

CURRICULUM VITA

Brian W. Murphy, Ph.D.

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EDUCATION

Indiana University

Ph.D., in Astrophysics, August 1988

M.A., in Astronomy, August 1985

University of Iowa

B.S., Physics and Astronomy, May 1982

PROFESSIONAL EXPERIENCE

Butler University

Professor of Physics & Astronomy, 2006 - present

Director of Holcomb Observatory & Planetarium, 1993 - present

Department Head Physics & Astronomy, 1999 - 2008

Associate Professor of Physics & Astronomy, 1999 - 2006

Assistant Professor of Physics & Astronomy, 1993 - 1999

Florida Institute of Technology – Senior Researcher, Department of Physics and Space Sciences, 2014

Cambridge University (England) – Visiting Senior Fellow, Institute of Astronomy, summer 1997

Indiana University – Visiting Senior Research Associate, Department of Astronomy, summer 1994, 1995

Cornell University – Research Associate, Department of Astronomy, 1991 - 1993

Utrecht University (The Netherlands) – Postdoctoral Researcher, Astronomical Institute, 1988 - 1991

RESEARCH SPECIALIZATIONS

Variable Stars in Globular Star Clusters

Dynamics of Globular Star Clusters and Galactic Nuclei

Massive Black Holes in Dense Stellar Systems

Interacting Binary Stars and Variable Stars

Computational Astrophysics

Planetary Rings

AWARDS AND HONORS

Butler University Distinguished Faculty Award for Research and Scholarship (2013)

College of Liberal Arts & Sciences Award for Excellence in Research and Scholarship (2012)

Thomson Electronics Award Dinner, Keynote Address (2008)

Indiana Academy of Sciences Speaker of the Year (2003)

Butler University Student Government Association Apple Award for outstanding teaching (2002)

Natural Sciences Outstanding Faculty Member (2000)

Technology-Based Learning Award from State of Indiana (1998)

Kinsley Award for the most outstanding Ph.D. dissertation across all academic disciplines, Indiana University (1988)

Joseph and Francis Morgan-Swain Fellowship (1987)

Graduate Fellowship in Astronomy (1983)

PROFESSIONAL SOCIETIES

American Astronomical Society
American Association of Variable Star Observers
Astronomical Society of the Pacific
Council on Undergraduate Research
Indiana Academy of Science
International Astronomical Union
Sigma Xi

PROFESSIONAL SERVICE

Board Member, Indiana Coalition on Outdoor Lighting Education
Board Member, Southeastern Association for Research in Astronomy
NASA Theoretical Astrophysics proposal review panel
Indiana Space Grant Consortium proposal review panel
Journal Referee for: *Astrophysical Journal*;
Astronomical Journal;
Astronomy & Astrophysics;
Monthly Notices of the Royal Astronomical Society;
Nature;
Publications of the Astronomical Society of the Pacific; &
Science
Technical Editor *Einstein for Dummies*

ACADEMIC SERVICE

Core Curriculum, Natural Sciences and Mathematics subcommittee (2008-present)
Promotion Review Committee of X. Han, Chair (2009)
Senior Director of Instructional Technology Search Committee, Co-chair (2008)
CSSE Faculty and Postdoctoral Search Committee (2008)
Faculty Executive Committee (Spring 2008)
Teacher Education Advisory Committee (2006-present)
Information Management Council (2005 to 2010)
Woods Lecture Series Committee (2002 to 2010)
STEM Exploration Committee (2005)
Strategic Planning Committee (2002)
Core Curriculum Task Force (2003-05)
Faculty Adviser, Butler Cycling Club (2001-present)
LAS Professional Standards Committee (1995-97)
LAS Dean Search Committee (1997)
LAS Scholarship committee (1997, 98, 99)
LAS Curriculum Committee (1997-99, 03-05), Chair (1998-99, 03-05)
LAS Honors Board (1998, 99)
LAS Scholarship Committee (1997-98)
University Honors Program Committee (1998, 99)
Academic Programs Committee (1993, 1994, 1995)
LAS Academic Change and Improvement (1993-95)
Computer Advisory Council (1996)
Assistant Librarian Search Committee (1995)
University Curriculum Committee (1993-94)

PUBLIC SERVICE

In addition to hundreds of television interviews I have typically given 50 radio interviews per year, including such notables as NPR, BBC, and The National Geographic Channel on subjects including Astronomy, Space Science, Physics, and General Science.

GRANTS AND CONTRACTS

- Determining the Interstellar Reddening and Properties of the RR Lyrae Variables in the Globular Cluster M14*, Holcomb Awards Committee, amount awarded: \$6000 (2017)
- Searching for Variable Stars in Globular Clusters*, Holcomb Awards Committee, amount awarded: \$7300 (2013)
- New Imaging CCD Camera for the Holcomb 38-inch Telescope*, Lilly-Endowed Equipment Trust Fund, amount awarded: \$16,648 (2012)
- Searching for Variable Stars in Globular Clusters*, NSF REU funded through SARA, had a 2 students funded at Butler during the summer along with faculty stipend \$17,500, NSF AST-1004872), (2012)
- Refurbishment of the J.I. Holcomb Telescope and the Creation of a Dual-Purpose Computational Physics Laboratory*. The Silicon Valley Community Foundation, amount awarded: \$453,680. (2011-13).
- Upgrading the PhysDawg Physics Computational Server*, Lilly-Endowed Equipment Trust Fund, amount awarded: \$1023 (2011)
- Searching for Variable Stars in Globular Clusters*, Holcomb Awards Committee, amount awarded: \$7100 (2011)
- Searching for Variable Stars in Southern Globular Clusters*, NSF REU funded through SARA, had a student funded at Butler during the summer along with faculty stipend \$8900, NSF AST-1004872), (2011)
- Indy Power*, Science Education for New Civic Engagements. To develop course titled Indy Power to be taught summer of 2012, \$2705 along with match from BIRS. (2011)
- Searching for Variable Stars in Southern Globular Clusters*, NSF REU funded through SARA, had a student funded at Butler during the summer along with faculty stipend \$7800, NSF AST-1004872), (2010)
- Joining and Funding Butler University's Membership in the Southeastern Association for Research in Astronomy Telescope Consortium*. The Silicon Valley Community Foundation, amount awarded: \$155,000. (2008).
- The Structure of the Globular Star Cluster M30*. Holcomb Awards Committee, Butler University, amount awarded: \$5540 (2005).
- A Massive Black Hole in the Globular Star Cluster M15?* Holcomb Awards Committee, Butler University, amount awarded: \$7300 (2004).
- The Challenge Grant for Distance Learning in Observational Astronomy*, TLC Mini-grant, amount awarded: \$5000 (2000)
- The Structure and Dynamics of the Globular Star Cluster 47 Tucane*, Holcomb Research Institute, Butler University, amount awarded: \$5550 (1999).
- The Stellar Composition of NGC 6397 and NGC 6752*, Holcomb Research Institute, Butler University, amount awarded: \$6040 (1998).
- An Observational Study of the Core-Collapsed Clusters*, WIYN Telescope observational time, Indiana University Allocation Committee, award: 15 nights per year of observing time on WIYN 3.5-meter telescope at Kitt Peak, Arizona (1997, 1998, and 1999).
- Stipend for partial travel and full living expenses while being a Visiting Senior Fellow during the summer of 1997 in Cambridge, England, Visitors Program, Cambridge University, amount awarded: \$3500 (1997).
- Travel award to present paper at a meeting entitled *Stellar Initial Mass Functions*, in Cambridge, England, Holcomb Research Institute: \$1000 (1997).

Hybrid Modeling of Dense Stellar Systems, Holcomb Research Institute, Butler University, amount awarded: \$9,100 (1997).

Study of Globular Star Cluster Evolution and Luminosity Functions, Butler University Faculty Fellowship, Butler Academic Grants Committee, amount awarded: \$4,163 (1996).

Travel award to present invited review at the meeting entitled *Active Galactic Nuclei, Dense Stellar Systems, and Galactic Environment*, International Opportunities for Scientist and Engineers, National Science Foundation, amount awarded: \$2000 (1995).

Dynamical Modeling of Globular Star Clusters: A Comparison of Theory and Observation, Butler University Faculty Fellowship, Butler Academic Grants Committee, amount awarded: \$3,489 (1995).

Dynamical Models for Globular Clusters, Research Opportunity Award, National Science Foundation, amount awarded: \$18,096 (1995).

An Observational Study of the Core-Collapsed Clusters, WIYN Telescope observational time, Indiana University Allocation Committee, award: 15 nights per year of observing time on WIYN 3.5-meter telescope at Kitt Peak, Arizona (1994, 1995, 1996, 1997, 1998, and 1999).

Dynamical Models for Globular Clusters, Research Opportunity Award, National Science Foundation, amount awarded: \$11,240 (1994).

The Evolution of Binary Stars in Globular Star Clusters, Butler University Faculty Fellowship, Butler Academic Grants Committee, amount awarded: \$3,462 (1994).

Dynamical Evolution of Globular Clusters and Galactic Nuclei, National Center for Supercomputing Applications at the University of Illinois, amount awarded: 250 hours of time on Cray Y-MP supercomputer (1993).

BUTLER SUMMER INSTITUTE RESEARCH STUDENTS (2003-17)

2003 Russ Behler, Dynamical Models of the Globular Star Cluster 47 Tucanae
Michael Haas, Building a Fiber Optic Spectrograph for the 38-inch Holcomb Telescope
Chris Johnson, The Growth of Intermediate Mass Black Holes in Globular Star Clusters

2004 Sean Couch, Measuring the Rotation Properties of Asteroids Using the 38" Holcomb Telescope

2005 Andrea Montgomery, Dynamical Models of the Globular Star Cluster 6572

2006 Sara Hanlin, The Formation and Dynamical Evolution of Blue Stragglers in Globular Clusters

2008 Kim Phifer, Growth and Evolution of the Central Black Hole in the Galactic Nucleus

2009 Brian Geiss, The Effect of Stellar Collisions and Tidal Disruptions on Post-Main-Sequence Stars in the Galactic Nucleus
Thomas Harp, Rotational and Angular Momentum Properties of Critical Asteroids

2010 Mackenzie Jones, Depletion of Giant Stars in the Galactic Nucleus Due to a Top-Heavy Mass Function
Jerry Liu, Search for Dwarf Novae in Globular Star Clusters

2011 Elliot Johnson, Searching for Variable Stars in Globular Star Clusters

2013 Adam Hibshman, The Properties of Variable Stars in Two Globular Star Clusters
John Vondesaar, Searching for Variables Stars in Southern Globular Star Clusters

2016 Nathan Villiger, Understanding the Nature of RR Lyrae Variable Stars in the Globular Cluster NGC6584

2017 Sedrick Weinschenk, Properties of the RR Lyrae Variable Stars in M14

COURSES TAUGHT

Modern Astronomy	Dynamical Astronomy	Modern Astronomical Techniques
Astrophysics 1	Astrophysics 2	Modern Physics 2
Intermediate Mechanics 1	Intermediate Mechanics 2	Electricity and Magnetism 1
Electromagnetic Waves and Optics	Computational Physics	Senior Seminar
Honors Seminar	IndyPower (Text & Ideas)	

UNDERGRADUATE STUDENT RESEARCH INVOLVEMENT (RECENT HIGHLIGHTS)

- From 2009-2017 my astronomy and astrophysics undergraduate students and I have produced over 30 publications including 20 papers coauthored by students.
- 16 Butler Summer Institute students in the last 15 years (see below).
- 9 of my research students have gone on to obtain National Science Foundation REU positions following their BSI's in the last 8 years.
- Over 50 student research presentations in last 8 years including local, national, and international venues.
- One of these students was awarded a Goldwater Scholarship for her research.

INVITED COLLOQUIA AND TALKS

Indiana University, October 1993
Indiana University-Purdue University at Indianapolis, February 1994
Indiana State University, November 1994
American Meteorological Society, December 1994
University of Illinois, February 1995
Indiana State University, October 1996
East Tennessee State University, November 1996
Cambridge University, England, August 1997
Miami University (Ohio), October 1997
Ball State University, March 1998
Taylor University, March 2003
Valparaiso University, April 2004
East Tennessee State University, October 2004
Thomson Electronics Award Dinner, Keynote Address, September 2008
Center for Inquiry, September 2008
Ball State University, February 2009
East Tennessee State University, September 2009
Indiana University-Purdue University at Indianapolis, October 2009
Center for Inquiry, Invited Speaker for Carl Sagan Day, November 2010
Indiana Astronomical Society November, 2010
Indiana Astronomical Society January, 2013
Florida Institute of Technology, March 2014
Embry Riddle Aeronautical University, April 2014
Ball State University, September 2015
Valparaiso University, April 2016

PUBLICATIONS

- Weinschenk, S., Murphy, B. & Villiger, N. J., "Multiband Fourier Analysis and Interstellar Reddening of the Variable Stars in the Globular Cluster NGC 6402 (M14)," *American Astronomical Society Meeting Abstracts*, 231, 146.17 (2018).
- Keel, W. C., Oswalt, T., Mack, P., Henson, G., Hillwig, T., Batcheldor, D., Berrington, R., De Pree, C., Hartmann, D., Leake, M., Licandro, J., Murphy, B., Webb, J. & Wood, M. A., "The Remote Observatories of the Southeastern Association or Research in Astronomy (SARA)," *Publications of the Astronomical Society of the Pacific*, 129, 015002 (2017).
- Villiger, N. J., Weinschenk, S., Hettinger, P. T. & Murphy, B. W., Multiband Fourier Analysis and Interstellar Reddening of Variable Stars in the Globular Cluster NGC 6584, *American Astronomical Society Meeting Abstracts* #229, 229, 152.03 (2017).

- Murphy, B.W., “A Detailed Survey of Pulsating Variables in Five Globular Clusters,” *Journal of the American Association of Variable Star Observers*, 44, 196, (2016).
- Reed, H.M., Pajkos, M.A., Murphy, B.W., & Darragh, A., “Fourier Decomposition and Properties of the Variable Stars in the Globular Cluster NGC 4833,” *American Astronomical Society Meeting Abstracts*, 227, 144.26 (2016).
- Hettinger, P.T., Villiger, N.J., & Murphy, B.W., “Fourier Decomposition and Properties of the Variable Stars in the Globular Cluster NGC 6584,” *American Astronomical Society Meeting Abstracts*, 227, 144.26 (2016).
- Murphy, B.W., Darragh, A., Hettinger, P., et al., “A Detailed Study of the Variable Stars in Five Galactic Globular Clusters: IC4499, NGC4833, NGC6171 (M107), NGC6402 (M14), and NGC6584,” *IAU General Assembly*, **22**, 2255998 (2015).
- Hrivnak, Lu, Henson, Hillwig, T., Kaitchuck, Murphy, B.W., Reed, J.M. & Cheek, W.J., "Photometric Variability in Proto-Planetary Nebulae: Extending to a Fainter (V=13-15) Sample," *American Astronomical Society Meeting Abstracts*, **223**, 156.23 (2014).
- G.Bhatta, J.R.Webb, H.Hollingsworth, S.Dhalla, A.Khanuja, Y.Efimov, V.M. Larionov, A.C. Gupta, R. Bindu, R. Sagar, P. Calcidese, J.M. Ohlert, C-H. Lee, M. Bottcher, P. Roustazadeh, A. Lamerato, M. Villata, B. Murphy, D. Carosati, D. Capezzali, P. Paakkonen, A. Oksanen, J.T. Pollock, A. Collins, S. Vennes, A. Strigachev, R. Bachev, J.A. Ros, O. Kurtanidze, A. Sanchez21, E. Lindfors, R. Reinthal, C. Villforth, K. Nilsson, L. Takalo, J.M. Coloma, D. Rodriguez, J. Wu, & S-M. Hu, “The 72-Hour WEBT Microvariability Observation of Blazar S5 0716+714 in 2009,” *Astronomy and Astrophysics*, 558 A92 (2013).
- Murphy, B.W & Darragh, A.N., “Fourier Decomposition and Physical Parameters of the of the RR Lyrae Stars in the Globular Cluster NGC 4833, *American Astronomical Society Meeting Abstracts*, 222, 115.12 (2013).
- Murphy, B.W & Darragh, A.N., “Fourier Decomposition and Physical Parameters of the of the RR Lyrae Stars in the Globular Cluster NGC 4833, to appear in the *Bulletin of the American Astronomical Society* (2013).
- Reinhart, E.D., McCombs, T.A., Murphy, B.W., Darragh, Liu, Z.J., & Conroy, K.E., “The Color-Magnitude Diagram of M14,” *Bulletin of the American Astronomical Society*, 221, 250.21 (2013).
- McCombs, T.A., Reinhart, E.D., & Murphy, B.W., “Variable Stars in the Globular Cluster M107: Discovery of a Probable SX Phoenicis Star in M107,” *Bulletin of the American Astronomical Society*, 221, 250.22 (2013).
- McCombs, T.A., Reinhart, E.D., Darragh, A.N., Johnson, E.W., & Murphy, B.W., Discovery of a Probable SX Phoenicis Star in M107,” *Journal of the Southeastern Association for Research in Astronomy*, 7, 51 (2012).
- Reinhart, E.D., McCombs, T.A., Darragh, Liu, Z.J., Murphy, B.W., & Conroy, K.E., “The Color-Magnitude Diagram of M14,” *Journal of the Southeastern Association for Research in Astronomy*, 7, 56 (2012).
- Murphy, B.W., Darragh, A.N., Conroy, K.E., Johnson, E.W., Liu, Z.J. & Toddy, J.M., "Searching for Variable Stars in Southern Globular Clusters", *Bulletin of American Astronomical Society*, 220, 333.01 (2012).
- Darragh, A.N. & Murphy, B.W., “New Variable Stars in the Globular Cluster NGC 4833 *Journal of the Southeastern Association for Research in Astronomy*, 6, 72 (2012).
- Toddy, J.M. , Johnson, E.W., Darragh, A.N., & Murphy, B.W., “Variable Stars in the Globular Cluster NGC 4833,” *Journal of the Southeastern Association for Research in Astronomy*, 6, 63 (2012).
- Murphy, B.W. & Darragh, A. N., “Discovery of 6 SX Phoenicia Stars in the Globular Cluster NGC 4833,” *Bulletin of the American Astronomical Society*, 45, 151.19 (2012).

- Toddy, J.M., Johnson, E.W., Darragh, A.N., & Murphy, B.W., "Discovery of 27 New Variable Stars in the Globular Cluster NGC6584," *Bulletin of the American Astronomical Society*, 43, 151.20 (2012).
- Conroy, K.E., Darragh, A.N., Liu, Z.J., & Murphy, B.W., "Variable Stars in the Globular Cluster M14," *Journal of the Southeastern Association for Research in Astronomy*, 5, 34 (2012).
- Murphy, B.W., Cohn, H.N., & Lugger, P.M., "Fokker-Planck Models for M15 Without a Central Black Hole: The Role of the Mass Function," *Astrophysical Journal*, 732, 67 (2011).
- Murphy, B.W., Darragh, A., Harp, T., Liu, J., Geiss, B., Lawder, M., McFall, M., & Phifer, K.A., "Light Curve Analysis of Asteroids 6619 Kolya, 9549 Akplatonov, 12466 1997 AS12, 15154 2000 FW30, and 32505 2001 KF17," *Minor Planet Bulletin*, 38, 139 (2011).
- Conroy, K.E., Darragh, A.N., Liu, Z.J., and Murphy, B.W., "Variable Stars in the Globular Cluster M14," *Bulletin of the American Astronomical Society* 43, 152.18 (2011).
- Jones, M.L., Murphy, B.W., Phifer, K.A., Geiss, B.B., Mc Fall, M.J., & Cohn, H.N., "Depletion of Giant Stars in the Galactic Nucleus Due to a Top-Heavy Mass Function," *Bulletin of the American Astronomical Society*, 43, 241.13 (2011).
- Updike, A. C., Hartmann, D. H., & Murphy, B., & Darragh, A.N. "GRB 110212A: SARA-N optical limits," *GRB Coordinates Network, Circular Service*, 11702, 1 (2011).
- Murphy, B.W., "The Formation of Stellar Cusps in Galactic Nuclei," *The Galactic Center: A Window to the Environment of Disk Galaxies*, ed. M. Morris, D.Q. Wang, and F. Yuan (A.S.P. Conference Series: San Francisco), vol. 439, 189 (2011).
- Updike, A. C., Hartmann, D. H., & Murphy, B., "GRB 100418A: SARA observations," *GRB Coordinates Network, Circular Service*, 10619, 1 (2010).
- Geiss, B., Murphy, B.W., Phifer, K. A., McFall, M., Cohn, H.N., "The Effect of Stellar Collisions and Tidal Disruptions on Post-Main-Sequence Stars in the Galactic Nucleus." *Bulletin of the American Astronomical Society*, 42, 413.15 (2010).
- Updike, A. C.; Hartmann, D. H.; Murphy, B.; & Rumstay, K., "GRB 090915: SARA detection of afterglow candidate," *GRB Coordinates Network, Circular Service*, 9920, 1 (2009).
- Murphy, B.W., Phifer, K. A., Cohn, H. N., & Lugger, P. M., "Mass Segregation in the Galactic Nucleus," *Bulletin of the American Astronomical Society*, 41, 226 (2009).
- Phifer, Kimberly A., Murphy, B. W., Cohn, H. N., & Lugger, P. M., "Growth and Evolution of the Central Black Hole in the Galactic Nucleus," *Bulletin of the American Astronomical Society*, 41, 226 (2009).
- Drukier, G.A., Cohn, H.N., Lugger, P.M., Slavin, S.D., & Berrington, R.C., & Murphy, B.W., "The Global Kinematics of the Globular Cluster M92," *Astronomical Journal*, 113, 1104 (2007).
- Behler, R. H., Murphy, B. W., Cohn, H. N., & Lugger, P. M., "The Dynamics of the Globular Star Cluster 47 Tucanae," *Bulletin of the American Astronomical Society*, 35, No. 5, 1125 (2003).
- Johnson, C. J., Murphy, B. W., Cohn, H. N., & Lugger, P. M., "The Growth of Intermediate Mass Black Holes in Star Clusters," *Bulletin of the American Astronomical Society*, 35, No. 5, 1149 (2003).
- Murphy, B. W.; Cohn, H. N.; Lugger, P. M.; Drukier, G. A., "Fokker-Planck Models for M15 without a Central Black Hole," *Bulletin of the American Astronomical Society*, 26, No. 4, 1487 (2003).
- Murphy, B.W., "The Thousand Blazing Suns: The Inner Life of Globular Clusters," *Mercury Magazine, Astronomical Society of the Pacific*, 28, no. 4, 26 (1999).
- Dull, J. D.; Cohn, H. N.; Lugger, P. M.; Murphy, B. W.; Seitzer, P. O.; Callanan, P. J.; Rutten, R. G. M.; Charles, P. A. Addendum: "The Dynamics of M15: Observations of the Velocity Dispersion Profile and Fokker-Planck Models" (*The Astrophysical Journal*, 481, 267 [1997]), *The Astrophysical Journal*, (2003).
- Murphy, B. W.; Moore, C. A.; Trotter, T. E.; Cohn, H. N.; Lugger, P. M. "The Dynamics of the Globular Star Cluster 47 TUC (NGC 104)," *Bulletin of the American Astronomical Society*, 29, No. 5, 1338 (1997).

- Drukier, G.D., Slavin, S.D., Cohn, H.N., Lugger, P.M., Berrington, R.C., Murphy, B.W., and Seitzer, P.O., "The Global Kinematics of the Globular Cluster M15", *The Astronomical Journal*, 115, 708 (1998).
- Murphy, B.W., Cohn, H.N., Lugger, P.M., and Drukier, G.D., "The Stellar Mass Function of M15," *Bulletin of the American Astronomical Society*, 29, No. 5, 1338 (1997).
- Dull, J., Cohn, H.N., Lugger, P.M., Murphy, B.W., Seitzer, P., "The Dynamics of M15: Observations of the Velocity Dispersion Profile and Fokker-Planck Models," *The Astrophysical Journal*, 481, 267 (1997).
- Berrington, R.C., Lugger, P.M., Cohn, H.N., Drukier, G.A., and Murphy, B.W., "The Dynamics of Abell 2256," *Bulletin of the American Astronomical Society*, 28, 1410 (1996).
- Drukier, G.A., Cohn, H.N., Lugger, P.M., Slavin, S.D., Berrington, R.C.; Murphy, B.W. and Seitzer, P.O., "Kinematic Evidence for Tidal Heating in M15," *Bulletin of the American Astronomical Society*, 28, 1364 (1996).
- Dull, J., Cohn, H.N., Lugger, P.M., Murphy, B.W., Seitzer, P., and Callanan, P., "Dynamical Modeling of NGC 6397: Simulated Hubble Space Telescope Imaging," *Bulletin of the American Astronomical Society*, 26, No. 4, 1487 (1994).
- Murphy, B.W., Cohn, H.N., Lugger, P.M., and Dull, J.D., "Dynamical Models of the Globular Clusters M15", *Bulletin of the American Astronomical Society*, 26, No. 4, 1487 (1994).
- Dull, J., Cohn, H.N., Lugger, P.M., Murphy, B.W., Seitzer, P., and Callanan, P., "The Inner Velocity Dispersion of M15", *Bulletin of the American Astronomical Society*, 26, No. 4, 1487 (1994).
- Murphy, B.W., and Chernoff, D.F., "Polarized Scattering in the Vicinity of Galaxies," *The Astrophysical Journal*, 418, 60, (1993).
- Murphy, B.W., "Numerical Modeling of Pre- and Post-Core Collapse," in *Dynamics of Globular Clusters* (Ivan King Symposium), ed. G. Meylan (A.S.P. Conference Series: San Francisco), 50, 101 (1993).
- Van der Klis, M., Hasinger, G., Dotani, T., Mitsuda, F., Verbunt, F., Murphy, B.W., van Paradijs, J., Belloni, T., Makishima, K., Morgan, E., and Lewin, W.H.G., "Simultaneous Rosat/Ginga Observations of 4U 1820-30," *Monthly Notices of the Royal Astronomical Society*, 260, 686 (1993).
- Durisen, R.H., Bode, P.W., Cuzzi, J.N., Cederbloom, S.E., and Murphy, B.W., "Ballistic Transport in Planetary Ring Systems Due to Erosion Mechanisms II. Theoretical Models for Saturn's A and B-Ring Inner Edges," *Icarus*, 100, No. 2 (1992).
- Grabhorn, R.P., Cohn, H.N., Lugger, P.M., and Murphy, B.W., "Evolving, Dynamical Models for Collapsed-Core Globular Clusters: M15 and NGC 6624," *The Astrophysical Journal*, 392, 86 (1992).
- Murphy, B.W., "The Evolution of Globular Clusters," *New York State Astronomy*, ed. A.G.D. Phillips (L. Davis Press: Schenectady), Vol. 4, No. 2, p.3 (1992).
- Murphy, B.W., Rutten, R.G.M., Callanan, P., Seitzer, P., Charles, P., Cohn, H.N., and Lugger, P.M., "Detection of Binaries in the Core of the Globular Cluster M15 Using Calcium Emission Lines," *Nature*, 331, No. 6332, 130 (1991).
- Cohn, H.N., Lugger, P.M., Grabhorn, R.P., Breeden, J.L., Packard, N.H., Murphy, B.W., and Hut, P., "Core Oscillations in Globular Cluster Evolution: Recent Results," in *The Formation and Evolution of Star Clusters*, ed. K. Janes (A.S.P. Conference Series: San Francisco), 13, p. 381 (1991).
- Grabhorn, R.P., Cohn, H.N., Lugger, P.M., and Murphy, B.W., "Evolving, Dynamical Models for Collapsed-Core Globular Clusters: M15 and NGC 6624," in *The Formation and Evolution of Star Clusters*, ed. K. Janes (A.S.P. Conference Series: San Francisco), 13, p. 392 (1991).
- Murphy, B.W., and Cohn, H.N., "Post-Collapse Scenarios of Globular Clusters," in *The Formation and Evolution of Star Clusters*, ed. K. Janes (A.S.P. Conference Series: San Francisco), 13, p. 436 (1991).
- Gao, B., Goodman, J., Cohn, H., and Murphy, B., "Fokker-Planck Calculations of Star Clusters with Primordial Binaries," *The Astrophysical Journal*, 370, 567 (1991).

- Murphy, B.W., Cohn, H.N., and Durisen, R.H., "The Dynamical and Luminosity Evolution of Active Galactic Nuclei: Models With a Mass Spectrum," *The Astrophysical Journal*, 370, 60 (1991).
- Hut, P., Murphy, B.W., and Verbunt, F., "The Formation Rate of Low-Mass X-Ray Binaries in Globular Clusters," *Astronomy and Astrophysics*, 241, 137 (1991).
- Murphy, B.W., "The Evolution of Globular Clusters: Post-Core Collapse with Stellar Evolution," *Bulletin of the American Astronomical Society*, 23 (1991).
- Murphy, B.W., Cohn, H.N., and Hut, P., "Realistic Models for Evolving Globular Clusters II: Post-Core Collapse With a Mass Spectrum," *Monthly Notices of the Royal Astronomical Society*, 245, 335 (1990).
- Murphy, B.W., Rutten, R.G.M., Seitzer, P., Cohn, H.N., Lugger, P.M., Callanan, P., and Charles, P., "Ca II H & K Emission from the Core of M15: Evidence of Binaries," *Bulletin of the American Astronomical Society*, 22, No. 4, 1285 (1990).
- Durisen, R.H., Bode, P.W., Cederbloom, S.E., Murphy, B.W., and Cuzzi, J.N., "Theoretical Models for the Structure at Saturn's A and B-Ring Inner Edges," *Bulletin of the American Astronomical Society*, 22, No. 3, 1045 (1990).
- Murphy, B.W., Cohn, H.N., and Durisen, R.H., "The Dynamical Evolution of Multi-Mass Galactic Nuclei," in *The Dynamics of Dense Stellar Systems*, ed. D. Merritt (Cambridge University Press: Cambridge), p. 97 (1989).
- Durisen, R.H., Cramer, N.L., Murphy, B.W., Cuzzi, J.N., and Mullikin, T.L., "Ballistic Transport in Planetary Ring Systems Due to Particle Erosion Mechanisms. I. Theory, Numerical Methods, Illustrative Examples," *Icarus*, 80, 136 (1989).
- Murphy, B.W., Cohn, H.N., and Hut, P., "The Effect of a Mass Spectrum on Post-Collapse Evolution," *Bulletin of the American Astronomical Society*, 21, No. 2, 791 (1989).
- Murphy, B.W., Cohn, H.N., and Durisen, R.H., "The Evolution of Active Galactic Nuclei: A Multi-Mass Model," in *Active Galactic Nuclei*, eds. H.R. Miller and P.J. Wiita (Springer-Verlag: New York), p. 421 (1988).
- Murphy, B.W., and Cohn, H.N., "Realistic Models for Evolving Globular Clusters I: Core Collapse With a Mass Spectrum," *Monthly Notices of the Royal Astronomical Society*, 232, 835 (1988).
- Murphy, B.W., "The Evolution of Active Galactic Nuclei and Globular Clusters," *Publications of the Astronomical Society of the Pacific*, 100, 1588 (1988).
- Durisen, R.H., Cederbloom, S.E., Murphy, B.W., and Cuzzi, J.N., "Evolution of the Inner A and B-Ring Edges in Saturn's Ring System," *Bulletin of the American Astronomical Society*, 20, No. 3, 851 (1988).
- Murphy, B.W., Cohn, H.N., and Durisen, R.H., "The Evolution of Active Galactic Nuclei: A Multi-Mass Model," *Bulletin of the American Astronomical Society*, 19, No. 4, 1047 (1987).
- Durisen, R.H., Cederbloom, S.E., Murphy, B.W., and Cuzzi, J.N., "Ballistic Transport Due to Meteoroid Erosion in Planetary Rings," *Bulletin of the American Astronomical Society*, 19, No. 3, 980 (1987).
- Murphy, B.W., and Cohn, H.N., "Realistic Models for Evolving Globular Clusters: Core Collapse With a Mass Spectrum," *Bulletin of the American Astronomical Society*, 18, No. 4, 680 (1986).