

William M. Wolf

Curriculum Vitae

Address

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RESEARCH INTERESTS

- Theoretical stellar astrophysics
 - 1D modeling of stellar structure
 - Stellar explosions: novae and supernovae
 - White dwarf stars
- Undergraduate research experiences
- Contemporary models of physics and astronomy education

EDUCATION

<i>Doctor of Philosophy</i> , Physics University of California, Santa Barbara, CA Advisors: Lars Bildsten and Andy Howell Thesis: Supersoft Emission from Thermonuclear Burning on Hydrogen-Accreting White Dwarfs	September 2017
<i>Master of Arts</i> , Physics University of California, Santa Barbara, CA Advisors: Lars Bildsten and Andy Howell	April 2013
<i>Bachelor of Science</i> , Physics Eastern Illinois University, Charleston, IL University Honors; Summa Cum Laude Summer 2009 REU at U. of Rochester <ul style="list-style-type: none">• Advisor: Eric Blackman• Topic: Astrophysical Jets	<i>Bachelor of Arts</i> , Mathematics Eastern Illinois University, Charleston, IL University Honors; Summa Cum Laude Departmental Honors <ul style="list-style-type: none">• Advisor: Leo Comerford• Thesis: Conjugacy in Hyperbolic Groups

ACADEMIC APPOINTMENTS

<i>Assistant Professor</i> Department of Physics and Astronomy, University of Wisconsin – Eau Claire	August 2019 – Present
<i>Postdoctoral Research Associate</i> School of Earth and Space Exploration, Arizona State University	September 2017 – August 2019
<i>Adjunct Professor</i> Maricopa County Community Colleges	August 2018 – May 2019
<i>Graduate Research Assistant</i> Department of Physics, UC Santa Barbara	June 2011 – September 2017
<i>Graduate Teaching Assistant</i> Department of Physics, UC Santa Barbara	September 2010 – May 2016

SUMMARY OF TEACHING EXPERIENCE*Assistant Professor of Physics and Astronomy (UW Eau Claire)*

Course Name	Style	Term	Approx. Enrollment
PHYS 212: General Physics II	Lecture	Spring 2020	50
PHYS 212: General Physics II	Laboratory (2 sections)	Spring 2020	20
PHYS 211: General Physics I	Lecture	Fall 2019	60
PHYS 211: General Physics I	Lecture (2 sections)	Fall 2019	50
PHYS 211: General Physics I	Laboratory (2 sections)	Fall 2019	20

Adjunct Professor of Astronomy (Maricopa County Community College District)

- Taught multiple in-person integrated lectures and laboratory sections for introductory astronomy; typical enrollments of ≈ 25 students
- Taught fully online “Life in the Universe” course

Online: AST 111x (ASU)

- AST 111x is an online version of ASU’s course, AST 111: Introduction to Solar System Astronomy
- Offered as part of ASU’s Global Freshman Academy
- Enrollment: ~ 3000
- I help moderate discussions and participate in live video question and answer sessions with the instructor, Frank Timmes
- Worked on three offerings so far in 2017-2018; anticipate serving as instructor in Summer 2019

Teaching Assistant for Undergraduate Courses (UC Santa Barbara)

Course Name	Style	Term	Approx. Enrollment
ASTRO 1: Introductory Astronomy	Discussion	Winter 2011	60
ASTRO 2: Introductory Cosmology	Discussion	Spring 2011	40
PHYS 1: Introductory Physics for Engineers	Discussion	Winter 2012	30
PHYS 3L: Introductory Physics for Engineers	Lab	Fall 2010, 2011	24
PHYS 132: Stellar Structure & Evolution	Discussion	Fall 2010, 2011	40
PHYS 133: Galaxies & Cosmology	Discussion	Winter 2012	40
PHYS 134: Observational Astrophysics	Lab	Spring 2012	24

Teaching Assistant for Graduate Courses (UC Santa Barbara)

- Assisted in teaching of the graduate course PHYS 232: Stellar Structure
- Aided students in installing and using the MESA software instrument used for their projects
- Served as a guest lecturer on the topic of white dwarf stars
- Helped in Fall 2013 and Spring 2016 offerings

Teaching Assistant, MESA Summer School

- Help organize and execute laboratory exercises for the annual MESA summer school
- Assisted the following lecturers and topics:

– Matteo Cantiello: Planetary Engulfment	August 2018
– Pablo Marchant: Stellar Rotation in Binary Systems	August 2017
– Jim Fuller: Wave Transport in Stars	August 2016
– Craig Wheeler: Massive Star Explosions	August 2015
– Lars Bildsten: Stellar Response to Mass Loss	August 2014
– Lars Bildsten: Helium Core Burning	August 2013
– Lars Bildsten: Accreting White Dwarfs	August 2012

Mentor to Undergraduate Research Student (UC Santa Barbara)

- Closely mentored a visiting undergraduate student, Timothy Cunningham
- After UCSB, project became his Masters’ thesis
- Taught concepts of radiative transfer and stellar structure
- Taught research skills like figure design and academic writing
- Timothy is now a doctoral student at the University of Warwick

PUBLICATIONS

11. Paxton, Bill; Smolec, R.; Schwab, Josiah; Gautschy, 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.

LECTURES**Public Lectures**

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

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.

SERVICE

- MESA Users List* 2012 – Present
- Ask and answer questions relating to the installation and use of the MESA software instrument.
 - See archive of contributions here: <https://bit.ly/2EC3CR8>

- Journal Referee* 2014 – Present

Refereed articles for the following journals:

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

- Webmaster, UCSB Astronomy and Astrophysics* 2014 – 2017

- Completely redesigned website and kept it up to date, accounting for changes in faculty, postdocs, and students. Implemented selected research, faculty search, automatic “recent papers on the arxiv” features.
- <http://www.physics.ucsb.edu/~astrogroup>

COMPUTER SKILLS

- Programming Languages: Ruby, Python, Mathematica, IDL, and Fortran 95
- Markup Languages: L^AT_EX, Markdown
- Internet Tools: HTML5, CSS3, Javascript (jQuery, CoffeeScript), Bootstrap, Ruby on Rails (RSpec, Cucumber)
- Scientific Packages: Numpy, Scipy, Matplotlib, Tioga
- Scientific Software Instruments: MESA, Cloudy
- Operating Systems: Mac, Unix/Linux.
- Version Control Systems: Git

CODING PROJECTS

Here are several tools I’ve written to aid in the use of MESA and analyzing the data it produces. All are open source and available through Github. Most of these are detailed on the “Projects” section of my web page: <http://wmwolf.github.io/projects/>.

MesaTestHub

- Web app (testhub.mesastar.org) for tracking MESA test suite status
- Ruby on Rails app deployed through Heroku
- Used with `mesa_test`
 - Ruby gem
 - Installs and tests MESA revisions; submits results to web app

MesaScript

- Powerful domain-specific language for creating complex inlists
- Written in Ruby
- <http://wmwolf.github.io/MesaScript/>

MesaReader

- Eases access to MESA output for plotting or analysis
- Python: http://wmwolf.github.io/py_mesa_reader/
- Ruby/Tioga: http://wmwolf.github.io/MESA_Reader/

Mesa CLI

- Command line interface for automating many common tasks in MESA
- Written in Ruby
- http://wmwolf.github.io/mesa_cli/