

# Natalie M. Gosnell

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

## Education

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- **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

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### Teaching:

- **Associate Professor of Physics** 2023–Present  
Colorado College
- **Assistant Professor of Physics** 2017–2023  
Colorado College
- **Visiting Assistant Professor of Physics** 2016–2017  
Colorado College
- **Visiting Lecturer of Physics** Fall 2013, Spring 2016  
Colorado College

### Research:

- **Research Affiliate** 2016–2017  
McDonald Observatory
- **W. J. McDonald Postdoctoral Fellow** 2014–2016  
The University of Texas at Austin  
– Endowed institutional fellowship to support independent astrophysics research

### Artistic Residencies:

- **Leonardo@Djerassi Resident Artist Program** Summer 2023  
Extremely competitive (0.05% acceptance rate) art-science residency
- **Guild of Future Architects Shared Future Incubator** Fall 2020  
Supported by Joxi
- **Sundance Institute Theater Lab** July 2020
- **Brooklyn College** Aug 2019  
Supported by The Public Theater and the Tow Foundation
- **The Public Theater** Dec 2018

## Artistic Exhibitions

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### ◦ *The Gift*

Yale University Schwarzman Center	April 2025
Arizona State University MIX Center	Feb 2025
Los Angeles Music Center, presented by the Getty "Pacific Standard Time" project	Feb 2025
Mt. Wilson Observatory	Sep 2024
Stanford University, small installation	May–June 2024
Stanford University, large installation	May 2024
Djerassi Art Center Open Studios	July 2023
Fine Arts Center of Colorado Springs at Colorado College	March–June 2023
New York Public Library, presented by the Lincoln Center	Dec 2022

## Publications

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Undergraduate research advisees are indicated with \*\*.

### Peer-Reviewed Journal Articles and Proceedings

22. K. E. Brady, C. Sneden, C. A. Pilachowski, M. Afsar, G. N. Mace, D. T. Jaffe, **N. M. Gosnell**, R. Seifert. *M67 Blue Stragglers with High-resolution Infrared Spectroscopy*. 2023, *The Astronomical Journal*, 166, 154.
21. K. G. Stassun, G. Torres, M. Kounkel, B. M. Tofflemire, E. Leiner, D. L. Feliz, D. M. Dixon, R. D. Mathieu, **N. M. Gosnell**, M. Gully-Santiago. *An Eclipsing Binary Comprising Two Active Red Stragglers of Identical Mass and Synchronized Rotation: A Post-mass-transfer System or Just Born That Way?*. 2023. *The Astrophysical Journal*, 950, 99.
20. A. C. Nine, R. D. Mathieu, **N. M. Gosnell**, E. M. Leiner. *WIYN Open Cluster Study. LXXXVII. HST Ultraviolet Detection of Hot White Dwarf Companions to Blue Lurkers in M67*. 2023, *The Astrophysical Journal*, 944, 145.
19. **N. M. Gosnell**, M. A. Gully-Santiago, E. M. Leiner, B. M. Tofflemire. *Observationally Constraining the Starspot Properties of Magnetically Active M67 Sub-Subgiant S1063*. 2022, *The Astrophysical Journal*, 925, 5.
18. E. M. Leiner, A. M. Geller, **N. M. Gosnell**, M. A. Gully-Santiago, B. M. Tofflemire. *Revealing the Field Sub-subgiant Population Using a Catalog of Active Giant Stars and Gaia EDR3*. 2022, *The Astrophysical Journal*, 927, 222.
17. R. Rampalli, M. Agüeros, J. Curtis, S. Douglas, A. Núñez, P. Cargile, K. Covey, **N. M. Gosnell**, A. Kraus, N. Law, A. Mann. *Three K2 Campaigns Yield Rotation Periods for 1013 Stars in Praesepe*. 2021, *The Astrophysical Journal*, 921, 167.
16. S. Getty, B. Whitten, **N. M. Gosnell**, J. Taylor. *Supporting Inclusiveness in Introductory Physics - A "Design Your Own Problem" (DYOP) Assignment*. 2020, *The Physics Teacher*, 58, 312.
15. **N. M. Gosnell**, E. Leiner, R. D. Mathieu, A. M. Geller, C. Knigge, A. Sills, N. Leigh. *Constraining Mass Transfer Histories of Blue Straggler Stars with COS Spectroscopy of White Dwarf Companions*. 2019, *The Astrophysical Journal*, 885, 1.
14. E. Leiner, R. D. Mathieu, A. Vandenberg, **N. M. Gosnell**, J. C. Smith. *Blue Lurkers: Hidden Blue Stragglers on the M67 Main Sequence Identified From Their Kepler/K2 Rotation Periods*. 2019, *The Astrophysical Journal Letters*, 881, 47.
13. R. López-Valdivia, G. N. Mace, K. R. Sokal, M. Huzzaini, B. Kidder, A. W. Mann, **N. M. Gosnell**, H. Oh, D. T. Jaffe. *Effective Temperatures of Low-Mass Stars from High-Resolution H-band Spectroscopy*. 2019, *The Astrophysical Journal*, 879, 105.
12. N. W. C. Leigh, T. Panurach, M. Simunovic, A. M. Geller, D. Zurek, M. M. Shara, A. Sills, C. Knigge, **N. M. Gosnell**, R. Mathieu, T. H. Puzia, J. Ventura, Q. Minor. *Constraints on blue straggler formation mechanisms in galactic globular clusters from proper motion velocity distributions*, 2019, *Monthly Notices of the Royal Astronomical Society*, 482, 231.

11. E. Leiner, R. D. Mathieu, **N. M. Gosnell**, A. Sills. *Observations of Spin-down in Post-mass-transfer Stars and the Possibility for Blue Straggler Gyrochronology*, 2018, The Astrophysical Journal Letters, 869, 29.
10. G. N. Mace, A. W. Mann, B. A. Skiff, C. Sneden, J. D. Kirkpatrick, A. C. Schneider, B. Kidder, **N. M. Gosnell**, H. Kim, B. W. Mulligan, L. Prato, D. Jaffe. *Wolf 1130: A Nearly Triple System Containing a Cool, Ultramassive White Dwarf*, 2018, The Astrophysical Journal, 854, 145.
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, The Astrophysical Journal, 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, The Astrophysical Journal, 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, The Astronomical Journal, 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, The Astrophysical Journal, 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, The Astronomical Journal, 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, The Astronomical Journal, 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, The Astronomical Journal, 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, The Astrophysical Journal, 745, 57.

## Books in Preparation

1. J. Balasubramanian & **N. M. Gosnell**, *Undisciplined: Radical Strategies for Growing Artist-Scientist Collaborations*. Under contract with University of California Press, expected publication 2027.

## Selected National and International Conference Abstracts and Presentations

18. **N. M. Gosnell**, M. A. Gully-Santiago, E. M. Leiner, B. Tofflemire. *Characterizing magnetic activity through the lens of sub-subgiant stars*. 2022, Fifty Years of the Skumanich Relations, 24.
17. **\*\*M. Nowotka, N. M. Gosnell**, A. W. Mann, S. T. Douglas, M. Agüeros. *K2 view on open clusters: removing systematic biases from the Pleiades catalog*. 2020, American Astronomical Society Meeting Abstracts, 235, #204.04
16. **N. M. Gosnell**, E. M. Leiner, R. D. Mathieu, A. M. Geller, C. Knigge, A. Sills, N. Leigh. *Constraining Mass Transfer Histories of Blue Straggler Stars: Observations with HST/COS and Resulting WD Atmosphere Fits*. 2020, American Astronomical Society Meeting Abstracts, 235, #265.04
15. E. M. Leiner, **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, C. Knigge, A. Sills, N. Leigh. *Constraining Mass Transfer Histories of Blue Straggler Stars: MESA Modeling of Formation Pathways*. 2020, American Astronomical Society Meeting Abstracts, 235, #265.05

14. M. S. Burns & **N. M. Gosnell**. *A Liberal Arts Observatory at the Colorado College Baca Campus*. 2020, American Astronomical Society Meeting Abstracts, 235, #175.25
13. R. Rampalli, M. Agüeros, J. Curtis, S. Douglas, A. Núñez, P. Cargile, K. Covey, **N. M. Gosnell**, A. Kraus, N. Law, A. Mann. *How Long Do Bees Buzz? Examining Light Curve Evolution for Low-Mass Stars in Praesepe*. 2020, American Astronomical Society Meeting Abstracts, 235, #273.04
12. Janani Balsubramanian & **N. M. Gosnell**. *Be a Star: Theatre Games for Astrophysicists*. 2019, Association for Theatre in Higher Education.
11. **N. M. Gosnell**, M. A. Gully-Santiago, E. Leiner. *K2 M67 legacy field signals spots as cause of sub-subgiant underluminosity*. 2019, Kepler/K2 SciCon.
10. **N. M. Gosnell**, M. A. Gully-Santiago, E. Leiner. *Magnetic activity and starspots as a cause of sub-subgiant stars*. 2019, American Astronomical Society Meeting Abstracts, 233, #204.07.
9. **N. M. Gosnell**. *Using Blue Straggler Binaries to Constrain AGB Mass Transfer*. 2018. International Astronomical Union Symposium 343: Why Galaxies Care About AGB Stars: A Continuing Challenge Through Cosmic Time.
8. **N. M. Gosnell**, M. A. Gully-Santiago, E. Leiner. *Investigating Starspots as a cause of sub-subgiant stars*, 2018, “Know Thy Starspot, Know Thy Star” Cool Stars 20 Splinter Session.
7. **N. M. Gosnell**, \*\*M. Lucey, A. W. Mann, S. T. Douglas, \*\*R. Seifert, M. Agüeros. *Catching more bees with Hydra: membership, binarity, and kinematics of the Beehive Cluster*. 2018, Cool Stars 20.
6. **N. M. Gosnell**, E. Leiner, A. M. Geller, C. Knigge, R. D. Mathieu, A. Sills, N. Leigh. *Using White Dwarf Companions of Blue Stragglers to Constrain Mass Transfer Physics*. 2018, American Astronomical Society Meeting Abstracts, 232, #315.04.
5. \*\*M. Lucey, **N. M. Gosnell**, A. Mann, S. Douglas. *Cataloging the Praesepe Cluster: Identifying Interlopers and Binary Systems*. 2018, American Astronomical Society Meeting Abstracts, 231, #344.08.
4. \*\*J. Kohler, **N. M. Gosnell**, K. R. Sokal, G. N. Mace. *Observationally Testing the Triple Origin of Blue Straggler Stars with Near-Infrared Spectroscopy*. 2018, American Astronomical Society Meeting Abstracts, 231, #244.06.
3. **N. M. Gosnell**, A. M. Geller, C. Knigge, R. D. Mathieu, A. Sills, E. Leiner, N. Leigh. *COS Spectroscopy of White Dwarf Companions to Blue Stragglers*. 2017, American Astronomical Society Meeting Abstracts, 230, #344.11.
2. \*\*R. Seifert, **N. M. Gosnell**, C. Sneden. *Near-Infrared Surface Compositional Analysis of Blue Straggler Stars in Open Cluster M67*. 2017, American Astronomical Society Meeting Abstracts, 230, #315.05.
1. **N. M. Gosnell**, R. D. Mathieu, A. M. Geller, \*E. M. Leiner. *Alternative Pathway Stellar Products in Old Open Clusters*. 2016, Cool Stars 19.

## Recent Awards, Grants, & Honors

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○ Cottrell Scholar Award (\$100,000)	2021–2024
○ Alfred P. Sloan Foundation Books Grant (\$50,000)	2024
○ Maria Mitchell Observatory Affiliate Astronomer	2022
○ <i>Hubble Space Telescope</i> Research Funds (\$26,700)	2021–2022
○ WIYN/NASA Research Funds (\$72,000)	2016–2022
○ Student Collaborative Research Experience (SCoRE) grant (\$16,000)	2017–2022
○ Natural Sciences Division Research & Development Funds (\$14,000)	2016–2021
○ Cox Research Funds (\$1,500)	2015
○ UW–Madison Jansky Family Fellowship for Outstanding Research (\$3,000)	2014

## Recent Invited Talks

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- **Physics Colloquium** March 2024  
KIPAC, Stanford University
- **Invited Plenary Speaker** October 2023  
.Astronomy 12 Conference
- **Physics Colloquium** October 2022  
Syracuse University
- **Invited Speaker** October 2022  
4-Corners APS Meeting
- **Employee Resources Workshop** November 2021  
Lincoln Center for the Performing Arts
- **Physics and Astronomy Colloquium** November 2019  
University of Wyoming
- **Physics and Astronomy Colloquium** September 2018  
St. Olaf College
- **Astronomy Colloquium** October 2017  
Pomona College
- **Physics and Astronomy Colloquium** January 2017  
Franklin & Marshall College
- **Physics and Astronomy Colloquium** January 2017  
Carleton College
- **Physics Colloquium** November 2016  
Haverford College
- **Stars & Planets Seminar** October 2016  
Center for Astrophysics, Harvard University

## Selected Successful Observing Proposals

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Summary: Optical and Near-IR spectroscopy and imaging: 150+ nights, *HST*: 80 orbits, *Chandra*: 22 ks

- **Hubble Space Telescope**
  - “*Testing the Limits of Mass Transfer Stability With A Post-Mass-Transfer Binary In M67*” 2022  
– (2nd co-I) Cycle 30, 10 orbits, PI: E.M. Leiner
  - “*Blue Lurkers: Low-Mass Blue Stragglers and the Stability of Mass Transfer*” 2021  
– (2nd co-I) Cycle 28, 17 orbits, PI: R.D. Mathieu
  - “*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
- **WIYN 3.5m Telescope**
  - “*Clusters with K2: Systematics From Membership and Binarity*” 2017–2021  
– (PI) NOAO: 32.5 nights
  - “*Studying Young Planets with TESS*” 2018  
– NOAO: 5 nights, PI: A. Mann
  - “*Constraining magnetic variability in the planet-hosting cluster Praesepe*” 2017  
– NOAO: 4 nights, PI: S. Douglas
  - “*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
- **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

## Recent Leadership and Service

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### Service to Colorado College:

- Physics Department Chair 2024–Present
- Curriculum Executive Committee (elected position) 2022–2023
- Crown Center Instructional Coach 2022–2023
- Committee on Admissions and Financial Aid 2022–2023
- Stroud Scholars Quantitative Reasoning Curriculum Committee 2019–2022
- Tashjian-Crecelius Family Prize Committee 2018–2022
- STEM@CC Task Force 2019–2021
- Academic Events Committee 2019–2020
- Chemistry and Biochemistry Department Tenure-track Search Committee 2019–2020
- First-Year Advising Faculty Cohort 2018–2020
- Physics Department Tenure-track Search Committee 2018–2019
- Summer Research Application Workshop for Physics Majors 2017, 2018, 2019
- Butler Center External Review Faculty Panel Spring 2019
- Food and Resource Sustainability Committee 2018–2019
- Physics Department Tenure-track Search Committee Fall 2018
- QRC Professional Tutor Search Committee Spring 2018

### Service to Professional Community:

- Referee for The Astronomical Journal, The Astrophysical Journal, The Astrophysical Journal Letters, Nature Letters, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society
- *Hubble Space Telescope* Financial Review Committee 2021–Present
- NASA Review Panel Summer 2019, Fall 2020
- National Optical Astronomical Observatory Telescope Allocation Committee 2017–2019
- Member of the “Council of Scholars” for Janani Balasubramanian’s residency at the UCCS Heller Center Fall 2018
- Invited panelist at the Women in Astronomy IV conference Summer 2017
- Panelist for *Hubble Space Telescope* Cycle 25-26 peer review Summer 2017
- Member of the US delegation for the International Women in Physics Conference Spring 2017

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## Public Outreach & Press Coverage

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- *Encounters: Where Creative and Scientific Inquiry Meet* podcast August 2024
- *Colorado Springs installation uses stars to reflect on loss, grief*, The Gazette May 2023
- *Star Power: Immersive Experience The Gift Blends Art with Astrophysics*, Southwest Contemporary Magazine March 2023
- *Redefining Space from a Feminist Lens*, GoFAR Blog February 2021
- *Can Blue Stragglers Be Used to Tell Time?*, AAS Nova 18 Jan 2019
- *Astronomy is losing women three times faster than men*, Nature News 15 Oct 2018
- *From CC to...CC*, Colorado College Bulletin Fall 2017
- Featured Interview, *How the Universe Works*, Season 5, Discovery Channel first aired Dec 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
- *Stargazing with Astronomy Outreach at UT*, KXAN Morning News 5 Nov 2014
- *Old stars gleaned neighbors' gas*, Science News 6 Feb 2014