

Maria Womack

Research Professor for Department of Physics
University of South Florida
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EDUCATION

Ph.D. Physics, Arizona State University, 1991, “Observational studies of interstellar and solar nebula nitrogen chemistry”

B.S. Physics, Florida State University, 1985

PROFESSIONAL EXPERIENCE

Research Professor, 2015 – present

Department of Physics, University of South Florida, Tampa, FL

- Lead externally-funded research programs in cometary science
- Publish original research in refereed journals and refereed NASA databases
- Major professor for two doctoral and twelve undergraduate research students
- Director of USF physics Bridge-to-the-Doctorate program, 2017-2019
- Created new “Bridge-to-Candidacy” awards program to support conference travel and research assistantships for physics graduate students from under-represented groups
- Member of the physics department graduate admissions committee, 2017-2018
- Established a new, funded research collaboration between planetary science groups at USF and University of Central Florida
- Co-chair and member, Scientific Organizing Committee, Centaur Exploration Workshop, 2016 (local), 2017 (local), 2019 (national)
- Lead organizer for international observing campaign for Centaur 29P/SW 1
- Established a new Astrophysics and Planetary Science cluster within three departments in the College of Arts and Sciences (CAS) comprised of 18 USF faculty members, their postdoctoral researchers and graduate students.
- Prepared and submitted a proposal to CAS to initiate the Center for Astrophysics and Planetary Sciences for interdisciplinary research and education funding (pending)
- Doctoral thesis committee member for two geological sciences students
- Speaker at various USF CAS NSF Funding workshops; advised individual professors on federal funding procedures

Program Director, 2011 - 2015 (IPA “rotator”) and 2016 (expert consultant)

Division of Astronomical Sciences, National Science Foundation, Arlington, VA

Managed annual budget of \$20 million; lead program director for the Stellar Astronomy and Astrophysics (Nov 2011-Jan 2014), and the Planetary Astronomy (Sep 2013 – Jan 2015) grant programs. I created and helped develop the new NSF-NASA partnership for observational extrasolar planet research: NN-EXPLORE; I reorganized the stellar astronomy and astrophysics and planetary astronomy programs, including establishing and assessing the NSF extrasolar planet portfolio.

Other NSF highlights include:

- Strategic planning and program development;
- Identified and supported emerging scientific trends and potentially transformative research and scholarship;

- Coordinated, scheduled and conducted review panels, identified and secured topical experts and made merit review assignments for over 800 proposals;
- Made funding recommendations based on merit review and budget allocations;
- Provided annual review, evaluation and oversight of funded programs;
- Conducted merit review and made well-justified funding recommendations for over 800 proposals; conveyed results to PIs;
- Worked with colleagues in Divisions of Physics (PHY), Materials Research (DMR) and Chemistry (CHE) and Office of Multidisciplinary Activities (OMA) of the Math and Physical Sciences (MPS) Directorate and the Geosciences Directorate (GEO) to secure joint funding for meritorious proposals;
- Point-of-contact for NSF, and the inter-agency (NSF, NASA and DOE) coordinator for Congressionally-appointed Astronomy and Astrophysics Advisory Committee;
- Worked with colleagues to prepare and present information on NSF's extrasolar planet research initiatives to staffers of U.S. House of Representatives Science, Space and Technology Committee, Subcommittee on Research;
- Worked with colleagues to prepare follow-up testimony for NSF's extrasolar planet research initiatives, for the House Committee on Science, Space and Technology;
- Worked with colleagues to review and comment on draft testimony from the Department of the Air Force and the President's Science Advisor for a hearing on Threats from Space Objects, which was presented before the House Committee on Science, Space and Technology.

College Director of Assessment for Student Learning, 2008-2011

Director of the SCSU Observatory, 2004 – 2015

Interim Director for SCSU Planetarium, 2002

St Cloud State University, St. Cloud, MN

Worked with the Dean of the College of Science and Engineering, faculty and students to achieve research, teaching and assessment goals of the university; managed budgets and supervised student employees.

Professor of Physics and Astronomy, 2005 – 2015

Associate Professor of Physics and Astronomy, 1999-2005 (tenured 2000)

Assistant Professor of Physics and Astronomy, 1997-1999

Department of Physics and Astronomy, St. Cloud State University, St. Cloud, Minnesota

Taught all levels of undergraduate physics and astronomy courses; conducted NSF- and NASA- funded research programs, supervised 43 undergraduate researchers.

Research Scientist, 2007-2008 (sabbatical)

University of Central Florida, Department of Physics

Assistant Professor of Physics, 1994-1997 (tenure-track)

Pennsylvania State University at Erie, Division of Science

Adjunct Associate Professor, 1994-1998

Visiting Professor, 1995-1996

Postdoctoral Research Associate, 1992-1994

Northern Arizona University, Department of Physics and Astronomy

Planetary science research, Native American astronomy outreach, research advising and

mentoring for 7 undergraduate researchers, taught intro astronomy laboratory courses; helped develop new teaching observatory

Postdoctoral Research Associate, 1991-1992

Arizona State University, Department of Chemistry.

RESEARCH SUPPORT

Grant Funding: \$1.2M+ as PI

2016-2019: PI, NSF Planetary Astronomy
 2010-2015: PI, NSF Planetary Astronomy
 2001-2005: PI, NSF Planetary Astronomy
 2001-2004: PI, NASA Planetary Astronomy
 1999-2001: Co-I, Toyota Tapestry Grant
 1996-2002: PI, NSF Faculty Early Career Development Program (CAREER)
 1997-1999: PI, NASA Comet Hale-Bopp Program
 1998: PI, Jorje Scientific Corporation International Travel Grant
 1995-1996: PI, NSF Astronomy
 1992-1996: Co-I, NASA Origins of Solar Systems Program
 1995-1996: PI, American Astronomical Society Small Research and Travel grants

Telescope access granted at national and international facilities: \$2M+ est. value

2019: PI, Atacama Large Millimeter/submillimeter Array (ALMA), Chile
 2019: Co-I, W.M. Keck Optical Observatory 10-m telescope, Hawaii
 2018-2019: Co-I, NASA Spitzer Infrared Space Telescope
 2016 - 2019: PI, Arizona Radio Observatory Submillimeter Telescope (ARO SMT) 10-m
 2018: Co-I, Institut de Radioastronomie Millimetrique 30-m telescope, Spain
 2016-2017: NASA Kepler 2 space telescope observatory
 2016: PI, Institut de Radioastronomie Millimetrique 30-m telescope, Spain
 2016, 2018: PI, Arizona Radio Observatory Kitt Peak 12-m telescope
 2011: PI, W.M. Keck Optical Observatory 10-m telescope, Hawaii
 1990-2005: PI, National Radio Astronomy Observatory 12m telescope, Kitt Peak
 1990-1993: PI, Caltech Submillimeter Observatory 10-m telescope, Hawaii
 1993-1995: PI, National Undergraduate Research Optical Observatory, Arizona
 1993-1994: PI, James Clerk Maxwell Submm Telescope, 15-m, Hawaii
 1988-1990: PI, Kitt Peak National Optical Observatory coude-feed

PUBLICATIONS

Refereed publications

1. Womack, M., Theobald, J. 1989, "Spatial Profiles of CN, C₂, NH, NH₂, H₂O⁺, CO⁺ and CO₂⁺ in Comet P/ Halley," Publ. Astr. Soc. Pacific, 101, 881.
2. Womack, M., L.M. Ziurys, and S. Wyckoff, 1991, N₂H⁺ in Orion: Chemical Clues to the Dynamics of the Quiescent Gas, Astrophysical Journal Letters, 370, L99.
3. Tegler, S.C., L.F. Burke, S. Wyckoff, M. Womack, U. Fink, M. DiSanti 1992, NH₃ and NH₂ in the Coma of Comet Brorsen-Metcalf, Astrophysical Journal, 384, 292.
4. Womack, M., L.M. Ziurys and S. Wyckoff, 1992, A Survey of N₂H⁺ in Dense Clouds: Implications for Interstellar Ion-Molecule and Nitrogen Chemistry, Astrophysical Journal, 387, 417.
5. Womack, M., L.M. Ziurys and S. Wyckoff, 1992, Estimates of N₂ Abundances in

- Dense Molecular Clouds, *Astrophysical Journal*, 393, 188.
6. Womack, M., S. Wyckoff and L.M. Ziurys, 1992, Observational Constraints on Solar Nebula Nitrogen Chemistry: N_2/NH_3 , *Astrophysical Journal*, 401, 728.
 7. Lutz, B.L., M. Womack, and R.M. Wagner, 1993, Ion Abundances and Implications for Photochemistry in Comets Halley (1986 III) and Bradfield (1987 XXIX), *Astrophysical Journal*, 407, 402.
 8. Womack, M., L.M. Ziurys, and L. Sage, 1993, N_2H^+ in the Orion Ambient Ridge: Cloud Clumping vs. Rotation, *Astrophysical Journal Letters*, 406, L29.
 9. Womack, M., B.L. Lutz, and R.M. Wagner, 1994, Pre- and Post-Perihelion Abundances of Gas and Dust in Comet Halley *Astrophysical Journal*, 433, 886.
 10. Womack, M., Ziurys, L.M., and Apponi, A.J. 1995, A Search for Interstellar CH_3D , *Astrophysical Journal*, vol. 461, p. 897.
 11. Noll, K.S., Gilmore, D., Knacke, R., Womack, M., Griffith, C.A., Orton, G. 1997, CO in Jupiter After Comet Shoemaker-Levy 9, *ICARUS*, 126, Issue 2, pp. 324-335.
 12. Womack, M., Stern, S.A., and Festou, M.C., 1997, Millimeter-wavelength Spectroscopy of CO, HCN, H_2CO , and CH_3OH in C/1996 B2 (Hyakutake), *Planetary and Space Science*, vol. 45, pp. 711-715.
 13. Womack, M., Festou, M.C., and Stern, S.A., 1997, The Heliocentric Evolution of Key Species in the Distantly-Active Comet C/1995 O1 (Hale-Bopp), *Astronomical Journal*, Vol. 114, p. 2789.
 14. Womack, M., Festou, M.C., Stern, S.A. and Homich, A. 1997, Maps of HCO^+ Emission in C/1995 O1 (Hale-Bopp), *Earth, Moon and Planets (Hale-Bopp Edition)*, vol. 77, no. 3, 259-264.
 15. Braunstein, M., Womack, M., et al. 1997, A CCD Image Archive of Comet C/1995 O1 (Hale-Bopp): Dust Expansion Velocities, *Earth, Moon and Planets (Hale-Bopp Edition)*, vol. 78, no. 1, 219-227.
 16. Womack, M. and Stern, S.A. 1999, The Detection of CO in 2060 Chiron, *Solar System Res.*, vol. 33, p. 187.
 17. Womack, M., Festou, M., Stern, S. 2000, "On the Fly Imaging of Neutral and Ionized Molecules in Comet Hale-Bopp", *ASP Conference Proceedings*, Vol. 217, 82.
 18. Bockelee-Morvan, D., Biver, N., Moreno, R., Colom, P., Crovisier, J., Gerard, E., Henry, F., Lis, D. Matthews, H., Weaver, H.A., Womack, M., Festou, M.C. 2001, "Outgassing behavior and composition of comet C/1999 S4 (LINEAR) during its disruption," *SCIENCE*, 292, pp. 1339-1343
 19. Festou, M.C., Barale, O., Davidge, T., Stern, S.A., Tozzi, G.P., Womack, M., and Zucconi, J.M. 2002, *Proceedings from IAU Colloquium No. 186 "On the Identity of Cometary CN Parent Molecule."*
 20. Meech, K.J. and 208 co-authors including M. Womack, 2005, *SCIENCE*, 310, 5746, 265-269, "Deep Impact: Observations from a Worldwide Earth-Based Campaign."
 21. Biver, N., Bockelee-Morvan, D., Crovisier, J., Lis, D.C., Moreno, R., Colom, P., Henry, F., Herpin, F., Paubert, G. and M. Womack, 2006, "Radio wavelength molecular observations of comets C/1999 T1 (McNaught-Hartley), C/2001 A2 (LINEAR), C/2001 WM1 (LINEAR), and 153P/Ikeya-Zhang," *Astronomy and Astrophysics*, 449, 1255B.
 22. Milam, S.N., Remijan A.J., Womack, M., Abrell, L., Ziurys, L.M., Wyckoff, S., Apponi, A.J., Friedel, D.N., Snyder, L.E., Veal, J.M., Palmer, P., Woodney, L.M., A'Hearn, M.F., Forster, J.R., Wright, M.C.H., de Pater, I., Choi, S. and Gesmundo, M. 2006, *Astrophysical Journal*, 649, 1169.

23. Remijan, A.J., Milam, S.N., Womack, M., Apponi, A.J., Ziurys, L.M., Wyckoff, S., A'Hearn, M.F., dePater, I., Forster, J.R., Friedel, D.N., Palmer, P., Snyder, L.E., Veal, J.M., Woodney, L.M., Wright, M.C.H. 2008, "The Distribution, Excitation, and Formation of Cometary Molecules: Methanol, Methyl Cyanide, and Ethylene Glycol," *Astrophysical Journal*, 689, 613-621.
24. Womack, M., Sarid, G., Wierzchos, K. 2017, "Carbon monoxide and other volatiles in distant comets," *Publications of the Astronomical Society of the Pacific*, topical review article, 129, 973.
25. Wierzchos, K., Womack, M., Sarid, G., 2017, "Carbon monoxide in the distantly active Centaur (60558) 174P/Echeclus at 6 au," *Astronomical Journal*, 153, 5, 230.
26. Wierzchos, K., Womack, M. 2018, "C/2016 R2 (PANSTARRS): A comet rich in CO and depleted in HCN," *Astronomical J.*, 156, 34.
27. Womack, M., Curtis, A., Lastra, N., Harrington Pinto, O., Rabson, D.A., Wierzchos, K., Cox, T., Rivera, I., Mentzer, C., Ruffini, N., Jackson, C., and Micciche, A., "Hale-Bopp Visual Lightcurve," [urn:nasa:pds:compil-comet:halebopp::1.0](https://pds.nasa.gov/compil/comet/halebopp/1.0/); NASA Planetary Data System, 2018."

Non-refereed publications, abstracts and meeting proceedings

1. Wyckoff, S.; Wehinger, P. A.; Belton, M. J. S.; Spinrad; Wagner, R. M.; Womack, M., 1986, "Spectral Evolution of Comet P/Halley: 1984-1986", *BAAS*, 18, 813.
2. Wyckoff, S., P.A. Wehinger, M. Womack, A.J. Ferro, B.A. Peterson, S. Tegler, and J. Theobald 1987, "Optical Spectroscopy of Comet Halley", *B.A.A.S.*, 19, No. 3.
3. Womack, M. and Theobald, J. 1988, "Violet and Red Systems of CN in the Spectrum of Comet Halley", *B.A.A.S.*, 20, No. 3.
4. Womack, M. and Theobald, J. 1989 "Spatial Profiles of Free Radicals in Comet Halley", *Astron. Soc. Pacific, Berkeley Meeting*, June 1989.
5. Womack, M. and S. Wyckoff, 1989, "Spatial Distributions of Molecules in Comet Halley", *B.A.A.S.*, 21, No. 3.
6. Wehinger, P.A., Wyckoff, S., Womack, M., Peterson, B.A., 1989, "Echelle Spectra of the CN (0,0) Violet system in comet Brorsen-Metcalf", *BAAS*, 21, 933.
7. Womack, M., P. Wehinger, S. Wyckoff, and B. Peterson, 1990, "The 12CN/13CN Abundance Ratio in Comets and Local Interstellar Medium", *BAAS*, 21, 4, 1124.
8. Womack, M., P.A. Wehinger, S. Wyckoff, and B.A. Peterson, 1990, "The 12CN/13CN Abundance Ratio in the Local Interstellar Medium", *Protostars and Planets III meeting*.
9. Womack, M., L.M. Ziurys, and S. Wyckoff, 1990, "N₂H⁺ in Warm and Cold Clouds", *B.A.A.S.*, 22, No. 2, 800
10. Burke, L.F., S.C. Tegler, S. Wyckoff, M. Womack, U. Fink, and M. DiSanti, 1990, "NH₂ in the Coma of Comet Brorsen-Metcalf", *B.A.A.S.*, 22, No. 3.
11. Wyckoff, S., S.C. Tegler, L. Engel, M. Womack, A. Ferro and B. Peterson, 1990, "Ammonia and N Abundances in Comets", *B.A.A.S.*, 22, No. 3.
12. Womack, M., S. Wyckoff, P.A. Wehinger, and B.A. Peterson, 1990, "A Spectroscopic Atlas of Comet Halley (3200 – 9200A)", *B.A.A.S.*, 22, No. 3.
13. Womack, M., Ziurys, L.M., Wyckoff, S., and Sage, L. 1991, "N₂H⁺ in Orion: Two Clouds at KL/IRc2?", *B.A.A.S.*, 22, No. 4, 1329.
14. Womack, M. 1991, "N₂H⁺ in the Orion Quiescent Gas", *Steward Obs. Internal Symposium*.
15. Womack, M., S. Wyckoff, and L.M. Ziurys, 1991, "Molecular Cloud Diagnostics of Solar Nebula Chemistry", *B.A.A.S.*, 23, No. 3, 1232.

16. Wyckoff, S., M. Womack and L.M. Ziurys, 1991, "Cometary Diagnostics of Solar Nebula Chemistry", B.A.A.S., 23, No. 3, 1234.
17. Womack, M., Lutz, B.L., and R.M. Wagner, 1992, "Molecular Ions in Comets Halley and Bradfield (1987 XXIX)", B.A.A.S., 24, No. 3, 999.
18. Womack, M., L.M. Ziurys and L.J. Sage, 1993, "Cloud Clumping of the Orion Ambient Ridge: No Rotation About KL/IRc2", B.A.A.S., 24, No. 4, 1199.
19. Womack, M., and S. McKeown, 1993, "Millimeter-Wavelength Spectra of H₂CO and CH₃OH in Comet Swift-Tuttle", B.A.A.S. 25, No. 3, 1050.
20. Lutz, B.L., and M. Womack, 1993, "Pre- and Post-Perihelion Spectroscopy of Comet Halley", B.A.A.S. 25, No. 3, 1050.
21. Womack, M., Stern, S.A. 1994, "Search for CO and HCN in Chiron", BAAS, 26, 3.
22. Womack, M., Ziurys, L.M., Apponi, A.J. and Yoder, J.T. 1994, "Interstellar CH₃D: Deuterated methane in the Orion hot core?," AIP 312, 305.
23. Graham, R.A., and Womack, M. 1995 "Carbon monoxide in the Coma of P/Schwassmann-Wachmann 1", B.A.A.S., 186, 33.01.
24. Noll, K., Gilmore, D., Knacke, R., Womack, M., Fajardo-Acosta, S., Orton, G., Griffith, C. "Evolution of CO on Jupiter Before, During and After SL9", International Astronomical Union, May 1995.
25. Womack, M. "Carbon Chemistry in Comets", Topics in Modern Astronomy, American Assoc. of Physics Teachers, Aug. 1995.
26. Womack, M., Stern, S.A. 1995, "Detection of CO in Chiron", BAAS, 27, 33.07.
27. Womack, M., Festou, M.C., and Stern, S.A. 1996, "CO, HCN, CH₃OH and H₂CO in Comet Hyakutake Before, During and After Perihelion", B.A.A.S., 28, 188.
28. Womack, M. Panel Discussion on Comet Hyakutake, at American Astronomical Society meeting, June 1996.
29. Womack, M., Festou, M., and Stern, S.A. 1996, "Parent Molecules in Comet Hyakutake", ACM meeting, July 1996.
30. Womack, M., Suswal, D., Festou, M., Stern, S.A., and Slater, D. 1996, "Millimeter-wavelength Spectroscopy of Comets Hyakutake and Hale-Bopp", B.A.A.S., 29.
31. Womack, M., Festou, M.C., Mangum, J., and Stern, S.A., 1997, "Millimeter-wavelength Images of Gaseous Emission in C/1995 O1 (Hale-Bopp)", BAAS 29, 3406.
32. Pinnick, D.A., Womack, M., Moore, G., Faith, D., Wiest, A., Modi, C., Ricotta, J., and Suswal, D. 1997, "Optical Images of C/1995 O1 (Hale-Bopp) During Perihelion", BAAS, 29, 3214.
33. Spinar, M., Womack, M., and Goldschen, M. 1998, "HCN and CO Emission in Comet C/1996 Q1 (Tabur)," B.A.A.S. 30, 4010
34. Festou, M.C., Barale, O., Davidge, T., Stern, S.A., Tozzi, G.P., Womack, M., and Zucconi, J.M. 1998, "Tentative Identification of the Parent of CN radicals in Comets: = C₂N₂", B.A.A.S. 30, 4002.
35. Womack, M., Festou, M.C., and Stern, S.A. 1998, "The Heliocentric Evolution of Carbon-Bearing Volatiles in Comet Hale-Bopp", B.A.A.S., 30, 3111.
36. Homich, A. Womack, M., Uhl, W.T. 1998, "Correlations between CO and HCN Production Rates and Visual Magnitudes in Comet Hale-Bopp", B.A.A.S., 30, 3108.
37. Deglman, F.; Womack, M.; Braunstein, M.; Pinnick, D.A.; Aaker, G.; Goldschen, M.; Zilka, J.; Henning, B.; Comstock, R.; Hoffman, P.; Faith, D.; Moore, S.; Ricotta, J.; Wiest, A.; and Modi, C. 1998, "An Optical Archive of Comet Hale-Bopp: Dust Expansion Velocities and the Evolution of Coma Morphology", B.A.A.S., 300, 2910.
38. Womack, M., Festou, M.C., Stern, S.A., and J. Mangum, 1998, "Mm-wave maps of

- HCO⁺ Emission and Molecular Ion Morphologies in C/1995 O1 (Hale-Bopp)", First International Meeting of Comet Hale-Bopp, Tenerife, Proceedings, 53.
39. Braunstein, M., Womack, and 9 co-authors, 1998, "CCD Image Archive of Comet C/1995 (O1) Hale-Bopp", International Meeting of Comet Hale-Bopp, Tenerife, 69.
 40. Womack, M. "On the Activity of Distant Comets", Invited speaker, Asteroids, Comets and Meteors Meeting, 1999, Ithaca, NY.
 41. Womack, M. and Homich, A. "Comparison of Long-term Activity of Comet Hale-Bopp at Visible and Mm-wavelengths", 1998, B.A.A.S., 31, 1709.
 42. Womack, M., Pinnick, D.A., Mangum, J.G., Festou, M.C., Stern, S.A. 1999, "On the Fly Imaging of Neutral and Ionized Molecules in Comet Hale-Bopp", Conference at Radio through Submillimeter Wavelengths, Tucson, AZ
 43. Pinnick, D.A. and Womack, M. 1999, "Spectral Analyses of HCN and CO Emission Maps of Comet Hale-Bopp," BAAS, 31, 1589.
 44. Womack, M 2000, "Cometary Activity Beyond 4 AU", BAAS, 32, 4124.
 45. Womack, M. 2000, "COMETWATCHERS: Bringing Research into the Undergraduate Astronomy Curriculum," BAAS, 32, 875.
 46. Womack, M., 1990, "N₂H⁺ in Warm and Cold Clouds", Workshop on Observations of Recent Comets (1990), ed. W.F. Huebner, P.A. Wehinger, J. Rahe, I. Konno, Southwest Research Institute, 110.
 47. Womack, M., Ziurys, L.M., Apponi, A.J., and Yoder, J.T. 1994, "Interstellar CH₃D: Deuterated Methane in the Orion Hot Core?", Physical Chemistry of Molecules and Grains in Space meeting, Mont Sainte-Odile (France), 305.
 48. Womack, M., and Stern, S.A., 1997, "Observations of Carbon Monoxide in (2060) Chiron", LPSC, 28, 1575.
 49. Stern, S.A, Womack, M., and Festou, M.C. 1997, "Helio-centric Evolution of Key Species in Comet C/1995 O1 (Hale-Bopp)", LPSC, 28, 1375.
 50. Womack, M. 2010, "Challenges of a Ground-based Search for Water in a Hot Jupiter: HD 209458b," review, proceedings Univ. Central Florida Winter Workshop: Exoplanets for Planetary Scientists, <http://planets.ucf.edu/node/206>.
 51. Crovisier, J., Biver, N., Moreno, R., Lis, D., Bockelee-Morvan, D., Womack, M., and 6 co-authors, 2001, "Spectroscopic Investigation of Comets C/1999 T1 (McNaught-Hartley) and C/2001 A2 (Linear) at Radio Wavelengths," BAAS, 33, 4306.
 52. Cabanela, J., Womack, M., & Dickey, J.M. 2001, "Deep CO Observations of Four LSBs", BAAS, 199, 710.
 53. Womack, M., Festou, M., Pinnick, D., Mangum, J.G. 2002, "OTF images and asymmetric outgassing from comet Hale-Bopp", BAAS, 34, 1607.
 54. Festou, M., Womack, M., Pinnick, D., Mangum, J., 2002, "How anisotropic was the gas coma of comet C/Hale-Bopp?", BAAS, 34, 1212.
 55. Milam, S., Womack, M., Ziurys, L.M., Wyckoff, S. 2005, "Simple Organics in Comets: Formaldehyde, Methyl Cyanide and Methanol", IAU Symposium, Asilomar.
 56. Womack, M., S. Choi, M. Gesmundo, J. Swanson, 2007, "CO, HCN and H₂S in comet C/2001 Q4 (NEAT), BAAS, 39, 5308.
 57. Womack, M., Harrington, J., Deming, D., Rojo, P., Fortney, J.J. 2008, "The search for water in HD209458b with transit spectroscopy over 0.7–2.4 micron", BAAS, 40, 1109
 58. Womack, M., Harrington, J., Rojo, P., Deming, D, Fortney, J. 2010, "A ground-based search for water in HD 209458b using transit spectroscopy," proceedings UCF Winter Workshop: Exoplanets for Planetary Scientists.
 59. Womack, M., Sarid, G., Wierzos, K. 2016, "Gaseous activity of distant comets,"

- Bulletin of the American Astronomical Society, 483, 3006.
60. Wierzchos, K. and Womack, M. 2016, "CO in Centaur Echelus," Bulletin of the American Astronomical Society, 481,604.
 61. Wierzchos, K., Womack, M., "Detection of CO and HCN in the coma of Jupiter-family comet 41P/Tuttle-Giacobini-Kresak," 2017, BAAS, 493, 508.
 62. Dones, H.C.L., Womack, M., Alvarellos, Jose, Bierhaus, E., Bottke, W., Hamill, P., Nesvorny, D., Robbins, S., Zahnle, K. 2017, BAAS 483, 102.
 63. Womack, M. Lastra, N., Harrington, O., Cutis, A., Wierzchos, K., Ruffini, N., Mentzer, C., Rabson, D., Cox, T., Rivera, I., Micciche, A. "New Methods for deriving cometary secular lightcurves: C/1995 O1 (Hale-Bopp) revisited," 2017, BAAS, 494, 2001.
 64. Harrington, O., Womack, M., Lastra, N., Curtis, A., 2017, "Correlation between cometary gas/dust ratios and heliocentric distance," BAAS, 494, 1417.
 65. Dones, H.C.L., Womack, M., Nesvorny, D., Bierhaus, E., Zahnle, K., Robbins, S., Bottke, W., Ivrellos, J., Hamill, P. 2017, "Can Ecliptic comets be created en route from the Kuiper Belt," BAAS, 494, 102.
 66. Womack, M. 2018, "Carbon in Comets," NASA SSERVI Workshop: Carbon in the Solar System, **invited**.
 67. Sarid, G., Womack, M., Wierzchos, K., 2018, "Stay Active My Friend: 29P/S-W1, The Most Interesting Comet in the World," BAAS, 505, 0904.
 68. Mommert, M., Trilling, D., Knight, M.M., Hora, J., Biver, N., Womack, M., and 10 coauthors, 2018, "Systematic Characterization and Monitoring of Potentially Active Asteroids: The Case of Don Quixote," BAAS, 505, 0505.
 69. Schambeau, C., Fernandez, Y., Woodney, L., Samarasinha, N., Meech, K., Knight, M., Womack, M., Sarid, G, Hernandez, I., Montano, J., Presler,-Marshall, B. 2018, "Characterizing Comets in the Centaur-to-Jupiter Family Transition," BAAS, 502, 412.
 70. Harrinton Pinto, O., McKay, A., DiSanti, M.A., Kelley, M.S., Cochran, A., Dello Russo, N., Womack, M., Wierzchos, K., Biver, N., Bauer, J. and 5 coauthors, 2018, "A coordinated ground- and space-based observing campaign to measure CO₂ and CO emission in C/2016 R2 (PANSTARRS)," BAAS, 502, 404.
 71. McKay, A., DiSanti, M., Kelley, M.S., Cochran, A., Dello Russo, N., Villanueva, G., Womack, M., Wierzchos, K., Biver, N., Bauer, J., and 6 coauthors, 2018, "The Volatile Composition of CO-Dominated Comet C/2016 R2 (PANSTARRS)", BAAS, 502, 402.
 72. Wierzchos, K., Womack, M., 2018, "Strong emission of CO from C/2016 R2," BAAS, 502, 401.

International Astronomical Union Telegrams

- Womack, M., S.A. Stern, 1994, "Upper Limits to CO in 2060 Chiron," IAUC 5957.
- Womack, M., Stern, S.A., Festou, M.C. 1995, "CO in Hale-Bopp," IAUC 6276.
- Womack, M., Stern, S.A. 1995, "Detection of CO in 2060 Chiron," IAUC 6193.
- Womack, M., Festou, M.C., and Stern, S.A. 1996, IAUC 6345.
- Womack, M., Woodney, L.M., Festou, M.C., McMullin, J., A'Hearn, M., Suswal, D., and Stern, S.A. 1996, "Detection of Methanol in Hale-Bopp," IAUC 6382.
- Woodney, L., Womack, M., et al. 1996, "H₂S Detection in Hale-Bopp," IAUC 6408.
- Womack, M., and Suswal, D. 1996, "Detection of HCN in Comet Tabur," IAUC 6485.
- Womack, M., Faith, D., Festou, M.C., Slater, D., and Stern, S.A. 1997, "Ortho-to-para Ratio in Hale-Bopp," IAUC 6542.
- Wierzchos, K., and Womack, M., 2017, "Detection of CO in comet C/2016 R2," Central Bureau for Electronic Telegram No. 4464.

Professional policy articles

- Womack, M. 2015, "Astronomy Decadal Reports Primer," Astrobetter, <http://www.astrobetter.com/blog/2015/09/09/astronomy-decadal-reports-primer-new-worlds-new-horizons-visions-voyages-and-nsf-portfolio-review-committee/>
- Womack, M. 2015, "The Astronomy OIR Study recommendations for the LSST era," Astrobetter, <http://www.astrobetter.com/blog/2015/09/16/the-astronomy-oir-study-recommendations-for-the-lsst-era/>
- Womack, M. 2015, "How will NSF pay for the Astronomy OIR Study recommendations?" Astrobetter, <http://www.astrobetter.com/blog/2015/09/22/how-to-pay-for-the-oir-study-recommendations/>

INVITED PRESENTATIONS

- 2018 NASA SSERVI Workshop, "Carbon in Comets", Boulder, CO
- 2017 NSF CAREER Workshop, USF, keynote speaker
- 2017 USF CAS NSF Funding Workshop, speaker
- 2015 NSF Grant Strategies Workshop, USF
- 2015 University of Central Florida, Dept of Physics, "Carbon monoxide in Comets," colloquium
- 2015 University of South Florida, Dept of Physics, "Writing a great research proposal" graduate seminar lecture for USF Bridge program
- 2014 University of South Florida, Dept of Physics, "Research communities and the craft of proposal writing," graduate seminar lecture
- 2013 University of S. Florida, Dept. of Physics, "Proposal writing: Selling your Best Idea," graduate seminar lecture
- 2011 St. Cloud State University, "NSF Funding Opportunities and Tips"
- 2010 Minnesota State University Moorhead, Department of Physics and Astronomy, "Using Spectra to Probe Cometary Atmospheres," colloquium
- 2010 Winter Workshop at University of Central Florida: Exoplanets for Planetary Scientists, "Challenges of a Ground-based Search for Water in a Hot Jupiter: HD 209458b," invited review talk
- 2009 University of South Florida, Department of Physics, "Spectral Clues to the Origin of Organic Molecules in Comets," colloquium
- 2009 SCSU, "A Guided Tour of Five Exotic Exoplanets," public lecture
- 2000 Univ. of Toledo Dept. of Physics and Astronomy, "Outbursts in Comets at Large Heliocentric Distances," colloquium
- 1999 American Astronomical Society meeting (Atlanta), invited session for NSF CAREER Awardees, "Cometary Activity Beyond 4 AU"
- 1999 NRAO Conference: Imaging at Radio through Submillimeter Wavelengths, "On the Fly Imaging of Comet Hale-Bopp," invited review
- 1999 University of Minnesota Astronomy Dept, "Millimeter-wavelength Observations of Comet Hale-Bopp," colloquium
- 1999 Asteroids, Comets, and Meteors meeting, Cornell University, "On the Activity of Distant Comets," invited review
- 1999 Minnesota Optical Society, "Millimeter-wavelength Spectral Imaging of Comets: New Insights into Gas Dynamics"
- 1998 Western Regional NASA Space Grant meeting, "Native American Astronomy Education in the Stargazer Program," invited speaker

- 1996 Panel Discussion on Comet Hyakutake, American Astronomical Society meeting, Madison, WI
- 1995 American Association for Physics Teachers meeting, Spokane, WA, "Carbon Chemistry in Comets," invited review
- 1996 Univ. of Toledo Dept. of Physics and Astronomy, "Observational Constraints to Solar System Formation," colloquium
- 1995 Pennsylvania State Univ. at Erie, Division of Science, "Millimeter-wavelength Observations of Organic Species in Comets," colloquium
- 1996 Max Planck Institut fur Astronomie, Bonn, Germany, "N₂H⁺ in Quiescent Gas: Evidence for Colliding Clouds," colloquium
- 1991 Univ. Massachusetts at Amherst, "Interstellar Nitrogen Chemistry as Revealed from Observations of N₂H⁺," colloquium

SOCIETY MEMBERSHIP

- American Astronomical Society (AAS)
 - Division for Planetary Sciences
- American Geophysical Union (AGU)
- International Astronomical Union (IAU)
 - Division F Commission 15 Physical Study of Comets & Minor Planets
 - Division F Commission 51 Bio-Astronomy
 - Division F Commission 53 Extrasolar Planets
- LSST Solar System Science Collaboration
- Sigma Xi
- Sigma Pi Sigma

SERVICE

Professional service

- NSF Program Director, 2011-2016
- Lead organizer, international observing campaign for Centaur 29P/Schwassmann-Wachmann 1, 2018-present
- Co-chair, and member of Scientific Organizing Committee, Centaur Exploration Workshops, Orlando, FL, 2016, 2017, 2019
- Expert witness for astrophysical topics, since 2018
- Hubble Space Telescope reviewer, since 2017
- Reviewer for institutions and facilities undergoing external program review, since 2014
- NSF Review Panels and external reviewer, since 1993
- NASA Review Panels and external reviewer, since 1992
- Reviewer for journals Icarus, Astrophysical and Astronomical Journal, since 1994
- Scientific Organizing Comm., for International Astronomical Union Colloquium No.186: "Cometary Science after Hale-Bopp" meeting in Tenerife, Canary Islands, 2000-2002
- NASA Planetary Data Systems Small Bodies Node International Halley Watch Peer Review Committee, 1993

University Service

- USF CAS Faculty Development Committee, alternate, 2017-2018
- USF Physics Department Graduate admissions committee, 2017-2019
- USF Bridge-to-doctorate program committee, 2015-2019 (chair 2017-2019)
- USF Doctoral thesis committee member, Geology, Christopher Mehta, since 2017

USF Doctoral thesis committee member, Geology, Tian Feng, since 2018
 SCSU Faculty Senate, 2008-2010
 SCSU University Steering Committee on Assessment of Student Learning, 2008-2011
 SCSU College of Science and Engineering (COSE) Curriculum Committee, 2005-2007
 SCSU COSE Director for Student Learning Assessment, 2008-2011
 SCSU Director of the Observatory, 2004-2011
 SCSU Director of the Planetarium, 2002
 SCSU Elected member of the Minnesota (statewide) Online Academic Services Committee
 SCSU COSE Assessment Committee, 2000-2011
 SCSU Committee on the Institution, 2006-2011
 SCSU Master's thesis committee member, M.S. Electrical Engineering, S.Y. Choi,
 "Automatic modulation classification on software defined radio," 2008-2009
 SCSU Chair, search committee for department faculty positions, multiple years
 SCSU Oversaw all aspects of the astrophysics track of the B.S. physics major, and the B.S.
 Physics Education major
 SCSU Led the department through the university-wide general education overhaul,
 including coordination with statewide transfer curriculum standards
 SCSU Helped develop the Physics Education curriculum to meet the State of Minnesota
 Board of Teacher Education new licensure requirements for junior and senior high
 school teacher candidates
 SCSU Secured final approval of our general education courses and oversight of the early
 stages of implementation
 SCSU Worked with colleagues to write and publish laboratory exercise manuals, which
 raised over \$100,000 for laboratory equipment, supplies and student scholarships
 SCSU Faculty advisor to students majoring in physics, radiologic technology and nuclear
 medical technology, 1994-2011
 SCSU Committee of student workers, 1997-2011
 SCSU Departmental committee of retention, promotion and tenure, 2005-2011
 SCSU Working group, Wiki-users, 2008-2010
 Faculty advisor, Penn State Erie, Women in Science and Engineering, 1994-1997

Community service and public outreach

Public lectures on astronomical topics, since 1995
 Astronomy Day activities with tourists on the National Mall, Washington, DC, 2013
 Public Observing Nights, SCSU, 1997-2010
 Planetarium Shows, SCSU, 1997-2010
 Public and professional outreach with social media, since 2013
 Workshops with High School Teachers on observing variable stars, 1999-2000, Minnesota
 Coach, "Odyssey of the Mind" problem-solving tournament, 2012
 Advice and mentoring to African American students working with European Space
 Agency's Mars research, 2015 <http://www.planetary.org/blogs/guest-blogs/2016/0226-atlantastudents-bring-mars-to-earth.html>

News Releases and Other Contact with Media

["Bizarro Comet Challenging Central Florida Researchers,"](#) 2017, UCF press release.
["Gravitational waves discovered: top scientists respond,"](#) 2016, in The Conversation,
 expert panel opinion piece, reprinted in [Newsweek](#) and [US News & World Report](#).
["Hitching a Ride on Comet 29P,"](#) 2016, USF News.

- “[Rosetta captures comet dust after finally finding Philae](#),” 2016, in Chemistry World, contributed expert comments to article about European spacecraft mission.
- “[Comet 67P’s carbon blanket promises solar system birth insights](#),” 2015, in Chemistry World, contributed expert comments to article about European spacecraft result.
- “[Contemplating the Chemical Composition of Comets and Exoplanets](#),” 2015, People Behind the Science podcast with Marie McNeely.
- “[Global perspectives on a comet](#),” 2014, NSF Press release about comet ISON photography contest, reprinted in [Astrobiology Magazine](#), [CBSNews](#).
- “[Celestial Pollution](#),” 2013, Gemini Observatory Press Release about meteor shower, reprinted in [Space.com](#).
- “[Spiral arms hint at the presence of planets](#),” 2011 in NSF Press Release.
- “An Inside Look at NSF,” Fundamentals Newsletter, SCSU, 2012
- “NASA Mission Hits Home,” University Chronicle, 2005
- “[SCSU Professor, Students Train Eyes on NASA Mission](#),” WCCO, 2005
- “SCSU’s Womack monitored Deep Impact from home,” St. Cloud Times, 2005
- “[Astronomers’ Holiday Special – a July 4 Comet Bash](#),” University of Arizona News, 2005
- “Students of SCSU Professor’s space camp get patch launched,” St. Cloud Times, 1998
- “[Cometwatcher](#),” Research Penn State, 1997
- Multiple other radio, television and social media interviews for unusual events (e.g. comets, solar and lunar eclipses, meteors, brooms “[standing on end](#)”) since 1991

STUDENT RESEARCH SUPERVISED

1993

1. Sean McKeown, "Mm-wave Spectroscopy of Comet Swift-Tuttle" (REU student at NAU), B.S. 1994 Physics and Theology, Georgetown Univ., M.S. Physics, Northwestern University. Now I.T. Director at Oracle Corp.
2. Bret Huggard, "Optical Imaging of Collision of Comet SL9 with Jupiter," and "HST Ultraviolet spectroscopy of Interstellar Clouds." B.S. 1996, Physics and Astronomy, Northern Arizona Univ., later telescope operator and electronics technician at Kitt Peak National Observatory, Arizona.
3. Kartik Sheth, "Interstellar Optical Spectroscopy," (REU student at NAU), B.S. Grinnell College, Ph.D. Astronomy Univ. Maryland, co-supervised with B. Lutz. Now Deputy Program Scientist at NASA.

1994

4. Brian Cudnik, "Optical Imaging of Jupiter and Mars." B.S. 1994, Physics and Astronomy, NAU, M.S. San Diego State University, 1998. Now Laboratory Specialist at Prairie View A&M University
5. Ray Graham, "CO spectra of Comet P/Schwassmann-Wachmann 1," B.S. 1997, Electrical Engineering, Penn State Erie, Now President of Bitwise Design.

1995

6. Dennis Faith, "Imaging Comet Hale-Bopp," B.S. Biology 1997, Penn State Erie. Now physician at FirstLight Health System, Minnesota.

1996

7. Oren Ben-Bassat, "CCD Imaging of Comet Hale-Bopp," B.S. Physics, 1997, Brandeis U., Ph.D. Mathematics, U. of Pennsylvania 2006.

8. Javier Ruiz, "CCD Imaging of Comet Hale-Bopp", B.S. Physics, 1997, NAU.
9. Dave Suswal, "Mm-wave spectroscopy of Comet Hale-Bopp," B.S. Physics, 1997, Penn State Erie, Special Education aide, Deary High School, Deary, Idaho.
10. Steve Spencer, "Infrared Spectroscopy of Jupiter," B.S. Math, 1997, Penn State Erie, systems engineer, Aquilent.

1997

11. Chintan Modi, "CCD Imaging of Comet Hale-Bopp," B.S. Biochemistry and Molecular Biology, Penn State University. Now working at Merck Co.
12. Jack Ricotta, "CCD Imaging of Comet Hale-Bopp," B.S. Mech. Engineering, Penn State Univ., lead application developer at Progressive Insurance.
13. Scott Moore, "CCD Imaging of Comet Hale-Bopp," Environmental Science major at Penn State University, Now posting Specialist and Internet Research Assistant at Penn State Univ.
14. Aric Wiest, "Photography and CCD Imaging of Comet Hale-Bopp," B.S. Biology, 1998, Penn State Erie, M.S., Biology at Texas A&M University, 2002. Now faculty member at Univ. Missouri-Kansas City.
15. Trevor Uhl, "Mm-wave Spectroscopy of Comet Hale-Bopp," (REU student at NAU), B.S. Physics and Astronomy 1997, Yale University, Now at Investment Research & Risk Analysis at Reliance Funds, NY.
16. Jean Zilka, "Data Reducation and Analysis of Comet Hale-Bopp," B.E.S. Physics, 1999, SCSU. Now working at DeVry Univ.
17. Frank Deglman, "CCD Imaging and Data Reduction of Comets with SCSU Observatory," B.S. Physics, 1996, SCSU. Now telescope operator and engineer at McDonald Observatory.
18. April Homich, "CCD Imaging and Analysis of Comets" and "Mm-wave Spectroscopy of Comets," B.S. Physics, SCSU, 2000, M.S. Astronomy University of Minnesota, 2003.

1998

19. Marcel Goldschen-Ohm, "Analysis of Dust Jets in Comet Hale-Bopp", "Stellar spectroscopy", in ASTR 312, B.S. physics, SCSU. Ph.D., Physics, 2009, Univ. Wisconsin-Madison, assistant scientist at UW-Madison.
20. Ahnie Jacobson, "Image Reduction of Comet Hale-Bopp", B.A. Math, 1998, College of St. Benedict, M.S. Applied and Computational Mathematics, U. of Minnesota, Duluth.
21. Mike Spinar, "Mm-wave Imaging of Comet Hale-Bopp," B.S. Meteorology, 2001, SCSU. Now graduate student in atmospheric science, University of Illinois, Urbana-Champaign
22. Brian Henning, "CCD Imaging of Comets," B.A. computer science, SCSU, 2001, senior engineer at Target.
23. Grant Aaker, "Analysis of Dust Jets in Comet Hale-Bopp," post-secondary student, B.S. Lewis and Clark College, philosophy. Currently in med school at Cornell and filmmaker.
24. Aaron Lemke, "Image Reduction of Comet Hale-Bopp Data," post-secondary student.
25. Sarah Reed, "CCD Imaging of Comets with SCSU Observatory," also in ASTR 311, B.S. Physics 2002; UC at Berkeley, Environmental Science, Policy and Management,

Ph.D. 2013, postdoctoral scholar at Lawrence Hall of Science at UC-Berkeley.

1999

26. Andrea Tollison, "CCD Imaging of Comets with SCSU Observatory," in ASTR 311, B.S. Physics, SCSU. Edmund Industrial Optics, Data Systems Analyst at Mastery Charter Schools.
27. Jessica Hafner, "CCD Imaging of Comets with SCSU Observatory," undeclared, SCSU
28. Jason Cook, "CCD Imaging of Comets with SCSU Observatory," in ASTR 311, B.S. physical science education major, SCSU. Now teaching high school.
29. Steven Dorsher, "CCD Imaging of Comets with SCSU Observatory," in ASTR 311, post-secondary student, SCSU, member US TEAM 2000 Physics Olympiad. Now graduate student in physics at Louisiana State University.

2000

30. Laura Lockwood, "Stellar Spectroscopy with SCSU Observatory," in ASTR 312, B.S. Meteorology, SCSU, 2002, now meteorologist, Director of Operations, Weatherology.
31. Corey Strom, "Variable Star Lightcurves" in ASTR 312, ASTR 323 CCD Imaging of Comets, B.S. Physics, SCSU, B&C Plumbing.
32. Andy Matt, "Stellar Spectroscopy with SCSU Observatory" in ASTR 312, computer science, SCSU
33. Kar-Yeong Teoh, "Scientific Databases on the Internet, computer maintenance," B.S. computer science, SCSU. Now at Unisys Corp.
34. Judith Peters, in ASTR 323, B.S. physics, SCSU, M.S. Mechanical Engineering SCSU, LPKB Engineering.
35. Brent Williams, in ASTR 323, B.S. physics, SCSU, Ph.D. Univ. California Berkeley, associate professor at Washington University at St. Louis.
36. Megan Broberg, in ASTR 323, B.S. earth science, SCSU.
37. Pete Crandall, in ASTR 323, SCSU, "CCD Observations of Comets," B.S. physics, product manager at TE Connectivity.

2001

38. Jeff Ward, "SHINY: linux laptops and image acquisition," B.S. computer science, SCSU, 2004, Senior Software Engineer at Akamai Technologies.
39. Eric Richey, "CCD Observations of comets," computer science major, SCSU
40. Michelle Kawecki, "Observing Comets," physics major, SCSU

2003

41. Nicholas Johnson, ASTR 311, "Planetary spectra," B.S. computer science, 2004, SCSU
42. Laura Holt in ASTR 311, "Optical images of comets," B.S. physics, 2004
43. Jesse Belschner in ASTR 311, "Optical images of comets," B.S. physics, 2004. Now a medical physicist in Minnesota.

2004

44. Kyle Nestor, "Observing Comets," B.S. aviation, 2006, SCSU, Captain, Challenger 300 at Harley-Davidson Motor Co.
45. Matt Gesmundo, "Observing comets" in ASTR 323, physics major, SCSU, B.S. electrical engineering 2007. Project engineer at Nortech systems.

46. Sung Yeol Choi, "Computer programming and data reduction," B.S. SCSU computer engineering 2006, M.S. electrical and computer engineering, 2009
47. Todd Stanley, "Planetary spectroscopy with the SCSU Observatory" in ASTR 323, B.S. physics, 2005, now software engineer at Hysitron.

2005

48. Joshua Swanson, "Mm-wave spectra of comet C/2001 Q4 NEAT," in ASTR 311, B.S. physics, 2007, SCSU. Ph.D. Univ. Wisconsin-Madison, Engineer at Intel, Oregon.
49. Dan Hessler, in ASTR 311, "Optical spectra of Mars," ASTR 311, physics, SCSU

2006

50. Tom Pundsack in ASTR 323, "Optical spectra of comets," B.S. physics and math, 2007, SCSU. Ph.D. physics, Univ. Minnesota 2014; Pace Analytical.

2008

51. Andy Davies in ASTR 311, "Spectra of Hot Jupiters," in ASTR 312, B.S. physics, astrophysics track, SCSU 2011, graduate student Univ. Rochester dept of physics.
52. Brody Fuchs, "Internal energy of Io," in ASTR 311, B.S. physics major with astrophysics track, 2010, SCSU, now graduate student at Colorado State Univ.
53. Eric Bye, "Detecting Exoplanets," in ASTR 311, computer science major, SCSU
54. Nishu Karna, "Diversity of Comets" in ASTR 311 and "Auroral activity and sunspots" in ASTR 312, B.S. physics, 2010, SCSU, Ph.D. from George Mason Univ.

2009

55. Tim Roettger in ASTR 312, "Orbits of Binary Stars and Extrasolar Planets Learning Activity," majoring in physics, SCSU.
56. Judd Worley in ASTR 312, "Gravitational collapse of diffuse and dense molecular clouds," physics teaching major, SCSU.

2010

57. Shannon Escoto, "Studies of Hale-Bopp's lightcurve," physics major, SCSU.
58. Thomas Erdahl, "Dust and CO in comet Hale-Bopp," M.S. in statistics, SCSU.

(Note: Did not work with students while at NSF from 2011-2015)

2015

59. Kacper Wierzchos, "Millimeter-wavelength spectroscopy and optical photometry of comets," doctoral candidate, applied physics doctoral student, USF.
60. Ryan Mack, "Mm-wavelength spectra of comet Hale-Bopp," B.S. physics and math, USF.

2016

61. Timothy Cox, "Comet Lightcurve Project and phase angle analysis," B.S. physics, USF.
62. Isabel Rivera, "Comet phase angle analysis," B.S. physics, USF, now graduate student at University of Central Florida.
63. Nathan Lastra, "Comet Lightcurve Project and time series analysis," B.S. physics, USF, now graduate student at Bowling Green State University.
64. Anthony Curtis, "Comet Lightcurve Project statistical analysis, comparative studies, database management and submission to NASA PDS SBN archive," B.S. physics and

math, USF, now graduate student at Boston University.

2017

65. Charles Mentzer, "Comet Lightcurve Project and geometric corrections to visible magnitude measurements," B.S. physics, USF.
66. Nicholas Ruffini, "Comet Lightcurve Project," B.S. physics, USF.
67. Anthony Micciche, "Comet Lightcurve project," physics major, USF (now at FSU).
68. Olga Harrington Pinto, "CO+CO₂ in comets using space-based infrared photometry and ground-based radio spectroscopy," applied physics doctoral student, USF.
69. Chloe Jackson, "Comet Lightcurve Project," physics major, USF.

2018

70. Sharlene Cruz-Gonzalez, "Comet Lightcurve Project and periodogram analysis using rotational line spectra," physics major, USF.
71. Sebastian Lende, "Comet Lightcurve Project and periodogram analysis," physics major, Vanderbilt U.

2019

72. Nicolas Pichette, "Comet Lightcurve Project and the energetics of cometary activity," physics major, USF.