

# Aditya Vijaykumar

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RESEARCH INTERESTS Gravitational Wave Astronomy and Astrophysics, Tests of General Relativity and Cosmology, Scientific Computing

EDUCATION **International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru**  
Research Scholar and Graduate Student in Physics 2018 - Present

**Birla Institute of Technology and Science (BITS), Pilani**  
M.Sc. (Hons.) Physics and B.E. (Hons.) Mechanical Engineering 2013 - 2018

EMPLOYMENT **Graduate Student**  
**International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru**  
Mentored by *Prof. Parameswaran Ajith* Aug 2018 - Present  
Member of the *LIGO Scientific Collaboration* and the *LIGO-India Scientific Collaboration*

**Fulbright-Nehru Doctoral Research Fellow**  
**Department of Physics, The University of Chicago**  
Mentored by *Prof. Daniel Holz* Aug 2022 - Mar 2023

**SN Bhatt Fellow**  
**International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru**  
Mentored by *Prof. Parameswaran Ajith* May 2018 - July 2018  
Topic - *Cosmological Large-scale Structure probes using gravitational-wave observations*

**Summer Research Intern**  
**The Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India**  
Mentored by *Prof. Raghunathan Srianand* May 2016 - July 2016  
Topic - *Analysis of Quasar Absorption Lines from SDSS Photometric Data*

**Summer Research Intern**  
**The National Centre for Radio Astrophysics (NCRA-TIFR), Pune, India**  
Mentored by *Prof. Yashwant Gupta* May 2015 - July 2015  
Topic - *Testing the fast transient detection pipeline of the GMRT*

SEMINARS AND TALKS

- *Standard Sirens and Large Scale Structure* at **The Quest for Precision Gravitational-wave Cosmology, The University of Chicago**, September 2022 (Invited Talk)
- *Gravitational-wave probes of astrophysics and cosmology: Large Scale Clustering and Lensing* at **IGC, Pennsylvania State University**, August 2022 (Invited Seminar)
- *Constraints on the time variation of the gravitational constant using binary neutron star observations* at **Second Chennai Symposium on Gravitation and Cosmology**, February 2022 (Online Invited Seminar)
- *Probing Large Scale Structure using Binary Black Hole Observations* at **Instituut-Lorentz for Theoretical Physics, Leiden University**, June 2020 (Online Invited Seminar)
- *Constraints on Black Hole Mimickers using GWTC-1* at **ICTS In-house Symposium**, February 2020 (Contributed Poster)

- *Probing Large Scale Structure using Binary Black Hole Observations* at **ICTS In-house Symposium**, ICTS, Bengaluru, India, February 2020 (Contributed Talk)
- *Probing Large Scale Structure using Binary Black Hole Observations* at **International Conference on Gravitation & Cosmology**, IISER, Mohali, India, December, 2019 (Contributed Talk)
- *Probing Large Scale Structure using Binary Black Hole Observations* at **The Inter-University Centre for Astronomy and Astrophysics (IUCAA)**, Pune, India, September 2019 (Invited Talk)
- *Probing Large Scale Structure using Binary Black Hole Observations* at **Max Planck Institute for Gravitational Physics**, Hannover, Germany, June 2019 (Invited Talk)
- *Probing Large Scale Structure using Binary Black Hole Observations* at **GR22 and Amaldi13**, Valencia, Spain, July 2019 (Contributed Talk)
- *Gravitational Lensing from Orbiting Binary* at the **Paper Presentation competition of APOGEE 2017**, BITS Pilani, India (*Contributed Talk, First runner-up*)

#### TEACHING

- Instructor and organizer, **LIGO-Virgo Collaboration Gravitational-Wave Open Data Workshop #5**.
- Tutor for the **Numerical Relativity** graduate course, ICTS, Jan-April 2022.
- Co-organizer and tutor, **ICTS Workshop on Parameter Estimation with bilby**, ICTS, Bengaluru, India, August 2020 (Online)
- Tutor, **Light and Beyond—Summer Course for Undergraduate Students** by Prof. **Rajaram Nityananda**, June 2020 (Online)
- Tutor, **LIGO-Virgo Collaboration Gravitational-Wave Open Data Workshop #3**, May 2020 (Online)
- Tutor for the following mini-courses, **ICTS Summer Schools on Gravitational Wave Astronomy**, ICTS, Bengaluru, India:
  1. *Astrophysical Stochastic GW Foreground*, July 2021.
  2. *Numerical Hydrodynamics*, May 2020.
  3. *Advanced General Relativity*, July 2019.

#### MENTORSHIP

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|---|---------------------------|
| • Kaustubh Gupta (IISER, Pune)                        | May 2022 - <i>Present</i> |
| • Adhrit Ravichandran (IIT Roorkee → UMass Dartmouth) | Sep 2021 - Aug 2022       |
| • Kruthi Krishna (IISc → Radboud University)          | Sep 2020 - Aug 2021       |
| • Harsh Narola (IISER, Tirupati → Utrecht University) | Sep 2020 - Aug 2021       |

#### OTHER CONFERENCES AND MEETINGS

- Semester Participant, **Advances in Computational Relativity**, ICERM, Brown University, USA. September 2020 - December 2020 (Online)
- Participant, **Discussion Meeting - Astrophysics of Supermassive Black Holes**, ICTS, Bengaluru, India, December 2019
- Participant, **Discussion Meeting - Future of Gravitational Wave Astronomy**, ICTS, Bengaluru, India, August 2019
- Participant, **ICTS Summer School on Gravitational Wave Astronomy**, ICTS, Bengaluru, India, July 2017, July 2018, July 2019, May 2020, July 2021, May 2022.

OUTREACH	<ul style="list-style-type: none"> <li>• Co-PI of the <i>IndiaBioscience Outreach Grant</i> to communicate science using stage theatre.</li> <li>• Panelist at the <i>Bengaluru: The Astronomy City</i>, a Q&amp;A event organized for <b>National Science Day</b>, February 2022.</li> <li>• Mediator for the <b>Contagion Exhibition</b>, Science Gallery Bengaluru, April-July 2021.</li> <li>• Moderated a discussion with Prof. Smitha Vishveshwara on her collaborative science theatre project <i>Quantum Voyages</i> as a part of <b>Cosmic Zoom Online Exhibition</b>, April 2021</li> <li>• Articles on the <b>ICTS blog</b>: <ul style="list-style-type: none"> <li>1. <b>A Conversation with ICTS Scientists Studying the Indian Monsoon</b>, November 2019</li> <li>2. <b>Summer School on Gravitational Wave Astronomy</b>, November 2019</li> </ul> </li> <li>• Talk titled <i>The Whats, Whys and Hows of Gravitational-wave Astronomy</i>, <b>BMS College of Engineering, Bengaluru</b>, November 2019</li> <li>• Talk titled <i>Gravitational Waves - A New Tool for Cosmology!</i> at <b>Vigyan Samagam</b>, Visvesvaraya Industrial and Technological Museum, Bengaluru, India, August 2019</li> </ul>
TECHNICAL SKILLS	<p><b>Programming Languages</b> - Python, C, C++, Shell Script</p> <p><b>Developer for open-source softwares</b> - bilby (relative binning pipeline), pesummary (summarytgr pipeline), scipy</p> <p><b>Softwares</b> - MATLAB, Mathematica</p> <p><b>Tools/Frameworks</b> - L<sup>A</sup>T<sub>E</sub>X, Git</p>
SCORES AND AWARDS	<ul style="list-style-type: none"> <li>• <b>Fulbright-Nehru Doctoral Research Fellowship</b> 2023 (Host Institution: The University of Chicago)</li> <li>• <b>ICTS Graduate Fellowship</b> 2018-2023</li> <li>• Secured all-India rank 21 in the <b>Joint Entrance Screening Test (JEST)</b>, 2018 for admission into Physics PhD programmes in India</li> <li>• Awarded the <b>ICTS S.N. Bhatt Memorial Excellence Fellowship</b>, 2018</li> <li>• Scored 960/990 on the <b>Subject GRE in Physics</b>, October 2017</li> <li>• Selected for the <b>Summer Research Fellowship</b> of the Indian Academy of Sciences in 2016</li> <li>• Recipient of the <b>INSPIRE-DST Scholarship for Higher Education</b> for the period 2013 to 2018</li> </ul>
REFERENCES	<ul style="list-style-type: none"> <li>• Prof. Parameswaran Ajith, ICTS – <a href="mailto:ajith@icts.res.in">ajith@icts.res.in</a></li> <li>• Dr. Shasvath Kapadia, IUCAA – <a href="mailto:shasvath.kapadia@icts.res.in">shasvath.kapadia@icts.res.in</a></li> <li>• Prof. Bala Iyer, ICTS – <a href="mailto:bala.iyer@icts.res.in">bala.iyer@icts.res.in</a></li> </ul>