Dr. Rachel A. Smullen

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Citizenship: USA

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"

Selected Presentations

Contributed Conference Talks

2021	Seeing is Believing?	*UA-LANL Days, Virtual*
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*

Local Talks

Winter 2021	Seeing is Believing?	*Agnew & Metropolis Showcase*
Fall 2020	Machine Learning in the Kuiper Belt	*CTA Friday Meeting*
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*

Teaching and Advising

Mentoring high school student N. Ayyalapu on research project	*Fall 2020–present*
Co-mentored UA undergraduate T. 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*

Selected Service and Outreach

Academic and Department Service

CTA Journal Club Co-host	*Fall 2020–present*
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

NMHS Stellar Alumni Webinar	*Spring 2021*
LAHS Astronomy Club Speaker	*Fall 2020, Spring 2021*
STEM Santa Fe Volunteer	*Spring 2021*
Teen Astronomy Café presentation "Breaking the Solar System (and other ways simulations help us understand the universe)"	*Summer 2020, Spring 2021*
UA WISE Mentor	*Fall 2020-present*
LAHS Astronomy Club Speaker	*Fall 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*

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*

Professional Affiliations

LANL: Women of Computing, Atomic Women, Connect ERG

American Astronomical Society, Junior Member

Sigma Pi Sigma/Society of Physics Students

Phi Beta Kappa

Technical Skills

Programming	Python (primary), C, C++, Fortran, IDL, SQL, MATLAB
Tools	`yt`, `scikit-learn`, Jupyter, RADMC-3D, MERCURY, REBOUND, LaTeX, and lots more
Systems	Linux (Ubuntu, Red Hat, CentOS), OS-X, Windows
HPC Tools	LSF, PBS, Slurm, Globus, OpenACC, OpenMP, MPI