

# Divyansh Tripathi

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 **Work:** Indian Institute of Science Education and Research Bhopal Bhauri Bypass Road,Bhauri, 462066 Bhopal (India)

## ABOUT ME

BS-MS student majoring in Physics with a minor in Data Science.

Research Interests:

- 1. Compact Object Evolution and Merger
- 2. Gamma Ray Bursts, Astrophysical Jets
- 3. Accretion Disk in astrophysical systems
- 4. Using Deep Learning to Study Astrophysical Phenomenons
- 5. Computational Astrophysics

## EDUCATION AND TRAINING

### BS-MS Dual Degree

*Indian Institute of Science Education and Research Bhopal* [ 20/12/2020 – Current ]

City: Bhopal | Country: India | Website: <https://www.iiserb.ac.in> | Field(s) of study: Natural sciences, mathematics and statistics: • Physics | Final grade: 8.25 | Level in EQF: EQF level 7 | Thesis: Exploring Mass Gap Objects and High Density Matter Using Kilonovae

**Relevant Subjects:** Introduction to Astronomy and Astrophysics, Cosmology, General Relativity, Numerical Methods in Programming, Quantum Mechanics, Electrodynamics, Classical Mechanics, Machine Learning, Computer Vision and Data Science

## PROJECTS

[ 20/12/2022 – Current ]

**Long Term Evolution of Neutron Stars X-ray Binaries using MESA** In this project, I aim to study how the binary and the neutron parameter values are evolving in the X-ray Binary system in which a Neutron star is accreting material from a companion star. I have calculated the critical accretion rate on the accretor in the LXMBs using MESA stellar evolution code and studying the various accretion states of pulsars and the effect of accretion rate on pulsar evolution

[ 01/07/2024 – 31/08/2024 ]

**Higher Order Numerical Schemes for Hydrodynamics using PLUTO** In this project, I aim to study higher-order numerical schemes (WENO3, WENOZ) for hydrodynamics using PLUTO MHD code. I also performed simulations of 1D and 2D hydrodynamics problems using PLUTO code and studied Shock Tube, Isentropic Vortex, and Rayleigh-Taylor Instability and why higher order schemes are essential.

[ 01/08/2023 – 01/12/2023 ]

**Applying Deep Learning Techniques to Astronomy** This was a course project as part of the Computer Vision course. In this project, I have used Convolutional Neural Networks(CNN) to make a robust star-galaxy classification model. We have also shown that the model performs better than the models described in the literature.

## PUBLICATIONS

[2024]

**A Novel Sector-Based Algorithm for an Optimized Star-Galaxy Classification** The paper introduces a novel sector-based methodology for star-galaxy classification, leveraging the latest Sloan Digital Sky Survey data (SDSS-DR18). By strategically segmenting the sky into sectors aligned with SDSS observational patterns and employing a dedicated convolutional neural network (CNN), we achieve state-of-the-art performance for star galaxy classification.

LIKHIT, A.A.S.R., Tripathi, D. and Agarwal, A.,In The Second Tiny Papers Track at ICLR 2024.

## SKILLS

## Technical Skills

- **Astronomical Codes:-** PLUTO, MESA
- **Programming Languages:-** Python , FORTRAN-90 , C , Bash
- **Libraries Used:-** Astropy, Scipy , Pandas, Scikit-Learn , TensorFlow
- **Software:-** Linux, LATEX, SAO DS9 ,Git

## SUMMER SCHOOLS

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[ 01/07/2024 – 12/07/2024 ]

### Summer School on Gravitational Wave Astronomy

Organized by the International Centre of Theoretical Sciences(ICTS), Bangalore

[ 01/07/2022 – 10/07/2022 ]

### Astrophysics Summer School

Organized by Indian Institute of Astrophysics.

## HONOURS AND AWARDS

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[ 01/01/2021 ] Department of Science and Technology (DST)

**DST Inspire Higher Education Fellowship** Awarded top 1% of the students in India who pursue higher education in natural sciences.

## RECOMMENDATIONS

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Name: **Dr. Sudip Bhattacharyya**

Project Supervisor

Email: [sudip@tifr.res.in](mailto:sudip@tifr.res.in)

Name: **Dr. Ritam Mallick**

Thesis Supervisor

Email: [mallick@iiserb.ac.in](mailto:mallick@iiserb.ac.in)