Maria Womack
Astrophysicist and Planetary Scientist

EDUCATION

Ph.D. Physics, Arizona State University, 1991, "Observational studies of interstellar and solar nebula nitrogen chemistry," advisors S. Wyckoff and L.M. Ziurys

B.S. Physics, Florida State University, 1985

PROFESSIONAL EXPERIENCE

Research Scientist, Mar 2019 – present
Florida Space Institute, University of Central Florida, Orlando, FL

- Science management consulting
- Arecibo Observatory liaison for planetary radar scientists, users' groups regarding current and future science, and funding agencies.
- Help communicate Arecibo Observatory current science and capabilities to users' groups and astronomy communities.
- Build new collaborations, partnerships, projects and funding between Arecibo Observatory and astronomy communities.
- Lead externally funded research programs on planetary science and publish

Research Professor, 2015 – 2019
Department of Physics, University of South Florida, Tampa, FL

- Lead externally-funded research programs in planetary science
- Publish original research in refereed journals and refereed NASA databases
- Major professor for two doctoral and twelve undergraduate research students in physics
- 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
- Established a new, funded research collaboration between planetary science groups at USF (Tampa) and UCF (Orlando)
- Co-chair and member, Scientific Organizing Committee, Centaur Exploration Workshop, 2016 (local, Tampa), 2017 (local, Orlando), 2019 (national, Orlando)
- 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 12 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

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.

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 (NASA funded)

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, instructor for NASA/NAU Spacegrant "Stargazer" and "Jupiter Watch" programs, 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
2016-2020: 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 for variable star observing
1996-2002: PI, NSF Faculty Early Career Development Program (CAREER)
1997-1999: PI, NASA Comet Hale-Bopp Program
1998: PI, Jorge 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
2018-2019: 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 CO_2^+ in Comet P/ Halley," Publ. Astr. Soc. Pacific, 101, 881.
2. Womack, M., L.M. Ziurys, and S. Wyckoff, 1991, N_2H^+ 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, NH_3 and NH_2 in the Coma of Comet Brorsen-Metcalf, Astrophysical Journal, 384, 292.
4. Womack, M., L.M. Ziurys and S. Wyckoff, 1992, A Survey of N_2H^+ 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 N_2 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," Astron. 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., 2018, "Hale-Bopp Visual Lightcurve;" urn:nasa:pds:compil-comet:halebopp::1.0; NASA Planetary Data System.
28. McKay, A.J., DiSanti, M.A., Kelley, M.S.P., Knight, M.M., Womack, M., Wierzchos, K., Harrington Pinto, O., Bonev, B., Villanueva, G.L., Dello Russo, N., Cochran, A., Biver, N., Bauer, J., Vervack, Jr., J.V., Gibb, E., Roth, N., Kawakita, H. 2019, "The Peculiar Volatile Composition of CO-Dominated Comet C/2016 R2 (PanSTARRS)," Astron. J., 158, 128, 1-24.
29. Sarid, G., Volk, K., Steckloff, J.K., Harris, W., Womack, M., Woodney, L.M., 2019, "29P/Schwassmann-Wachmann 1, A Centaur in the Gateway to the Jupiter-Family Comets," Astrophysical Journal Letters, 883, L25.
30. Sickafoose, A.A., A.S. Bosh, J.P. Emery, M.J. Person, C.A. Zuluaga, Womack, M., F.B. Bianco, A.M. Zangari, 2019, "Characterization of material around the centaur (2060) Chiron from a visible and near-infrared stellar occultation in 2011," under review.
31. Wierzchos, K., Womack, M., 2019, "CO gas and dust outbursts of Centaur 29P/Schwassmann-Wachmann", under review.

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: = C_2N_2", 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, ``Heliocentric 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., Wierzchos, 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., lvrellos, 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 CO_2 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.
73. Harrington, O., Womack, M. and 13 co-authors, "A Coordinated Ground- and Space-Based Observing Campaign to Measure CO2 and CO Emission in C/2016 R2 (PanSTARRS), BAAS, 51, 4, 208.06

International Astronomical Union Telegrams and Central Bureau Electronic 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., and six co-authors, 1996, "Detection of CH_3OH in Hale-Bopp," IAUC 6382.
Woodney, L., Womack, M., et al. 1996, "H_2S 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.
Schambeau, C. and 8 co-authors including Womack, M., 2019, "Recovery of 39P," CBET No. 4600.

Professional policy articles and white papers

Anish Roshi, D. and 34 co-authors (incl. M. Womack), 2019, "Astro2020 Activities and Projects White Paper: Arecibo Observatory in the Next Decade," https://arxiv.org/abs/1907.06052
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, AAS 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 AST 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 and science integrity in Florida court case, 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 CAS group and individual research funding presentations, 2015-2019
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, 2017-2019
USF Doctoral thesis committee member, Geology, Tian Feng, 2018-2019
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 for NSF with tourists on the National Mall, Wash., 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, Virginia
Microblogging on Twitter as @StarzanPlanets since 2013 with news, policy and outreach on physics, astrophysics and planetary science
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

"Comet Gateway Discovered to Inner Solar System" 2019, UCF news about paper I am a co-author on. Also picked up by Live Science, Phys.Org, Forbes, Astronomy and Discover magazines.

"Defending Earth from Asteroids," 2019, USF news about graduate student K. Wierzchos

working at Catalina Sky Survey for an internship.

"Hyperactive Comets Hint at Origins of Earth's Oceans," 2019, in Scientific American, contributed expert comments for article by Nola Redd Taylor about NASA Sofia study.

"UCF Workshop to focus on mysterious space objects," 2019, UCF press release.

"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 for article by Emma Stoye.

"Comet 67P's carbon blanket promises solar system birth insights," 2015, in Chemistry World, contributed expert comments for article by Andy Extance.

"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

UNDERGRADUATE STUDENT RESEARCH SUPERVISED
(Equipment, wages and travel for students paid from various NSF grants to Womack)

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 UV spectroscopy of Interstellar Clouds." B.S. 1996, Physics and Astronomy, NAU, later telescope operator, electronics technician at Kitt Peak National Observatory, Arizona.
3. Kartik Sheth, "Interstellar Optical Spectroscopy," B.S. Grinnell College, Ph.D. Astronomy Univ. Maryland. Now 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.
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 U. 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," 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. Ryan Mack, “Spectra of comet Hale-Bopp,” B.S. physics and math, USF.

2016

60. Timothy Cox, “Comet lightcurves and phase angle analysis,” B.S. physics, USF.
61. Isabel Rivera, “Comet phase angle analysis,” B.S. physics, USF, now graduate student at University of Central Florida.
62. Nathan Lastra, “Comet Lightcurve Project and time series analysis,” B.S. physics, USF, now graduate student at Bowling Green State University.
63. Anthony Curtis, “Comet Lightcurve Project statistical analysis,” B.S. physics and math, 2018, USF, now graduate student at Boston University.

2017

64. Chloe Jackson, “Comet Lightcurve Project,” physics major, USF.
65. Charles Mentzer, “Comet Lightcurve Project and geometric corrections to visible magnitude measurements,” B.S. physics, 2018, USF, graduate student at U. Missouri.
66. Nicholas Ruffini, “Comet Lightcurves,” B.S. physics, 2017, USF, grad student U. Monash, Australia
67. Anthony Micciche, “Comet Lightcurve project,” physics major, USF (now at FSU).

2018

68. Sharlene Cruz-Gonzalez, “Comet Lightcurve Project and periodogram analysis using rotational line spectra,” physics major, USF.
69. Sebastian Lende, “Comet Lightcurve Project,” physics major, Vanderbilt U.

2019

70. Nicolas Pichette, “Comet Lightcurve Project and the energetics of cometary activity,” B.S. physics 2019, graduate student Montana State U.

GRADUATE STUDENT RESEARCH SUPERVISED

1. Sung Yeol Choi, committee member, SCSU, M.S. electrical and computer eng., 2009.
2. Kacper Wierzchos, major professor, “Mm-wavelength spectroscopy and optical photometry of comets,” applied physics doctoral candidate, USF, Fall 2019 graduation.
3. Olga Harrington Pinto, major professor, “CO+CO_2 in comets using space-based infrared photometry and ground-based mm-wave spectroscopy,” applied physics doctoral student, USF, expected graduation date 2021.