

DEVESH GIRI

 DeveshGiri |  deveshgiri |  deveshgiri.github.io |  devesh.giri@students.iiserpune.ac.in

EDUCATION

2021 - Present	BS-MS Degree at Indian Institute of Science Education and Research, Pune, IN
2021	Class 12th (AISSCE) at Disha Delphi Public School, Kota, Rajasthan
2019	Class 10th (ICSE) at H. P. Children's Academy, Gorakhpur, U.P.

PUBLICATIONS

D. Giri and B. Gadre, "Understanding SSM-IMRIs with LIGO-Virgo and ET", [in prep.]

PROJECTS/SOFTWARE/CODE RELEASES

playgwtc

[Link to ReadtheDocs documentation](#)

It is an open-source user-friendly Python command-line tool for fetching, processing, and visualizing data for gravitational-wave events from the Gravitational Wave Open Science Center. This tool allows you to browse GW events through prefix-search, instantly generate high-quality plots, including time-frequency Q-transforms of the raw detector strain data from chosen detectors, and theoretical waveform models based on the event's physical parameters. Installable through pip: [Link to PyPI page](#)

EXPERIENCE

Tata Institute of Fundamental Research, Mumbai, IN

June 2025 - present

Visiting Master's Thesis Student

Guide: Prof. Suvodip Mukherjee

- Working to model the imprints of primordial black holes (PBHs) on Gravitational Waves (GWs)

IUCAA, Pune, IN and BITS-Pilani, IN

June 2025 - present

Research Internship

Guides: Prof. Sajal Mukherjee, Dr. Apratim Ganguly

- Study of gravitational waveform systematics for eccentric Intermediate Mass Ratio Inspirals (IMRIs) in the deci-hertz band.

Nikhef, Amsterdam, NL

October 2023 - December 2024

Research Internship

Guide: Prof. Bhooshan Gadre

- Worked on understanding sub-solar mass black holes (SSM-BHs) intermediate-mass ratio inspirals (IMRIs) in the frequency band of the present and upcoming ground-based GW detectors.
- Showed the detectability of SSM-IMRIs based on (matched-filter) signal-to-noise ratio calculations.
- Performed in-depth fitting factor studies using global optimiser methods (particle swarm optimisation and differential evolution) and Bayesian parameter estimation studies to understand parameter biases/error, waveform systematics and template bank size. Familiarized with IMRPhenomX and BHPTNRSURROGATE waveform models.
- Demonstrated the significant effects of higher harmonics for IMRI systems and need to develop aligned and precessing spin waveform surrogates.

Vanderbilt University, Nashville, USA

May 2023 - July 2023

Summer Internship

Guide: Prof. Karan Jani

- Completed PyCBC tutorials and familiarized with using PyCBC Inference and Bilby for bayesian parameter estimation.

- Worked on studying the improvement in parameter estimates by including LIGO-India in the detector network.
- Demonstrated 30% – 90% improvements in different parameters through bayesian parameter estimation for GW190521-like systems.

SCHOOLS/LECTURES/COURSES

CIERA, Northwestern University, IL, USA (online)

August 2025

Code/Astro 2025 A Software Engineering Workshop for Astronomy *Guides: Dr. Jason Wang, Dr. Sarah Blunt*

- Hands-on tutorials and lectures on Development Environments, Programming Paradigms, Git Mechanics, Debugging, Parallel Programming, `jax`, Releasing Code, Code Documentation, Software Testing, Anti-Discriminatory Practices, and Code Profiling.
- As a part of the workshop project, released an open-source (pip installable) software `playgwtc` with command-line tools for fetching, processing, and visualizing data for gravitational-wave events from the Gravitational Wave Open Science Center.

International Centre for Theoretical Sciences - TIFR, Bengaluru, IN

July 2025

GW Summer School *Guides: Dr. Surhud More, Dr. Chiara Caprini, Dr. Tirthankar Roy Choudhury*

- Undertook three courses: Probing the early universe using GW observations; Cosmography using GW standard sirens; and, Probing large-scale structure using GW observations
- Besides the rigorous theoretical lectures, gained practical experience in GW Population Analysis, Cosmological Parameter Inference and N-Body Cosmological Simulations. Hands-on experience with different softwares/codes used for such studies: `GWCOSMO`, `ICAROGW` and `GADGET-4`
- Delivered a flash talk and presented a poster on SSM-IMRIs.

National Centre for Radio Astrophysics - TIFR, Pune, IN

May 2022 - August 2022

CCS Lectures

Guides: Prof. Yashwant Gupta, Prof. Ruta Kale, Prof. Yogesh Wadadekar

- An overview of multi-wavelength astronomy (with qualitative descriptions of astrophysical objects), mechanism of radio telescopes and GMRT.
- Learned to work with FITS files and about mean and median stacking with some optimising techniques like the Binapprox algorithm.
- An exposure of equatorial/Galactic coordinates.
- An exposure of Astronomy Catalogues. Worked with AT20G BSS catalogue and SuperCOSMOS all-sky catalogue to learn about cross-matching.
- Learned about optimisation and used NumPy optimisation, Sorting optimisation and Binary search optimisation.
- Learned about k-d trees optimisation using Astropy

The University of Sydney, Australia (Coursera)

Data-driven Astronomy

Guides: Prof. Tara Murphy, Dr. Simon Murphy

- Course conducted by Dr. Tara Murphy and Dr. Simon Murphy, focussing on working with large datasets, implementing algorithms, and learning from data using ML tools. I will be learning to work with files from exoplanet surveys, pulsar detections, galaxy clusters, etc., using Python and SQL.

SKILLS

Programming languages and softwares

Python, Bash, Git, L^AT_EX, MATLAB, PyCBC, GW-COSMO, ICAROGW, GADGET-4

Operating systems

macOS, Linux, Windows

Cluster computing

HTCondor

PRESENTATIONS/TALKS/SEMINARS

33rd IAGRG Conference

Poster presentation

January'25, 02 - January'25, 04

- Presented a poster on GWs from SSM-IMRIs and displayed some of the results from the research carried during the internship at Nikhef.

WORKSHOPS

Workshop on Gravitational Waves and LIGO-India

October 2024

BITS, Pilani

Gravitational Wave Open Data Workshop

April 2024

gwosc.org and *IUCAA*

Workshop on Data Science in Astronomy

December 2023

IUCAA

VOLUNTEER EXPERIENCE

Core Member and Tutor

August 2022 - April 2023

Mindspark, DISHA

IISER, Pune, IN

- Mindspark, DISHA is an initiative by the students of IISER-Pune which imparts education to underprivileged students of Grade 8 by conducting classes every Saturday and Sunday. I worked to design the structure of Mathematics lectures and also volunteered for weekly lectures as a tutor.