

Sanika S. Khadkikar

Fifth Year Graduate Student at The Pennsylvania State University

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EDUCATION

The Pennsylvania State University, State College, PA <i>Ph.D. in Physics (expected May 2027)</i> <i>Exploring the fundamental physics of neutron stars using astrophysics and gravitational waves</i> Advisor: Bangalore Sathyaprakash	Aug 2022 – May 2027
Birla Institute of Science and Technology, Pilani, India <i>M. Sc. (Hons) in Physics</i> <i>B.E. (Hons) in Mechanical Engineering</i> <i>Quasi-stationary sequences of hyper-massive neutron stars with exotic equations of state</i> Advisor: Sarmistha Banik	Aug 2017 – Jul 2022
The Pennsylvania State University, State College, PA <i>BITS Pilani exchange program</i> <i>Binary neutron star post-merger signal analysis using wavelet transforms</i> Advisor: Bangalore Sathyaprakash and Sujith R.	Aug 2021 – May 2022

RESEARCH INTERESTS

Neutron stars, gravitational wave data analysis, black holes, multimessenger astronomy, compact object binaries, nuclear astrophysics, next generation gravitational wave detectors, dark matter

SELECTED FELLOWSHIPS AND HONORS

LIGO Compact Binary Coalescence Award <i>Laser Interferometer Gravitational-wave Observatory (LIGO) Collaboration</i> <i>Recognition for outstanding contribution towards collaboration science</i>	2026
Peter Clay Eklund Award for Scientific Communication <i>Pennsylvania State University</i> <i>Awarded by the Department of Physics for excellence in scientific communication of research</i>	2026
Graduate Student International Research Award <i>Pennsylvania State University</i> <i>Sole recipient selected from a university-wide pool of over 12,600 graduate students across all Penn State campuses for excellence in international research.</i>	2026
George A. and Margaret M. Downs brough Department Head's Chair in Physics <i>Pennsylvania State University</i> <i>Annual merit-based fellowship awarded by the Eberly College of Science at Penn State</i>	2026
John Randall Shuman Troxell Memorial Scholarship in Physics <i>Pennsylvania State University</i> <i>Annual merit-based fellowship awarded by the Eberly College of Science at Penn State</i>	2025
Edward M. Frymoyer Honors Scholarship <i>Eberly College of Science, Pennsylvania State University</i> <i>Awarded for an excellent academic record and achievements</i>	2025
Edward A. and Rosemary A. Mebus Graduate Fellowship in Physics <i>Eberly College of Science, Pennsylvania State University</i> <i>Awarded for an excellent academic record and achievements</i>	2025

Division of Gravitational Physics Best Student Speaker <i>American Physical Society</i> <i>Awarded for the best student presentation at the annual APS Eastern Gravity meeting</i>	2025
Physics and Astronomy for Women+ Research Travel Grant <i>Pennsylvania State University</i> <i>Merit-based scholarship awarded for women+ physicists to travel to a conference</i>	2025
Rick Robinett Service Award <i>Pennsylvania State University</i> <i>Awarded by the Department of Physics for efforts in science communication and outreach to a larger community</i>	2025
Distinguished Student Award <i>American Physical Society</i> <i>Awarded by APS's Forum on International Physics to outstanding students in any field of physics</i>	2025
W. Donald Miller Graduate Fellowship <i>Pennsylvania State University</i> <i>Annual merit-based fellowship awarded by the Eberly College of Science at Penn State</i>	2025
David C. Duncan Graduate Fellowship <i>Pennsylvania State University</i> <i>Annual merit-based fellowship awarded by the Eberly College of Science at Penn State</i>	2025
Division of Gravitational Physics Travel Grant <i>American Physical Society</i> <i>Travel grant awarded by APS's Division of Gravitational Physics to allow student members to present their work at the APS meeting.</i>	2025
Peter Clay Eklund Award for Scientific Communication (Honorable mention) <i>Pennsylvania State University</i> <i>Awarded by the Department of Physics for excellence in scientific communication of research</i>	2025
ACCESS Computing Grant (Co-PI) <i>National Science Foundation</i> <i>500k Compute Hours awarded by the National Science Foundation as a Co-PI</i>	2024
I am STEM Award <i>Pennsylvania State University</i> <i>Student speaking contest to inspire future scientists in STEM</i>	2024
Homer F. Braddock Scholarship in Biology, Chemistry, and Physics <i>Pennsylvania State University</i> <i>Merit-based scholarship awarded by the Eberly college of Science at Penn State to first-year graduate students</i>	2022
Off-Campus International Master's Thesis Fellowship <i>Birla Institute of Technology and Science</i> <i>Merit-based scholarship awarded by BITS-Pilani to complete an exchange year in a foreign country</i>	2021
Charpak Indo-France Research Scholarship <i>Government of France</i> <i>Ranked first nationwide in the highly competitive Charpak Research Fellowship program, awarded to fewer than 1% of applicants from India to intern in France.</i>	2021

LIGO Summer Undergraduate Research Fellowship (SURF) <i>California Institute of Technology</i> <i>Selected as one of four students in India for a fully funded research internship at the LIGO Laboratory, Caltech.</i>	2020
BITS Pilani Merit Scholarship <i>Birla Institute of Technology and Science</i> <i>Awarded 50 % tuition waiver for four consecutive years</i>	2018–2021
INSPIRE Award <i>Government of India</i> <i>One of 25 high school students across India to receive an award from the Government of India for scientific aptitude and research potentials</i>	2014

PUBLICATIONS

As of October 2026, I have authored 6 short-author papers (4 as first author) with 346 citations, contributed significantly to 3 LVK collaboration papers currently on arXiv, and have 7 manuscripts submitted or in preparation, 6 of them as lead author. Including LVK collaboration papers, my work has 2,088 citations and an h-index of 17 on Google Scholar.

SHORT-AUTHOR PUBLICATIONS WITH SIGNIFICANT CONTRIBUTION

- **Khadkikar, S.**, & Singh, D. (2026). A case study of GW190425 for classifying binary neutron star versus binary black hole mergers and constraining asymmetric dark matter with gravitational wave detectors. *Physical Review D*, 113, 023029. <https://doi.org/10.1103/tzz8-wvrf>
- **Khadkikar, S.**, Gupta, I., Kashyap, R., Chandra, K., Gamba, R., et al. (2025). Precise and accurate neutron star radius measurements with next-generation gravitational wave detectors. *Physical Review D*, 112(6), 063020. <https://doi.org/10.1103/h6rl-mcjm>
- Gupta, I., et al. incl **Khadkikar, S.**, (2024). Characterizing gravitational wave detector networks: From A# to Cosmic Explorer. *Class.Quant.Grav.* 41 (2024) 24, 245001. <https://doi.org/10.1088/1361-6382/ad7b99>
- Evans, M., et al. incl **Khadkikar, S.**, (2023). Cosmic Explorer: A submission to the NSF MPSAC ngGW Subcommittee. arXiv: <https://arxiv.org/abs/2306.13745>
- **Khadkikar, S.**, Mangat, C. S., and Banik, S. (2022). Quasi-stationary sequences of hyper-massive neutron stars with exotic equations of state. *Journal of Astrophysics and Astronomy*, 43(2), 57. <https://doi.org/10.1007/s12036-022-09798-1>
- **Khadkikar, S.**, Raduta, A. R., Oertel, M., and Sedrakian, A. (2021). Maximum mass of compact stars from gravitational wave events with finite-temperature equations of state. *Physical Review C*, 103(5), 055811. <https://doi.org/10.1103/PhysRevC.103.055811>

SUBMITTED

- **S. Khadkikar** and B. S. Sathyaprakash. "The Goldilocks Prior: Physically Consistent Inference of Neutron Star Properties from Gravitational Wave Observations".
- **S. Khadkikar** and B. S. Sathyaprakash. "Reanalysis of GW170817 and GW190425 under the Goldilocks Prior".

IN PREPARATION

- **S. Khadkikar**, M. Zevin, and F. S. Broekgaarden. "What Can Short Gamma-Ray Bursts Tell Us About the Earliest Binary Neutron Star Mergers?".
- **S. Khadkikar**, D. Radice, X. Huez, and S. Bernuzzi. "Unifying a Decade of Binary Neutron Star Simulations into a Novel Multimessenger Inference Framework".
- **S. Khadkikar**, D. Chattopadhyay, and B. S. Sathyaprakash. "Radio Selection Effects in the Galactic Double Neutron Star Population".
- L. Suleiman, **S. Khadkikar**, and S. Guillot. "Systematic Biases in NICER Neutron Star Radius

Measurements".

- **S. Khadkikar**, M. Emma, A. Abac, N. Kunert, T. Dietrich, and V. Sagun. "Can Dark Matter Halos Around Neutron Stars Have Detectable Signatures in Gravitational Waves?".

COLLABORATION PUBLICATIONS WITH SIGNIFICANT CONTRIBUTION

Member of the LIGO–Virgo–KAGRA (LVK) Collaboration since 2020. Served as a liaison and a paper writing team member for the GWTC-5 study, along with being one of four analysts responsible for production runs and validation across multiple Bayesian inference pipelines. Listed here are papers with my major contribution.

- LIGO Scientific Collaboration, Virgo Collaboration, and KAGRA Collaboration, A. G. Abac et al. incl **Khadkikar, S.**, (2026, May). *GWTC-5.0: An Introduction to Version 5.0 of the Gravitational-Wave Transient Catalog*. arXiv preprint: <https://arxiv.org/abs/2605.27223>
- LIGO Scientific Collaboration, Virgo Collaboration, and KAGRA Collaboration, A. G. Abac et al. incl **Khadkikar, S.**, (2026, May). *GWTC-5.0: Methods for Identifying and Characterizing Gravitational-wave Transients*. arXiv preprint: <https://arxiv.org/abs/2605.27224>
- LIGO Scientific Collaboration, Virgo Collaboration, and KAGRA Collaboration, A. G. Abac et al. incl **Khadkikar, S.**, (2026, May). *GWTC-5.0: Observations from the Second Part of the Fourth LIGO–Virgo–KAGRA Observing Run and Updates to the Gravitational-Wave Transient Catalog*. arXiv preprint: <https://arxiv.org/abs/2605.27225>

INVITED TALKS

Selected

Invited Talk , APS Global Physics Summit, Denver, CO	2026
Department Colloquium , California State University, Fullerton, CA	2025
Lecture , Institute for Nuclear Theory, Seattle, WA	2025

Upcoming

Strong Gravity Seminar, Pennsylvania State University, PA	Nov 2026
Seminar, Inter-University Centre for Astronomy and Astrophysics, Pune, India	Nov 2026
Seminar, Canadian Institute for Theoretical Astrophysics, Toronto, Canada	Feb 2027

2026

GRB/High Energy Lunch Talk, NASA Goddard Space Flight Center and University of Maryland, MD
Seminar, Space Telescope Science Institute, Baltimore, MD
Talk, Center for Computational Astrophysics, Flatiron Institute, New York, NY
THEA Seminar, Columbia University, New York, NY
Astro Lunch Talk, University of California, Santa Barbara, CA
LIGO Seminar, California Institute of Technology, Pasadena, CA
Relativity Seminar, University of Texas at Austin, TX
N3AS Seminar (virtual)
Seminar, University of California, San Diego, CA
ITC Luncheon Talk, Harvard University, Cambridge, MA
IAS–Princeton Joint Gravitational-Wave Meeting, Institute for Advanced Study, NJ
Astro Coffee Talk, Princeton University, NJ
Monday Afternoon Talk, Massachusetts Institute of Technology, MA
Transient Tea Talk, Harvard & Smithsonian Center for Astrophysics, MA
Public Talk, Lectures on Tap, Boston, MA
Seminar, Johns Hopkins University, Baltimore, MD
Seminar, University of Southampton, UK
Seminar, Royal Holloway University of London, UK
Seminar, University of Portsmouth, UK
Seminar, University of Birmingham, UK
Seminar, CNRS Strasbourg, France

Seminar, Sapienza University of Rome, Italy
 Seminar, Gran Sasso Science Institute, L'Aquila, Italy
 Seminar, Utrecht University, Netherlands
 Seminar, Friedrich Schiller University Jena, Germany
 Seminar, University of Potsdam, Germany
 Seminar, Max Planck Institute for Gravitational Physics, Potsdam, Germany
 Seminar, DESY Zeuthen, Germany
 Seminar, College of the Holy Cross, Worcester, MA

2025

Seminar, Indian Institute of Technology Bombay, Mumbai, India
 Seminar, LIGO Hanford Observatory, WA
 AstroChat Talk, University of California, Berkeley, CA
 Einstein Telescope Nuclear Astrophysics Call (virtual)
 Astronomy on Tap, State College, PA
 Lecture, State College Area High School, PA

CONTRIBUTED TALKS

2025

APS Global Physics Summit, Anaheim, CA
 APS Eastern Gravity Meeting, University of New Hampshire, NH
 American Astronomical Society 245th Meeting, Oxon Hill, MD
 Nuclear Physics from Multi-Messenger Mergers Summer School, Indiana University, IN
 Prospects in Theoretical Physics Summer School (poster), Princeton University, NJ
 Neighborhood Workshop, State College, PA
 Primordial Universe and Gravity Seminar, Penn State (also 2021, 2023, 2024)

2024

APS April Meeting, Sacramento, CA
 LIGO–Virgo Collaboration Meeting (virtual)

2020

LIGO SURF Presentation, California Institute of Technology (virtual)
 Finesse Interferometric Modelling Workshop and Hackathon, IUCAA, Pune, India

LEADERSHIP AND ACADEMIC SERVICE

Journal Referee <i>Monthly Notices of the Royal Astronomical Society</i>	2026-
Journal Referee <i>Astrophysical Journal Letters</i>	2026-
Student Representative <i>Executive Committee of the American Physical Society's Division of Gravitational Physics</i> Elected Student Representative to the APS Division of Gravitational Physics Executive Committee following nomination by the DGRAV Nominating Committee and an open election of the division membership.	2026-2028
Council Member <i>Gravitational-Wave Early Career Scientists (GWECS)</i> Represented the Cosmic Explorer Consortium on the GWECS council and contributed to efforts supporting early-career researchers through resources, opportunities, and community initiatives.	2025

Chair of the Early Career Scientists Group <i>Cosmic Explorer Consortium</i> Coordinated early-career activities, mentorship efforts, and liaison with the executive board.	2025
GAPP Graduate Student Liaison <i>Department of Physics, Pennsylvania State University</i> Arranged and managed the Gravity, Astrophysics and Particle Physics seminars with faculty.	2024
Gravi-tea Time Podcast (Co-creator) <i>Institute for Gravitation and the Cosmos, Penn State</i> Produced episodes explaining breakthroughs in astrophysics for advanced undergrads and grads.	2024
Founder, Physics Journal Club <i>BITS Hyderabad</i> Fostered collaborative learning and research discussions.	2021
Secretary, AD ASTRA Astronomy Club <i>BITS Hyderabad</i> Initiated projects (e.g., horn antenna for galaxy rotation curves), organized fests and trivia sessions.	2019
Team Manager & Suspension Engineer, Vulcan Racing <i>BITS Hyderabad</i> Managed off-roading automobile team; contributed to suspension design and project coordination.	2019

TEACHING AND MENTORSHIP

Graduate Teaching Assistant <i>Department of Physics, Pennsylvania State University</i> Quantum Information and Computing Introductory Electromagnetism Introductory Mechanics	Aug 2022 – May 2024
Undergraduate Teaching Assistant <i>Department of Physics, BITS Pilani</i> Statistical Mechanics	Jan 2020 – May 2020

OUTREACH AND SOCIAL SERVICE

Host, Astro[sound]bites Podcast <i>American Astronomical Society</i> One of four hosts that host this astronomy podcast for general outreach.	2025
Author, GW250114 Factsheet <i>LIGO Education and Public Outreach (EPO) Team</i> Designed the official GW250114 factsheet, translating key scientific results for broad public and media engagement.	2025
Outreach Chair of PAW+ <i>Physics and Astronomy for Women+, Pennsylvania State University</i> <ul style="list-style-type: none">• Organized invited physics talks from renowned physicists for women and other underrepresented groups in physics.• Organized a fully physics-based experiment section for the Easterly Parkway School Fair in State College for children from kindergarten to grade 12.• Designed and coordinated a physics-themed escape room for the Haunted-U event at Penn State near Halloween to engage young minds in science.	2025
Graduate Student Newsletter Editorial Team <i>Eberly College of Science, Pennsylvania State University</i> <ul style="list-style-type: none">• Co-editor for the Graduate Student Newsletter circulated throughout Penn State.• Interviewed several individuals to highlight their research in the Graduate Student Spotlight section.• Helped coordinate the publication of LIGO-related press releases through the official Penn State communications office.	2025
PAW Pals Volunteer <i>Physics and Astronomy for Women+, Pennsylvania State University</i> Led demonstrations and discussions in local elementary schools to engage kids in science.	2023–2025

PROFESSIONAL REFERENCES

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