# A. SYLVIA BISCOVEANU

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sbisco@northwestern.edu ⋄ updated March 25, 2025

## EDUCATION

**Massachusetts Institute of Technology, *Cambridge, MA*** 2018–2023
Ph.D. in Physics, June 2023
*From black holes to the Big Bang: astrophysics and cosmology with gravitational waves and their electromagnetic counterparts*, advisor Salvatore Vitale

**The Pennsylvania State University, *State College, PA*** 2013–2017
B.S. in Physics and B.A. in Spanish, May 2017 GPA: 4.0
Schreyer Honors Scholar and Paterno Fellow
Minors in Mathematics and Music Performance (violin and viola)
*Determining the Mass Composition of Ultra High Energy Cosmic Rays Using the Principle of Shower Universality and Data from the Pierre Auger Observatory*, advisor Miguel Mostafá

## RESEARCH INTERESTS

Gravitational-wave data analysis, black holes, neutron stars, multimessenger astronomy, compact-object binaries, stochastic gravitational-wave backgrounds, next-generation gravitational-wave detectors

## EXPERIENCE

**NASA Einstein Fellow** Sept. 2023-present
CIERA, Northwestern University *Evanston, IL*

**Research Specialist** May 2023-July 2023
**Graduate Research Fellow** Sept. 2018–May 2023
LIGO Laboratory, Massachusetts Institute of Technology *Cambridge, MA*

**Fulbright Postgraduate Fellow** Sept. 2017–June 2018
Monash University *Clayton, VIC*
OzGrav: The ARC Centre of Excellence for Gravitational-Wave Discovery

## FELLOWSHIPS AND HONORS

Forbes 30 Under 30 in Science, North America 2025
NASA Hubble Fellowship Program - Einstein Fellowship 2023-2026
Northwestern CIERA Fellowship 2026-2029
APS Cecilia Payne-Gaposchkin Doctoral Dissertation Award in Astrophysics Finalist 2024
GWIC-Braccini Thesis Prize 2023
IAU Division D Thesis Prize Honorable Mention 2023
NSF Astronomy and Astrophysics Postdoctoral Fellowship (declined) 2023

Charlotte Mateer Obert Named PEO Scholar Award 2022
MIT Physics Department Alan H. Barrett Prize 2021
NSF Graduate Research Fellowship 2018–2023
Paul And Daisy Soros Fellowship for New Americans 2018–2020
Monash University Faculty of Science Young Leader Award 2018
Fulbright Postgraduate Scholarship – Australia 2017–2018

Student Marshal – Penn State Eberly College of Science 2017

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| Student Marshal – Penn State Department of Spanish, Italian, and Portuguese | 2017 |
| Penn State Schreyer Honors College Channa and Usharani Reddy Mission Award | 2017 |
| Barry Goldwater Scholarship Award | 2016 |
| Astronaut Scholarship Foundation Award | 2016 |
| Caltech Summer Undergraduate Research Fellowship | 2016 |
| NSF International REU - University of Florida & Monash University | 2015 |
| Penn State University and Physics Department Honors | 2013-2017 |
| NASA Space Grant for Women in Science and Engineering Research | 2013-2014 |

## SELECT PUBLICATIONS

As a member of the LIGO Scientific Collaboration since 2015, I am a co-author on over 100 full-collaboration papers. Highlighted below are those to which I have made a direct personal contribution.

1. **A.S. Biscoveanu**, *Probing Spin-Orbit Resonances with the Binary Black Hole Population*, submitted to PRD (2025), arXiv:2502.04278
2. F. Kıroğlu, K. Kremer, **A.S. Biscoveanu**, et al., *Black Hole Accretion and Spin-up Through Stellar Collisions in Dense Star Clusters*, accepted in ApJ (2024), arXiv:2410.01879
3. E. Sänger et al., *Tests of General Relativity with GW230529: a neutron star merging with a lower mass-gap compact object*, submitted to PRD (2024), arXiv:2406.03568
4. S. Ronchini et al., *Constraining possible $\gamma$-ray burst emission from GW230529 using Swift-BAT and Fermi-GBM*, ApJL 970 L20 (2024), arXiv:2405.10752
5. The LIGO-Virgo-KAGRA Collaboration including **A.S. Biscoveanu** as paper manager, *Observation of Gravitational Waves from the Coalescence of a 2.5-4.5 $M_\odot$ Compact Object and a Neutron Star*, ApJL 970, L34 (2024), arXiv:2404.04248
6. K. Krishna et al., *Accelerated parameter estimation in Bilby with relative binning*, (2023), arXiv:2312.06009
7. J. Heinzel, **A.S. Biscoveanu**, S. Vitale, *Probing Correlations in the Binary Black Hole Population with Flexible Models*, Phys. Rev. D 109, 103006 (2024), arXiv:2312.00993
8. I. Gupta et al., *Characterizing Gravitational Wave Detector Networks: From A# to Cosmic Explorer*, Class. Quant. Grav. 41, 245001 (2024), arXiv:2307.10421
9. **A.S. Biscoveanu**, E. Burns, P. Landry, and S. Vitale, *An observational upper limit on the rate of gamma-ray bursts with neutron star-black hole merger progenitors*, RNAAS 7 136 (2023), arXiv:2306.14974
10. M. Evans et al., *Cosmic Explorer: A Submission to the NSF MPSAC ngGW Subcommittee*, (2023), arXiv:2306.13745
11. A. Renzini et al., *pygwb: A Python-based Library for Gravitational-wave Background Searches*, ApJ 952 25 (2023), arXiv:2303.15696
12. S. Vitale, **A.S. Biscoveanu**, and C. Talbot, *Spin it as you like: the (lack of a) measurement of the spin tilt distribution with LIGO-Virgo-KAGRA binary black holes*, A&A 668 L2 (2022), arXiv:2209.06978
13. **A.S. Biscoveanu**, P. Landry, S. Vitale, *Population properties and multimessenger prospects of neutron star-black hole mergers following GWTC-3*, MNRAS 518, 5298 (2022), arXiv:2207.01568
14. **A.S. Biscoveanu**, K. Kremer, E. Thrane, *Probing the efficiency of tidal synchronization in outspiralling double white dwarf binaries with LISA*, ApJ 949, 95 (2023), arXiv:2206.15390
15. **A.S. Biscoveanu**, T.A. Callister, C.-J. Haster, K.K.Y. Ng, S. Vitale, W.M. Farr, *The binary black hole spin distribution likely broadens with redshift*, ApJL 932 L19 (2022), arXiv:2204.01578
16. S. Vitale, **A.S. Biscoveanu**, and C. Talbot, *The orientations of the binary black holes in GWTC-3*, (2022), arXiv:2204.00968
17. V. Varma, **A.S. Biscoveanu**, T. Islam, F.H. Shaik, C.-J. Haster, M. Isi, W.M. Farr, S.E. Field, S. Vitale, *Evidence of large recoil velocity from a black hole merger signal*, Phys. Rev. Lett. 128, 191102 (2022), arXiv:2201.01302
18. **A.S. Biscoveanu**, C. Talbot, S. Vitale, *The effect of spin mismodeling on gravitational-wave mea-*

*surements of the binary neutron star mass distribution*, MNRAS 511, 4350 (2022), arXiv:2111.13619
19. The LIGO-Virgo-KAGRA Collaboration, *The population of merging compact binaries inferred using gravitational waves through GWTC-3*, Phys. Rev. X 13, 011048 (2023), arXiv:2111.03634
20. D. Frostig, **A.S. Biscoveanu** et al., *An Infrared Search for Kilonovae with the WINTER Telescope. I. Binary Neutron Star Mergers*, ApJ 926, 152 (2022), arXiv:2110.01622
21. M. Evans et al., *A Horizon Study for Cosmic Explorer: Science, Observatories, and Community*, (2021), arXiv:2109.09882
22. V. Varma, **A.S. Biscoveanu**, M. Isi, W.M. Farr, S. Vitale, *Hints of spin-orbit resonances in the binary black hole population*, Phys. Rev. Lett. 128, 031101 (2022), arXiv:2107.09693
23. V. Varma, M. Isi, **A.S. Biscoveanu**, W.M. Farr, S. Vitale, *Measuring binary black hole orbital-plane spin orientations*, Phys. Rev. D 105, 024045 (2022), arXiv:2107.09692
24. **A.S. Biscoveanu**, *Characterizing gravitational-wave sources with likelihood reweighting*, Nat. Rev. Phys. 4, 5 (2022), DOI: 10.1038/s42254-021-00404-4
25. C. Talbot, E. Thrane, **A.S. Biscoveanu**, R. Smith, *Inference with finite time series: Observing the gravitational Universe through windows*, Phys. Rev. Research 3, 043049 (2021), arXiv:2106.13785
26. **A.S. Biscoveanu**, M. Isi, V. Varma, S. Vitale, *Measuring the spins of heavy binary black holes*, Phys. Rev. D 104, 103018 (2021), arXiv:2106.06492
27. **A.S. Biscoveanu**, C. Talbot, E. Thrane, R. Smith, *Measuring the primordial gravitational-wave background in the presence of astrophysical foregrounds*, Phys. Rev. Lett. 125, 241101 (2020), arXiv:2009.04418
28. **A.S. Biscoveanu**, M. Isi, S. Vitale, V. Varma, *New spin on LIGO-Virgo binary black holes*, Phys. Rev. Lett. 126, 171103 (2021), arXiv:2007.09156
29. Y. Huang et al., *Statistical and systematic uncertainties in extracting the source properties of neutron star - black hole binaries with gravitational waves*, Phys. Rev. D 103, 083001 (2021), arXiv:2005.11850
30. I. Romero-Shaw, C. Talbot, **A.S. Biscoveanu** et al., *Bayesian inference for compact binary coalescences with BILBY: Validation and application to the first LIGO–Virgo gravitational-wave transient catalogue*, MNRAS 499, 3 (2020), arXiv:2006.00714
31. M. Safarzadeh, **A.S. Biscoveanu**, A. Loeb, *Constraining the delay time distribution of compact binary objects from the stochastic gravitational wave background searches*, ApJ 901, 2 (2020), arXiv:2004.12999
32. **A.S. Biscoveanu**, C.-J. Haster, S. Vitale, J. Davies, *Quantifying the Effect of Power Spectral Density Uncertainty on Gravitational-Wave Parameter Estimation for Compact Binary Sources*, Phys. Rev. D 102, 023008 (2020), arXiv:2004.05149
33. V. Varma, M. Isi, **A.S. Biscoveanu**, *Extracting the Gravitational Recoil from Black Hole Merger Signals*, Phys. Rev. Lett. 124, 101104 (2020), arXiv:2002.00296
34. **A.S. Biscoveanu**, E. Thrane, S. Vitale, *Constraining short gamma-ray burst jet properties with gravitational waves and gamma rays*, ApJ 893, 38 (2020), arXiv:1911.01379
35. **A.S. Biscoveanu**, S. Vitale, C.-J. Haster, *The reliability of the low-latency estimation of binary neutron star chirp mass*, ApJL 884, L32 (2019), arXiv:1908.03592
36. G. Ashton et al., *Bilby: A user-friendly Bayesian inference library for gravitational-wave astronomy*, ApJS 241, 27 (2019), arXiv:1811.02042
37. The LIGO-Virgo-KAGRA Collaboration, *Search for Tensor, Vector, and Scalar Polarizations in the Stochastic Gravitational-Wave Background*, Phys. Rev. Lett. 120, 201102 (2018), arXiv:1802.10194
38. T.A. Callister, **A.S. Biscoveanu** et al., *Polarization-based Tests of Gravity with the Stochastic Gravitational-Wave Background*, Phys. Rev. X 7, 041058 (2017), arXiv:1704.08373
39. The LIGO-Virgo-KAGRA Collaboration, *Upper Limits on the Stochastic Gravitational-Wave Background from Advanced LIGO's First Observing Run*, Phys. Rev. Lett., 118, 121101 (2017), arXiv:1612.02029
40. The LIGO-Virgo-KAGRA Collaboration, *Directional limits on persistent gravitational waves from Advanced LIGO's first observing run*, Phys. Rev. Lett., 118, 121102 (2017) arXiv:1612.02030

## INVITED PRESENTATIONS

1. Harvard Black Hole Initiative Annual Conference, *Cambridge, MA* April 2025
2. LSST Discovery Alliance Data Science Fellowship Program Lecturer, *Pittsburgh, PA* April 2025
3. Ohio State Physics Department Colloquium, *Columbus, OH* Nov. 2024
4. Penn State Gravity, Astroparticle and Particle Physics Seminar, *State College, PA* Oct. 2024
5. Minnesota Institute for Astrophysics Colloquium, *Minneapolis, MN* Oct. 2024
6. IAU 389: Gravitational Wave Astrophysics Plenary, *Cape Town, South Africa* Aug. 2024
7. Next-Generation Detectors Mock Data Challenge Workshop, *State College* June 2024
8. AAS 244: Astronomy with Neutrinos and other Messengers, *Madison, WI* June 2024
9. CIFAR Gravity & Extreme Universe Meeting, *Whitehorse, Canada* June 2024
10. HEAD 21: Illuminating the Formation Channels of Compact Binaries with Gravitational Waves *Horseshoe Bay, TX* April 2024
11. APS April 2024: CPG Dissertation Award Finalist Session, *Sacramento, CA* April 2024
12. APS April 2024: Multi-"Messengers" from Future Facilities, *Sacramento, CA* April 2024
13. Notre Dame Astrophysics Seminar, *Notre Dame, IN* Nov. 2023
14. University of Mississippi Physics and Astronomy Colloquium, *Oxford, MI* Oct. 2023
15. Gravitational-wave populations: what's next? *Milan, Italy* July 2023
16. Princeton Gravity Initiative Seminar, *Princeton, NJ* Nov. 2022
17. Johns Hopkins Particle Theory Seminar, *Baltimore, MD* Nov. 2022
18. Perimeter Institute Strong Gravity Seminar, *Waterloo, Canada* Oct. 2022
19. Caltech TAPIR Seminar, *Pasadena, CA* Oct. 2022
20. UC Berkeley Explosive Astro Seminar, *Berkeley, CA* Oct. 2022
21. Northwestern CIERA Theory Seminar, *Evanston, IL* Oct. 2022
22. UChicago KICP Seminar, *Chicago, IL* Oct. 2022
23. AEI Astrophysical and Cosmological Relativity Seminar, *Potsdam, Germany* Sept. 2022
24. Physics and Astrophysics at the eXtreme (PAX-VIII) Panelist, *Cambridge, MA* Aug. 2022
25. Harvard LPPC Seminar, *Cambridge, MA* May 2022
26. UWM CGCA Seminar, *virtual* March 2022
27. IPAM Workshop: Mathematical and Computational Challenges in the Era of GW Astronomy
    Workshop III, *Los Angeles, CA* Nov. 2021
    Tutorial Workshop, *virtual* Sept. 2021
28. Perimeter Institute Strong Gravity Seminar, *virtual* Nov. 2021
29. Gravitational Wave Astronomy Northwest Student Workshop, *virtual* June 2021
30. MIT Kavli Institute Brown Bag Lunch Seminar, *virtual* March 2021
31. Brown University ICERM Workshop, *virtual* Nov. 2020
    Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects
32. Harvard Black Hole Initiative Colloquium, *virtual* Nov. 2020
33. Gravitational-Wave Open Data Workshop #3, *virtual* May 2020
34. TEDxFulbrightCanberra, *Canberra, ACT* May 2018
    "The Cosmic Gravitational-Wave Symphony"
35. Penn State Primordial Universe and Gravity Seminar, *State College, PA* April 2017
36. University of Melbourne Astrophysics Colloquium, *Melbourne, VIC* July 2015

## CONTRIBUTED PRESENTATIONS

1. **33rd Midwest Relativity Meeting,** *Chicago, IL* Nov. 2023
   Probing Correlations in the Binary Black Hole Population with Flexible Models
2. **American Physical Society April Meeting,** *Minneapolis, MN* April 2023
   Population properties and multimessenger prospects of neutron star-black hole mergers following GWTC-3
3. **AAS High Energy Astrophysics Division Meeting,** *Waikoloa, HI* March 2023
   Probing the effect of tides in outspiralling double white dwarf binaries with LISA

4. **241st Meeting of the American Astronomical Society,** *Seattle, WA* Jan. 2023
   From black holes to the Big Bang: astrophysics and cosmology with gravitational waves and their electromagnetic counterparts
5. **Gravitational Wave Physics and Astronomy Workshop,** *Melbourne, AU* Dec. 2022
   Population properties and multimessenger prospects of neutron star-black hole mergers following GWTC-3
6. **International Workshop on AM CVn binaries 4.5,** *virtual* Aug. 2022
   Probing the effect of tides in outspiraling double white dwarf binaries with LISA
7. **American Physical Society April Meeting,** *New York, NY* April 2022
   Sources of systematic error in gravitational-wave measurements of the binary neutron star mass distribution
8. **14th Edoardo Amaldi Conference on Gravitational Waves,** *virtual* July 2021
   Measuring the spins of heavy binary black holes
9. **European Astronomical Society Meeting,** *virtual* July 2021
   The Multimessenger Discovery Potential of the Wide-Field Infrared Transient Explorer
10. **American Physical Society April Meeting,** *virtual* April 2021
    Simultaneous Measurement of a Cosmological Stochastic Background and an Astrophysical Foreground
11. **237th Meeting of the American Astronomical Society,** *virtual* Jan. 2021
    A new spin on LIGO-Virgo binary black holes
12. **235th Meeting of the American Astronomical Society,** *Honolulu, HI* Jan. 2020
    The Reliability of the Low-Latency Estimation of Binary Neutron Star Chirp Mass
13. **American Physical Society April Meeting,** Denver, CO April 2019
    Constraining Short Gamma-Ray Burst Jet Properties Using Coincident Gravitational-Wave and Electromagnetic Detections
14. **American Physical Society New England Section Meeting,** *Dartmouth, MA* Nov. 2018
    Constraining the Jet Properties of GRBs with Multimessenger Astronomy
15. **9th ACGRG,** *Gingin, WA* Nov. 2017
    Constraining GRB Jet Properties Using Coincident GW/EM Detections
16. **LIGO-Virgo Collaboration Meeting,** *Pasadena, CA* March 2017
    Stochastic Search for Non-GR Polarizations
    Best Data Analysis Poster
17. **American Physical Society April Meeting,** *Salt Lake City, UT* April 2016
    Determining the Mass Composition of Cosmic Rays Using Shower Universality
18. **Pierre Auger Collaboration Meeting,** *Malargüe, Argentina* March 2016
    Elongation Rate Using the El Universal Reconstruction
19. **American Physical Society April Meeting,** *Baltimore, MD* April 2015
    Extending the Measurement of Shower Maximum to the Highest Energies Using Universality and Data from the Surface Detector of the Pierre Auger Observatory
20. **American Physical Society Mid-Atlantic Section Meeting,** *State College, PA* Oct. 2014
    Determining the Particle Identity of Ultra-High Energy Cosmic Rays

## TEACHING AND MENTORSHIP

**Graduate Teaching Assistant** Jan. 2022
Department of Physics, Massachusetts Institute of Technology *Cambridge, MA*
Introduction to Special Relativity

**Learning Assistant** Jan. 2014-Dec. 2016
The Pennsylvania State University *State College, PA*
Introductory Mechanics (Spring 2014)
Introduction to Quantum Mechanics I (Fall 2016)

**Research Mentorship**

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| Lillie Szemraj, Princeton | Summer 2024-present |
| Jessica Cotturone, Augustana College | Summer 2024-present |
| Nico Bers, Northwestern | Fall 2023-present |
| Darsan Bellie, Northwestern (PhD student) | Fall 2023–Spring 2024 |
| Nadia Qutob, Georgia Tech | Summer 2022 |
| Claire Williams, Carleton College (PhD - UCLA) | Summer and Fall 2020 |
| Kaylee de Soto, MIT (PhD - Penn State) | Summer 2020 |
| Jonathan Davies, Imperial College London (PhD - University of Manchester) | Summer 2019 |

**Mentor,** Gravitational-Wave Open Data Workshop — May 2020, 2021, 2023
Develop and lead a series of tutorials introducing gravitational-wave data analysis techniques using open data

**Career Mentorship**

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| CIERA Mentorship Program | AYs 2023, 2024 |
| Goldwater Scholarship Mentorship Program | AY 2022 |
| MIT Women in Physics Mentorship Program | AY 2018 |

## SERVICE AND OUTREACH

**Astronomy Conversations Volunteer**, Adler Planetarium — April 2024–present
Lead discussion and presentation sessions on a broad range of astrophysics topics with museum guests

**Chair, Code of Conduct Committee**, Northwestern CIERA — May 2024–present
Lead the development of a CIERA Community Values Statement and serve as the representative on the Justice, Equity, Diversity, and Inclusion Committee

**Student Representative**, LIGO Academic Advisory Committee — Sept. 2021–Nov. 2023
Advocate for early career scientists in the LIGO Collaboration through career development and social programming

**Reviewer** — 2020–present
ApJ, ApJL, Phys. Rev. Lett., Phys. Rev. D, JCAP, NASA ATP

**Research Project Leader,** Warrior-Scholar Project — July 2020, 2021, 2022
Design and lead a gravitational-wave research project for veterans transitioning from active service to an academic setting

**Student organizer,** MIT Kavli Institute Journal Club — AYs 2019, 2020
Arrange and introduce weekly speakers to present on new papers and preprints to the MIT Kavli community