Derek Buzasi
Whitaker Eminent Scholar in Science
Florida Gulf Coast University

Education

Ph.D., Astronomy, Pennsylvania State University (1989)
- Dissertation: "The Nature of Activity in RS CVn Systems", advisor L. W. Ramsey

A.B., Physics, University of Chicago (1985)

Teaching Interests

- Introductory physics and astronomy (for nonmajors and majors)
- Computational physics and modeling, particle and continuum mechanics, solar and stellar physics

Research Interests

- Space-based optical/UV instrumentation
- Solar activity: spots, flares, CMEs, magnetic morphology, solar wind
- Stellar physics: asteroseismology, convection, MHD modeling of stellar activity
- Extrasolar planet detection and characterization
- Underwater acoustic communication and propagation
- Industrial process simulation and workforce modeling
- Signal detection and processing in the low SNR regime

Experience

2012 – pres: Whitaker Eminent Scholar & Professor of Physics, Florida Gulf Coast University
2008 – 2012: Senior Scientist, Eureka Scientific
- Science Team, NASA Kepler mission
- Member, Kepler Asteroseismology Consortium (KASC)

2007 – 2010: SurgeMain Program Manager, Puget Sound Naval Shipyard & IMF
- Navy reservist on 3-year recall

2007 – 2010: Affiliate Professor of Astronomy, University of Washington
2003 – 2010: Associate Professor & Professor of Physics, US Air Force Academy
- Program Manager, 4-meter telescope
- USAFA Observatory Director
- Director of Research (Department of Physics)
- PI, Wide-Field Infrared Explorer (WIRE)

1998 – 2000: Assistant/Associate Research Astronomer, Space Sciences Laboratory, UC Berkeley
- Detector Scientist, HST Cosmic Origins Spectrograph

1996 – 1998: Assistant Professor, Department of Physics, Valdosta State University
- Original (Cycle 1) PI, Chandra X-ray Observatory (CXO)

1995 – 1996: Visiting Assistant Professor, Department of Physics, College of Charleston
- Member, Project Kaleidoscope (PKAL) Faculty for the 21st Century

1994 – 1995: Career hiatus (sailing a 36-foot sailboat from Connecticut to Caribbean and back)
1992 – 1994: JPL Visiting Senior Scientist, Astrophysics Division, NASA Headquarters
- Program Manager, International Ultraviolet Explorer (IUE), Extreme Ultraviolet Explorer (EUVE)
- Program Manager, Astrophysics Data Program, Long-Term Space Astrophysics Program, Astrophysics Theory Program (total ~$70M annually)

1990 – 1992: Associate Research Scientist, Department of Physics and Astronomy, Johns Hopkins U
- Calibration Scientist/Optical Scientist, Hubble Space Telescope Imaging Spectrograph (STIS)
- Co-I, Hopkins Ultraviolet Telescope

1989 – 1990: Visiting Scientist, High Altitude Observatory, NCAR
- Co-I, Lowell-HAO Solar-Stellar-Spectrograph

Current Activities

- Organizer of FGCU CAS "STEMinar" series, which has brought 75+ speakers to campus since it began in January 2013
- Co-organizer of Whitaker Center "Friday Coffees"
- Developed and oversee Holmes Development grant program
- Reviewer for all internal Whitaker Center Grants; also provide partial funding for mini-grant program and Holmes Development Grant
- Whitaker Center advisory board member
- Search committee member for 5 advisors, physics faculty, CAS Dean
- Past member, FGCU Faculty Senate (both regular and alternate senator), current alternate
- Helped plan and financially supported various mathematical conferences, including the annual AsPIRE conference (undergraduate mathematics research), SEARCDE (differential equations), and USTARS (Underrepresented Students in Topology and Algebra Research)
- Team member for development of physics major major and curriculum
- Led effort to bring FGCU into membership of Southeastern Association for Research in Astronomy (SARA), providing telescope access on 3 continents.
- FGCU lead for access to Astrophysics Research Consortium (ARC) 3.5-meter telescope
- Invited leader for Stellar Astrophysics team in support of NSF-led $100 million Extremely Large Telescope program
- Kepler Asteroseismology Consortium core team member
- TESS Asteroseismology Consortium core team member
- TESS Data for Asteroseismology (T'DA) team lead
- Large Synoptic Survey Telescope (LSST) Stars Study Group
- Kepler-SDSS Galactic Archaeology Program (GAP) core team member
- NASA Living With a Star Program core team member
- Australian FunnelWeb Survey Team member (only US representative)
- Lead developer of one of the regularly-used Kepler/K2 data reduction pipelines (Buzasi 2014, 2015)
- Member of core team developing TESS data reduction pipeline for stellar astrophysics (lead for instrumental detrending portion; roughly 1/3 of the effort)
- Developed and built medium-resolution fiber echelle spectrograph, high-speed multi-band imaging camera, and diffuser-assisted high-precision photometer in preparation for use at sites in New Mexico, Arizona
- Hosted/organized 2017 National Astronomy Teaching Summit at FGCU
- Organizer of 2018 Cool Star Workshop Computational splinter session (Cambridge, MA)
- Invited presentations and public talks at Aarhus University (Denmark), Leuven University (Belgium), University of Birmingham (UK), Nova Southeastern University, Embry-Riddle Aeronautical University, University of British Columbia, University of Colorado, K2SciCon (Santa Barbara), American Astronomical Society Meeting (Boston, Seattle, Honolulu, San Diego), US Navy Engineering Workshop (twice), Cool Star Workshop (Flagstaff, AZ), National Astronomy Teaching Summit (San Francisco, FGCU), FGCU (twice), TEDx, Calusa Nature Center, Museum of South Florida, and others
- Invited guest at Hawaii Science Fiction Convention (Hawaiicon), 2016-2019
- Work has been featured in the national and international media, including USA Today, Huffington Post, Science Daily, Universe Today, Ars Technica, Sky & Telescope, The Guardian, Astrobites, Axios, Space.com, etc., as well as local media outlets including WINK, Fox-4, WGCU, and Hello SWFL
- 65 submitted funding and observing proposals as PI/core team member since January 2013 (9 fully accepted, 31 partially accepted, 15 currently pending). In addition, I have advised or participated as unfunded collaborator on numerous other proposals both from FGCU and from other institutions.
- Under contract with Institute of Physics Press for book, "Introductory Heliophysics", 2019
- Co-author of online book "Science-Driven Optimization of the LSST Observing Strategy" (312 pp, NSF-sponsored)
- Successful Principal Investigator for Cycle 1 of NASA's TESS Mission (only one from a non-R1 institution)
- PI and team leader (collaborators are UC Berkeley and JPL/Caltech) for proposed $22M UV asteroseismology mission MAGIC (Massive star AsteroseismoloGy Instrument Cubesat).
- Publications and conference presentations with 42 different FGCU student co-authors; have taken 11 different students to national meetings and 2 for international visits (UBC, Aarhus)
- Helped research undergraduates obtain internships at NASA, JPL/Caltech, DoD (SMART Scholarship), and Aarhus University (Denmark)
- Former FGCU research students now work at Lockheed-Martin, NASA, Space Telescope Science Institute

Selected Additional Professional Activities

2018- Stars Key Science Lead, NSF Extremely Large Telescope Program
2018- Science Team member, Maunakea Spectroscopic Explorer Telescope (11-meter)
2018- SmallSat team member, NAS Astro 2020 Decadal Survey
2013-2019 American Astronomical Society Agent for SW Florida
2017-2018 Organizing Committee, Cool Stars Workshop Computational Splinter (Cambridge, MA)
2015-2018 NSF Astronomy program reviewer (chair in 2018)
2017-2018 NASA Heliophysics Supporting Research program reviewer (chair in 2017, 2018)
2017-2018 NASA Exoplanets Research Program (chair in 2018)
2015-2019 NASA Postdoctoral Program Reviewer
2014-2016 NASA Keck Observatory Time Allocation Committee (Panel chair in 2015-2016)
2012-2017 NSF Postdoctoral Program Reviewer
2007-2014 Kepler mission Participating Scientist
2011 NASA Explorer Program Review Panel
2003-2008 Pennsylvania State University Eberly College of Science Board of Directors
2000-2007 Principal Investigator, NASA Wide Field Infrared Explorer mission
1999-2007 NASA Applied Information Systems Review Panel (Panel chair in 99, 00, 03, 05 – 07: Overall chair in 2001)
2005-2007 USAFA 4-meter telescope program manager

- Regular proposal reviewer for NASA, NSF, ESA, Swiss NSF
- Regular referee for Astrophysical Journal, Astronomy & Astrophysics, Optical Engineering, and others
- Outreach activities including observatory tours (roughly 10 annually), open houses (2 annually), science fair support (local and regional, annually), talks to local societies/clubs/libraries/organizations (roughly monthly), collaboration with Calusa Nature Center and Planetarium to develop planetarium shows
- Consultant for Navy Undersea Warfare Center, Keyport (strategic technology planning roadmap, virtual reality control of undersea ROVs)

Current and Pending Funding

- Principal Investigator, "Exploring the Solar-Stellar Connection Using K2", NASA Living With A Star Program (NASA Heliophysics), $439,184
- Principal Investigator, "Revisiting the Past: B Star Asteroseismology with TESS", NASA TESS Guest Investigator Program, $50,000.
- US Principal Investigator, "Galactic Archaeology on a Grand Scale", NASA K2 Guest Observer Program, $100,000. (PI: Dennis Stello, University of New South Wales, Australia)
- Co-Investigator, "All-Sky Galactic Archeology with TESS", TESS Guest Investigator Program, $200,000 (PI: Mark Pinsonneault, Ohio State)
- Co-Investigator, "Light Curves from TESS Full-Frame Images", TESS Guest Investigator Program, $160,000 (PI: Daniel Huber, Hawaii)
- Principal Investigator, "Exploring Stellar Convective Overshoot using The Asteroseismic Modeling Portal", NSF Extreme Science and Engineering Discovery Environment (XSEDE), 50,000 hours.
- Co-Investigator, "Gyrochronology of Stars in Wide Binaries With K2", NASA K2 Guest Observer Program, selected, $50,000. (PI: Terry Oswalt, Embry-Riddle University)
- Principal Investigator, "Solar Analogs: Rotation, Activity, Gyrochronology", NASA K2 Guest Investigator Program, selected.
- Co-Investigator, "Confronting the Stellar Rotation-Age Paradigm Using Wide Binaries in the TESS and Kepler/K2 Fields", NASA Astrophysics Data Analysis Program, (pending; PI: Terry Oswalt, Embry-Riddle University).
- Co-Investigator: "Calbrating the Stellar Gyrochronology Paradigm Using Wide Binaries in the Kepler K2 Fields", NSF A&A (pending; PI: Terry Oswalt, Embry-Riddle University).
- Co-Investigator: "Pioneering Polarisation in Pulsating Stars", Anglo-Australian Telescope (selected, PI: Daniel Cotton, UNSW).
- Principal Investigator, "Revisiting the Past: B Star Asteroseismology with TESS", NASA TESS Guest Investigator Program (Cycle 2, pending), $50,000.

- Principal Investigator, “Searching for Visible GRB Progenitors Using TESS”, NASA TESS Guest Investigator Program (Cycle 2, pending), $50,000.
- Principal Investigator, “Spots and Flares in Active Binary Systems”, NASA TESS Guest Investigator Program (Cycle 2, pending), $50,000.
- Principal Investigator, “TESS Observations of the Bright Cepheid Polaris”, NASA TESS Guest Investigator Program (Cycle 2, pending), $50,000.
- Co-Investigator, “Asteroseismology of Solar-Type Stars with TESS”, NASA TESS Guest Investigator Program, $50,000 (Cycle 2, pending; PI: Daniel Huber, U. Hawaii)
- Co-Investigator, “All-Sky Galactic Archeology with TESS”, TESS Guest Investigator Program, $200,000 (Cycle 2, pending; PI: Mark Pinsonneault, Ohio State)
- Co-Investigator, “Confronting the Stellar Gyrochronology Paradigm Using Wide Binaries in the TESS Fields”, TESS Guest Investigator Program, $50,000 (Cycle 2, pending; PI: Terry Oswalt, Embry-Riddle University).

Classes Taught (last 5 years)

The Sun and the Earth (Honors College), Planet Hunters (Honors College), Scientific Process, Honors Scientific Process, General Physics I, General Physics II, College Physics II

Recent Observing Time Allocations

- SMARTS 1.5-meter telescope (Chile): 150 hours
- K2 Guest Observer Allocations: 4000+ approved targets as PI, over 132,000 targets (22% of the entire program) as Co-I; total of 38 observing programs)
- TESS Guest Investigator Allocation: over 700,000 targets over 3 approved programs
- Stratospheric Observatory For Infrared Astronomy (SOFIA), approved program awaiting scheduling
- WIYN 3.5-meter telescope: 8 hours
- AAO 3.9-meter telescope: 9 nights

Professional Associations

American Astronomical Society
International Astronomical Union
American Geophysical Union
Royal Astronomical Society
Society of Photo-Optical Instrumentation Engineers
Astronomical Society of the Pacific
Sigma Xi

Selected Publications (of 171)

Note: 25 publications in 3 year period since last renewal

1. Buzasi, D. L. 1997, "Polar Magnetic Activity and Spin-Down on the Lower Main Sequence," ApJ 484, 855.

2. Buzasi, D., Catanzarite, J., Laher, R., Conrow, T., Shupe, D., Gautier, T. N. III, Kreidl, T, & Everett, D. 2000, "The Detection of Multimodal Oscillations on α Ursae Majoris," ApJL 532, 133.

3. Vallerga, J., Zaninovich, J., Welsh, B., Siegmund, O., McPhate, J., Hull, J., Gaines, G., & Buzasi, D. 2002, "The FUV detector for the Cosmic Origins Spectrograph on the Hubble Space Telescope," Nuclear Instruments and Methods in Physics Research Section A, Volume 477, Issue 1-3, p. 551-555.

4. Vourlidas, A., Buzasi, D., Howard, R. A., & Esfandiari, E. 2002, "Mass and energy properties of LASCO CMEs," in Solar variability: from core to outer frontiers, ed. A. Wilson, ESA SP-506, 91.

5. Corsaro, R. D., Giovane, F., Tsou, P., Liou, J.-C., Buzasi, D. L., & Gustavson, B. 2004, "An acoustic sensor system for the determination of impact timing and other impact characteristics," Orbital Debris Quarterly News, 8 (3), 3.

6. Buzasi, D. L. 2004, "The Performance of a High-Precision Photometry Mission in Space," in Second Eddington Workshop: Stellar structure and habitable planet finding, eds. F. Favata, S. Aigrain & A. Wilson, ESA SP-538, 205.

7. Andersen, G. P. & Buzasi, D. 2004, "U.S. Air Force Academy 4-m telescope," in Proceedings of the SPIE, Volume 5489, 650.

8. Hakkila, J., Buzasi, D., & Thacker, R. J. 2004, "Computational Astrophysics", chapter in Computer Science Handbook, Second Edition (ed. Allen Tucker), CRC Press.

9. Buzasi, D. L. et al. 2005, "Altair: The Brightest δ Scuti Star," ApJ 619, 1072.

10. Bruntt, H., Kjeldsen, H., Buzasi, D. L., & Bedding, T. R. 2005, "Evidence for Granulation and Oscillations in Procyon from Photometry with the WIRE Satellite," ApJ 633, 440.

11. Fletcher, S. T., Chaplin, W. J., Elsworth, Y., Schou, J., & Buzasi, D. 2006, "Frequency, splitting, linewidth and amplitude estimates of low-l p modes of α Cen A: analysis of Wide-Field Infrared Explorer photometry," MNRAS 371, 935.

12. Morales-Calderon, M., et al. 2006, "A Sensitive Search for Variability in Late L Dwarfs: The Quest for Weather," ApJ 653, 1454.

13. Southworth, J., Bruntt, H., & Buzasi, D. L. 2007, "Eclipsing binaries observed with the WIRE satellite. II. β Aurigae and non-linear limb darkening in light curves," A&A 467, 1215.

14. Stello, D., Bruntt, H., Preston, H., & Buzasi, D. 2008, "Oscillating K Giants with the WIRE Satellite: Determination of Their Asteroseismic Masses," ApJ 674, 53.

15. Bruntt, H., Evans, N. R., Stello, D., Penny, A. J., Eaton, J. A., Buzasi, D. L., Sasselov, D. D., Preston, H. L., & Miller-Ricci, E. 2008, "Polaris the Cepheid Returns: 4.5 Years of Monitoring from Ground and Space," ApJ 683, 433.

16. Bruntt, H., Kurtz, D. W., Cunha, M. S., Brandão, I. M., Handler, G., Bedding, T. R., Medupe, T., Buzasi, D. L., Mashigo, D., Zhang, I., & van Wyk, F. 2009, "Asteroseismic analysis of the roAp star Alpha Circini: 84 days of high-precision photometry from the WIRE satellite," MNRAS, 396, 1189.

17. Karoff, C., Metcalfe, T. S., Chaplin, W. J., Elsworth, Y., Kjeldsen, H., Arentoft, T., & Buzasi, D. 2009, "Sounding Stellar Cycles with Kepler – I. Strategy for Selecting Targets," MNRAS, 399, 914.

18. Borucki, W. J. et al. 2010, “Kepler Planet-Detection Mission: Introduction and First Results,” Science, 327, 977.

19. Chaplin, W. J. et al. 2010, “The Asteroseismic Potential of Kepler: First Results for Solar-Type Stars,” ApJ, 713, 169.

20. Bedding, T. R. et al., 2010, “Solar-Like Oscillations in Low-Luminosity Red Giants: First Results from Kepler,” ApJ, 713, 176.

21. Huber, D. et al., 2010, “Asteroseismology of Red Giants from the First Four Months of Kepler Data: Global Oscillation Parameters for 800 Stars,” ApJ, 723, 1607.

22. Bedding, T. R. et al., 2011, “Gravity Modes as a way to distinguish between hydrogen and helium-burning red giant stars,” Nature, 471, 608.

23. Doyle, L. R. et al., 2011, “Kepler-16: A Transiting Circumbinary Planet,” Science, 333, 1602.

24. Gilliland, R. L. et al., 2011, ‘Kepler Mission Stellar and Instrument Noise Properties,” ApJL, 197, 6.

25. Mathur, S.et al., 2012, “Investigating the Properties of Granulation in the Red Giants Observed by Kepler,” in Progress in Solar/Stellar Physics with Helio- and Asteroseismology (San Francisco: Astronomical Society of the Pacific),375.

26. Buzasi, D., 2013, “Stellar Magnetic Fields as a Heating Source for Extrasolar Giant Planets,” ApJL, 765, 25.

27. Karoff, C. et al. 2013, “Sounding Stellar Cycles with Kepler – II. Ground-based Observations,” MNRAS, 433, 3227.

28. Chaplin, W.J., et al. 2013, “Kepler White Paper: Asteroseismology of Solar-Like Oscillators in a 2-Wheel Mission,” arXiv:1309.0702.

29. Chaplin, W. J. et a. 2015, “Asteroseismology of Solar-Type Stars with K2: Detection of Oscillations in C1 Data”, PASP 1027, 138.

30. Stello, D. et al. 2015, “ Oscillating Red Giants Observed during Campaign 1 of the Kepler K2 Mission: New Prospects for Galactic Archaeology”, ApJ 809, 3.

31. Ingalls, J. et al. 2016, “Repeatability and Accuracy of Exoplanet Eclipse Depths Measured with Post-cryogenic Spitzer”, AJ 152, 44.

32. Buzasi, D., Lezcano, A., & Preston, H. 2016, “Rotation, activity, and stellar obliquities in a large uniform sample of Kepler solar analogs”, JSWSC 6, 38.

33. Marshall, P. et al. 2018, “Science-Driven Optimization of the LSST Observing Strategy”, arXiv:1708.04058.

34. Bergemann, M. et al. 2019, “Stellar Astrophysics and Exoplanet Science with the Maunakea Spectroscopic Explorer (MSE)”, arXiv 1903.03157.

35. Handler, G. et al. 2019, “Asteroseismology of Massive Stars with the TESS Mission: The Runaway β Cep Pulsator PHL 346 = HN Aqr”, ApJ 873, 4.

36. Pedersen, M. G. et al. 2019, “Diverse Variability of O and B Stars Revealed from 2-minute Cadence Light Curves in Sectors 1 and 2 of the TESS Mission: Selection of an Asteroseismic Sample”, ApJ 872, 9.

37. Huber, D. et al. 2019, “A Hot Saturn Orbiting An Oscillating Late Subgiant Discovered by TESS”, AJ, in press.

38. Cunha, M. et al. 2019. “Rotation and pulsation in Ap stars: first light results from TESS sectors 1 and 2", MNRAS, in press.