

# William Wolf

Associate Professor of Physics and Astronomy, UWEC

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## PROFESSIONAL INTERESTS

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- **Research:** Computational Stellar Astrophysics, White Dwarfs, Classical Novae, Supernovae.
- **Teaching:** Introductory Physics and Astronomy, Computational Physics, Including computation in upper division physics courses

## EDUCATION

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<b>Doctor of Philosophy in Physics</b>	2017
<i>University of California – Santa Barbara</i>	<i>Santa Barbara, CA</i>
◦ <b>Advisors:</b> Lars Bildsten and Andy Howell	
◦ <b>Dissertation Title:</b> Supersoft Emission from Thermonuclear Burning on Hydrogen-Accreting White Dwarfs	
<b>Master of Arts in Physics</b>	2013
<i>University of California – Santa Barbara</i>	<i>Santa Barbara, CA</i>
<b>Bachelor of Science in Physics</b>	2010
<i>Eastern Illinois University</i>	<i>Charleston, IL</i>
<b>Bachelor of Arts in Mathematics</b>	2010
<i>Eastern Illinois University</i>	<i>Charleston, IL</i>

## ACADEMIC APPOINTMENTS

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<b>Associate Professor of Physics and Astronomy</b>	Aug 2024 – Present
<i>University of Wisconsin – Eau Claire</i>	<i>Eau Claire, WI</i>
<b>Assistant Professor of Physics and Astronomy</b>	Aug 2019 – Aug 2024
<i>University of Wisconsin – Eau Claire</i>	<i>Eau Claire, WI</i>
<b>Adjunct Professor of Astronomy</b>	Aug 2018 - May 2019
<i>Maricopa County Community College District</i>	<i>Mesa, AZ and Chandler, AZ</i>
<b>Postdoctoral Research Associate</b>	Sep 2017 – Aug 2019
<i>Arizona State University</i>	<i>Tempe, AZ</i>

## EXTERNAL FUNDING

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<b>NSF Faculty Early Career Development Program (CAREER); PI</b>	2023–2028
<i>“Mixing and Oscillations in Novae”</i>	<i>\$526,813</i>
<b>NASA Astrophysics Theory Program (ATP); Co-I</b>	2024–2027
<i>“Dead Ringers: A New Paradigm for Supersoft X-ray Oscillations of Novae”</i>	<i>\$423,518</i>

## INTERNAL FUNDING

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<b>UWEC Summer Research Experience for Undergraduates</b>	Summer 2020
<i>“Constraining the Impact of Mixing in Classical Nova Explosions”</i>	<i>\$7,040</i>

## CURRENT RESEARCH STUDENTS

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Student	Years	Home Institution
Grace Mullikin	2024–	UWEC
Mahdi Mohamed	2024–	UWEC
Ryan Selby	2024–	UWEC
Teagan Laws	2023–	Embry Riddle A. U.
Elaina Plonis	2022–	UWEC

## PAST RESEARCH STUDENTS

Student	Years	Institution	Afterwards
Sam Hearden	2023–2024	UWEC	Graduate program at University of Iowa
Alexis Rustin	2023–2024	UWEC	UWEC Student
Huston Wilhite	2019–2023	UWEC	Graduate program at U. of Michigan
Jessica Ryun	2022	UWSP	Graduate program at U. of Illinois
Caitlin Hedberg	2019–2021	UWEC	Graduate program at University College Dublin
Timothy Cunningham	2013–2014	UCSB	Ph.D. and Postdoc at University of Warwick

## TEACHING EXPERIENCE

### University of Wisconsin–Eau Claire

Course Name	Term(s)	Approx. Enrollment
PHYS 211: General Physics I	Fall 2019 (2 sections), Spring 2020	50–70
PHYS 212: General Physics II	Spring 2020 – Fall 2024	40–70
PHYS 240: Computational Physics	Fall 2021 – Fall 2024	10–30
PHYS 291: Special Topics (Comp. Physics)	Fall 2020 and Spring 2021	10
PHYS 445: Thermal Physics	Fall 2022 and Fall 2024	10

### Maricopa County Community College District

Course Name	Term(s)	Approx. Enrollment
AST 111/113: Intro to Solar Systems Astronomy	Fall 2018, Spring 2019	20
AST 112/114: Intro to Stars, Galaxies, and Cosmology	Fall 2018	20
AST 106: Life in the Universe (online)	Spring 2019	20

## PUBLICATIONS

13. **Wolf, William M.**; Schwab, J.; Farmer, R.; Bauer, E. B. Testing Modules for Experiments in Stellar Astrophysics (MESA). 2023, The Astrophysical Journal Supplement Series, Volume 269, Number 50, 10p.
12. Jermyn, Adam S.; Bauer, E. B.; Schwab, J.; Farmer, R.; Ball, W. H.; Bellinger, E. P.; Dotter, A.; Joyce, M.; Marchant, P.; Mombarg, J. S. G.; **Wolf, William M.**; Sunny Wong, T. L.; Cinquegrana, G. C.; Farrell, E.; Smolec, R.; Thoul, Anne; Cantiello, M.; Herwig, F.; Toloza, O.; Bildsten, L.; Townsend, R. H. D.; Timmes, F. X. Modules for Experiments in Stellar Astrophysics (MESA): Time-dependent Convection, Energy Conservation, Automatic Differentiation, and Infrastructure. 2023, The Astrophysical Journal Supplement Series. Volume 265, Issue 1, 38 pp.
11. Paxton, Bill; Smolec, R.; Schwab, Josiah; Gautschi, A.; Bildsten, Lars; Cantiello, Matteo; Dotter, Aaron; Farmer, R.; Goldberg, Jared A.; Jermyn, Adam S.; Kanbur, S. M.; Marchant, Pablo; Thoul, Anne; Townsend, Richard H. D.; **Wolf, William M.**; Zhang, Michael; Timmes, F. X. Modules for Experiments in Stellar Astrophysics (MESA): Pulsating Variable Stars, Rotation, Convective Boundaries, and Energy Conservation. 2019, The Astrophysical Journal Supplement Series. Volume 243, Issue 1, 44p.
10. Timmes, F.X; Townsend, Richard H.D.; Bauer, Evan B.; Thoule, Anne; Fields, C. E.; **Wolf, William M.** The Impact of White Dwarf Luminosity Profiles on Oscillation Frequencies. 2018, The Astrophysical Journal Letters. Volume 867, Number 2, 6 pp.
9. **Wolf, William M.**; Townsend, Richard H. D.; Bildsten, Lars. Nonradial Pulsations in Post-outburst Novae. 2018, The Astrophysical Journal. Volume 855, Issue 2, article id. 127, 10 pp.
8. Fields, C. E.; Timmes, F. X.; Farmer, R.; Petermann, I.; **Wolf, William M.**; Couch, S. M. The Impact of Nuclear Reaction Rate Uncertainties on the Evolution of Core-collapse Supernova Progenitors. 2018, The Astrophysical Journal Supplement Series. Volume 234, Issue 2, article id. 19, 25 pp.
7. Prajs, S.; Sullivan, M.; Smith, M.; Levan, A.; Karpenka, N. V.; Edwards, T. D. P.; Walker, C. R.; **Wolf, William M.**; Balland, C.; Carlberg, R.; Howell, A.; Lidman, C.; Pain, R.; Pritchett, C.; Ruhlmann-Kleider, V. The Volumetric Rate of Superluminous Supernovae at  $z \sim 1$ . 2016, Monthly Notices of the Royal Astronomical Society. Volume 463, Issue 2. 16pp.

6. Arcavi, I.; **Wolf, William M.**; Howell, D. A.; Bildsten, L.; Leloudas, G.; Hardin, D.; Prajs, S.; Perley, D. A.; Svirski, G.; Gal-Yam, A.; Katz, B.; McCully, C.; Cenko, S. B.; Lidman, C.; Sullivan, M.; Valenti, S.; Astier, P.; Balland, C.; Carlberg, R. G.; Conley, A.; Fouchez, D.; Guy, J.; Pain, R.; Palanque-Delabrouille, N.; Perrett, K.; Pritchett, C. J.; Regnault, N.; Rich, J.; and Ruhlmann-Kleider, V. Rapidly Rising Transients in the Supernova-Superluminous Supernova Gap. 2016, *The Astrophysical Journal*, Volume 819, Issue 1, article id. 35, 22pp.
5. Soraisam, M. D.; Gilfanov, M.; **Wolf, William M.**; and Bildsten, L. Population of post-nova supersoft X-ray Sources. 2016, *The Monthly Notices of the Royal Astronomical Society*, Volume 455, Issue 1, p.668-679. January 2016.
4. Cunningham T.; **Wolf, William M.**; and Bildsten, L. Photoionization Heating of Nova Ejecta by the Post-outburst Supersoft Source. 2015, *The Astrophysical Journal*, Volume 803, Issue 3, article id. 76, 7pp.
3. Tang, S.; Kaplan, David L.; Phinney, E. S.; Prince, Thomas A.; Breton, Rene P.; Bellm, E.; Bildsten, L.; Cao, Y.; Kong, A. K. H.; Perley, D. A.; Sesar, B.; **Wolf, William M.**; and Yen, T.-C. Identification of the Optical Counterpart *Fermi* Black Widow Millisecond Pulsar PSR J1544+4937. 2014, *The Astrophysical Journal Letters*, Volume 791, article id. L5, 5pp.
2. Tang, S.; Bildsten, L.; **Wolf, William M.**; Li, K. L.; Hong, A. K. H.; Cao, Y.; Cenko, B. S.; De Cia, A.; Kasliwal, M. M.; Kulkarni, S. R.; Laher, R. R.; Masci, F.; Nugent, P. E.; Perley, D. A.; Prince, T. A.; and Surace, J. An Accreting White Dwarf Near the Chandrasekhar Limit in the Andromeda Galaxy. 2014, *The Astrophysical Journal*, Volume 786, Issue 1, article id. 61, 8pp.
1. **Wolf, William M.**; Bildsten, L.; Brooks, J.; and Paxton, B. 2013. Hydrogen Burning on Accreting White Dwarfs: Stability, Recurrent Novae, and the Post-nova Supersoft Phase. 2013, *The Astrophysical Journal*, Volume 777, Issue 2, article id. 136, 15 pp.

## PRESENTATIONS AND POSTERS

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### Public Lectures

4. **Wolf, William M.** From Death Stars to Deaths of Stars. Chippewa Valley Museum, Eau Claire, WI, USA, December 18, 2021.
3. **Wolf, William M.** Novae and Type Ia Supernovae: Friends or Foes? Northwoods Starfest, Beaver Creek Reserve, Fall Creek, WI, USA, August 7, 2021.
2. **Wolf, William M.** Classical Novae: Inside Out Stars Evolving in Reverse. Astronomy on Tap Santa Barbara, M8RX, Santa Barbara, CA, USA, November 16, 2016.
1. **Wolf, William M.** Stellar Explosions. Retirement Symposium for Professor Jim Conwell, Eastern Illinois University, Charleston, Illinois, USA, November 6, 2015.

### Invited Talks

10. **Wolf, William M.** Linking Progenitor Parameters to Nova Outburst Outcomes. Powerful Shocks in Novae meeting within the 244th Meeting of the American Astronomical Society. Madison, WI, USA, June 10, 2024.
9. **Wolf, William M.** Probing White Dwarf Binaries with Post-Outburst Novae. UW Milwaukee Center for Gravitation, Cosmology, and Astrophysics Seminar. Milwaukee, WI, USA, March 1, 2024.
8. **Wolf, William M.** Probing White Dwarf Binaries. Marquette University Department of Physics Colloquium. Milwaukee, WI, USA, March 5, 2020.
7. **Wolf, William M.** Probing White Dwarf Binaries. UW Madison Department of Astronomy Colloquium. Madison, WI, USA, October 17, 2019.
6. **Wolf, William M.** MESA Tutorial Day 2: Novae. “Bursting the Bubble” workshop at the Lorentz Center, Leiden University, Leiden, the Netherlands, June, 2019.
5. **Wolf, William M.** Nucleosynthesis in Novae. To 2020 and Beyond: Radionuclides Astronomy. Los Alamos National Laboratory, Los Alamos, NM, USA, August 20, 2018.

4. **Wolf, William M.** Nova Outbursts and the MESA Models. Nova Eruptions, Cataclysmic Variables and Related Systems: Observational vs. Theoretical Challenges in the 2020 Era. 42nd COSPAR Scientific Assembly, Pasadena, CA, USA, July 18, 2018.
3. **Wolf, William M.** Introduction to MESA. ZTF Summer Undergraduate Astronomy Institute. Caltech and Pomona College, Pasadena, CA, USA, June 21, 2017.
2. **Wolf, William M.** Theory of Nova Thermonuclear Runaways. Conference on Shocks and Particle Acceleration in Novae and Supernovae. Simons Foundation and Columbia University, New York, New York, USA, June 23-25, 2016.
1. **Wolf, William M.** Nova Populations: Models vs. Observations. Stellar Remnants at the Junction: Comparing Accreting White Dwarfs, Neutron Stars, and Black Holes. Junction, Texas, USA, May 2-6, 2016.

## Contributed Talks

7. **Wolf, William M.**, Townsend, R. H. D., & Bildsten, L. Nonradial Pulsations in Post-Outburst Novae. Twenty-first European White Dwarf Workshop. University of Texas, Austin, TX, USA, July 25, 2018.
6. **Wolf, William M.** & Bildsten, L. Helium Flashes on Steadily Burning White Dwarfs. Twentieth European White Dwarf Workshop. University of Warwick, Coventry, CV4 7AL, United Kingdom, July 25 - 19, 2016.
5. **Wolf, William M.**, Cunningham, T., & Bildsten, L. Photoionization Heating of Nova Ejecta. Physics of Cataclysmic and Compact Binaries. Columbia University, New York, USA, October 30 - November 2, 2014.
4. **Wolf, William M.**, Tang, S., Bildsten, L., et al. Post-nova Supersoft Sources, Recurrent Novae, and the Fastest Recurrent Novae Yet Discovered. Type Ia Supernovae: Progenitors, Explosions, and Cosmology. University of Chicago, Chicago, USA, September 15-19, 2014.
3. **Wolf, William M.**, Bildsten, L. Helium Flashes on Steadily Burning White Dwarfs. Thirteenth Annual Theoretical Astrophysics in Southern California Meeting, UCLA, Los Angeles, California, USA, December, 2013.
2. **Wolf, William M.**, Bildsten, L., Brooks, J., and Paxton, B. Steady State Burning on White Dwarfs and Recurrent Novae. Observational Signatures of Type Ia Supernova Progenitors II, Lorentz Center, Leiden, The Netherlands, September 2013.
1. **Wolf, William M.**, Bildsten, L., Brooks, J., and Paxton, B. MESA Models for Accreting White Dwarfs with Stable Burning. Twelfth Annual Theoretical Astrophysics in Southern California Meeting, Carnegie Observatories, Pasadena, California, USA, November, 2012.

## Student Talks and Posters

9. Wolf, William M. and Hearden, Sam. Poster: Post-nova supersoft sources can extend their lifetimes by irradiating their donor stars. 23rd European Workshop on White Dwarfs, Universitat Politècnica de Catalunya, Barcelona, Spain, July 2024.
8. Plonis, Elaina and Wolf, William M. Poster: Building White Dwarf Models with MESA. Celebration of Excellence in Research and Creative Activity, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, April, 2024.
7. Laws, Teagan and Wolf, William M. Poster: Modeling of White Dwarf Recurrent Helium Novae. 243<sup>rd</sup> Meeting of the American Astronomical Society, New Orleans, LA, USA, January, 2024.
6. Laws, Teagan and Wolf, William M. Presentation: Helium-burning Supersoft Sources. NSF REU: “Advancing high-performance computing opportunities in undergraduate research at UW-Eau Claire to meet challenges of multidisciplinary computational science” final symposium, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, August, 2023.
5. Wilhite, Huston and Wolf, William M. Presentation: Modeling Diffusion in Accreting White Dwarf Stars. National Conference on Undergraduate Research, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, April, 2023.
4. Ryun, Jessica and Wolf, William M. Presentation: Building White Dwarf Models with MESA and wd\_builder. NSF REU: “Advancing high-performance computing opportunities in undergraduate research at UW-Eau Claire to meet challenges of multidisciplinary computational science” final symposium, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, August, 2022.

3. Wilhite, Huston and Wolf, William M. Presentation: Modeling Diffusion in Accreting White Dwarf Stars. Provost's Honors Symposium, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, April, 2022.
2. Wilhite, Huston and Wolf, William M. Poster: Modeling Diffusion in Accreting White Dwarf Stars. Celebration of Excellence in Research and Creative Activity, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, April, 2021.
1. Hedberg, Caitlin and Wolf, William M. Poster: Modeling Convective Overshoot in Accreting White Dwarfs. Celebration of Excellence in Research and Creative Activity, University of Wisconsin–Eau Claire, Eau Claire, Wisconsin, USA, April, 2021.

## SERVICE

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### Journal Referee 2014–Present

Refereed articles for the following journals

- Astrophysical Journal
- Astronomy and Astrophysics
- Monthly Notices of the Royal Astronomical Society
- Nature Astronomy
- Publications of the Astronomical Society of Japan

### MESA Developer 2017–Present

- **Testhub Development and Maintenance:** Designed and maintain the globally-distributed testing infrastructure for MESA developers, including the [MESA Testhub](#) web app and the companion command line interface [mesa-test](#)
- **Community Engagement:** Answer user questions through the mesa-users mailing list
- **Tool Development:** Provide and maintain helper tools like [mesa.reader](#) and [MesaScript](#) that assist in users' interaction with MESA and its output data

### Director, L.E. Phillips Planetarium 2020–Present

- **Public Shows:** Design and deliver weekly public shows while mentoring and managing a student assistant.
- **Private Shows:** Work with schools, scouting troops, and other organizations to schedule and deliver private planetarium shows.

### Academic Advising 2020–Present

- **Advise:** Meet with approximately 10 students each semester to guide them in course selection, suggest research opportunities, and start career planning.
- **Advising Wizard:** Developed and maintain [web app](#) for helping advisors and students navigate degree plan requirements with course availability and prerequisite constraints.

### University Senate 2023–Present

- **Representative from Physics & Astronomy:** Attend bi-weekly meetings to discuss and vote on motions of university shared governance.
- **Member of Academic Policies Committee:** Attend weekly meetings to discuss and vote on program reviews and motions for changes to class, majors, departments, programs and other academic affairs.

### MESA Summer School 2013–2023

- **Teaching Assistant:** Help organize and execute laboratory exercises for the annual MESA Summer Schools along with the following lecturers: Ylva Goetberg (2021), Matteo Cantiello (2018), Pablo Marchant (2017), Jim Fuller (2016), Craig Wheeler (2015), Lars Bildsten (2012–2014).
- **Organizing Committee:** Helped organize the 2022 MESA Summer School
  - \* **Online subcommittee:** Design, update, and maintain an official website advertising the summer school and accepting applications.
  - \* **Logistics subcommittee:** Oversee and manage the day-to-day running of the summer school event.
- **Lecturer:** Prepared laboratory exercise for the 2022 MESA Summer School. Did not present due to illness.
- **Webmaster:** Designed and maintained the website for the 2023 MESA Summer School in Budapest, Hungary.

### **Scientific Programming Languages, Frameworks, and Packages**

- Python (Numpy, Scipy, Matplotlib, Sympy)
- Fortran 95 (MESA)
- Ruby

### **Markup Languages**

- L<sup>A</sup>T<sub>E</sub>X
- Markdown

### **Internet Tools, Languages, and Frameworks**

- HTML5/CSS3
- Javascript (D3, JQuery, CoffeeScript)
- Bootstrap
- Ruby on Rails