

Prof. Jeremiah W. Murphy, Ph.D. —Curriculum Vitae

Department of Physics
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Education

Ph.D. Astronomy, University of Arizona, Tucson, AZ , August 14, 2008
Dissertation: Multi-dimensional Hydrodynamics of Core-collapse Supernovae
M.S. Astronomy, University of Arizona, Tucson, AZ, 2004
B.S. Physics & Astronomy, University of Washington, Seattle, WA, 2001

Current Position

Assistant Professor
Florida State University, August 8th, 2013 to present

Previous Employment

- Postdoctoral Researcher, Princeton University, 2011-August 7th, 2013
- NSF Astronomy & Astrophysics Postdoctoral Fellow, University of Washington, 2008-2011
- Graduate Research Assistant, University of Arizona, 2001-2008, Advisor: Prof. Adam Burrows
- Graduate Teaching Assistant, Great Debates in Astronomy, University of Arizona, 2002
- Teaching Assistant, Introduction to Astronomy, University of Washington, 2000-2001
- Teaching Assistant, Introductory Physics courses, University of Washington, 1999-2000
- Physics Machine Shop Assistant, Department of Physics, University of Washington, 1998-1999

Research Interests

Theoretical astrophysics. Specifically, I am interested in the mechanism for core-collapse supernova explosions, multidimensional radiation-hydrodynamic simulations, stellar evolution, neutron star physics, and nuclear astrophysics.

Selected Honors & Awards

- Scialog Fellow 2015
- Kavli Fellow 2014
- National Science Foundation Astronomy and Astrophysics Postdoctoral Fellowship, 2008-2011
- Joint Institute for Nuclear Astrophysics (JINA) Fellow, 2003-2006
- Graduate Registration Scholarship, Steward Observatory, UA, 2003

- Baer Prize for Undergraduate Excellence in Astronomy, University of Washington, 2001
- Mary Gates Scholar, University of Washington, 1999-2000 & 2000-2001

Teaching Experience

- Recitation for Physcis 2054C, College Physics B, Florida State University, Spring 2014
- Algebra for Princeton Prison Teaching Initiative
- Order of Magnitude Astrophysics, University of Washington, Winter 2011
- Introduction to Astronomy 101, University of Washington, Summer 2010
- Order of Magnitude Astrophysics, University of Washington, Spring 2010
- Radio Astronomy, University of Washington, Spring 2009
- Graduate Teaching Assistant, Great Debates in Astronomy, University of Arizona, 2002
- Teaching Assistant, Introduction to Astronomy, University of Washington, 2000-2001
- Teaching Assistant, Introductory Physics courses, University of Washington, 1999-2000

Professional & Academic Service

- Served on review panel for the Division of Astronomical Sciences of the NSF, 2012
- Organizer of Institute for Nuclear Theory program “Core-Collapse Supernovae: Models and Observable Signatures”, 2012
- Organizer of NSF Astronomy & Astrophysics Fellow Symposium, 2011
- Served on review panel for the Division of Astronomical Sciences of the NSF, 2010
- Referee for The Astrophysical Journal since 2008

Professional Affiliations

- American Astronomical Society

Outreach and Mentoring Activities

- Public Talk, “A Star Explodes in M82! A Public Lecture” FSU, Feb. 5th, 2014
- Public Talk, “From the Ashes of Cosmic Explosions...”, Columbia University, Nov. 22, 2013
- Teach for the Princeton Prison Teaching Initiative
- I sit on the Advisory Board for NASA NOW, the Pacific Science Center’s project to modernize their astronomy exhibits.
- Mentoring undergraduates in research: Small Radio Telescope, Constraining SN explosion progenitor masses using star formation histories derived from HST imaging
- Seattle Public Schools astronomy curriculum: We are developing an astronomy curriculum for the 9th grade level.
- The Pre-Major in Astronomy Program (Pre-MAP): The goal of this program is to help traditionally underrepresented students of science and engineering to complete their science or engineering degree. I have participated in organizational aspects of the program, including drafting an evaluation plan, helped to restructure the organization, and mentored undergraduates in research. (<http://www.astro.washington.edu/premap/>) August 2007-present

- Girl Scouts Outreach: Developed and led several Girl Scout activities related to astronomy in 2004.
- Participated in a Project ASTRO training event, University of Arizona, Fall 2006 (http://www.astrosociety.org/education/astro/project_astro.html)

High-Performance Computing Experience

- Familiar with the following platforms: Unix, Linux, Mac OS X, and Windows
- I have working knowledge of the following programming languages: C, C++, FORTRAN 77, FORTRAN 90-95, IDL, Python, MATLAB, and many of the scripting languages associated with Unix/Linux.
- Packages used:
 - VisIt: analysis software for HPC simulations
 - CASTRO (AMR Hydrodynamics code developed by John Bell & Ann Almgren)
 - CLAWPACK (Randy LeVeque's finite volume package)
 - Timpani (Linear pulsational analysis code)
 - Prometheus (3D Higher-order Godunov hydrodynamics)
 - FLASH (3D Higher-order Godunov hydrodynamics, Adaptive Mesh Refinement (AMR), Message Passing Interface (MPI) for parallel computing)
 - RAGE/SAGE (3D Higher-order Godunov hydrodynamics, AMR, MPI)
 - VULCAN/2D (2D radiation-hydrodynamics, Arbitrary Lagrangian-Eulerian (ALE), Multi-Group Flux-Limited Diffusion (MGFLD), MPI)
 - BETHE-hydro (2D ALE, algebraic multigrid (AMG) and conjugate gradient matrix inversion techniques for a Poisson's equation solver on arbitrary grids)
- A selection of computing resources used:
 - NICS: Kraken
 - NERSC: Jacquard, Seaborg, Franklin, & Hopper
 - Athena, UW Physics and Astronomy cluster
 - Della (Tigress), Princeton
 - Columbia (NASA), a 10,240-CPU SGI Altix supercluster, with Intel Itanium 2 processors
 - Jaguar (ORNL), a Cray XT3 and XT4 with 11,508 compute nodes
 - Grendel (U of A), a local Beowulf cluster

Colloquia, Seminars, and Conference Talks

“Conditions for Explosion”, F.O.E. Fifty-One Erg, Raleigh, N.C., June 4, 2015

“A Theory for Core-Collapse Supernova Explosions”, Mayacamas Workshop, April 17, 2014

“A Theory for Core-Collapse Supernova Explosions”, Department of Astronomy Colloquium, University of Florida, Jan. 22, 2014

“A Theory for Core-Collapse Supernova Explosions”, Department of Astronomy Colloquium, University of Minnesota, Dec. 6, 2013

“Explosions of Massive Stars: Core-Collapse Supernovae and Giant Eruptions”, Supernovae and Gamma-Ray Bursts 2013, Yukawa Institute for Theoretical Physics, Kyoto University – Oct. 22, 2013

“Explosion Conditions and the Effects of Multi-dimensional Instabilities”, A Workshop on Outstanding Problems in Massive Star Research St. Paul, Minnesota, September 30 – Oct 3, 2012

“A Theory for Gravitational Wave Emission from Core-Collapse SNe”, A Workshop on Outstanding Problems in Massive Star Research St. Paul, Minnesota, September 30 – Oct 3, 2012

“A Theory for Core-Collapse Supernova Explosions”, Formations of Compact Objects: from the cradle to the grave, Waseda University, Tokyo, Japan, March 9, 2012

“A Theory for Core-Collapse Supernova Explosions”, Wunch, Princeton University, February 22, 2012

“A Model for Gravitational Wave Emission from Neutrino-Driven Core-Collapse Supernovae”, Gravitational Wave Physics and Astronomy Workshop, Milwaukee, WI, Jan. 27, 2011

“Solutions for Successful Core-Collapse Supernova Explosions,” NSF AAPF Symposium 2011, Seattle, WA, Jan. 9, 2011

“Solutions for Successful Core-Collapse Supernova Explosions,” 217th AAS Meeting, Seattle, WA, Jan. 13, 2011 “Conditions for Successful Core-Collapse Supernova Explosions,” Nuclear Astrophysics XV, Ringberg Castle, Germany, March 25, 2010

“A Model for Gravitational Wave Emission from Core-Collapse Supernova Explosions,” Nuclear Astrophysics XV, Ringberg Castle, Germany, March 25, 2010

“A Theory for Core-Collapse Supernova Explosions,” Theoretical Astrophysics Center Seminar, Berkeley, CA, March 1, 2010

“A Model for Gravitational Wave Emission from Core Collapse Supernova Explosions,” New Frontiers in QCD 2010, Yukawa Institute for Theoretical Physics, Kyoto, Japan, Jan. 28, 2010

“A Model for Gravitational Wave Emission from Core-Collapse Supernovae,” NSF Fellow Symposium at the 215th AAS Meeting, Washington, D.C., Jan. 3, 2010

“Gravitational Waves from Core Collapse,” Gravitational Wave Bursts, Astrophysics, Data Analysis and Numerical Relativity, Chichen-Itza, Yucatan, Mexico, December 9-11, 2009

“Critical Conditions for Successful Neutrino-Driven Explosions and A Model for Gravitational Wave Emission,” Microphysics in Computational Relativistic Astrophysics, MICRA2009, Copenhagen, DK, August 24-28, 2009

“Simulating Core-Collapse Supernovae: Finding the necessary Conditions for Successful Explosions,” NSF Fellow Symposium at the 213th AAS Meeting, Long Beach, CA., Jan. 4, 2009

“Criteria for Core-Collapse Supernova Explosions by the Neutrino Mechanism,” Neutrinos ’08, UM, Minneapolis, MN, Oct. 25, 2008

“Criteria for Core-Collapse Supernova Explosions by the Neutrino Mechanism,” UW Colloquium, Sept. 25, 2008

“Criteria for Core-Collapse Supernova Explosions by the Neutrino Mechanism,” Asymmetric Instabilities in Stellar Core Collapse, Institut Henri Poincare, Paris, June 30th 2008

“BETHE: an ALE code for Astrophysical Simulations,” SciDAC Supernova Group Meeting, Stanford Linear Accelerator, April 7, 2008

“BETHE: an ALE code for Astrophysical Simulations,” LANL, Feb. 25, 2008

“Core Oscillations and Instabilities in Core-Collapse Supernovae,” Supernova 1987A: 20 Years After, Aspen Center for Physics, Feb 20th, 2007 “Core Oscillations in Core-Collapse Supernovae,” The Multicolored Landscape of Compact Objects and Their Explosive Origins, Cefalu, June 10, 2006

“A New Mechanism for Core-Collapse Supernova Explosions: the Numerical Techniques Involved,” LANL, March 8, 2006

“Asymmetry in Core-Collapse Supernovae,” MSU lunch talk, Nov. 25, 2005

“Asymmetry of Core-Collapse Supernova Shocks,” Santa Fe New Mexico (LANL), July 17, 20 05

“Pulsar Kicks and a Pulsational Analysis of the Cores of Massive Stars,” AAS meeting 204, #21.06, Jan. 2004