

DR. MELINDA SOARES-FURTADO

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Appointments

NASA Hubble Postdoctoral Fellow, University of Wisconsin–Madison	Dec 2021–present
Postdoctoral Fellow, University of Wisconsin–Madison	Jul 2020–present
High School Math & Physics Instructor, Mount Madonna School	2012 – 2013

Research Experience

Graduate Student Researcher, Princeton University, Astrophysical Sciences <i>Advisor:</i> Prof. Gáspár Bakos	2014–2020
Undergraduate Student Researcher, UC Santa Cruz, Physics & Astronomy <i>Advisors:</i> Profs. Enrico Ramirez-Ruiz & David Williams	2009–2014

Education

Princeton University	Astrophysical Science	Ph.D., 2020
Princeton University	Astrophysical Science	M.S., 2016
University of California, Santa Cruz	Physics	B.S., 2014

Research Interests

- Investigating the bulk composition of planets and other substellar companions via post-main-sequence engulfment.
- Identifying the mechanisms responsible for anomalous rotational signatures & peculiar chemistry in stellar clusters/associations.
- Probing the chemical variation within star clusters.
- The detection & characterization of periodic and semi-periodic stellar variables.
- Building image subtraction pipelines to generate high-precision photometry in crowded regions.
- Probing dust occultation signatures of circumstellar discs using photometric survey data.

Fellowships, Grants, & Awards

NASA Hubble Fellowship “ <i>Devoured Worlds: The Signatures of Substellar Ingestion</i> ” Total budget: \$364,527 (admin PI: Richard Townsend)	2021 – 2024
TESS DDT Proposal, Principal Investigator <i>Asteroseismic Investigation of Pulsating Blue Stragglers in M67</i>	2021
TESS DDT Proposal, Principal Investigator <i>Asteroseismic Investigation of Pulsating Blue Stragglers in NGC 6819</i>	2021
NASA Postdoctoral Program Fellowship (<i>declined</i>) “ <i>Cluster Variability & Planetary Engulfment with TESS</i> ” Total budget: \$237,162 (admin PI: Padi Boyd)	2020

First Place Poster, Kepler & K2 Science Conference V	2019
National Science Foundation Graduate Research Fellowship “ <i>The Impact of Millisecond Pulsars on the Intracluster Environment</i> ” Total budget: \$102,000	2015 – 2018
TESS Cycle 1 Guest Investigator Program, Co-Investigator <i>Difference Imaging of Star Clusters at Low Galactic Latitude</i> Total budget: \$200,000 (PI: J. Hartman)	2018
Exhibition Selection (permanent feature), Art of Science , Princeton University	2017
Kenneth & Ann Thimann Scholarship, UCSC	2014
SLUG Fellowship, UCSC	2013
Lamat Fellowship, UCSC	2013
First Place Oral presentation, AAAS National ERN Conference	2012
Steven Chu Award for Undergraduate Research, APS Annual Conference	2011
Ron Ruby Memorial Scholarship for Teaching Excellence, UCSC	2010
Campus Merit Scholarship, UCSC	2010
Regents Scholarship, UCSC	2008 – 2010

PUBLICATIONS

* *Mentored students are underlined*

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14. **Soares-Furtado, M.**; Limbach, M.; Vanderburg, A.; Mann, A.; Cody, A. M.; Rosen, A.; Hensley, B.; Jackson, B.; Kounkel, M.; Kraus, A.; Vos, J.; Heller, R.; Kipping, D.; Robberto, M.; Townsend, R. *The TEMPO Survey II: Predicting Yields of Transiting Moons, Planets and Satellites from a 30-day Survey of Orion with the Roman Space Telescope*, currently in prep with plans for submission to the Publications of the Astronomical Society of the Pacific by 04/2022.
 13. Limbach, M.; **Soares-Furtado, M.**; Vanderburg, A.; Mann, A.; Cody, A. M.; Rosen, A.; Hensley, B.; Jackson, B.; Kounkel, M.; Kraus, A.; Vos, J.; Heller, R.; Kipping, D.; Robberto, M.; Townsend, R. *The TEMPO Survey I: Predicting Yields of Transiting Moons, Planets and Satellites from a 30-day Survey of Orion with the Roman Space Telescope*, currently in prep with plans for submission to the Publications of the Astronomical Society of the Pacific by 04/2022.
 12. Vigna-Gómez, V.; Liu, B.; Aguilera-Dena, D.; Grishin, E.; Ramirez-Ruiz, E.; **Soares-Furtado, M.**; *Mergers Prompted by Dynamical Resonances in Compact, Multiple-Star Systems: a Stellar-Reduction Case for the Massive Triple TIC 470710327*, submitted to the Monthly Notices of the Royal Astronomical Society in 04/2022
 11. Yarza, R.; Razo-López, N.; Murguía-Berthier, A.; Wallace Everson, R.; MacLeod, M.; **Soares-Furtado, M.**; Lee, D.; Ramirez-Ruiz, E. *Hydrodynamics and Survivability During Post-Main-Sequence Planetary Engulfment*, submitted to the Astrophysical Journal in 03/2022, [arXiv:2203.11227](#)
 10. Capistrant, B.; **Soares-Furtado, M.**; Rappaport, S.; Vanderburg, A. *A Population of Dipper Stars from the Transiting Exoplanet Survey Satellite Mission*, submitted to the Astrophysical Journal Supplement in 12/2021.

9. Grunblatt, S.; Saunders, N.; Sun, M.; Thaddeus, K.; Huber D.; Chontos, A.; **Soares-Furtado, M.**; Eisner, N.; Pereira, F.; Collins, K.; Quinn, S.; Tronsgaard, R.; Zhou, G.; Nowak, G.; Ciardi, D.; Howard, A.; Buchhave, L.; Ricker, G.; Jenkins, J.; Latham, D.; Seager, S.; Vanderspek, R.; Winn, J. *Planets Orbiting Evolved TESS Stars (POETS) II: The Hottest Jupiters Orbiting Evolved Stars*, in press with the Astrophysical Journal, [arXiv:2201.04140](https://arxiv.org/abs/2201.04140)
8. **Soares-Furtado, M.**, Cantiello, M.; MacLeod, M.; Ness, M. *Lithium Enrichment Signatures of Planetary Engulfment Events in Evolved Stars*, 2021, the Astrophysical Journal, Volume 162, Issue 6, [arxiv:2002.05275](https://arxiv.org/abs/2002.05275)
7. **Soares-Furtado, M.**; Hartman, J. D.; Bhatti, W.; Bouma, L. G.; Barna, T.; Bakos, G.Á. *A Catalog of Periodic Variables in Open Clusters M35 & NGC 2158*, 2020, the Astrophysical Journal Supplement, Volume 246, Issue 1, id.15, [arxiv:1911.00832](https://arxiv.org/abs/1911.00832)
6. Naiman, J.; **Soares-Furtado, M.**; Ramirez-Ruiz, E. *Modeling Gas Evacuation Mechanisms in present-Day Globular Clusters: Stellar Winds from Evolved Stars & Pulsar Heating*, 2019, Monthly Notices of the Royal Astronomical Society, Volume 491, Issue 4, p.4602-4614, [arxiv:1310.8301](https://arxiv.org/abs/1310.8301)
5. Rappaport, S.; Zhou, G.; Vanderburg, A.; Mann, A.; Kristiansen, M. H.; Oláh, K.; Jacobs, T. L.; Newton, E.; Omohundro, M. R.; LaCourse, D.; Schwengeler, H. M.; Terentev, I. A.; Latham, D. W.; Bieryla, A.; **Soares-Furtado, M.**; Bouma, L. G.; Ireland, M. J.; Irwin, J. *Deep Long Asymmetric Occultation in EPIC 204376071*, 2019, Monthly Notices of the Royal Astronomical Society, Volume 485, Issue 2, p.2681–2693, [arxiv:1902.08152](https://arxiv.org/abs/1902.08152)
4. MacLeod, M.; Cantiello, M.; **Soares-Furtado, M.** *Planetary Engulfment in the Hertzsprung-Russell Diagram*, 2018, the Astrophysical Journal Letters, Volume 853, Issue 1, [arxiv:1801.04274](https://arxiv.org/abs/1801.04274)
3. Zhu, Wei; Huang, C. X.; Udalski, A.; **Soares-Furtado, M.**; Poleski, R.; Skowron, J.; Mróz, P.; Szymański, M. K.; Soszyński, I.; Pietrukowicz, P.; Kozłowski, S.; Ulaczyk, K.; Pawlak, M. *Extracting Microlensing Signals from K2 Campaign 9*, 2017, Publications of the Astronomical Society of the Pacific, Volume 129, Issue 980, [arxiv:1704.08692](https://arxiv.org/abs/1704.08692)
2. **Soares-Furtado, M.**; Hartman, J. D.; Bakos, G.Á.; Huang, C. X.; Penev, K.; Bhatti, W. *Image Subtraction Reduction of Open Clusters M35 & NGC 2158 in the K2 Campaign of Super Stamps*, 2017, Publications of the Astronomical Society of the Pacific, Volume 129, Issue 974, [arxiv:1703.00030](https://arxiv.org/abs/1703.00030)
1. Aliu, E.; Archambault, S.; Arlen, T.; Aune, T.; Beilicke, M.; Benbow, W.; Bird, R.; Bouvier, A.; Buckley, J. H.; Bugaev, V.; Cesarini, A.; Ciupik, L.; Connolly, M. P.; Cui, W.; Dumm, J.; Errando, M.; Falcone, A.; Federici, S.; Feng, Q.; Finley, J. P. Fortin, P.; Fortson, L.; Furniss, A.; Galante, N.; Gérard, L.; Gillanders, G. H.; Griffin, S.; Grube, J.; Gyuk, G.; Hanna, D.; Holder, J.; Hughes, G.; Humensky, T. B.; Kaaret, P.; Kertzman, M.; Khassen, Y.; Kieda, D.; Krawczynski, H.; Krennrich, F.; Lang, M. J.; Madhavan, A. S.; Maier, G.; Majumdar, P.; McArthur, S.; McCann, A.; Moriarty, P.; Mukherjee, R.; Nieto, D.; O’Faoláin de Bhróithe, A.; Ong, R. A.; Orr, M.; Otte, A. N.; Park, N.; Perkins, J. S.; Pohl, M.; Popkow, A.; Prokoph, H.; Quinn, J.; Ragan, K.; Reyes, L. C.; Reynolds, P. T.; Richards, G. T.; Roache, E.; Saxon, D. B.; Sembroski, G. H.; Skole, C.; Smith, A. W.; **Soares-Furtado, M.**; Staszak, D.; Telezhinsky, I.; Tešić, G.; Theiling, M.; Varlotta, A.; Vasiliev, V. V.; Vincent, S.; Wakely, S. P.; Weekes, T. C.; Weinstein, A.; Welsing, R.; Williams, D. A.; Zitzer, B.; VERITAS Collaboration; Böttcher, M.; Fumagalli, M.; Jadhav, J. *Long Term Observations of B2 1215+30 with VERITAS*, 2013, the Astrophysical Journal, Volume 779, Issue 2, [arxiv:1310.6498](https://arxiv.org/abs/1310.6498)

Scientific Presentations

Invited Oral Presentations

Colloquium, MIT Kavli Institute for Astrophysics and Space Research	2022
Colloquium, University of California, Los Angeles	2022
Colloquium, University of Illinois Urbana-Champaign	2022
Seminar, MIT Planetary Lunch Colloquium Series (PICS)	2022
Seminar, Penn State Center for Exoplanets and Habitable Worlds	2022
Presentation, AAS YouTube Series: Video Chats with Journal Authors	2022
Seminar, Probes of Transport in Stars—Kavli Institute for Theoretical Physics	2021
Seminar, Michigan State University	2021
Colloquium, NASA Goddard Space Flight Center	2021
Presentation, NASA Hubble Fellowship Program Symposium	2021
Seminar, Carnegie Earth and Planets Laboratory	2021
Seminar, Division on Dynamical Astronomy of the AAS	2021
Colloquium, Astrophysics Research Centre of the Queen's University Belfast	2021
Colloquium, UCSB Kavli Institute for Theoretical Physics	2021
Seminar, UCLA–UCSC Joint Astrophysics Seminar Series	2021
Seminar, CIERA Science Happy Hour	2021
Colloquium, University of Wisconsin–Madison	2020
Seminar, American Museum of Natural History	2020
Seminar, Carnegie Department of Terrestrial Magnetism	2019
Seminar, Harvard University Stars & Planets Seminar Series	2019
Seminar, Princeton University Envision Conference—Ethics & Space Policy	2019
Colloquium, University of Wisconsin–Madison	2019
Colloquium, Pomona College	2019
Colloquium, University of the Virgin Islands	2019
Seminar, Harvard University Exoplanet Lunch Series	2019
Presentation, NASA's Kepler & K2 SciCon V	2019
Seminar, Harvard University Institute for Theory and Computation	2017
Seminar, Harvard University Exoplanet Lunch Series	2016
Seminar, UCSC Supercomputing Laboratory for Undergraduates	2015

Contributed Oral Presentations

NASA Exoplanets in Our Backyard Workshop	2020
University of California Santa Cruz Planetary Lunch Series	2019
NASA Goddard Extrasolar Planets Seminar	2019
University of Michigan Star and Planet Formation Series	2019
Princeton University Thunch Series	2019
Emerging Researchers in Exoplanet Science IV	2018
Dwarf Stars & Clusters with K2 Conference	2018
Princeton University Seminar (8 talks)	2014–2018
Princeton University Research Day	2017
Emerging Researchers National Conference in STEM	2012
Annual Western Conference for Undergraduate Women in Physics	2012
Society for Advancement of Chicanos & Native Americans	2011

VERITAS Collaboration Meeting	2011
West Coast Conference for Undergraduate Women in Physics	2010
University of California–Santa Cruz Astronomy Seminar	2010
West Coast Conference for Undergraduate Women in Physics (UCSC)	2009

Selected Posters

NASA’s Kepler & K2 SciCon V	2019
Emerging Researchers in Exoplanet Science III	2017
223rd AAS Conference	2014
Annual Meeting of the California-Nevada Section of the APS	2011
University of California–Santa Cruz Science Symposium	2011
Annual Undergraduate Research Symposium (3 posters)	2009–2011

Observational Experience

- WIYN 3.5-M telescope at Kitt Peak National Observatory (4 nights)
- ANU 2.3-m telescope at Siding Spring Observatory (15 nights)
- Magellan Telescopes (Walter Baade 6.5-m) at Las Campanas Observatory (2 nights)
- VERITAS at Whipple Observatory (12 nights)

Advising Experience

Graduate Students

Michelle Limbach (Texas A&M): September 2021–present. MSF is co-advising graduate student Limbach with Professor Andrew Vanderburg. Research focus is an infrared time domain survey of the Orion Nebula Cluster (ONC) using the Nancy Grace Roman Space Telescope. This survey would provide the first census population of exosatellites. Moreover, the young age of the ONC offers key insights into the formation process at early stages (1–3 Myr).

Ricardo Yarza (University of California, Santa Cruz): September 2021–present. MSF is co-advising graduate student Yarza with Professor Enrico Ramirez-Ruiz. Research focus is the stellar envelope ejection, as induced by planetary engulfment events. Yarza recently submitted a publication on this work to ApJ.

Rachel McClure (UW-Madison): 2020–2022. MSF co-advised McClure with Prof. Robert Mathieu. Research focus is the photometric search for variables in the NGC 6791 open cluster. McClure performed an in-depth cluster membership analysis and produced high-precision light curves. She presented an AAS poster on this work and is co-author of a publication that is currently in prep.

Undergraduate & Postbaccalaureate Students

Benjamin Capistrant (UW-Madison): June 2021–present. MSF co-advised Capistrant with Prof. Andrew Vanderburg. Research focuses on the characterization of semi-periodic dipper stars observed in the TESS dataset. Capistrant led a first-authored publication on this work that was submitted to ApJ in December 2021. We are currently working on a second research project, investigating a multi-planet system in a young co-moving group.

Evan Bauer (UW-Madison): May 2021–present. MSF is co-advising Bauer with Prof. Robert Mathieu and graduate student Evan Linck. Research focuses on the characterization and deblending of variables in open clusters, incorporating radial velocity data to distinguish eclipsing binary sources among blended groups when possible. Bauer will be a co-author on an upcoming catalog publication for the NGC 6791 system.

Rianna Kuenzi (UW-Madison): January 2021–present. MSF co-advised Kuenzi with Prof. Robert Mathieu and graduate student Rachel McClure. MSF served as the primary advisor for Kuenzi’s Lamat REU internship (2021). Research focused on the characterization and deblending of variables in the NGC 6819 open cluster. Kuenzi will be a co-author on the upcoming catalog publication for this system. Kuenzi has presented a scientific poster and oral presentation showcasing her contributions.

Tyler Barna (Rutgers University): 2018–2019. MSF was the primary advisor for this project. Research focused on the characterization and deblending of periodic variables in the M35 open cluster, as well as performing systematic corrections to K2 light curves. Barna was a co-author on the catalog publication for this system and presented a poster at the NASA Kepler & K2 SciCon V. Barna is now an astronomy graduate student at the University of Minnesota.

Jose Lopez (University of California, Santa Cruz): 2014–2015. MSF co-advised Lopez with Prof. Enrico Ramirez-Ruiz. A computational science major (now working in industry), Lopez focused on data visualization of a 3D hydrodynamical simulation generated by MSF. Lopez employed volume rendering techniques (ray tracing) with the YT data visualization platform. The results from this analysis are part of the Art & Science gallery at Princeton University. A framed print is on display at the DARK Cosmology Centre in Denmark.

High School Students

Atirath Dhara (West Windsor-Plainsboro High School): 2017–2019. MSF was the primary advisor for this project. Research focused on the characterization and deblending of periodic variables in the M35 open cluster, as well as a literature search of prior investigations to compare results. Dhara presented a scientific poster on his work at the NASA Kepler & K2 SciCon V. He is now an undergraduate Regents Scholar at UC Santa Cruz majoring in astronomy.

Classroom Experience

Instructor, Lamat REU Program (NSF #1852393) <i>Astrobiters Undergraduate Journal Club</i> — six-week summer seminar	2021
Guest Instructor, Pomona College <i>Stellar Structure & Evolution</i> (ASTR 123) — two weeks of instruction + final project	2019
Assistant Instructor, Princeton University <i>The Universe</i> (AST 205)	2015
Head Instructor, Mount Madonna School <i>AP Physics, AP Calculus, & Python Programming</i>	2012–2013
Physics Section Leader & Lecturer, UCSC Academic Excellence Program <i>Introduction to Waves & Optics, Introduction to Elementary Mechanics, & Introduction to Electricity & Magnetism</i>	2009 – 2011

Professional Service Experience

Referee for the scientific journal <i>Nature</i>	2021
Co-organizer & host of the TESS (TSC ₂) Splinter Session “ <i>Ultra Short Period Planets</i> ”	2021
Division for Dynamical Astronomy Session Chair, “ <i>How Gaia Reveals the Galaxy’s Secrets</i> ”	2021
Member of the TESS Follow-Up Working Group	2021
Produced and publicly released high-level photometric science products. Collection of 4,000 light curves (soon 30,000) from highly-crowded open cluster fields. Image subtraction pipeline provides unprecedented high-precision photometry.	2017–present
Committee Member, Lamat Research Internship Admissions Committee	2014

Department Service Experience

Graduate Admissions Committee Member	2021–present
LAMAT REU Admissions Committee Member	2021
Co-organizer, UW-Madison Monday Science Seminar	2020–present
Founder, UW-Madison Astronomy Tool Exchange	2020–2022
Graduate Applicant Recruiter, SACNAS & NSBP Conferences	2020–2021
Presenter, Princeton Advisory Council	2020
Founder, Princeton University Astrophysics Writing Group	2018
Session Chair, Princeton Research Day	2017
Co-organizer, Princeton Thunch Speaker Series	2015
Founder, Graduate Astrophysics Technical Seminar	2014
Founder, UCSC Undergraduate Astrophysics Journal Club	2011

Outreach Service Experience

Invited Service

Invited Speaker, Madison Astronomical Society	2022
Panelist for the Committee on the Status of Women in Astronomy	2021
Invited Speaker, European Astronomical Society Annual Meeting “ <i>The Value of Building Social Support Networks for Mothers in Astronomy</i> ”	2021
Invited Speaker, NSF NoirLab DEI Seminar “ <i>The Astrono-Mom Conversation Series: Lessons Learned in Year One</i> ”	2021
Invited Speaker, AeroSTEM Academy and Gavilan College “ <i>So You Want to be an Astronomer?</i> ”	2021
Invited Speaker, Gavilan College “ <i>Essential Skills for Higher Education</i> ”	2020
Invited Speaker, Lamat REU Mentor Speaker Series	2020
Invited Speaker, Astronomy on Tap Philadelphia	2019
Invited Speaker, The National Society of Black Physicists, University of the Virgin Islands	2019
Invited Speaker, Amateur Astronomers Inc.	2019
Invited Keynote Speaker & Co-organizer, National Chemistry Week “ <i>Life Beyond Earth</i> ” (932 attendees)	2018
Invited Keynote Speaker, Gavilan Community College Graduation	2014
Invited Speaker, Minority Access to Research Careers	2014

Contributed Service

SETI Institute's NASA Community College Network Committee Member	2022
Organizer & Speaker, <i>Solar System Annual Science Workshop</i> , Lincoln Elementary School	2022
Speaker, <i>The TEMPO Survey</i> , University of North Carolina Greensboro	2022
*Event was intended to help students build familiarity with giving scientific talks	
NASA Hubble Fellowship Program SOC Symposium Committee Member	2021
Panelist for the NASA Hubble Fellowship Program Application Workshop	2021
Founder and organizer, The Astrono-Mom Conversation Series	2020–present
*Membership includes twenty astronomers across six countries	
Organizer & Mentor, Mastering the Graduate School Application Process	2018–present
*As of 2022, I have mentored 50 URM graduate school applicants	
*To support 2022 grad school applicants, I created a Discord server with 150 members	
Co-founder & Co-organizer, Astronomy on Tap Trenton chapter	2019–2020
Performer, <i>Astrophysics Through Dance: From Stellar Death to Chemical Rebirth</i>	2019
*Performance earned the Graduate Student Impact Award	
Co-organizer, Princeton Public Observing Night	2018
Organizer, Littlebrook Elementary Solar System Annual Science Workshop	2015 – 2018
Co-organizer, Young Women's Conference in STEM	2017
Coordinator/Speaker, Boy Scouts of America Astronomy Outreach	2015
Speaker, UCSC STEM Transfer Day	2014
Coordinator/Speaker, Astronomy Workshop, Alianza Charter School	2014
Guest Astronomy Instructor, Santa Cruz's Children School (thirty-six lessons)	2013 – 2014
Coordinator, Expanding Your Horizons Conference, UCSC	2013
Co-organizer, West Coast Conference for Undergraduate Women in Physics	2009

Media & Press

Scientific American Magazine, *Women Are Creating a New Culture for Astronomy*, Ann Finkbeiner, Mar 2022. [\[Article\]](#)

Princeton University Press, *Astronomy on Tap Brings Astrophysicists & the Community Together at a Trenton Pub*, Liz Fuller-Wright, Jul 2019. [\[Article\]](#)

New Scientist Magazine, *Stars That Devour Their Planets Get Brighter & Faster*, John Wenz, Jan 2018. [\[Article\]](#)

Mount Madonna School News, *Astrophysics Researcher Joins MMS Faculty*, Leigh Ann Clifton, October, 2012. [\[Article\]](#)