

Anuradha Gupta

My research interests span gravitational-wave astronomy and astrophysics, theoretical astrophysics, general theory of relativity, physics of neutron stars and black holes, and cosmology.

Contact

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Academic positions

The University of Mississippi <i>Assistant Professor, Department of Physics and Astronomy</i>	Mississippi, USA 2020 - current
Pennsylvania State University <i>Postdoctoral Fellow, Institute for Gravitation and the Cosmos</i>	Pennsylvania, USA 2017-2020
Inter-University Centre for Astronomy and Astrophysics <i>National Postdoctoral Fellow</i>	Pune, India 2014-2017

Education

Tata Institute of Fundamental Research <i>Ph.D., Department of Astronomy and Astrophysics</i> <ul style="list-style-type: none">◦ <i>Thesis advisor:</i> Achamveedu Gopakumar◦ <i>Thesis title:</i> "Probing inspiral dynamics of spinning compact binaries"	Mumbai, India 2009-2014
Banaras Hindu University <i>Master's degree in Physics</i> <ul style="list-style-type: none">◦ <i>Thesis advisor:</i> D. P. Singh◦ <i>Thesis title:</i> "Study on Microcontroller 8051"	Varanasi, India 2007-2009
Dr. Ram Manohar Lohiya Avadh University <i>Bachelor's degree in Science</i>	Ayodhya, India 2004-2007

Metrics

Publications: 31 short-author-list papers published in major peer-reviewed journals, 3 papers in submission stage, 14 papers from LIGO Scientific Collaboration where I have made significant contributions, 7 conference proceedings, 4 white papers, unpublished preprints, technical documents, 1 popular-level article.

Total number of citations (from short-author-list papers): >1,400

Total number of citations (from LIGO Scientific Collaboration papers): >17,700

Presentations: 39 invited talks at conferences and department seminars/colloquia, 2 plenary talks, 11 contributed talks at conferences, 11 poster presentations, 14 outreach talks.

Full list of publications and **Full list of presentations** are available below.

Grants

National Science Foundation, USA. PI, \$150,000, PHYS-2308887 "Collaborative Research: Testing General Relativity with Gravitational-Wave Observations"	2023-2026
National Science Foundation, USA. PI, \$398,053, AST-2205920 "Advancing the Understanding of Compact Binary Formation Through Gravitational-Wave Observations"	2022-2025
Department of Science and Technology, India. PI, \$42,000, 04/2016/000896 "Understanding the interior of neutron stars with gravitational wave observations of binaries containing neutron stars"	2016-2021
Science and Engineering Research Board, India. PI, \$18,000, PDF/2015/000263 "Exploring and understanding neutron star's interior with the help of gravitational wave observations of neutron star-neutron star and neutron star-black hole binaries"	2015-2017

Awards

Individual awards:

- Excellence in Community Engagement Award, The University of Mississippi, USA 2024
- Audience Prize for Best Presentation, Annual Postdoc Research Exhibition, Penn State University 2019
- Best Poster Prize, WE-Heraeus Seminar on Equations of Motion in Relativistic Gravity, Germany 2013
- Qualified CSIR-UGC National Eligibility Test, India 2008, 2009

Group awards:

- The Buchalter Cosmology Prize, Second prize 2019
- Special Breakthrough Prize in Fundamental Physics 2016
- Gruber Foundation Cosmology Prize 2016

Other funding:

- Travel Award, \$1400, Office of Research and Sponsored Programs, University of Mississippi, USA 2024
- International Travel Grant, Council of Scientific and Industrial Research, India 2015
- International Travel Grant, \$1000, Department of Science and Technology, India 2013
- Travel Grant, Indian Space Research Organization, India 2012

Mentorship

Projects resulted in one or more publications marked with *.

Postdocs:

- Nathan Johnson-McDaniel*, The University of Mississippi, USA 2021-current

Ph.D. students:

- Arindam Sharma, The University of Mississippi, USA 2024-current
- Amitesh Singh, The University of Mississippi, USA 2022-current
- Purnima Narayan*, The University of Mississippi, USA 2021-current
- Sumeet Kulkarni*, The University of Mississippi, USA 2020-2024
(currently a writer/director at YouTube channel Veritasium)

Ph.D. students co-mentor:

- Charlie Winborn, Missouri University of Science and Technology, USA 2024-current
- Shilpa Kastha*, Institute of Mathematical Sciences, Chennai, India 2017-2020
(currently an Associate Professor at Saha Institute of Nuclear Physics, India)
- Khun Sang Phukon*, Indian Institute of Technology Kanpur, India 2015-2018
(currently a postdoc at the University of Birmingham, United Kingdom)

- Kabir Chakravarti*, Inter-University Centre for Astronomy and Astrophysics, Pune, India 2015–2017
(currently a postdoc at Institute of Physics of the Czech Academy of Sciences, Czechia)

Master's students:

- Cody McCammon, The University of Mississippi, USA 2023–2024
- Sakshi Madekar*, Indian Institute of Science Education and Research, Mohali, India 2022–2023
(accepted as a Marie Skłodowska-Curie Doctoral Candidate through the DocFam+ program)
- Ish Gupta, Birla Institute of Technology and Science, Pilani, India 2019–2020
(currently a graduate student at Penn State University, USA)
- Chaitanya Afle*, Indian Institute of Science Education and Research, Pune, India 2015–2017
(graduated from Syracuse University, USA; currently a data scientist at BNY Mellon)
- Reetika Dudi, Indian Institute of Technology BHU, Varanasi, India 2015–2016
(graduated from University of Jena, then joined as a postdoc at AEI, Potsdam, Germany)

Undergraduate students:

- Courtland Nobles, The University of Mississippi, USA 2024
- Jessica Swindoll, The University of Mississippi, USA 2021–2022
(received offer to join Graduate School of University of Maryland, Baltimore County, USA)

Summer project students:

- Sakshi Madekar, IISER-Mohali, India 05/2021–07/2021
- Ayush Roy, Pennsylvania State University, USA 05/2019–07/2019
- Yiting Li, Pennsylvania State University, USA 11/2017–06/2018
- Emanuele D'Angelo, University of Rome, Italy 06/2017–07/2017
- Simone Trevisan, University of Milan, Italy 06/2017–07/2017
- Mufaddal Travadi, SVNIT, Surat, Gujarat, India 06/2015–08/2015

Teaching

- *Phys 303: Physical Theory and Techniques* Fall 2024
Instructor, The University of Mississippi, USA
- *Phys 319: Optics* Spring 2023–current
Instructor, The University of Mississippi, USA
- *Phys 629: Statistical Tools for Physics Research* Fall 2023
Instructor, The University of Mississippi, USA
- *Phys 310: Classical Mechanics* Spring 2022–current
Instructor, The University of Mississippi, USA
- *Phys 629/630: Graduate reading course* Spring 2021, Fall 2022, Spring 2023, Fall 2023, Spring 2024
The University of Mississippi, USA
- *Phys 464: Senior Research Project* Fall 2021, Spring 2022, Fall 2024
The University of Mississippi, USA
- *Phys 212: Introductory physics for undergrads II* Fall 2020–Fall 2022
Instructor, The University of Mississippi, USA
- *Phys 211: Introductory physics for undergrads I* Spring 2020–Spring 2022
Instructor, The University of Mississippi, USA
- *Intermediate Electricity and Magnetism* 2018
Guest lecturer, Instructor: B. Sathyaprakash, Pennsylvania State University, USA
- *Tutorials on gravitational wave data analysis* 2016
Advanced School on Gravitational Waves, Presidency University, Kolkata, India
- *Black Hole Perturbation Theory* 2016
Teaching Assistant, Instructor: E. Berti, Summer School on Gravitational-Wave Astronomy,

- International Centre for Theoretical Sciences, Bangalore, India
- *Lecture series on gravitational wave astronomy and astrophysics* 2016
Cotton College State University, Guwahati, India
- *Lecture on dynamics of inspiralling binaries* 2016
Department of Physics, Savitribai Phule University, Pune, India
- *Crash Course on Mathematica* 2015
Sir Parashurambhau College, Pune, India
- *Astronomy and Astrophysics* 2011–2012
Teaching Assistant, Instructor: Achaveedu Gopakumar,
Tata Institute of Fundamental Research, Mumbai, India

Service

Journal review:

- Physical Review D
- Physical Review Letter
- Physical Review Research
- The Astrophysical Journal
- Monthly Notices of the Royal Astronomical Society

Grant/Fellowship proposal review: Panel memberships marked with *.

- National Science Foundation, Physics Division*
- National Science Foundation, Graduate Research Fellowship Program*
- National Science Foundation, MPS Ascending Postdoctoral Research Fellowship
- Department of Defense, National Defense Science and Engineering Graduate Fellowship*
- Swiss National Science Foundation

Conferences organized:

- 10th Physics and Astrophysics at the eXtreme (PAX) workshop/Cosmic Explorer Symposium 2025
SOC member, University of Illinois Urbana-Champaign, USA
- Gulf Coast Gravity Meeting 2025
main organizer, The University of Mississippi, USA
- 9th Physics and Astrophysics at the eXtreme (PAX) workshop 2024
SOC co-chair, King's College, London, United Kingdom
- 89th Annual Meeting of the Southeastern Section of the American Physical Society 2022
LOC member, The University of Mississippi, USA
- Gravitational wave workshop/bootcamp 2015
main organizer, Inter-University Centre for Astronomy and Astrophysics, Pune, India
- An Invitation to Astronomy and Astrophysics 2014
main organizer, Gonda, Uttar Pradesh, India

Leadership roles:

- Chair, new CBC detection committee, LIGO Scientific Collaboration 2025–current
- Vice Chair, Physics and Engineering Division, Mississippi Academy of Sciences 2024–current
- Review Chair, CBC group, LIGO Scientific Collaboration 2022–current
- Group PI, The University of Mississippi, LIGO Scientific Collaboration 2020–current

Panels and service:

- Chair, “Tests of General Relativity” session, 2025
APS Global Physics Summit, California, USA
- Panelist, “Tips on preparing an academic job application for early career scientists”, 2024
Gravitational-Wave Early Career Scientists (GWECS) Organisation, online
- Moderator, “New avenues in physics beyond general relativity” session, 2024
Detection and Analysis of Gravitational Waves in the era of Multi-Messenger Astronomy, Canada
- Panelist, “Equity, Diversity, and Inclusion in Future Large Scale Collaborations” session, 2024

- Physics and Astrophysics at the eXtreme (PAX) workshop, United Kingdom
- Chair, “Source Astrophysics, Waveforms and Modelling” session, 14th Edoardo Amaldi Conference on Gravitational Waves, online 2021
- Panelist, Multiband Gravitational-Wave Science Workshop, Carnegie Mellon University, USA 2021
- Panelist, “PHYS 590 postdoc for graduate students”, Pennsylvania State University, USA 2019
- Developer and reviewer of codes used for data analysis, LIGO Scientific Collaboration 2013–current
- Reviewer, Publications & Presentations (P&P), LIGO Scientific Collaboration 2013–current

Professional memberships:

- Society of Physics Students 2023–current
- International Astronomical Union 2023–current
- LISA Consortium, associate member 2020–current
- American Physical Society 2019–current
- Gravitational Wave International Committee (GWIC)-3G-Science Case Team 2017–2020
- Indian Association of General Relativity and Gravitation, life member 2014–current
- LIGO Scientific Collaboration 2013–current
- IndIGO consortium 2013–2017

Outreach work

- Organizer: Astronomy Art Contest, Astronomy Creative Writing Contest 2023–current
The University of Mississippi, USA
- Organizer: Astronomy Public Talks, Astronomy Trivia 2022–current
The University of Mississippi, USA
- AstroFest Volunteer 2018
Pennsylvania State University, USA
- Prepared Factsheet for events: GW170608, GW170817, GW170814, GW170104 2017
LIGO Scientific Collaboration
- Press release Hindi translation: GW230529, GW170817, GW170814, GW170104, GW151226 2016–current
LIGO Scientific Collaboration
- Translated and dubbed in Hindi “Gravitational Wave Astronomy Indian Perspective Hindi” 2016
<https://www.youtube.com/watch?v=UXQ2hvbKqoE> (9000+ views)
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Preparation of the press conference at IUCAA on 11 Feb. 2016 for the announcement 2016
of the first detection of gravitational-waves from GW150914. In particular, prepared the media kit,
Hindi translations of the press releases from LSC, IndIGO-LSC, and IUCAA.
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Frontier of Science Volunteer 2009–2013
Tata Institute of Fundamental Research, Mumbai, India

Open-source software

- bbh_spin_morphology_prior
- Tilts at infinity
- Contributions to LALSuite’s LALInference package

Computing skills

Programming languages: Python (advanced), Bash, Mathematica, C

Other scientific tools: LALSuite, LaTeX, git

Languages: English (fluent), Hindi (native)

Full publication list

Submitted papers:

3. *Effect of Type II Strong Gravitational Lensing on Tests of General Relativity*
P. Narayan, N. K. Johnson-McDaniel, **Anuradha Gupta**
Submitted to PRD, arXiv:2412.13132
2. *A meta inspiral-merger-ringdown consistency test of general relativity with gravitational wave signals from compact binaries*
S. Madekar, N. K. Johnson-McDaniel, **Anuradha Gupta**, A. Ghosh
submitted to CQG, arXiv:2405.05884
1. *Cosmography with bright and Love sirens*
A. Dhani, S. Borhanian, **Anuradha Gupta**, B. S. Sathyaprakash
submitted to PRD, arXiv:2212.13183

Papers in major peer-reviewed journals:

31. *Possible Causes of False General Relativity Violations in Gravitational Wave Observations*
Anuradha Gupta, K. G. Arun, E. Barausse, L. Bernard, 38 others
Accepted in SciPost Physics Community Reports, arXiv:2405.02197
• [Review article](#)
30. *Predictions of a simple parametric model of hierarchical black hole mergers*
P. Mahapatra, D. Chattopadhyay, **Anuradha Gupta**, M. Favata, K. G. Arun, B. S. Sathyaprakash
Physical Review D 111 023013 (2025), arXiv:2209.05766
29. *Reconstructing the genealogy of LIGO-Virgo black holes*
P. Mahapatra, D. Chattopadhyay, **Anuradha Gupta**, F. Antonini, M. Favata, B. S. Sathyaprakash, K. G. Arun
Astrophysical Journal 975 117 (2024), arXiv:2406.06390
28. *Multiparameter multipolar test of general relativity with gravitational waves*
P. Mahapatra, S. Kasta, **Anuradha Gupta**, B. S. Sathyaprakash, K. G. Arun
Physical Review D 109 064036 (2024), arXiv:2312.06444
27. *Inferring spin tilts of binary black holes at formation with plus-era gravitational wave detectors*
S. Kulkarni, N. K. Johnson-McDaniel, K. S. Phukon, N. V. Krishnendu, **Anuradha Gupta**
Physical Review D 109 043002 (2024), arXiv:2308.05098
26. *Numerical Relativity Estimates of the Remnant Recoil Velocity in Binary Neutron Star Mergers*
S. Kulkarni, S. Padamata, **Anuradha Gupta**, D. Radice, R. Kashyap
Physical Review D 108 103023 (2023), arXiv:2308.03955
25. *Distinguishing binary black hole precessional morphologies with gravitational wave observations*
N. K. Johnson-McDaniel, K. S. Phukon, N. V. Krishnendu, **Anuradha Gupta**
Physical Review D 108 103003 (2023), arXiv:2301.10125
• Open source code: [link](#)
24. *Effect of Ignoring Eccentricity in Testing General Relativity with Gravitational Waves*
P. Narayan, N. K. Johnson-McDaniel, **Anuradha Gupta**
Physical Review D 108 064003 (2023), arXiv:2306.04068
23. *Constraining properties of asymmetric dark matter candidates from gravitational-wave observations*
D. Singh, **Anuradha Gupta**, E. Berti, S. Reddy, B. S. Sathyaprakash
Physical Review D 107 083037 (2023), arXiv:2210.15739
22. *Constraining runaway dilaton models using joint gravitational-wave and electromagnetic observations*
A. Dhani, **Anuradha Gupta**, B. S. Sathyaprakash
Physical Review D 106 064032 (2022), arXiv:2204.08445
21. *Inferring spin tilts at formation from gravitational wave observations of binary black holes: Interfacing precession-averaged and orbit-averaged spin evolution*
N. K. Johnson-McDaniel, S. Kulkarni, **Anuradha Gupta**
Physical Review D 106 1023001 (2022), arXiv:2107.11902
• Open source code: [link](#)
20. *Population inference of spin-induced quadrupole moments as a probe for non-black hole compact binaries*
M. Saleem, N. V. Krishnendu, A. Ghosh, **Anuradha Gupta**, W. Del Pozzo, A. Ghosh, K. G. Arun
Physical Review D 105 104066 (2022), arXiv:2111.04135

19. *Bayesian inference of overlapping gravitational wave signals*
E. Pizzati, S. Sachdev, **Anuradha Gupta**, B. S. Sathyaprakash
Physical Review D 105 104016 (2022), arXiv:2102.07692
18. *Remnant black hole kicks and implications for hierarchical mergers*
P. Mahapatra, **Anuradha Gupta**, M. Favata, K. G. Arun, B. S. Sathyaprakash
Astrophysical Journal Letters 918:L31 (2021), arXiv:2106.07179
• Media coverage: [The Hindu](#), [AAS Nova](#)
17. *Tests of general relativity using multiband observations of intermediate mass binary black hole mergers*
S. Datta, **Anuradha Gupta**, S. Kastha, K.G. Arun, B. S. Sathyaprakash
Physical Review D 103 024036 (2021), arXiv:2006.12137
16. *Dark Sirens to Resolve the Hubble-Lemaître Tension*
S. Borhanian, A. Dhani, **Anuradha Gupta**, K. G. Arun, B. S. Sathyaprakash
Astrophysical Journal Letters 905:L28 (2020), arXiv:2007.02883
• Media coverage: [VICE](#), [Live Science](#), [AAS Nova](#), [Blog Post](#)
15. *Multiparameter tests of general relativity using multiband gravitational-wave observations*
Anuradha Gupta, S. Datta, S. Kastha, S. Borhanian, K. G. Arun, B. S. Sathyaprakash
Physical Review Letters 125 201101 (2020), arXiv:2005.09607
14. *Black holes in the low mass gap: Implications for gravitational wave observations*
Anuradha Gupta, D. Gerosa, K. G. Arun, E. Berti, W. Farr, B. S. Sathyaprakash
Physical Review D 101 103036 (2020), arXiv:1909.05804
13. *Calibrating the cosmic distance ladder using gravitational-wave observations*
Anuradha Gupta, D. Fox, B. S. Sathyaprakash, B. F. Schutz
Astrophysical Journal 886 1 (2019), arXiv:1907.09897
12. *Testing the multipole structure and conservative dynamics of compact binaries using gravitational wave observations: The spinning case*
S. Kastha, **Anuradha Gupta**, K. G. Arun, B. S. Sathyaprakash, C. Van Den Broeck
Physical Review D 100 044007 (2019), arXiv:1905.07277
11. *Effect of orbital eccentricity on the dynamics of precessing compact binaries*
K. Phukon, **Anuradha Gupta**, S. Bose, P. Jain
Physical Review D 100 124008 (2019), arXiv:1904.03985
10. *Systematic effects from black hole-neutron star waveform model uncertainties on the neutron star equation of state*
K. Chakravarti, **Anuradha Gupta**, S. Bose, M. Duez, J. Caro, W. Brege, F. Foucart, S. Ghosh, K. Kyutoku, B. Lackey, M. Shibata, D. A. Hemberger, L. E. Kidder, H. P. Pfeiffer, M. A. Scheel
Physical Review D 99 024049 (2019), arXiv:1809.04349
9. *Testing the multipole structure of compact binaries using gravitational wave observations*
S. Kastha, **Anuradha Gupta**, K. G. Arun, B. S. Sathyaprakash, C. Van Den Broeck
Physical Review D 98 124033 (2018), arXiv:1809.10465
8. *Detection and characterization of spin-orbit resonances in the advanced gravitational wave detectors era*
C. Afle, **Anuradha Gupta**, B. Gadre, P. Kumar, N. Demos, G. Lovelace, H. Choi, H. M. Lee, S. Mitra, M. Boyle, D. A. Hemberger, L. E. Kidder, H. P. Pfeiffer, M. A. Scheel, B. Szilagyi
Physical Review D 98 083014 (2018), arXiv:1803.07695
7. *Implications of binary black hole detections on the merger rates of double neutron stars and neutron star-black holes*
Anuradha Gupta, K. G. Arun, B. S. Sathyaprakash
Astrophysical Journal Letters 849:L14 (2017), arXiv:1708.03939
6. *χ^2 discriminators for searches of gravitational waves from compact binary coalescences*
S. Dhurandhar, **Anuradha Gupta**, B. Gadre, S. Bose
Physical Review D 96 103018 (2017), arXiv:1708.03605
5. *Towards mitigating the effect of sine-Gaussian noise transients on searches for gravitational waves from compact binary coalescences*
S. Bose, S. Dhurandhar, **Anuradha Gupta**, A. Lundgren
Physical Review D 94 122004 (2016), arXiv:1606.06096
4. *Post-Newtonian analysis of precessing convention for spinning compact binaries*
Anuradha Gupta, A. Gopakumar
Classical and Quantum Gravity 32 175002 (2015), arXiv:1507.00406

3. *Gravitational waves from spinning compact binaries in hyperbolic orbits*
L. De Vittori, A. Gopakumar, **Anuradha Gupta**, P. Jetzer
Physical Review D 90 124066 (2014), arXiv:1410.6311
2. *Probing evolution of binaries influenced by the spin-orbit resonances*
Anuradha Gupta, A. Gopakumar
Classical and Quantum Gravity 31 105017 (2014), arXiv:1312.0217
1. *Time-domain inspiral templates for spinning compact binaries in quasi-circular orbits described by their orbital angular momenta*
Anuradha Gupta, A. Gopakumar
Classical and Quantum Gravity 31 065014 (2014), arXiv:1308.1315

LIGO Scientific Collaboration papers with my significant contributions

As the LIGO CBC review chair, I have coordinated reviews of 5 papers (not listed below).

14. *GWTC-2.1: Deep Extended Catalog of Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run*
R. Abbott et al. (including **Anuradha Gupta**)
Physical Review D 109 022001 (2024), arXiv:2108.01045
 - [The paper reported spin tilts at infinity using the code developed by my group.](#)
13. *GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run*
R. Abbott et al. (including **Anuradha Gupta**)
Physical Review X 13 041039 (2023), arXiv:2111.03606
 - [The paper reported spin tilts at infinity using the code developed by my group.](#)
12. *Tests of General Relativity with GWTC-3*
R. Abbott et al. (including **Anuradha Gupta**)
Accepted in PRD, arXiv:2112.06861
 - [Served as overall analysis review chair and also reviewed one of the analyses in the paper.](#)
11. *Tests of General Relativity with Binary Black Holes from the second LIGO-Virgo Gravitational-Wave Transient Catalog*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review D 103 122002 (2021), arXiv:2010.14529
 - [Served as one of the 5 editors and also reviewed one of the analyses in the paper.](#)
10. *GW190814: Gravitational Waves from the Coalescence of a $23 M_{\odot}$ Black Hole with a $2.6 M_{\odot}$ Compact Object*
B. P. Abbott et al. (including **Anuradha Gupta**)
Astrophysical Journal Letters 896:L2 (2020), arXiv:2006.12611
 - [Reviewed one of the analyses presented in Section 5 of the paper.](#)
9. *Tests of General Relativity with the Binary Black Hole Signals from the LIGO-Virgo Catalog GWTC-1*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review D 100 104036 (2019), arXiv:1903.04467
 - [Reviewed the results presented in Section VA of the paper.](#)
8. *GWTC-1: A Gravitational-Wave Transient Catalog of Compact Binary Mergers Observed by LIGO and Virgo during the First and Second Observing Runs*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review X 9 031040 (2019), arXiv:1811.12907
 - [This paper reported properties of binary black hole merger remnant, computed by me.](#)
7. *Properties of the binary neutron star merger GW170817*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review X 9 011001 (2019), arXiv:1805.11579
 - [Participated in the parameter estimation analyses to get the parameters of this signal.](#)
6. *GW170608: Observation of a 19-solar-mass Binary Black Hole Coalescence*
B. P. Abbott et al. (including **Anuradha Gupta**)
Astrophysical Journal Letters 851:L35 (2017), arXiv:1711.05578
 - [The paper used a code that I developed to compute the properties of this binary black hole merger remnant.](#)
5. *GW170814: A three-detector observation of gravitational waves from a binary black hole coalescence*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review Letters 119 141101 (2017), arXiv:1709.09660
 - [Participated in the parameter estimation analyses to get the parameters of this signal.](#)

4. *GW170104: Observation of a 50-Solar-Mass Binary Black Hole Coalescence at Redshift 0.2*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review Letters 118 221101 (2017), arXiv:1706.01812
• [The paper used a code that I developed to compute the properties of this binary black hole merger remnant.](#)
3. *Binary black hole mergers in the first advanced LIGO observing run*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review X 6 041015 (2016), arXiv:1606.04856
• [The paper used a code that I developed to compute the properties of this binary black hole merger remnant.](#)
2. *GW151226: Observation of gravitational waves from a 22 solar-mass binary black hole coalescence*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review Letters 116 241103 (2016), arXiv:1606.04855
• [The paper used a code that I developed to compute the properties of this binary black hole merger remnant.](#)
1. *An improved analysis of GW150914 using a fully spin-precessing waveform model*
B. P. Abbott et al. (including **Anuradha Gupta**)
Physical Review X 6 041014 (2016), arXiv:1606.01210
• [Provided comments to improve the writing of the paper.](#)

Conference proceedings:

7. *Recoil Velocity of Binary Neutron Star Merger Remnants*
S. Kulkarni, S. Padamata, **Anuradha Gupta**
Proceedings of the International Astronomical Union, 16(S363), 250-254 (2023)
6. *Statistical study of spin dynamics in precessing binary black holes in eccentric orbits*
P. Jain, K. S. Phukon, **Anuradha Gupta**, S. Bose
Proceedings of the International Conference “The multi-messenger astronomy: gamma-ray bursts, search for electromagnetic counterparts to neutrino events and gravitational waves”, Russia, Nizhnij Arkhyz (SAO RAS), 10.26119/SAO.2019.1.35514
5. *Inspiral waveforms for spinning compact binaries in a new precessing convention*
Anuradha Gupta, A. Gopakumar
Journal of Physics: Conference Series 716 012012 (2016), arXiv:1606.01769
4. *Tackling excess noise from bilinear and nonlinear couplings in gravitational-wave interferometers*
S. Bose, B. Hall, N. Mazumder, S. Dhurandhar, **Anuradha Gupta**, A. Lundgren
Journal of Physics: Conference Series 716 012007 (2016), arXiv:1602.02621
3. *Time-domain inspiral templates for spinning compact binaries*
Anuradha Gupta, A. Gopakumar
Fundamental Theories of Physics 179 Springer (2015), arXiv:1506.02788
2. *The remains of a spinning, hyperbolic encounter*
L. De Vittori, A. Gopakumar, **Anuradha Gupta**, P. Jetzer
Proceedings of the LISA Symposium X, **Journal of Physics: Conference Series** 610 012048 (2015), arXiv:1410.6606
1. *Memory effect from spinning unbound binaries*
L. De Vittori, A. Gopakumar, **Anuradha Gupta**, P. Jetzer
Astrophysics and Space Science Proceedings Volume 40 259-266 (2015), arXiv:1410.6605

White papers, unpublished preprints, technical documents:

4. *A Horizon Study for Cosmic Explorer: Science, Observatories, and Community*
M. Evans, R. X. Adhikari, C. Afle, S. W. Ballmer, S. Biscoveanu, S. Borhanian, D. A. Brown, Y. Chen, R. Eisenstein, A. Gruson, **Anuradha Gupta**, E. D. Hall, R. Huxford, B. Kamai, R. Kashyap, K. Kuns, P. Landry, A. Lenon, G. Lovelace, L. McCuller, K. K. Y. Ng, A. H. Nitz, J. Read, B. S. Sathyaprakash, D. H. Shoemaker, B. J. J. Slagmolen, J. R. Smith, V. Srivastava, L. Sun, S. Vitale, R. Weiss
arXiv:2109.09882
3. *The GstLAL Search Analysis Methods for Compact Binary Mergers in Advanced LIGO’s Second and Advanced Virgo’s First Observing Runs*
S. Sachdev, S. Caudill, H. Fong, R. Lo, C. Messick, D. Mukherjee, R. Magee, L. Tsukada, K. Blackburn, P. Brady, P. Brockill, K. Cannon, S. Chamberlin, D. Chatterjee, J. Creighton, P. Godwin, **Anuradha Gupta**, C. Hanna, S. Kapadia, R. Lang, T. G. F. Li, D. Meacher, A. Pace, S. Privitera, L. Sadeghian, L. Wade, M. Wade, A. Weinstein, S. Xiao
arXiv:1901.08580

2. *Quantum gravity and black-hole spin in gravitational wave observations: a test of the Bekenstein-Hawking entropy*
E. Bianchi, **Anuradha Gupta**, H. M. Haggard, B. S. Sathyaprakash
arXiv:1812.05127
1. *Determining the final spin of a binary black hole system including in-plane spins: Method and checks of accuracy*
N. K. Johnson-McDaniel, **Anuradha Gupta**, P. Ajith, D. Keitel, O. Birnholtz, F. Ohme, S. Husa
LIGO-T1600168

Popular article

1. *Doing is understanding: science fun in India*
A. P. Singh, **Anuradha Gupta**, R. Gulvady, A. Mhamane, T. E. Saunders
Science in School 34: 45-51 (2015), arXiv:1511.09007

Full presentation list

Invited talks marked with *

Talks at conferences/meetings:

- 27.* *Challenges in claiming general relativity violation*
Detection and Analysis of Gravitational Waves in the Era of Multi-Messenger Astronomy: From Mathematical Modeling to Machine Learning, Canada, November 2024
- 26.* *Future Challenges in Testing General Relativity*
XG Mock Data Challenge Workshop, Penn State University, USA, June 2024
- 25.* *Probing Fundamental Physics with Gravitational Waves*
10th International Conference on Gravitation and Cosmology, IIT Guwahati, India, December 2023
- 24.* *Testing general relativity with meta Inspiral-Merger-Ringdown Consistency Test*
New insights into particle physics from quantum information and gravitational waves, U. of Lethbridge, Canada, June 2023
- 23.* *Tests of General Relativity with Gravitational Waves: current status and challenges ahead*
Testing Aspects of General Relativity-II, Online, April 2023
- 22.* *Tests of General Relativity with Gravitational Waves*
Gravitational Wave Physics and Astronomy Workshop, Melbourne, Australia, December 2022
- 21.* *Cosmography with bright and aphotc sirens with Love*
89th Annual Meeting of the Southeastern Section of the American Physical Society, Mississippi, November 2022
- 20.* *Tests of General Relativity with Gravitational Waves: current status*
Symposium on Gravitational wave physics and astronomy: Genesis, Kyoto University, Japan, April 2022
- 19.* *Observation and astrophysics of gravitational waves: Current status and future prospects*
Second Chennai Symposium on Gravitation and Cosmology, India, February 2022
18. *Multiparameter tests of GR using multiband observations of stellar mass binary black holes*
14th Edoardo Amaldi Conference on Gravitational Waves, Australia, July 2021
- 17.* *Rigorous tests of General Relativity with Multiband Gravitational-Wave observations*
2021 Multiband Gravitational-Wave Science Workshop, The McWilliams Center for Cosmology, Carnegie Mellon University, USA, May 2021
16. *Multiparameter tests of GR using multiband observations of stellar-mass binary black holes*
31th Indian Association for General Relativity and Gravitation, India, December 2020
15. *Multiparameter tests of GR using multiband observations of stellar-mass binary black holes*
American Physical Society Mid Atlantic Section Meeting, December 2020
14. *Multiparameter tests of GR using multiband observations of stellar-mass binary black holes*
Midwest Relativity Meeting, October 2020
13. *Multiparameter tests of GR using multiband observations of stellar-mass binary black holes*
13th International LISA Symposium, September 2020
12. *Calibrating the cosmic distance ladder using gravitational wave observations*
IGC@25, Pennsylvania State University, USA, July 2019
11. *Bekenstein-Hawking entropy and gravitational wave observations*
LOOPS'19, Pennsylvania State University, USA, July 2019
10. *Calibrating the cosmic distance ladder using gravitational-wave observations*
American Physical Society meeting, Denver, USA, April 2019
- 9.* *Binary black hole mergers observed by LIGO and Virgo during the first and second observing runs*
Physics and astrophysics at the extreme/MM19-Multimessenger transients, Pennsylvania State University, USA, February 2019
- 8.* *Compact binary mergers observed by LIGO and Virgo during their first and second observing runs*
30th meeting of the IAGRG, BITS, Pilani, Hyderabad Campus, India, January 2019
- 7.* *Testing the multipolar structure of compact binary spacetimes*
Focus Session: Dynamical Horizons, Binary Coalescences, Simulations and Waveforms, Pennsylvania State University, USA, July 2018
- 6.* *Challenges in parameter estimation of gravitational wave signals*
Lights, Sounds, Action in Strong Field Gravity, Perimeter Institute, Waterloo, Canada, November 2017
- 5.* *Properties of GW170104 and their significance*
Eastern Gravity Meeting, Pennsylvania State University, USA, May 2017
- 4.* *Detection of GWs from spin-orbit resonant binaries in advanced detector era*
Indo-Korean GW workshop, Inter-University Centre for Astronomy and Astrophysics, Pune, India, January 2016

3. *Effect of noise transients in CBC searches*
International Conference on Gravitation and Cosmology, IISER Mohali, Punjab, India, December 2015
2. *Post-Newtonian analysis of precessing convention for spinning compact binaries*
Amaldi11, Gwangju, South Korea, June 2015
1. *Efficient gravitational wave phasing for spinning compact binaries*
GR20/Amaldi10 Conferences, Warsaw, Poland, July 2013

Department seminars/colloquia:

- 25.* *Accessing Causes of False General Relativity Violation Using Gravitational Wave Observations*
Missouri University of Science and Technology, USA, October 2024
- 24.* *Effect of Missing Physics on Tests of General Relativity with Gravitational Waves*
Nuclear Physics from Multi-Messenger Mergers (NP3M) group, September 2023
- 23.* *Extracting astrophysics from spin precession in binary black holes*
GAPP Seminar, Pennsylvania State University, April 2023
- 22.* *Extracting astrophysics from spin precession in binary black holes*
Gravity Seminar, University of Balearic Islands, Spain, February 2023
- 21.* *Binary remnants and hierarchical mergers*
California State University at Los Angeles, USA, December 2021
- 20.* *Tests of General Relativity with Gravitational Waves: current status and future prospects*
Center for Gravitation, Cosmology & Astrophysics, University of Wisconsin-Milwaukee, USA, May 2021
- 19.* *Tests of General Relativity with Gravitational Waves: current status and future prospects*
The University of Memphis, USA, March 2021
- 18.* *Tests of General Relativity with Gravitational Waves: current status and future prospects*
Institute for Gravitation and Cosmos, Pennsylvania State University, USA, February 2021
- 17.* *Physics and astrophysics with gravitational waves from compact binary coalescences*
University of Mississippi, USA, February 2019
- 16.* *Physics and astrophysics with gravitational waves from compact binary coalescences*
Institute for Theoretical Physics, Goethe University Frankfurt, Germany, January 2019
- 15.* *Physics and astrophysics with gravitational waves from compact binary coalescences*
University of Potsdam, Potsdam, Germany, January 2019
- 14.* *Testing the multipolar structure of compact binary spacetimes*
Johns Hopkins University, USA, November 2018
- 13.* *Using spins to unravel the formation history of binary black holes*
Max Planck Institute for Gravitational Physics (AEI), Hannover, Germany, September 2018
- 12.* *Use of spins to unravel the formation history of binary black holes*
University of Amsterdam, The Netherlands, August 2018
- 11.* *Effective spin can tell us the properties of binary black hole population*
Inter-University Centre for Astronomy and Astrophysics, Pune, January 2018
- 10.* *Effective spin can constrain the formation history of the binary black hole population*
International Centre for Theoretical Sciences, Bangalore, December 2017
- 9.* *Gravitational waves from black hole binaries*
Indian Institutes of Science Education and Research, Mohali, October 2016
- 8.* *Detection of Gravitational Waves from GW150914 and its Implications*
Department of Physics and Astrophysics, University of Delhi, India, May 2016
- 7.* *Ongoing efforts to constrain EoS of neutron stars from gravitational waves*
National Centre for Radio Astrophysics - Tata Institute of Fundamental Research, Pune, India, January 2016.
- 6.* *Noise transients in GW detector data: their modeling and implications*
Seoul National University, Seoul, South Korea, July 2015
- 5.* *Characterization of noise transients in GW detector data and its implications*
Korea Institute of Science and Technology Information, Daejeon, South Korea, June 2015
- 4.* *Memory effect from spinning compact binaries in hyperbolic orbits*
National Centre for Radio Astrophysics - Tata Institute of Fundamental Research, Pune, India, November 2014
- 3.* *Benefits of a new approach for constructing time domain inspiral templates for spinning compact binaries*
Max Planck Institute for Gravitational Physics (AEI), Honnover, Germany, July 2013.
- 2.* *Probing the benefits of a new approach for constructing templates for spinning compact binaries*
Inter-University Centre for Astronomy and Astrophysics, Pune, India, May 2013
- 1.* *Accurate and efficient gravitational wave phasing for spinning compact binaries*
Institute for Theoretical Physics, Friedrich Schiller University, Jena, Germany, March 2013

Poster presentations:

11. *Quantum gravity and black hole spin in gravitational wave observations*
Indian Association for General Relativity and Gravitation, BITS, Pilani, Hyderabad, India, January 2019
10. *Quantum gravity and black hole spin in gravitational wave observations*
Gravitational Wave Physics and Astronomy Workshop, Maryland, USA, December 2018
9. *Towards an effective signal-based discriminator for searches of gravitational waves from compact binary coalescences*
34th ASI meeting, University of Kashmir, Jammu and Kashmir, India, May 2016
8. *L-based precessing convention for spinning compact binaries*
Gravitational Wave Physics and Astronomy Workshop, Osaka, Japan, June 2015
7. *Post-Newtonian analysis of precessing convention for spinning compact binaries*
Indian Association for General Relativity and Gravitation, Bangalore, India, March 2015
6. *On spinning compact binaries experiencing spin-orbit resonances*
Gravitational Wave Physics and Astronomy Workshop, Pune, India, December 2013
5. *Time domain inspiral templates for spinning compact binaries*
Gravitational Wave Physics and Astronomy Workshop, Pune, India, December 2013
4. *Initial dominant spin orientation for unequal mass spinning compact binaries*
GR20/Amaldi10 Conferences, Warsaw, Poland, July 2013
3. *New approach for constructing time-domain inspiral templates for spinning compact binaries*
School of Gravitational waves, Warsaw, Poland, July 2013
2. *Accurate and efficient gravitational wave phasing For spinning compact binaries*
524. WE-Heraeus Seminar on Equations of Motion in Relativistic Gravity, Bad Honnef, Germany, February 2013
• **Best presentation award.**
1. *Gravitational wave phasing for compact binaries in hyperbolic orbits*
International Conference on Gravitation and Cosmology, Goa, India, December 2011

Public outreach talks:

- 14.* *Listening to the Symphony of the Universe*
Oxford Science Café, Mississippi, USA, October 2024
- 13.* *An Introduction to Gravitational Waves*
University of Alabama in Huntsville, USA, September 2024
- 12.* *Gravitational waves: A new window on the Universe*
Indian Institute of Technology Hyderabad, India, March 2022
11. *Mini-keynote on 'I am STEM'*
Pennsylvania State University, USA, November 2019
- 10.* *Gravitational waves: A new window on the Universe*
State College Area High School, Pennsylvania, USA, October 2019
9. *Listening to the symphony of the Universe*
Pennsylvania State University, USA, September 2019
- 8.* *Gravitational Waves and what they tell us*
National Institute of Science Education and Research, Bhubaneswar, November 2016
- 7.* *Gravitational waves and Career in Astronomy*
Marathi Vidnyaan Parishad Goa Vibhagh, Goa, India, September 2016
- 6.* *Gravitational waves-A window to Universe*
St. Xavier's College, Goa, India, September 2016
- 5.* *Life of an Astronomer*
Science day, Inter-University Centre for Astronomy and Astrophysics, Pune, India, February 2015
4. *Exoplanets: Are we alone in the universe? (in Hindi)*
Science day, Inter-University Centre for Astronomy and Astrophysics, Pune, India, February 2015
3. *Astronomy: From Earth to Sun and beyond*
New English School, Landewadi, Maharashtra, India, February 2015
- 2.* *From Gonda to gravitational wave research: A personal journey*
L. B. S. P. G. College, Gonda, Uttar Pradesh, India, December 2014
1. *Our Solar System and Extra-solar Planets*
Night Sky Observation and Science camp, Badlapur, Maharashtra, India, December 2011