

PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

Marcelle Soares-Santos, assistant professor of physics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of physics, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2010	Astrophysics, University of Sao Paulo, Sao Paulo, Brazil
M.Sc.	2006	Astrophysics, University of Sao Paulo, Sao Paulo, Brazil
B.Sc.	2004	Physics, Federal University of Espirito Santo, Vitória, Brazil

Professional Record:

2020-present	Assistant Professor, Department of Physics, University of Michigan
2018-2020	Landsman Career Development Chair, Brandeis University
2017-2020	Assistant Professor, Brandeis University
2014-2017	Associate Scientist, Fermi National Accelerator Laboratory
2010-2014	Postdoctoral Research Associate, Fermilab

Summary of Evaluation:

Teaching: Since arriving at the University of Michigan in 2020, Professor Soares-Santos has successfully taught two different courses, an undergraduate laboratory course and an undergraduate lecture course, both at the 300 level. Previously, as a tenure-track faculty member at Brandeis University, she taught three other undergraduate courses, two aimed at upper-level physics majors and one introductory course. Regarding mentorship, during her time at Michigan, she has served as the primary advisor for two post-doctoral research associates and five Ph.D. students. In addition, since coming to Michigan, she has served as the primary research advisor for two master's or post-Baccalaureate students, three undergraduate students, and two summer research interns. She proactively and successfully recruits mentees from a wide range of backgrounds, leading to a diverse group in terms of both gender and ethnicity.

Research: Since joining the University of Michigan in 2020, Professor Soares-Santos has sustained a high-profile, well-funded research program. She built upon the foundations she had established as an associate scientist at Fermi National Accelerator Laboratory (Fermilab) (2014-17) and as an assistant professor at Brandeis University (2017-20). The research of Professor Soares-Santos has three thrusts: cosmology with gravitational waves, cosmology with galaxy clusters, and instrumentation. She has been very successful in all three, and her direct contribution to establishing the nascent subfield of multi-messenger astrophysics is ranked as one of the top achievements in all of cosmology over the past decade. Professor Soares-Santos is best known for the discovery of the electromagnetic counterpart of the binary neutron star merger first detected by the LIGO/Virgo gravitational wave detectors and then observed electromagnetically (i.e. in visible light) by DES. This work, in which she played a truly major role, is considered to be one of the most important discoveries in all of astronomy in the past few decades. The work of Professor Soares-Santos has been cited thousands of times and her h-factor is around 70; she or her group members have led seventeen papers since she joined UM. Her work has been extensively covered in the media, including the *New York Times*, *Nature*, and *Scientific American*.

Recent and Significant Publications:

- Soares-Santos, M., Palmese, A., Hartley, W., Annis, J., Garcia-Bellido, J., Lahav, O., Doctor, Z., Fishbach, M., et al. (2019). First measurement of the Hubble constant from a dark standard siren using the dark energy survey galaxies and the LIGO/Virgo binary-black-hole merger GW170814. *Astrophysical Journal Letters*, 876(1), L7.
- Abbott, B.P., Abbott, R., Abbott, T.D., Acernese, F., Ackley, K., Adams, C., Adams, T., Addesso, P., et al. (2017). A gravitational-wave standard siren measurement of the Hubble constant. *Nature*, 551(7678), 85-88.
- Abbott, B.P., Abbott, R., Abbott, T.D., Acernese, F., Ackley, K., Adams, C., Adams, T., Addesso, P., et al. (2017). Multi-messenger observations of a binary neutron star merger. *Astrophysical Journal Letters*, 848(2).
- Soares-Santos, M., Holz, D.E., Annis, J., Chornock, R., Herner, K., Berger, E., Brout, D., Chen, H.-Y., et al. (2017). The electromagnetic counterpart of the binary neutron star merger LIGO/Virgo GW170817. I. Discovery of the optical counterpart using the dark energy camera. *Astrophysical Journal Letters*, 848(2), L16.

Service: Professor Soares-Santos's service contributions at the national and international community-wide level go well beyond what is typical for her career stage within her subfield and provide a testament to the extremely high regard in which she is held by members of her scientific communities. Most notably, in the past two years she has been one of the top leaders in the development of long-term strategic plans for her subfield, serving as a convener for the American Physical Society Snowmass 2022 Planning Process. This report will have a major impact in determining in which missions and experiments billions of dollars will be invested by funding agencies over the next decade and beyond. Professor Soares-Santos has performed extensive service within her large scientific research collaborations (DES and DESI). In these collaborations, she has served in a number of high-level roles that recognize her scientific expertise and leadership, including being selected as part of a small group of advisors to top collaboration management in 2021. She also serves on grant review panels for government and private funding agencies in the U.S., such as the National Science Foundation, the Department of Energy, and the LSST Corporation, as well as others abroad. Since coming to UM, Professor Soares-Santos has served on the Physics Department Graduate Admissions Committee as well as the Undergraduate Awards Committee, and she is currently serving as a member of the Colloquium Committee.

External Reviewers:

Reviewer A: "...In a very crowded and competitive field, Professor Soares-Santos demonstrated excellence to the extent that she was one of only a few researchers invited to speak at the press release announcing the discovery..."

Reviewer B: "...What I can say from watching the arc of her career is that [Professor Soares-Santos] is poised to have many more successes in future. She has already hit a couple of home runs. She is being sought after to play important leadership roles at both a national and international scale."

Reviewer C: "...[following work at Fermilab that made her internationally known Professor Soares-Santos's] trajectory has clearly continued upward: her research has matured and expanded in new directions, and she has laid the foundations of a successful, long-term research program. Her research is of high quality, exceptional novelty, and high impact. Moreover, her leadership, technical, and communication skills, her energy and ambitious drive, and her enterprising, strategic approach to research indicate strong promise of further significant scientific contributions to come..."

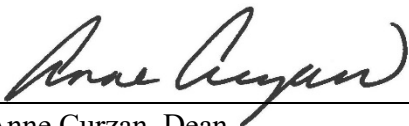
Reviewer D: "...There are few people around the world in such positions of leadership and it is clear to me that it is what you should be looking for in your faculty that are involved in LIGO. I strongly support [Professor Soares-Santos's] promotion and tenure case..."

Reviewer E: "...It is not an exaggeration to describe this event [discovery of the electromagnetic counterpart associated with the binary neutron star merger GW170817] as one of the most important discoveries in astronomy...Although many instruments and teams played an important role in this science, the role of the Dark Energy Survey (DES) and the DES Gravitational Waves (DESGW) led by [Professor Soares-Santos] was disproportionately important...[Professor Soares-Santos] without doubt gets the lion's share of the credit for putting DESGW together and making much of the science which followed this discovery possible...I would say that there is no question the accomplishments of Professor Soares-Santos are well above the bar for tenure..."

Reviewer F: "...Prof. Soares-Santos is among a handful of top junior faculty recognized in the area of multi-messenger astronomy as leaders. Specifically, in connection to the only actual multi-messenger source (GW170817) with gravitational-wave and electromagnetic emission, among electromagnetic observers she is the world leader in its analysis for cosmological studies and constraints on the Hubble constant...Without hesitation I recommend her for promotion to Associate Professor with tenure."

Summary of Recommendation:

Professor Soares-Santos has shown the highest intellectual quality, productivity, and leadership in creating and disseminating knowledge in physics. She is also a successful teacher and mentor, a generous citizen, and an emerging leader in her professional fields. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Marcelle Soares-Santos be promoted to the rank of associate professor of physics, with tenure, College of Literature, Science, and the Arts.



Anne Curzan, Dean
Geneva Smitherman Collegiate Professor of
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