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Stellar Astronomer & Software Developer

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education

2016	**Ph.D.** Astronomy	New Mexico State University, Las Cruces NM
	Red Giants in Eclipsing Binaries as a Benchmark for Asteroseismology	
2010	**M.S.** Astronomy	San Diego State University, San Diego CA
	Refined Neutron Star Mass Determinations for Six Eclipsing X-Ray Pulsar Binaries	
2008	**B.S.** Physics (Emphasis in Astrophysics)	Harvey Mudd College, Claremont CA
	Music humanities concentration; Semester abroad in Moscow, Russia	

employment

2016–Now **Vera C. Rubin Observatory LSST Data Management**   UW Dept of Astronomy, Seattle, WA
2019–Now *Research Scientist*
- Prompt image processing in python for the LSST Science Pipelines (80%)
- Continuing research in stellar astrophysics and satellite mitigations (20%)

2016–2019 *Research Associate* - Built a prototype image processing pipeline

2010–2016 **NMSU Department of Astronomy**   Las Cruces, New Mexico
Research Associate
- Observed and modeled red giant binaries as a window to stellar physics
- Trained and certified observer at Apache Point Observatory

Teaching Assistant
- Prepared, taught, and graded intro astronomy laboratory exercises
- Piloted an online distance-learning lab (astronomy.nmsu.edu/geas)

2011 **Indian Institute of Astrophysics**   Bangalore, India
Research Assistant - Derived orbital solutions for eclipsing binaries in the LMC

2008–2010 **SDSU Department of Astronomy**   San Diego, California
Research Assistant - Neutron star masses from binary observations and models
Teaching Associate - Intro labs, field trips, planetarium, and lab manual revision

2007 **Carnegie Observatories**   Pasadena, California
Research Assistant - Giant star chemical tagging & two observing runs at LCO

achievements & awards

2019–Now **Science Pipelines, URSSI, & Astro Data Carpentry Workshops**   LSST / URSSI / ADP
Instructor and helper for advanced scientific software tutorials and workshops

2018–Now **Analysis of Precursor Rubin Obs LSST Images**   LSST Science Pipelines, pipelines.lsst.io
Connecting each step of the Prompt Processing Pipeline, running real images
from precursor surveys through it, and preparing for LSST Alert Production

2018–2019 **Pre-MAP Project Mentor**   University of Washington
Undergrad mentor for projects with LSST-precursor data from ZTF and DECam

2017–Now **Software Carpentry Instructor**   The Carpentries, carpentries.org
Certified instructor for introductory scientific computing (bash, git, python)
Teaching regular workshops at UW eScience and beyond

2017–Now **Invited member of DiRAC as a Research Fellow**   Department of Astronomy, UW
Data Intensive Research in Astrophysics & Cosmology (DiRAC) Institute

2016–2017 **Student Advisor**   SDSS FAST / New Mexico State University
Primary mentor and scientific resource for a post-baccalaureate astronomer

2016	**Postdoc Poster Award Winner**	Cool Stars 19 SOC
	Awarded a plenary talk for best poster at the Cool Stars 19 conference	
2015	**Chambliss Astronomy Achievement Student Award**	American Astronomical Society
	Honorable Mention at the 225th AAS Meeting	
2012, 2013	**Graduate Fellowship**	New Mexico Space Grant Consortium
	Two-time recipient of the NM Space Grant Graduate Research Fellowship	
2009	**Graduate Fellowship**	Department of Astronomy, San Diego State University
	Ruth and Clifford Smith Astronomy Fellowship	

engagement

2020	**Mitigations Working Group Member**	Dark & Quiet Skies for Science and Society Workshop
	Organized by the UNOOSA, IAU, and IAC with NSF's NOIRLab	
2020	**Observations and Mitigations Working Group Member**	Satellite Constellation Workshop 1
	Organized by AAS and NSF's NOIRLab	
2020	**Panelist x2**	NSF & NASA
2018–Now	**DiRAC Visitor's Committee**	DiRAC Institute, UW
	Established new monthly seminar series and recruited a diverse set of speakers	
2016–2017	**ComSciCon-PNW Chair**	comscicon.com/comscicon-pnw2017, Seattle
	Chair of OC for science communication conference for 40 STEM grad students	
2013–2018	**Science Writer and Editor**	Astrobites Collaboration, astrobites.com
	Summaries of astronomy research papers, website redesign, social media lead	
2013	**Astronomy Ambassador**	AAS & Astronomical Society of the Pacific
	Trained in effective techniques to teach scientific concepts to varied audiences	

publications

Dark and Quiet Skies for Science and Society: Report and recommendations
More than 85 coauthors in five Working Groups, including **M. Rawls**
2021, IAU Publications, see Chapter 6 "Satellite Constellation Report"

Satellite Constellation Internet Affordability and Need
M. L. Rawls, H. B. Thiemann, V. Chemin, L. Walkowicz, M. W. Peel, & Y. G. Grange
2020, Res. Notes AAS, 4, 189

Impact of Satellite Constellations on Optical Astronomy and Recommendations Toward Mitigations
C. Walker, J. Hall, [7 lead authors & 19 alphabetized co-authors], **M. Rawls**, et al.
2020, SATCON1 Workshop Report (Member of Observations and Mitigations Working Groups)

Mitigation of LEO Satellite Brightness and Trail Effects on the Rubin Observatory LSST
J. A. Tyson, Ž. Ivezić, A. Bradshaw, **M. L. Rawls**, et al.
2020, The Astronomical Journal, 160, 226

APOGEE/*Kepler* Overlap Yields Orbital Solutions for a Variety of Eclipsing Binaries
J. M. Clark Cunningham, **M. L. Rawls**, D. Windemuth, A. Ali, et al.
2019, The Astronomical Journal, 158, 106

An Overview of the LSST Image Processing Pipelines
J. Bosch, [24 alphabetized co-authors], **M. L. Rawls**, et al.
2019, Astronomical Data Analysis Software and Systems XXVIII, 523, 521

Testing the Asteroseismic Scaling Relations for Red Giants with Eclipsing Binaries Observed by Kepler
P. Gaulme, J. McKeever, J. Jackiewicz, **M. L. Rawls**, et al.
2016, The Astrophysical Journal, 832, 121

Red Giants in Eclipsing Binaries as a Benchmark for Asteroseismology
M. L. Rawls
2016, PhD Thesis, doi:10.5281/zenodo.50996
Committee: J. Jackiewicz (chair), L. Boucheron, P. Gaulme, T. Harrison, & R. Walterbos

KIC 9246715: The Double Red Giant Eclipsing Binary With Odd Oscillations
M. L. Rawls, P. Gaulme, J. McKeever, et al.
2016, The Astrophysical Journal, 818, 108

Red Giants in Eclipsing Binary and Multiple-Star Systems: Modeling and Asteroseismic Analysis of 70 Candidates from Kepler Data
P. Gaulme, J. McKeever, **M. L. Rawls**, et al.
2013, The Astrophysical Journal, 767, 82

Refined Neutron Star Mass Determinations for Six Eclipsing X-Ray Pulsar Binaries
M. L. Rawls, J. A. Orosz, J. E. McClintock, et al.
2011, The Astrophysical Journal, 730, 25

select presentations   (t) = talk   (p) = poster

(t) Astronomy, Satellites, and You
2021 February, compileHer <interstell/Her> Keynote, *Invited Speaker*

(t) Vera C. Rubin Observatory: A Big Data Machine for the 21st Century
2021 January, IAA-CSIC Colloquium, *Invited Speaker*, doi:10.5281/zenodo.4477682

(p) Assessing Brightness Mitigations of Low-Earth Orbit Satellites
2021 January, 237th AAS Meeting, #324.08, iPoster

(t) Comparing SpaceX's DarkSat to brighter Starlink siblings in *g*-band with DECam
2020 June, SATCON1, *Invited Speaker*, doi:10.5281/zenodo.3937869

(t) The Software Behind LSST's Time Domain Science
2019 August, Vanderbilt Seminar, *Invited Speaker*

(t) DIA Processing, Testing, and Development: Finding Real Bumps in the Night
2019 August, LSST Project & Community Workshop, *Invited Speaker*

(p) Real Time Image Differencing with the LSST Alert Production Pipeline
2019 January, 233rd AAS Meeting, #363.25, doi:10.5281/zenodo.2543927

(t) Welcome and LSST Alert Production Overview
2018 May, DiRAC Inaugural Open House, *Invited Speaker*

(t) From Standalone Scripts to Software Development
2017 May, Python in Astronomy, Leiden, Netherlands

(t) Eclipsing Binaries as Astrophysical Laboratories
2017 February, WWU Department of Physics and Astronomy Colloquium, *Invited Speaker*

(t) A High Resolution Movie of the Night Sky with LSST
2017 February, University of British Columbia, *Invited Speaker*

(t) The Large Synoptic Survey Telescope: From Software to Science
2016 December, Herzberg Institute of Astrophysics, *Invited Speaker*

(t) The Odd Oscillatory Behavior of Red Giant Binaries
2016 November, Harvard CfA Stars & Planets Seminar, *Invited Speaker*

(p) Red Giant Eclipsing Binaries: Exploring Non-Oscillators and Testing Asteroseismic Scalings
2016 June, Cool Stars 19, Postdoc Poster Award Winner, doi:10.5281/zenodo.58046

(t) Red Giants in Eclipsing Binaries as a Benchmark for Asteroseismology
2016 April, NMSU Department of Astronomy Colloquium, PhD Thesis Defense