








Purnima Narayan




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 Department of Physics, Arizona State University, Tempe




Education

- 2020 - July 2025  **Ph.D., Physics, University of Mississippi (UM), Oxford, MS, USA**
Dissertation Title: *Missing Physics or New Physics? Understanding Biases in Gravitational Wave Tests of General Relativity*
Dissertation Advisor: Dr. Anuradha Gupta.
- 2016- 2019  **M.Sc., Astrophysics, University of Potsdam, Potsdam, Germany**
Dissertation title: *Potential Detection of a change in the Gravitational Constant with Scalar Gravitational Waves.*
Research Advisor: Dr. Jean-Luc Lehners, Max Planck Institute for Gravitational Physics, Albert Einstein Institute (AEI), Potsdam, Germany.
- 2013 - 2016  **B.Sc., Physics, Savitribai Phule Pune University, Pune, India**
Thesis title: *Determining Hubble's constant and Deceleration parameter using Supernova type Ia.*
Thesis Advisor: Dr. Aseem Paranjape, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune, India.



Research Positions

- Fall 2023 - Present  **Research Assistant, UM, Oxford, MS**
- 2023 - Present  Member: **LIGO Scientific Collaboration, Laser Interferometer Space Antenna (LISA) Consortium**
- Fall 2023 - Fall 2024  **SEC Emerging Scholars Doctoral Fellow, UM, Oxford, MS**

Teaching Positions

- Fall 2025  **Instructor** UM, Oxford, MS.
Instructor of record for undergraduate mechanics course. Additional responsibilities included managing five teaching assistants and ensuring a smooth functioning of the conceptual physics labs.
- Summer 2023, 24  **Undergraduate Physics Instructor of Record, UM, Oxford, MS.**
Offered to selected teaching assistants - responsible for designing and teaching an undergraduate summer course on Electromagnetism.
- Fall 2020 – Spring 2023  **Teaching Assistant for Physics labs, UM, Oxford, MS.**

Other Positions

- Spring 2026 - Present  **Academic Professional, Physics Department, Arizona State University (ASU), Tempe, USA.**
Hybrid faculty-staff position: online lab instructor, instructional support, and departmental outreach coordinator.
- Spring 2017 – Spring 2019  **Student assistant, IT department, Max Planck Institute for Gravitational Physics (AEI), Potsdam, Germany.**
Responsible for updating inventory database and improving user interface.

Honors, Awards & Scholarships

- Spring 2025
- 📌 [2025 Doctoral Class Marshall](#)
An honor awarded to two doctoral students each year for exemplary research, service, and leadership, recognizing them as leaders of their cohort at the doctoral hooding ceremony. [Speech as the Doctoral Class Marshal.](#)
 - 📌 [CLA Research and Creative Showcase Winner](#)
Won First Place among 30+ College of Liberal Arts participants for a creative demonstration of spacetime curvature and gravitational wave generation and propagation.
 - 📌 **Outreach Award**
Recognized by the Department of Physics and Astronomy for continued efforts towards service and outreach.
 - 📌 **UM Excellence in Community Engaged Teaching and Learning Award**
Recognized for my role as Public Relations Coordinator in Astronomy Outreach—an annual award honoring initiatives that advance community-engaged teaching, research, service, and scholarship.
- Fall 2024
- 📌 [2024 UM 3 Minute Thesis Grand Prize Winner](#)
Awarded to one graduate student annually in a research communication competition. Selected as the winner from over 80 participants, and represented UM at the Conference of Southern Graduate Schools Regional 3MT Competition.
- Spring 2024
- 📌 **2024 StudyMississippi International Graduate Student of the Year**
Awarded to one international graduate student from the participating schools across the State of Mississippi each year - chosen from candidates across Mississippi based upon exemplary academic achievement, intercultural engagement, and community involvement.
 - 📌 **Excellence in Community Engagement Partnership Development Award,**
Recognized for my contributions as Public Relations Coordinator in organizing Astronomy Public Outreach—an award given annually to one community-engaged initiative.
 - 📌 [Gulf Coast Gravity Meeting \(GCGM10\), Best Student Presentation Award](#)
Among 30 participants
- 2023 – 2024
- 📌 [SEC Emerging Scholars Doctoral Fellow,](#)
Awarded to three Doctoral students from each participating university in the South Eastern Conference (SEC) for demonstrated commitment to diversity reflected by my work in the UM Association of Graduate Women in STEM, and having shown excellence in academics and research.
- 2022 – 2023
- 📌 **Best New Student Organization of the Year**
Presented annually to one UM student organization for outstanding contributions to its members and the broader UM community during its first year of registration - **Awarded to the Association of Graduate Women in STEM (AGWiS) under my inaugural presidency.**
- 2015 – 2016
- 📌 **INSPIRE Scholarship,** Department of Science and Technology, Government of India
Awarded to the top 1% ranking students of the state of Maharashtra.
- Spring 2016
- 📌 **Late Prof D.S.Jog Prize,** Fergusson College, Pune.
Endowment Prize awarded for second highest marks in Physics from a class of 120 students.

Publications

In Preparation

- 1 A. Johnson, **P. Narayan**, and J. Kanner, LISA Global Fit Cataloging Metrics, 2026.
- 2 **P. Narayan**, N. K. Johnson-McDaniel, and A. Gupta, Effect of Waveform Systematics on Tests of General Relativity, 2026.

Peer Reviewed Articles

- 1 ***P. Narayan**, N. K. Johnson-McDaniel, and A. Gupta, "Effect of Type II Strong Gravitational Lensing on Tests of General Relativity," *arxiv*, Dec. 2024, Under review on Physical Review D. [🔗 URL: https://arxiv.org/abs/2412.13132.](https://arxiv.org/abs/2412.13132)
- 2 *A. Gupta-25 others-**P. Narayan**-16 others, "Possible Causes of False General Relativity Violations in Gravitational Wave Observations," *arXiv preprint*, May 2024, (**Contributed in writing about misinterpreting eccentricity as a potential false GR violation**). [🔗 DOI: 10.21468/SciPostPhysCommRep.5.](https://doi.org/10.21468/SciPostPhysCommRep.5)
- 3 ***P. Narayan**, N. K. Johnson-McDaniel, and A. Gupta, "Effect of ignoring eccentricity in testing general relativity with gravitational waves," *Phys. Rev. D*, vol. 108, p. 064 003, 6 Sep. 2023. [🔗 DOI: 10.1103/PhysRevD.108.064003.](https://doi.org/10.1103/PhysRevD.108.064003)
- 4 H. Bohra, S. Choudhury, P. Chauhan, **P. Narayan**, S. Panda, and A. Swain, "Relating the curvature of De Sitter universe to open quantum Lamb shift spectroscopy," *The European Physical Journal C*, May 2019. [🔗 DOI: 10.48550/arXiv.1905.07403.](https://doi.org/10.48550/arXiv.1905.07403)

LIGO-Virgo-KAGRA Collaboration papers

- 1 A. G. Abac et al. (The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration), Observation of Gravitational Waves from the Coalescence of a 2.5-4.5 M_{\odot} Compact Object and a Neutron Star, 2024. [🔗 DOI: 10.3847/2041-8213/ad5beb.](https://doi.org/10.3847/2041-8213/ad5beb)
- 2 A. G. Abac et al. (The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration), Search for continuous gravitational waves from known pulsars in the first part of the fourth LIGO-Virgo-KAGRA observing run, 2025. [🔗 DOI: 10.3847/1538-4357/adb3a0.](https://doi.org/10.3847/1538-4357/adb3a0)
- 3 A. G. Abac et al. (The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration), All-sky search for long-duration gravitational-wave transients in the first part of the fourth LIGO-Virgo-KAGRA Observing run, 2025. [🔗 DOI: 10.48550/arXiv.2507.12282.](https://doi.org/10.48550/arXiv.2507.12282)

Conference Proceedings

- 1 H. Shankar, A. Tiwary, and **P. Narayan**, Highly efficient method towards space debris scavenging, 2015. [🔗 URL: https://www.un-spider.org/sites/default/files/ISC2015_Proceedings.pdf.](https://www.un-spider.org/sites/default/files/ISC2015_Proceedings.pdf)

Research Presentations

Invited

- 1 **Vanderbilt University and Fisk University**, Tennessee, USA, *Lensing the Truth? How Strong Gravitationally Lensed GWs impact tests of GR*, 2025.
- 2 **Princeton Gravity Initiative**, Princeton, USA, *Testing General Relativity with Gravitational Waves in the Presence of Missing Physics*, 2024.
- 3 **NASA Goddard Space Flight Center**, Maryland, USA, *GR Deviations or Mimicking Biases? Understanding Effects of Eccentricity and Strong Gravitational Lensing on GW Tests of GR*, 2024.
- 4 **Center for Gravitational Physics**, Texas, USA, *Exploring Deviations in Tests of General Relativity with Binary Black Hole Coalescences: Eccentricity and Strong Gravitational Lensing Effects*, 2024.
- 5 **Sissa (International School for Advanced Studies)**, Trieste, Italy, *Is missing physics mimicking GR deviations? investigating effects of eccentricity and strong lensing on GW tests of GR*, 2024.
- 6 **Università degli Studi di Milano Bicocca**, Milan, Italy, *Uncovering Missing Physics: Eccentricity and Strong Gravitational Lensing Effects on GW tests of GR*, 2024.
- 7 **University of Tennessee, Fall Conference - Sixth Edition**, *Ripples in Spacetime: A New Era of Black Hole Exploration*, 2024.

Contributed

- 1 **Gulf Coast Gravity Meeting 11**, UM, Probing biases in Tests of GR due to Strong Gravitational Lensing of Gravitational Waves, 2025.
- 2 **APS April Meeting**, Sacramento, Assessing biases in testing general relativity due to Type II lensing of binary black hole signals, 2024.
- 3 **Gulf Coast Gravity Meeting 10**, UT Austin, Impact of Strong Gravitational Lensing on GR Tests with Binary Black Hole Signals, 2024.
- 4 **Physics and Astronomy Joint Research Symposium**, UM, Impact of Strong Gravitational Lensing on GR Tests with Binary Black Hole Signals, 2024.
- 5 15th **Edoardo Amaldi Conference on Gravitational Waves**, *When can we ignore eccentricity when testing general relativity with gravitational waves?* 2023.
- 6 **APS April Meeting**, Minneapolis, When can we ignore eccentricity when testing general relativity with gravitational waves? 2023.
- 7 **Southeastern Section of the American Physical Society (SESAPS) Annual Meeting**, UM, When can we ignore eccentricity when testing general relativity with gravitational waves? 2022.

Poster

- 1 **50 Years of Horndeski Gravity: Exploring Modified Gravity**, Perimeter Institute and University of Waterloo, GR Deviations or Biases? Effects of Eccentricity and Strong Gravitational Lensing on GW tests of GR, 2024.

Skills


Software 📌 Coding: **PYTHON**, **L^AT_EX**, Web Dev: **HTML**, **JavaScript**, **Wix**
GW software 📌 **Standard LVK GW analysis software**

Mentorship Experience










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| Research Mentorship | 📌 Mentoring junior graduate students. Charlie Winborn : University of Missouri, USA, Fall 2024 - Present , <i>Tests of GR on GW signals with non-stationary noise</i> . |
| Mentoring with Ph.D. Applications | 📌 Yearly, I support ~ 3 physics and astronomy students from India and Sri Lanka with their applications by discussing the application timeline, providing feedback on written essays, and giving advice regarding offers and rejections. |
| Mentoring underprivileged girls | 📌 Supported financially disadvantaged girls from the NGO, Udayan Shalini Foundation in India by enhancing their English speaking skills and guiding them through job applications. Developed and taught a compact course on English grammar and communication skills and assisted ~ 25 girls in drafting and reviewing their applications. |

Leadership & Service







- Fall 2024 - Present
- 📌 **AGWiS** - Public Outreach Officer
Leading STEM Mentorship Program and coordinating collaborative work with the UM Department of Outreach and AGWiS.
 - 📌 **Physics Graduate Student Association** - Outreach Coordinator
Facilitating Public Outreach at the Department of Physics and Astronomy.





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| Fall 2023 - Present | <ul style="list-style-type: none">  Oxford Science Cafe - Co-organizer An initiative towards public outreach where we talk about science in a cafe setting, Oxford, Ms. |
| Spring 2022 - Present | <ul style="list-style-type: none">  Astronomy Public Outreach - Public Relations Responsible for advertising initiatives of Astronomy Outreach on campus and social media. |
| Fall 2023 - 2024 | <ul style="list-style-type: none">  Physics Graduate Student Association - Head of Student Affairs Lead the initiative to make officials of the Graduate School aware of payroll inconsistencies with increasing cost of living, successfully leading to a hike of \$2000 in graduate student salaries. |
| Fall 2022 - 2024 | <ul style="list-style-type: none">  Badminton Club - Vice President |
| Spring 2022 - Fall 2024 | <ul style="list-style-type: none">  Association of Graduate Women in STEM - Founder/Inaugural President |
| Fall 2023 | <ul style="list-style-type: none">  Increasing Minority Access to Graduate Education (IMAGE) program - Tutor |
| Fall 2021 - Fall 2022 | <ul style="list-style-type: none">  Badminton Club - First Female International Graduate Student President |
| Fall 2013 - Fall 2016 | <ul style="list-style-type: none">  Lead Savitribai Phule Pune University's teams for Inter-University Badminton and Table Tennis Tournaments. |

Outreach Talks and Video Appearances

-  Astronomy Outreach Public Talk, UM, [THE GREAT PLANETARY ALIGNMENT OF 2025](#), 2025.
-  UM SEC Emerging Scholars, [INTERVIEW](#), 2023.
-  Volunteered: **Gravitational Wave Summer Workshop**, UM, *Gravitational wave detectors*, 2024.
-  Invited: **First High School Research Conference**, UM, *From curiosity to discovery: Researching black holes and gravity*, 2024.
-  Invited: **Webinar: Introduction to Gravitational Wave Astronomy**, University of Sri Jayawardenapura, [GRAVITY'S SECRETS: THE FASCINATING WORLD OF BLACK HOLES THROUGH THE LENS OF GRAVITATIONAL WAVES](#), 2024.
-  **Center for Multi-messenger Astrophysics**, UM, [APS TV](#), 2023.
-  **Fergusson College, Pune, India**, [A JOURNEY FROM A BACK-BENCHER TO A GRAVITATIONAL PHYSICIST](#), a popular talk given to physics aspiring undergraduate students, 2018.
-  **Udayan Care, Pune, India**, [WHAT WILL THE SOCIETY SAY IF I PURSUE MY DREAMS?](#) 2018.
-  **Interview with The German Academic Exchange Service (DAAD), Berlin, Germany**, *Life in germany as a student*.

Event Organization & Outreach Engagement

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| Spring 2024,25 | <ul style="list-style-type: none">  Exhibitor: Science Makers, Mississippi Museum of Natural Science, Jackson. Demos on gravitational-wave science and LIGO science. Focused on contributions of women and minorities in physics. Over 700 elementary-high school student attendees. |
| Fall 2024 | <ul style="list-style-type: none">  Judge: Astronomy Creative Writing Contest |
| Spring 2024 | <ul style="list-style-type: none">  Exhibitor: Environmental Day, Field Station, UM, Oxford, MS Presentation on gravitational-wave physics and LIGO science. Over 45 middle and high school student attendees.  Judge: Mississippi Regional Science Fair  Physics and Astronomy Joint Research Symposium - Co-Organizer |
| Fall 2022 | <ul style="list-style-type: none">  SESAPS - Co-Organizer |

- Fall 2017  **Presenter: Potsdam Science Day**, AEI, Germany.
Public outreach event. Represented the Max Planck Institute for Gravitational Physics.
- Fall 2015  **Frontiers in Physics** - Co-Organizer
- Spring, 2015  **33rd meet of Astronomical Society of India** - Co-Organizer
-  **Presenter: National Science Day**, IUCAA, India.
Public outreach event.

References

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 [Purnima Narayan: Personal Webpage](#)