

# Aditya Vijaykumar

aditya@utoronto.ca • Website • Canadian Institute for Theoretical Astrophysics (CITA)

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

## EMPLOYMENT CITA Postdoctoral Fellow

**Canadian Institute for Theoretical Astrophysics (CITA), Toronto**

*Independent research fellowship*

Sep 2023 - Present

*Member of the LIGO Scientific Collaboration*

## Graduate Student

**International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru**

*Mentored by Prof. Parameswaran Ajith*

Aug 2018 - Aug 2023

*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

## EDUCATION International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru

**Research Scholar and Graduate Student in Physics**

2018 - 2023

## Birla Institute of Technology and Science (BITS), Pilani

**M.Sc. (Hons.) Physics and B.E. (Hons.) Mechanical Engineering**

2013 - 2018

## SEMINARS AND TALKS

- *Probing host environments of gravitational-wave sources* at **Penn State University**, October 2024 (Invited talk)
- *Host galaxies of compact binaries and their impact on dark siren cosmology* at **IUCAA**, August 2024
- *Panelist: Data analysis challenges for next generation detectors* at **PAX Meeting, London**, July 2024 (Invited seminar)
- *Probing host environments of gravitational-wave sources* at **Cardiff University**, July 2024 (Invited seminar)
- *Probing host environments of gravitational-wave sources* at **CIERA, Northwestern University**, June 2024 (Invited seminar)
- *Probing host galaxies of merging compact binaries* at **CASCA Meeting, Toronto**, June 2024 (Contributed talk)
- *Compact binaries in clusters and how to find them* at **Globular Clusters and their Tidal Tails**, May 2024 (Contributed talk)
- *Probing host environments of gravitational-wave sources* at **GRAPPA, University of Amsterdam**, May 2024 (Invited seminar)
- *Probing host environments of gravitational-wave sources* at **Niels Bohr Institute**, April 2024 (Invited seminar)
- *Probing host environments of gravitational-wave sources* at **CITA**, January 2024 (Invited talk)

- *Accelerating binaries and their gravitational-wave signatures* at **TASTY, Department of Astronomy and Astrophysics, University of Toronto**, January 2024 (Invited talk)
- *Accelerating gravitational wave sources* at **Joint CITA-PI Gravitational waves meeting**, October 2023 (Contributed talk)
- *Fast Likelihood Evaluation with Relative Binning* at **IUCAA, Pune**, July 2023 (Invited seminar)
- *Testing General Relativity with Gravitational Waves: Opportunities and Challenges* at **IIT-Gandhinagar**, June 2023 (Invited seminar)
- *Fast Likelihood Evaluation with Relative Binning* at **Seoul National University**, October 2022 (Invited online seminar)
- *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 gravitational-wave observations* at **Second Chennai Symposium on Gravitation and Cosmology**, February 2022 (Invited online Seminar)
- *Probing Large Scale Structure using Binary Black Hole Observations* at **Instituut-Lorentz for Theoretical Physics, Leiden University**, June 2020 (Invited online 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 and #6** at ICTS.
- 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. *Compact binary evolution, rates and population modelling*, June 2022.
2. *Astrophysical Stochastic GW Foreground*, July 2021.
3. *Numerical Hydrodynamics*, May 2020.
4. *Advanced General Relativity*, July 2019.

- OTHER  
CONFERENCES  
AND  
MEETINGS
- Participant, **Gravitational waves: A new ear on the chemistry of galaxies**, Lorentz Center, Leiden, Netherlands. April 2024.
  - 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.

- MENTORSHIP
- Ben Stadel (University of Alberta) May 2024 - *Present*
  - Kaustubh Gupta (IISER, Pune) May 2022 - May 2023
  - 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

- OUTREACH
- Co-PI of the *IndiaBioscience Outreach Grant* to communicate science using stage theatre.
  - Panelist at the *Bengaluru: The Astronomy City*, a Q&A event organized for **National Science Day**, February 2022.
  - Moderated a discussion with Prof. Smitha Vishveshwara on her collaborative science theatre project *Quantum Voyages* as a part of **Cosmic Zoom Online Exhibition**, April 2021
  - Articles on the **ICTS blog**:
    1. **A Conversation with ICTS Scientists Studying the Indian Monsoon**, November 2019
    2. **Summer School on Gravitational Wave Astronomy**, November 2019
  - Talk titled *The Whats, Whys and Hows of Gravitational-wave Astronomy*, **BMS College of Engineering, Bengaluru**, November 2019
  - Talk titled *Gravitational Waves - A New Tool for Cosmology!* at **Vigyan Samagam**, Visvesvaraya Industrial and Technological Museum, Bengaluru, India, August 2019

TECHNICAL  
SKILLS

**Programming Languages** - Python, C, C++, Shell Script  
**Softwares** - MATLAB, Mathematica  
**Tools/Frameworks** - L<sup>A</sup>T<sub>E</sub>X, Git

SCORES AND  
AWARDS

- [Fulbright-Nehru Doctoral Research Fellowship](#) 2023 (Host Institution: The University of Chicago)
- ICTS Graduate Fellowship 2018-2023
- Secured all-India rank 21 in the [Joint Entrance Screening Test \(JEST\)](#), 2018 for admission into Physics PhD programmes in India
- Awarded the [ICTS S.N. Bhatt Memorial Excellence Fellowship](#), 2018
- Scored 960/990 on the [Subject GRE in Physics](#), October 2017
- Selected for the [Summer Research Fellowship](#) of the Indian Academy of Sciences in 2016
- Receptient of the [INSPIRE-DST Scholarship for Higher Education](#) for the period 2013 to 2018

REFERENCES

Prof. Parameswaran Ajith  
International Centre for Theoretical Sciences  
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