

Rachel A. Smullen

PhD Candidate
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Citizenship: USA

Education

- 2014–Present **University of Arizona**, *PhD in Astronomy & Astrophysics*
Expected Graduation: Summer 2020/Expected Dissertation Award Date: August 2020
- 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

- 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 Rosemarie Martha Spitaleri Award for Outstanding Female Graduate Finalist, University of Wyoming
- 2011, 2012, 2013 Wyoming NASA Space Grant Consortium Undergraduate Research Fellowship*

**Funded fellowships*

Publications

As First Author

Smullen, R. A., Kratter, K. M., Offner, S. S. R., Lee, A. T., & Chen, H. H., 2020 *Under Review* “The Highly Variable Time Evolution of Star-forming Cores Identified with Dendrograms” arXiv:2004.01263

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., Koblunicky, 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”

Koblunicky, 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”

Koblunicky, 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

Smullen, R. A. & Volk, K., 2020 (*expected MNRAS submission April 2020*) “Machine Learning Classification of Kuiper Belt Populations”

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

Presentations

Contributed Conference Talks

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| 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

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

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| 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 + Jupyter: 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 | Fragmentation of Filaments in Molecular Clouds | SO Journal Club |
| Fall 2017 | Hierarchical Structures in Star Formation Simulations | SO Internal Symposium |
| Summer 2017 | Hierarchical Structures in Star Formation Simulations | MPIA Coffee |
| Fall 2016 | Binary Star Formation | SO Journal Club |
| Fall 2016 | The Fate of Debris in the Pluto-Charon System | SO Internal Symposium |
| Spring 2016 | Planet Scattering Around Binaries | SO Journal Club |
| Fall 2015 | Optimizing the U.S. Ground-Based Optical and Infrared Astronomy System | SO Journal Club |
| Spring 2015 | The Architecture of Circumbinary Systems | SO Internal Symposium |
| Spring 2014 | Heartbeat Stars (Senior Thesis Presentation) | UWyo Undergraduate Research Day |
| Spring 2013 | Heartbeat Stars | UWyo Undergraduate Research Day |

Posters

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| 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 |
| 2014 | ESO 243-49's Small Friends: Finding Satellite Galaxies | CUWiP, Salt Lake City, UT |
| 2013 | Imaging the Spatial Density Within Starburst Galaxies | CUWiP, Golden, CO |
| 2013 | Imaging the Spatial Density Within Starburst Galaxies | AAS 221, Long Beach, CA |
| 2012 | Imaging the Spatial Density Within Starburst Galaxies | SPS Quadrennial Congress, Orlando, FL |
| 2012 | New Massive Binaries in the Cygnus OB2 Association | AAS 219, Austin, TX |

Teaching and Advising

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| Co-mentoring UA undergraduate Trevor Smith on research project | Fall 2018–present |
| 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 |

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

Girl Scout Troop 51 Astronomy Night speaker	Fall 2018
Mentor for junior graduate students	Fall 2018–present
PEO Chapter U and Chapter CS meeting speaker	Spring 2018
Teen Astronomy Café volunteer	Fall 2017–present
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–present

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

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

Technical Skills

Programming	Python (primary), C, C++, Fortran, IDL, Java, SQL, MATLAB
Tools	yt, scikit-learn, Jupyter, MERCURY, SWIFTER, REBOUND, ParaView, DS9, HyperZ, SourceExtractor, CASA, IRAF, L ^A T _E X
Systems	Linux (Ubuntu, Red Hat, CentOS), OS-X, Windows
HPC Tools	LSF, PBS, Globus, OpenACC, OpenMP, MPI