of the Society of Physics Students, University of Wyoming Chapter	2010–2011
Misc. outreach, e.g. star parties, planetarium shows, charity telescope raffle	2010–ongoing

### Other

REU summer student, National Optical Astronomy Observatory, Tucson, Arizona	2013
REU summer student, National Radio Astronomy Observatory, Charlottesville, Virginia	2012
Observer, Wyoming Infrared Observatory	2011–2014
Planetarium presenter, University of Wyoming	2010–2014

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## Professional Affiliations

American Astronomical Society, Junior Member  
University of Arizona Theoretical Astrophysics Program  
Tucson Women in Astronomy  
Sigma Pi Sigma/Society of Physics Students  
Phi Beta Kappa

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## Technical Skills

Programming	Python (primary), C, C++, Fortran, IDL, SQL, MATLAB
Tools	yt, scikit-learn, Jupyter, MERCURY, REBOUND, L <sup>A</sup> T <sub>E</sub> X, and lots more
Systems	Linux (Ubuntu, Red Hat, CentOS), OS-X, Windows
HPC Tools	LSF, PBS, Globus, OpenACC, OpenMP, MPI