

---

# Subhodeep Sarkar

Postdoctoral Researcher in Theoretical and Computational Gravity  
subhodeeps.github.io | subhodeep.sarkar1@gmail.com

---

## CURRENT POSITION AND AFFILIATION

### Research Associate I (Postdoctoral Fellow)

- Theoretical Gravitational Physics Group  
Department of Physics,  
Indian Institute of Technology Gandhinagar,  
Gujarat, India.

## RESEARCH INTERESTS

### Black Holes in General Relativity and Beyond: Theory and Numerics

Black Hole Perturbation Theory, Quasinormal Modes of Black Holes, Internal Structure of Black Holes, Gravitational Lensing and Black Hole Shadow, Classical and Quantum Aspects of Black Holes, Black Holes in Modified Theories of Gravity, Numerical Relativity, Critical Phenomena in Gravitational Collapse, Hyperboloidal Methods in General Relativity.

## EMPLOYMENT

### Indian Institute of Technology, Gandhinagar, Gujarat, India

- Position: Research Associate I Jun 2026 – Present  
Division: Theoretical Gravitational Physics Group  
Department: Physics  
Mentor: Prof. Sudipta Sarkar  
Funding Agency: Anusandhan National Research Foundation (ANRF),  
Government of India

### Indian Institute of Technology, Madras, Tamil Nadu, India

- Position: Postdoctoral Researcher Aug 2024 – Mar 2026  
Division: Centre for Strings, Gravitation and Cosmology  
Department: Physics  
Mentor: Prof. Dawood Kothawala  
Funding Agency: Centre for Industrial Consultancy  
and Sponsored Research, IIT-M
- Position: Project Scientist (equiv. Postdoctoral Fellow) Apr 2024 – Aug 2024  
Division: Centre for Strings, Gravitation and Cosmology

### Jamia Millia Islamia (Central University), New Delhi, India

- Position: Junior Research Fellow Feb 2023 – Mar 2024  
Department: Centre for Theoretical Physics  
Grant No.: CRG/2020/004347  
Principal Investigator: Prof. Anjan Ananda Sen  
Funding Agency: Science and Engineering Research Board (SERB),  
Department of Science and Technology (DST), Government of India

### Indian Institute of Information Technology, Allahabad, Uttar Pradesh, India

- Position: Senior Research Fellow Jul 2021 – Apr 2022  
Department: Applied Sciences
- Position: Junior Research Fellow Jul 2019 – Jul 2021  
Department: Applied Sciences  
Project: Near Horizon Structure of Black Holes  
Grant No.: ECR/2017/002124  
Principal Investigator: Dr. Srijit Bhattacharjee  
Funding Agency: Science and Engineering Research Board (SERB),  
Department of Science and Technology (DST), Government of India

## EDUCATION

**Indian Institute of Information Technology, Allahabad, Uttar Pradesh, India**

Ph.D., Physics, November 2024

- Thesis Title: *A Descent into the Maelström: Probing the near-horizon structure of black holes using perturbative techniques*
- Thesis Link: Shodhganga
- Supervisor: Dr. Srijit Bhattacharjee, IIIT, Allahabad
- CGPA/DGPI : 9.44
- Completed Credits: 76 (Min. Credits: 64)
- Note: *Thesis Defense on 4 November 2024.*
- Degree awarded during the XX Convocation on 13 September 2025.

**Jamia Millia Islamia (Central University), New Delhi, India**

M.Sc., Physics, June 2018

- CGPA: 9.5 (*Placed in First Class with Distinction*)
- Project Supervisor: Prof. Anjan Ananda Sen
- Topic: The Generalized Proca Action in the Randall-Sundrum Braneworld Scenario
- Special Papers: General Theory of Relativity, Quantum Field Theory, Particle Physics, Classical Field Theory

**Asutosh College, University of Calcutta, Kolkata, West Bengal, India**

B.Sc.(Honours), Physics, June 2016

- Result: First Class with Honours (*Secured 63.625 %*)

**National Gems Higher Secondary School, Kolkata, West Bengal, India**

Indian School Certificate Examination - I.S.C. (Higher Secondary), May 2012

- Result: *Secured 96.00% (aggregate)*

Indian Certificate of Secondary Education - I.C.S.E. (Secondary), May 2010

- Result: *Secured 95.40% (aggregate)*

PUBLICATIONS  
AND PREPRINTS**Preprints**

1. Vitor Cardoso, Shauvik Biswas and **Subhodeep Sarkar**, *The Physics of Black Holes and Their Environments: Consequences for Gravitational Wave Science*, [2511.14841](#) [\[iNSPIRE\]](#).
2. Lodovico Capuano, Thomas Lovo, Gorka Prieto-Varela, **Subhodeep Sarkar**, Adrien Kuntz, Enrico Barausse et al., *When the Ringing Stops: Purely Imaginary Modes in the Ringdown Spectrum of Dynamical Black Holes*, [2605.28951](#) [\[iNSPIRE\]](#).

**Published Papers**

1. Sunil Singh Bohra, **Subhodeep Sarkar** and Anjan Ananda Sen, *Gravitational atoms in the braneworld scenario*, *Phys. Rev. D* **109** (2024) 104021 [[2312.07295](#)] [\[iNSPIRE\]](#).
2. **Subhodeep Sarkar**, Mostafizur Rahman and Sumanta Chakraborty, *Perturbing the perturbed: Stability of quasinormal modes in presence of a positive cosmological constant*, *Phys. Rev. D* **108** (2023) 104002 [[2304.06829](#)] [\[iNSPIRE\]](#).
3. **Subhodeep Sarkar**, Shailesh Kumar and Srijit Bhattacharjee, *Can we detect a supertranslated black hole?*, *Phys. Rev. D* **105** (2022) 084001 [[2110.03547](#)] [\[iNSPIRE\]](#).
4. Srijit Bhattacharjee, **Subhodeep Sarkar** and Arpan Bhattacharyya, *Scalar perturbations of black holes in Jackiw-Teitelboim gravity*, *Phys. Rev. D* **103** (2021) 024008 [[2011.08179](#)] [\[iNSPIRE\]](#).
5. Srijit Bhattacharjee, Shailesh Kumar and **Subhodeep Sarkar**, *Mass inflation and strong cosmic censorship in a nonextreme BTZ black hole*, *Phys. Rev. D* **102** (2020) 044030 [[2005.09705](#)] [\[iNSPIRE\]](#).

PUBLICATION METRICS	<b>INSPIRE HEP</b>	<b>Google Scholar</b>	
	Papers: 7	Papers: 7	
	Citations: 155	Citations: 160	
	h-index: 6	h-index: 5	
	Citations/paper (avg): 22.1	i10-index: 5	
	<b>Semantic Scholar</b>	<b>Web of Science</b>	
	Papers: 7	Papers: 5	
	Citations: 95	Citing Articles: 114	
	h-index: 6	h-index: 5	
	Highly Influential Citations: 5		
SERVICE AND MEMBERSHIP	<b>Academic Collaborations and Networks</b>		
	<ul style="list-style-type: none"> <li>• Hyperboloidal Research Network.</li> </ul>		
	<b>Peer Review</b>		
	<ul style="list-style-type: none"> <li>• <i>Reviewer</i> for General Relativity and Gravitation, European Physical Journal C.</li> </ul>		
	<b>Academic Bodies</b>		
	<ul style="list-style-type: none"> <li>• <i>Life Member</i>, <b>Indian Association for General Relativity and Gravitation (IAGRG)</b>.</li> </ul>		
TEACHING EXPERIENCE	<b>Tutor, Workshop/School/Conference</b>		
	<ul style="list-style-type: none"> <li>• Beyond the Horizon, ICTS Bangalore</li> </ul>	24 Mar 2025 to 04 Apr 2025	
	Workshop on Testing the Black Hole Paradigm		
	Instructor: Vitor Cardoso, NBI Copenhagen and CENTRA, IST Lisbon.		
	<ul style="list-style-type: none"> <li>• Numerical Relativity, IIT Madras</li> </ul>	10 Feb 2025 to 14 Feb 2025	
	The Second School on Black Holes and Gravitational Waves		
	Instructor: Prayush Kumar, ICTS Bangalore.		
	<b>Teaching Assistant, Department of Physics, IIT Madras</b>		
	Classical Physics	2025 Odd Semester	
	Paper Code: PH5820		
Program: B.Tech., M.Sc. and Ph.D.			
Instructor: Prof. Dawood Kothawala			
Computational Physics	2025 Even Semester		
Paper Code: PH5720			
Program: B.Tech. (Dual Degree) and MSc (Physics)			
Instructor: Dr. Samir Choudhuri			
<b>Teaching Assistant, Department of Applied Sciences, IIIT, Allahabad</b>			
Engineering Physics	2022 Odd Semester		
Paper Code: SEGP132C	2021 Odd Semester		
Program: B.Tech. in IT and ECE	2020 Odd Semester		
Instructor: Dr. Srijit Bhattacharjee	2019 Odd Semester		
Biological Data Analytics (Biostatistics)	2021 Odd Semester		
Paper Code: SBDA131C	2020 Odd Semester		
Program: M.Tech. in Bioinformatics			
Instructor: Dr. Srijit Bhattacharjee			
Computational Methods in Physics using Python (CoMP-Py)	2021 Summer Break		
Program: Short Term Certificate Course			
Instructor: Dr. Srijit Bhattacharjee			

Numerical Methods for Bioinformatics Program: M.Tech. in Bioinformatics Instructor: Dr. Srijit Bhattacharjee	2022 Even Semester 2021 Even Semester
Nonlinear Dynamics and Infectious Disease Modeling Program: M.Tech. in Bioinformatics Instructor: Dr. Srijit Bhattacharjee	2022 Odd Semester

## MENTORING

Assisted *Prof. Anjan Ananda Sen* in supervising the following students at **CTP, Jamia Millia Islamia**

- Nargis Rashid (Jamia Millia Islamia), M.Sc. Thesis on *Black Holes and Quasinormal Modes in Modified Gravity*, 2023.

Assisted *Dr. Srijit Bhattacharjee* in supervising the following students at **IIIT, Allahabad**

- Kayyum Yusufali Sayyad (IIIT, Allahabad), M.Tech. Thesis on *Infectious Disease Modeling*, 2023
- Sanchari Biswas and Yuvasri G (Christ University, Bangalore), M.Sc. Thesis on *Black Hole Shadow*, 2022.
- Ashley Chraya (IISER Mohali), Summer Project on *Quasinormal Modes of Black Holes*, 2021.

OTHER  
ACADEMIC  
ACHIEVEMENTS**National Examinations**

- Qualified GATE 2019 (Rank: 993, Score: 462).
- Qualified IIT JAM 2016 (Rank: 863).
- Ranked in the top 1% nationwide in the Indian School Certificate Examination 2012.

**Awards and Scholarships**

- Junior Research Fellowship (DST-SERB) at Jamia Millia Islamia in 2023.
- Senior Research Fellowship (DST-SERB) at IIIT, Allahabad in 2021.
- Junior Research Fellowship (DST-SERB) at IIIT, Allahabad in 2019.
- Merit Based Scholarship for Performance in 1st Year M.Sc. Examination at Jamia Millia Islamia in 2017.

## SKILLS

**Languages:**

- English (C1), Bengali (Native), Hindi (Bilingual).

**Programming:**

- *Experienced in Julia, Wolfram Language (Mathematica), and Python (Scientific Stack).*
- *Familiar with C/C++, FORTRAN, SageMath, Maple, Cadabra.*

**Document Creation:**

- LaTeX, Markdown.

TALKS AND  
POSTER  
PRESENTATIONS**Talks**

- *Solving the Semiclassical Einstein Equations on a Computer* 11 Mar 2025  
Frontiers in Gravity 2026  
**IISER Mohali**
- *Black hole quasinormal mode instability: Insights from the pseudospectrum* 05 Mar 2025  
Physics Seminar  
**Chennai Mathematical Institute**

- *Black hole quasinormal mode instability: Insights from the pseudospectrum* 25 Feb 2025  
Theoretical Physics Seminar  
**Saha Institute of Nuclear Physics, Kolkata**
- *Black hole quasinormal mode instability: Insights from the pseudospectrum* 05 Nov 2024  
Strings Group Seminar  
**Harish-Chandra Research Institute, Prayagraj (Allahabad)**
- *The pseudospectrum of asymptotically de Sitter black holes.* 01 Jul 2024  
Virtual Infinity Workshop 2024  
**Hyperboloidal Research Network**
- *Black hole quasinormal mode instability: Insights from the pseudospectrum* 18 Jan 2024  
CTP Seminar, Centre for Theoretical Physics  
**Jamia Millia Islamia, New Delhi**
- *Perturbing the perturbed: The spectra and pseudospectra of asymptotically de Sitter black holes* 14 Dec 2023  
Departmental Seminar, School of Physical Sciences  
**Indian Association for the Cultivation of Science, Kolkata**
- *Perturbing the perturbed: Quasinormal mode instability in asymptotically de Sitter black holes* 09 Dec 2023  
Parallel Session on Classical and Quantum Gravity  
10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)  
**IIT Guwahati**
- *Testing the Strong Cosmic Censorship Conjecture in Anti-de Sitter spacetimes* 28 Jul 2022  
Departmental Seminar, School of Physical Sciences  
**Indian Association for the Cultivation of Science, Kolkata**
- *The Strong Cosmic Censorship Conjecture in Anti-de Sitter Spacetimes* 18 May 2022  
Atlantic General Relativity 2022  
**Memorial University of Newfoundland and Labrador, Canada**
- *Testing the Strong Cosmic Censorship Conjecture in Anti-de Sitter spacetimes* [Watch on YouTube] 11 Mar 2022  
Testing Aspects of General Relativity  
**IIT Gandhinagar, IIT Allahabad, University of Lethbridge, Canada**
- *Inner-horizon Instability in BTZ Black Holes* 14 Apr 2021  
21st British Gravity Meeting (BritGrav21)  
**University College Dublin, Ireland**
- *Inner-horizon Instability in BTZ Black Holes* 05 Oct 2020  
Workshop on Mathematical and Computational Approaches for Solving the Source-Free Einstein Field Equations  
**ICERM, Brown University, USA**

#### Poster Presentations

- *When the Ringing Stops: Purely Imaginary Modes in the Ringdown Spectrum of Vaidya Black Holes* 10 Jun 2026  
Symphony of Spacetime  
**RRI, Bengaluru**
- *Exploring Quasinormal Modes and Strong Cosmic Censorship in 2D Black Hole Models* 6 Dec 2023  
10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)  
**IIT, Guwahati on behalf of IAGRG**
- *Inner-horizon Instability in BTZ Black Holes* 19 Dec 2020  
31st Meeting of the Indian Association for General Relativity and Gravitation (IAGRG)  
**IIT, Gandhinagar on behalf of IAGRG**

WORKSHOPS,  
CONFERENCES  
AND OTHER  
ACADEMIC  
ACTIVITIES

**Assisted in organizing**

- The Second **School on Black Holes and Gravitational Waves**, IIT, Madras, 10 – 14 Feb 2025.
- Online Workshop on **Numerical and Analytical Relativity (NAR) 2024**, IIT, Allahabad, 20 – 22 March 2024.
- Short Term Certificate Course on **Computational Methods in Physics using Python (CoMP-Py) 2021**, IIT, Allahabad, 01 May – 10 July 2021.
- Vritika Seminars on **Computational and Theoretical Aspects of Gravitational Physics (CompGravIITA)**, IIT, Allahabad, June – July 2021.
- **Applications of Data Science in Astrophysics and Gravitational Wave Research (DSAP) 2019**, IIT, Allahabad, 01 – 03 November 2019.
- **XXXIV Annual Indian Association of Physics Teachers (IAPT) Convention 2019**, IIT, Allahabad, 13 – 15 October 2019.
- **National Seminar on Recent Advances & Innovations in Physics Teaching and Research (RAIPTR) 2019**, IIT, Allahabad, 13 – 15 October 2019.

**Attended**

- **Symphony of Spacetime** organized by RRI, Bengaluru, 10 – 12 June 2026.
- **Frontiers in Gravity 2026** organized by IISER Mohali, 09 – 12 March 2026.
- **The Future of Gravitational-Wave Astronomy** organized by ICTS, Bangalore, 27 – 31 October 2025.
- **Beyond the Horizon: Testing the Black Hole Paradigm** organized by ICTS, Bangalore, 24 March – 04 April 2025.
- **Summer School on Gravitational-Wave Astronomy 2024** organized by ICTS, Bangalore, 01 – 12 July 2024.
- **Predictability in General Relativity** organized by RRI, ICTS and IAGRG, 28 – 29 February 2024.
- **10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)** organized by IAGRG and IIT Guwahati, 05 – 09 December 2023.
- **IAGRG School on Gravitation and Cosmology** organized by IAGRG and ICTS, Bangalore, 09 – 23 October 2023.
- **Testing Aspects of General Relativity II** hosted by IIT Gandhinagar, IIT Allahabad, University of Lethbridge, Canada, 11 – 13 April 2023.
- **Numerical Relativity Community Summer School** organized by the Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, USA, 08 – 12 August 2022.
- **First IAGRG School on Gravitation and Cosmology** organized by the Indian Association of General Relativity and Gravitation (IAGRG), 16 – 28 May 2022.
- **Atlantic General Relativity 2022** hosted by the Memorial University of Newfoundland and Labrador, Canada, 16 – 19 May 2022.
- **Testing Aspects of General Relativity** hosted by IIT Gandhinagar, IIT Allahabad, University of Lethbridge, Canada, 11 – 14 March 2022.
- **Black Hole Inside Out 2021** organized jointly by Florida Space Institute, Tokyo Institute of Technology, and Yukawa Institute of Theoretical Physics (YITP), Kyoto University, 27 September – 1 October 2021.
- **2021 North American Einstein Toolkit School** organized by the National Center for Supercomputing Applications at the University of Illinois Champaign-Urbana, USA, 26 – 30 July 2021.
- **21st British Gravity Meeting (BritGrav21)** hosted by the Relativity Group in the School of Mathematics and Statistics at University College Dublin, 12 – 16 April 2021.
- **31st Meeting of the Indian Association for General Relativity and Gravitation (IAGRG)** organized by IIT, Gandhinagar on behalf of IAGRG, 19 – 20 December 2020.
- **Virtual Workshop on Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects** organized by ICERM, Brown University, USA, 16 – 20 November 2020.

- **Virtual Workshop on Mathematical and Computational Approaches for the Einstein Field Equations with Matter Fields** organized by ICERM, Brown University, USA, 26 – 30 October 2020.
- **Virtual Workshop on Workshop on Mathematical and Computational Approaches for Solving the Source-Free Einstein Field Equations** organized by ICERM, Brown University, USA, 05 – 09 October 2020.
- **Online Workshop on Testing GR using Gravitational Waves** organized by IIT, Gandhinagar and IACS, Kolkata, 13 – 14 August 2020.
- **Student Talks on Trending Topics in Theory (ST4) 2020**, 04 – 14 July 2020.

ACADEMIC  
VISITS**National Visits**

- Indian Institute of Technology Madras, Chennai  
Host: Dr. Dawood Kothawala  
Period: 01 Apr 2026 to 31 May 2026
- Indian Institute of Technology Gandhinagar, Gujarat  
Host: Dr. Sudipta Sarkar  
Period: 24 Apr 2025 to 09 May 2025  
Period: 18 Nov 2024 to 22 Nov 2024
- Indian Institute of Information Technology Allahabad  
Host: Dr. Srijit Bhattacharjee  
Period: 02 Nov 2024 to 07 Nov 2024
- Indian Association for the Cultivation of Science, Kolkata  
Host: Dr. Sumanta Chakraborty  
Period: 26 Apr 2026 to 06 May 2026  
Period: 15 Sep 2025 to 19 Sep 2025  
Period: 14 Feb 2025 to 26 Feb 2025  
Period: 10 Dec 2023 to 15 Dec 2023  
Period: 11 Jul 2022 to 05 Aug 2022

PROJECTS AND  
INTERNSHIPS

- Project Student** Dec 2018 to Mar 2019  
Saha Institute of Nuclear Physics  
Supervisor: Prof. Koushik Dutta  
Topic: Vector Dark Matter Production at the End of Inflation
- M.Sc. Project Student** Jul 2017 to May 2018  
Centre for Theoretical Physics,  
Jamia Millia Islamia  
Supervisor: Prof. Anjan Ananda Sen  
Topic: Gravitation (Basics of General Relativity, Modified Theories of Gravity, Generalized Proca Theories, Warped Geometry and the Randall-Sundrum Model)
- Summer Student** May 2017 to Jul 2017  
Department of Theoretical Physics,  
Indian Association for the Cultivation of Science  
Supervisor: Prof. Dilip Kr. Ghosh  
Topic: A Reading Course on Quantum Field Theory
- Visiting Student** Dec 2016 to Jan 2017  
Quantum Information and Computation Group,  
Harish-Chandra Research Institute  
Supervisor: Prof. Ujjwal Sen  
Topic: A Reading Course on Quantum Entanglement and Quantum Information Theory

## REFERENCES

- Prof. Anjan Ananda Sen  
Professor of Physics,  
Centre for Theoretical Physics,  
Jamia Millia Islamia  
E-mail: aasen@jmi.ac.in

- Prof. Srijit Bhattacharjee  
Head and Associate Professor of Physics,  
Department of Applied Sciences,  
IIT, Allahabad. E-mail: srijitb@iiita.ac.in
- Prof. Dawood Kothawala  
Professor of Physics,  
Centre for Strings, Gravitation and Cosmology,  
Department of Physics,  
IIT, Madras. E-mail: dawood@iitm.ac.in
- Prof. Sumanta Chakraborty  
Assistant Professor of Physics,  
School of Physical Sciences,  
IACS, Kolkata. E-mail: tpsc@iacs.res.in
- Prof. Lekha Nair  
Former Head and Professor of Physics,  
Department of Physics,  
Jamia Millia Islamia. E-mail: lnair@jmi.ac.in
- Prof. Somasri Sen  
Associate Professor of Physics,  
Department of Physics,  
Jamia Millia Islamia. E-mail: ssen@jmi.ac.in
- Prof. Tabish Qureshi  
Former Hony. Director and Professor of Physics,  
Centre for Theoretical Physics,  
Jamia Millia Islamia. E-mail: tabish@ctp-jamia.res.in

CONTACT  
INFORMATION

Theoretical Gravitational Physics Group  
Department of Physics,  
Indian Institute of Technology Gandhinagar  
Palaj, Gujarat 382055.  
Phone: +91 98311 35421, +91 83683 94790  
Primary Email ID: subhodeep.sarkar1@gmail.com  
Other Email IDs: ssarkar@iitg.ac.in, subhodeep.sarkar@physics.iitm.ac.in

OTHER  
INFORMATION

Date of Birth: 17 July 1993  
Nationality: Indian  
Religion: None  
Date of C.V.: 20 June 2026