

Natalie M. Gosnell

Department of Physics
Colorado College
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Research Interests: Binary stars, stellar evolution, mass transfer processes, stellar clusters, X-ray binaries, alternative pathway stellar products, cluster dynamics, stellar magnetic fields and coronae, stellar spectroscopy (X-ray, UV, optical, near-IR)

Education

- **Ph.D. Astronomy** 2014
University of Wisconsin–Madison
– Minor in Physics
- **M.S. Astronomy** 2010
University of Wisconsin–Madison
- **B.A. Physics, *cum laude*** 2008
Colorado College

Professional Experience

Research:

- **Research Affiliate** 2016–present
McDonald Observatory
- **W. J. McDonald Postdoctoral Fellowship** 2014–2016
The University of Texas at Austin
– Endowed institutional fellowship to support independent astrophysics research
- **Research Assistant in Astronomy** 2008–2014
University of Wisconsin–Madison

Teaching:

- **Visiting Assistant Professor of Physics** 2016–present
Colorado College
- **Visiting Lecturer of Physics** Fall 2013, Spring 2016
Colorado College
- **Teaching Assistant in Astronomy** Spring 2009, Fall 2011
University of Wisconsin–Madison

Awards, Grants, & Honors

- WIYN/NASA Research Funds (\$16,400) 2016–2018
- Cox Research Funds (\$1,500) 2015
- UW–Madison Jansky Family Fellowship for Outstanding Research (\$3,000) 2014
- Chambliss Astronomy Achievement Award 2013
– Awarded for top-10 graduate student poster presentation.
- Sigma Xi Grants-in-Aid of Research (\$4,650) 2012
- Vilas Conference Travel Grant (\$600) 2011
- Wisconsin Space Grant Consortium Graduate Fellowship (\$3,000) 2010
- Women in Science and Engineering Leadership Institute Grant (\$3,000) 2009
– Funded three colloquium speakers who also presented on gender equity issues.
- American Astronomical Society Travel Grant (\$500) 2009
- Wilbur Wright Memorial Prize for Excellence in Physics 2008
- Arthur and Helen Johnson Foundation Scholarship (\$188,000) 2004–2008

Teaching & Mentoring

Undergraduate Courses at Colorado College:

- Introductory Physics for the Physical Sciences: Electricity and Magnetism (Lab) Spring 2017
- Topics in Physics: Stellar Dynamics Spring 2017
- Introductory Physics for the Physical Sciences: Mechanics Fall 2016, Spring 2017
- Quantum Mechanics Fall 2016
- Introductory Physics for the Life Sciences: Electricity and Magnetism (Lab) Fall 2016
- Astronomy Spring 2016
 - Developed “Astronomy Ambassador” assignments, requiring students to teach astronomy concepts to campus community.
- Introductory Physics I (Mechanics) Fall 2013

Undergraduate Courses at UW–Madison:

- Hands on the Universe (TA) Fall 2011
 - Developed new lab with faculty mentor to collect radio data in real-time from Arecibo Observatory.
 - TAs in Astronomy at UW–Madison independently manage discussion sections.
- The Evolving Universe (TA) Spring 2009

Undergraduate Student Advisees:

- Michael Leveille, Colorado College 2016–present
- Richard Seifert, UT Austin 2015–present
- Emily Strickland, UT Austin (Freshman Research Initiative program) 2016
- Jeremy Penn, UW–Madison 2011–2012
 - Co-advised senior thesis: “Triple Star Systems in NGC 7789 and NGC 6819.”
- Tom Finzell, UW–Madison 2010–2011
 - Co-advised senior thesis: “Modeling the Dynamical Formation of NGC 6819-3002 with a Genetic Algorithm.”
- Erica Jones, Louisiana State University (UW–Madison REU program) Summer 2010
- Aisha Mahmoud, University of Arkansas Fayetteville (UW–Madison REU program) Summer 2009

Graduate Student Mentees:

- Graduate student mentor to UW–Madison Ph.D. students Emily Leiner and Benjamin Tofflemire.

Training:

- Diversity in the College Classroom Spring 2012
 - Semester-long course on developing classroom practices based on research-based evidence to directly address issues of diversity and the achievement gap.
- Research Mentor Training Seminar Summer 2009
 - Discussion-based course on becoming an effective research mentor by implementing research-based mentoring strategies and collective problem solving.

Selected Successful Observing Proposals

Summary: Optical and IR spectroscopy and imaging: 100+ nights, *HST*: 53 orbits, *Chandra*: 22 ks

- **WIYN 3.5m Telescope**
 - “*Clusters with K2: Systematics From Membership and Binarity*” 2016–2017
 - (2nd co-I) NOAO: 9.5 nights, PI: A. Mann
 - “*A Study of Anomalous Stars & Binary Populations Within Open Clusters*” 2010–2014
 - UW: 5–10 nights per semester, 70+ nights total, PIs: R.D. Mathieu, K. Milliman
 - “*A Study of Anomalous Stars & Binary Populations...Tests of Theoretical Models*” 2009–2010
 - NOAO long term status: 20 nights, UW: 18 nights, PI: A. M. Geller

- **Harlan J. Smith 2.7m Telescope**
 - “*Characterizing FeH Spectral Properties of Magnetically-Active M Dwarfs with IGRINS*” 2015
– (PI) UT: 1 night
 - “*Unveiling the Open Cluster X-ray Population with DIAFI H-alpha Imaging*” 2015
– (PI) UT: 2 nights
 - “*Constraining Blue Straggler Formation and Triple Star Processes with IGRINS*” 2014–2015
– (PI) UT: 2.5 nights
- **Hubble Space Telescope**
 - “*COS Spectroscopy of White Dwarf Companions to Blue Stragglers in NGC 188*” 2014
– (2nd co-I) Cycle 21, 12 orbits, PI: R.D. Mathieu
 - “*The Nature of the Binary Companions to the Blue Stragglers in Open Cluster NGC 188*” 2012
– (2nd co-I) Cycle 19, 41 orbits, PI: R.D. Mathieu
- **Chandra X-Ray Observatory**
 - “*A New Insight into Open Cluster Internal Dynamics and Neutron Star Formation*” 2013
– (PI) Cycle 14, 22 ks, 1 joint orbit on *Hubble Space Telescope*, \$30,000
- **MMT 6.5m Telescope**
 - “*The Formation and Evolution of Blue Stragglers in Open Clusters*” 2009
– NOAO: 2.5 nights, PI: R.D. Mathieu

Academic Leadership and Service

- Referee for The Astronomical Journal, Astronomy & Astrophysics, Nature Letters, The Astrophysical Journal Letters 2014–present
- Postdoc-Faculty Liaison, UT Austin 2015–2016
- Postdoc representative for Association for Women in Astronomy Research and Education (AWARE), UT Austin 2014–2016
- Local Organizing Committee and Science Organizing Committee for New Horizons in Astronomy “Bashfest” Symposium, UT Austin 2015
- UT Austin department representative at inaugural Inclusive Astronomy conference 2015
- NASA Review Committee 2014
- Grainger Postdoctoral Fellowship Selection Committee, UW–Madison 2013
- Graduate Admissions Committee, UW–Madison 2012
- Graduate Student-Faculty Liaison, UW–Madison 2010–2011
- Implemented Research Assistant Family and Medical Leave Policy, UW–Madison 2010
– Presented at Committee for the Status of Women in Astronomy special session on family leave policies at 221st American Astronomical Society meeting
- Leader of Women of Wisconsin Strengthening Astronomy (WOWSA), UW–Madison 2009–2014
- Represented UW–Madison at Women in Astronomy conference 2009

Recent Invited Seminars and Colloquia

- **Physics Colloquium** November 2016
Haverford College
- **Stars & Planets Seminar** October 2016
Center for Astrophysics, Harvard University
- **Physics Colloquium** March 2016
Colorado College
- **Astronomy Colloquium** January 2016
Kapteyn Astronomical Institute, University of Groningen

- **Physics and Astronomy Colloquium** October 2015
Trinity University
- **Bash Symposium Invited Speaker** October 2015
University of Texas at Austin
- **Astronomy Seminar** September 2015
Vanderbilt University
- **Physics and Astronomy Colloquium** April 2015
University of Denver
- **Astronomy Seminar** February 2015
Columbia University

Public Outreach & Press Coverage

- Featured Interview, *How the Universe Works*, Season 5 airs Fall 2016
- Volunteer, Women in Engineering: Girl Day, UT Austin Spring 2016
- *Mystery Solved: How Young Stars Appear In Old Clusters*, Forbes Science 14 Dec 2015
- *Texas Astronomer Solves Decades-Old Mystery About Aging Stars*, Marfa Public Radio 11 Dec 2015
- *Blue Stragglers: The Mystery of Born Again Stars*, Hubble Hangout 10 Dec 2015
- *Secrets of Vampire Stars Revealed in Hubble Telescope Data*, Space.com 8 Dec 2015
- *Hubble helps solve mystery of "Born Again" Stars*, Astronomy Magazine 8 Dec 2015
- *When Stars Collide!* public lecture, Astronomy on Tap, Austin, TX 19 May 2015
- *Stargazing with Astronomy Outreach at UT*, KXAN Morning News 5 Nov 2014
- *Old stars gleaned neighbors' gas*, Science News 6 Feb 2014
- Radio guest on WORT: 5 Minute Astronomy, Madison, WI 13 Jan 2014
- Volunteer, Expanding Your Horizons program, UW–Madison 2010–2014
- Public observing nights, Washburn Observatory, UW–Madison 2008–2014

Publications

Names of mentees are highlighted with **.

Peer-Reviewed Journal Articles and Proceedings

9. J. J. Andrews, M. Agüeros, W. Brown, **N. M. Gosnell**, A. Gianninas, M. Kilic, D. Koester. *Today a Duo, but Once a Trio? The Double White Dwarf HS 2220+2146 May Be a Post-Blue Straggler Binary*, 2016, ApJ, 828, 38.
8. **N. M. Gosnell**. *Blue Straggler Stars: A Window Into Alternative Pathway Stellar Products*. 2015, Frank N. Bash Symposium on New Horizons in Astronomy, eds. G. N. Mace & H. Kim.
7. **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, A. Sills, N. Leigh, C. Knigge. *Implications for the Formation of Blue Straggler Stars from HST Ultraviolet Observations of NGC 188*, 2015, ApJ, 814, 163.
6. **E. M. Leiner, R. D. Mathieu, **N. M. Gosnell**, A. M. Geller. *WIYN Open Cluster Study. LXX: Spectroscopic Binary Orbits in the Young Open Cluster M35*, 2015, AJ, 150, 10.
5. **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, A. Sills, N. Leigh, C. Knigge. *Detection of White Dwarf Companions to Blue Stragglers in the Open Cluster NGC 188: Direct Evidence for Recent Mass Transfer*. 2014, ApJ, 783, L8.
4. **B. Tofflemire, **N. M. Gosnell**, R. D. Mathieu, I. Platais. *WIYN Open Cluster Study. LIII. Radial Velocity Membership of the Evolved Population of Old Open Cluster NGC 6791*. 2014, AJ, 148, 61.

3. K. Milliman, R. D. Mathieu, A. M. Geller, **N. M. Gosnell**, S. Meibom, I. Platais. *WIYN Open Cluster Study. Spectroscopic Binary Orbits in NGC 6819*. 2014, AJ, 148, 38.
2. I. Platais, **N. M. Gosnell**, S. Meibom, V. Kozhurina-Platais, A. Bellini, C. Veillet, M. S. Burkhead. *WIYN Open Cluster Study. LV. Astrometry and membership in NGC 6819*. 2013, AJ, 146, 43.
1. **N. M. Gosnell**, D. Pooley, A. M. Geller, J. Kalirai, R. D. Mathieu, P. Frinchaboy, and E. Ramirez-Ruiz. *An Unexpected Discovery in the Rich Open Cluster NGC 6819 Using XMM-Newton*. 2012, ApJ, 745, 57.

Selected Conference Abstracts and Presentations

13. **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, **E. M. Leiner. *Alternative Pathway Stellar Products in Old Open Clusters*. 2016, Cool Stars 19
12. **R. Seifert, **N. M. Gosnell**, C. Sneden. *Near-Infrared Surface Compositional Analysis of Blue Straggler Stars in Open Cluster M67*. 2016, UT Austin Undergraduate Research Forum
11. **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, A. Sills, N. Leigh, C. Knigge. *The Mass-Transfer Formation Frequency of Blue Straggler Stars in the Old Open Cluster NGC 188*. 2015, American Astronomical Society Meeting Abstracts, 225, #342.15
10. **N. M. Gosnell**. *The Mass-Transfer Formation of Blue Stragglers as Revealed by Their White Dwarf Companions*. 2014, American Astronomical Society Meeting Abstracts, 223, #434.01D
9. **B. M. Tofflemire, **N. M. Gosnell**, R. D. Mathieu. *WIYN Open Cluster Study: Radial Velocity Membership of the Evolved Population of Open Cluster NGC 6791*. 2013, Bulletin of the American Astronomical Society, 222, #214.04
8. **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, C. Knigge, A. Sills, N. Leigh. *Detecting White Dwarf Companions of Blue Straggler Binaries in Open Cluster NGC 188*. 2012, ESO Workshop on the Ecology of Blue Stragglers
7. **N. M. Gosnell**, D. Pooley, A. M. Geller, R. D. Mathieu, J. Kalirai, P. Frinchaboy, E. Ramirez-Ruiz. *Intriguing Sources from the XMM-Newton Survey of Rich Open Clusters*. 2012, Bulletin of the American Astronomical Society, 220, #121.05
6. K. Milliman, R. D. Mathieu, A. M. Geller, **N. M. Gosnell**, S. Meibom. *WIYN Open Cluster Study: Orbital Solutions for Hard Binaries of NGC 6819*. 2012, Bulletin of the American Astronomical Society, 219, #153.56
5. **N. M. Gosnell**, D. Pooley, J. Kalirai, A. M. Geller, R. D. Mathieu, P. Frinchaboy, E. Ramirez-Ruiz. *X-ray Sources in the Rich Open Cluster NGC 6819*. 2011, Bulletin of the American Astronomical Society, 217, #152.31
4. **T. Finzell, A. M. Geller, **N. M. Gosnell**, R. D. Mathieu. *Exploring Possible Origins of an Improbable Binary Star in the Open Cluster NGC 6819 Through Dynamical Exchange Simulations*. 2011, Bulletin of the American Astronomical Society, 217, #144.17
3. **A. Mahmoud, **N. M. Gosnell**, R. D. Mathieu, D. Pooley, J. Kalirai. *X-ray Sources of the Young Open Cluster M35*. 2010, Bulletin of the American Astronomical Society, 215, #478.01
2. **N. M. Gosnell**, P. Frinchaboy, A. M. Geller, J. Kalirai, R. D. Mathieu, D. Pooley, and E. Ramirez-Ruiz. *X-ray Sources in the Rich Open Cluster NGC 6819*. 2009, Chandra's First Decade of Discovery
1. **N. M. Gosnell**, M. A. DiPompeo, E. K. Braden, A. M. Geller, and R. D. Mathieu. *Investigating Dynamical Formation Scenarios for an Interesting Binary in Open Cluster NGC 6819*. 2007, Bulletin of the American Astronomical Society, 211, #58.34