

# Estuti Shukla

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## EDUCATION

### IISER KOLKATA

2016-2021 | Kolkata, India  
**BS-MS DUAL DEGREE**  
Indian Institute of Science  
Education and Research  
Masters in Physics(5th Year)  
Cum. GPA: 8.58 / 10.0  
Major GPA: 8.83 / 10.0

### SARDAR PATEL VIDYALAYA

Grad. May 2016 | Delhi, India  
**SENIOR SECONDARY EXAMINATION**  
**XII<sup>TH</sup> (CBSE)**  
Percentage- 95 %

## RESEARCH INTERESTS

Computational Astrophysics,  
Gravitational Waves,  
General Relativity, Cosmology

## SKILLS

### PROGRAMMING

Advance

- Python(Numpy, Scipy)
- $\LaTeX$

Intermediate

- C++ • R • MATLAB

Familiar:

- C • HTML

### OPERATING SYSTEMS

- GNU/Linux • Windows

### OTHERS

- GNUplot • Origin • Libre Office

## COURSEWORK

Advanced Statistical Mechanics,  
Research Methodology,  
High Energy Physics,  
General Relativity,  
Condensed Matter Physics,  
Quantum Field Theory,  
Non-linear Dynamics,  
Electrodynamics, Optics  
Thermodynamics,  
Classical Mechanics,  
Astrophysics (intro),  
Computational Physics,  
Data Structures and Algorithms,  
Space Astronomy, Linear Algebra

## WORK EXPERIENCE

### IISER KOLKATA | MASTER THESIS

July 2020 - Present | Prof. Rajesh Kumble Nayak | Kolkata, India

- Project Description- I am studying ultra-compact neutron stars and various equation of states.

### JOHNS HOPKINS | RESEARCH INTERN

Oct 2020 - Present | Prof. Emanuele Berti | Remote

- Project Description- We are trying to find nonlinear features such as higher overtones in the merger phase of binary black holes.

### UMASS DARTMOUTH | SUMMER RESEARCH INTERN

Jun 2020 - Sep 2020 | Prof. Gaurav Khanna and Prof. Scott Field | Remote

- Project Description- Adding functionalities such as remnant Bondi mass and kick velocity to EMRI surrogate model. It is used to generate waveform models for intermediate mass ratio regime of black hole binary systems. I will soon be added as a contributor to the open-source model.

### IISER KOLKATA | INDEPENDENT STUDY

July 2020 - Present | Prof. Dibyendu Nandi | Kolkata, India

- Study Description- Learning magneto-hydrodynamics and studying about fluids and plasma.

### IUCAA PUNE | WORKSHOP AND HACKATHON

Dec 2019 - March 2020 | LIGO India | Pune, India

- Workshop Description- My team was selected for Finesse (Frequency domain INterFERometer Simulation SoftwarE) mentorship program. We were mentored by the researchers working at the international Finesse Working group headed by Prof. Andreas Freise, Univ of Birmingham. This interferometer modelling software is used to develop designs for gravitational wave detectors.
- Hackathon Description- After 3 months of mentorship, we competed with other teams to improvise a given design of the interferometer to make it sensitive in the range of neutron star collisions. The results of the hackathon are still pending.

### IUCAA PUNE | READING PROJECT

Dec 2019 | Prof. Ajit Kembhavi | Pune, India

- Project Description- Short reading project on using machine learning to classify barred and unbarred galaxies using IRAF. I used pyRAF to perform isophote fitting of spiral galaxies to identify bars in them.

### IISER MOHALI | SUMMER RESEARCH INTERN

May 2019 - July 2019 | Prof. Jasjeet Singh Bagla | Mohali, India

- Project Description- Ray tracing method to simulate "image" of black hole and learning about null geodesics in Schwarzschild metric. I also learnt about the working of Event Horizon Telescope which works on a similar principle.

### IIT INDORE | SUMMER RESEARCH INTERN

May 2018 - July 2018 | Dr. Bhargav Vaidya | Indore, India

- Project Description- Study of shock waves in MHD framework. I learnt about Rankine Hugoniot conditions and simulated them in python

## LANGUAGES

English, Hindi

## OTHER INTERESTS

Long distance running,  
Playing Ukulele,  
Trekking,  
Public speaking,  
Playing badminton,  
Writing articles and poetry,  
Theater

## TEACHING EXPERIENCE

### IISER KOLKATA | TEACHING ASSISTANT

July 2020 - Present | Intermediate Quantum Mechanics | Kolkata, India

- Teaching assistant for PH3102 Quantum Mechanics course under the guidance of Prof. Soumitro Banerjee.

## TALKS/PRESENTATION

- 3<sup>rd</sup> Sep'20 Talk on computing remnant mass of binary black hole mergers using EMRI surrogate model at UMass Dartmouth's Physics Colloquia
- 11<sup>th</sup> Mar'20 Group presentation on probing neutron stars merger with LIGO interferometer for Finesse Hackthon at IUCAA Pune.

## SEMINARS/WORKSHOPS/CONFERENCES

- Sep-Dec'20 Semester Program on Advances in Computational Relativity by ICERM, Brown University (Virtual)
- Sep'20 Vienna Summer School on Gravitational Quantum Physics by University of Vienna (Virtual)
- Aug'20 North American Einstein Toolkit Workshop by LSU (Virtual)
- May'20 BHP Toolkit Spring Workshop 2020 (Virtual)
- May'20 Gravitational Wave Summer School on Numerical Relativity by ICTS Bangalore (Virtual)
- Dec'19 Hackathon and Mentorship Workshop on LIGO Finesse at IUCAA.
- Nov'19 Indo-Swiss Round Table on Women in AI conducted by Swiss Embassy, Vigyan Samagam Mega Science Exhibition, Kolkata
- Nov'19 Data Science in Astrophysics GW research at IIIT Allahabad
- Oct'19 Bootcamp by NVIDIA on High-performance computing at IISERK
- Nov'16 National Science(Vijyoshi) Camp by DST, Gov. of India at IISERK

## AWARDS AND RECOGNITION

- 2016 DST Inspire Scholarship by Govt. of India
- 2016 Top 1 % in CBSE Board Class XII<sup>th</sup> Examination in India
- 2016 All India Rank 44 in IISER Aptitude Test

## EXTRA CURRICULAR

- 2020-21 Establishing a LGBTQ+ support platform at IISERK
- 2019-20 Founder and Secretary of Trekking and Adventure Club, IISERK
- 2019-20 Founding Member and Coordinator of Student Alumni Cell, IISERK
- Sept'19 Volunteer for cleanliness campaign, organised by Government of India
- 2018-19 Secretary of Aarshi, Dramatics Club, IISERK
- Dec'18 Event Organiser at 1st Inter-IISER Cultural Meet (IICM)'18
- Jul'18 Member of Anti-Ragging Committee
- 2017-18 Sponsorship Head, Core Committee, Inquivesta, college fest of IISERK