Profile: A fifth-year student of BS-MS Dual Degree Program with Physics as Major at Indian Institute of Science Education and Research – Kolkata. I am also a KVPY (Kishore Vaigyanik Protsahan Yojana) fellow.

Personal Information :   **Name: Manas Vishal**

✉ mv16ms205@iiserkol.ac.in , vishalmanas28@gmail.com
Gender Male | Date of birth 28/10/1997 | Nationality Indian
http://manasvishal.github.io/profile

Research Experience :

June 27, 2020 - current

A study of AdS Black Holes and Branes (MS project)
Dr. Rajesh Nayak, IISER Kolkata
I am trying to answer if there is a well defined solution for massless scalar field equation in AdS spacetime. In particular, I am working on 4 dimensional AdS metric and solving the massless scalar field equations analytically first and then later move on to numerical techniques.

Aug. 2020 - current

Independent study on Magnetohydodynamics and Fluid Dynamics
Dr. Dibyendu Nandi, IISER Kolkata
I am studying various properties of Fluids and Magnetohydrodynamics. I aim to teach myself the concepts of Advection Equation and different types of flows in fluid systems. I am acquiring skills in MHD simulations so that I could learn the techniques of General Relativistic version of it.

May 15, 2020 - current

EMRI surrogate modeling and late time Kerr tails with spinning primary Black Hole using discontinuous Galerkin method
Dr. Gaurav Khanna and Dr. Scott Field, UMass Dartmouth
This project was supposed to be carried out in the U.S. but due to **COVID-19**, this was done remotely. This work has significantly improved my skills in General Relativity, Matlab and Python coding. I am developing a model of Extreme Mass Ratio Black Hole Inspiral waveforms of gravitational waves which can be used for surrogate modeling. I have included the spin parameter in my model. I have used Jan Hesthaven's code on Matlab as the base code.

Dec. 2019 - March 2020

Finesse (Frequency domain INterfErometer Simulation SoftwarE) Workshop and Hackathon
IUCAA Pune
Finesse is a sophisticated simulation package for modeling optics and laser interferometers. This interferometer modeling software was developed for the design of gravitational wave detectors, but is easy to use for students with simpler lab-based setups as well. It includes advanced features such as higher-order modes, quantum noise and radiation pressure effects. I used this tool to model aLIGO detector for Hackathon.

May 15 - July 15, 2019

Reducing the flexing of the arms of LISA - a space based Gravitational Wave detector
Dr. Rajesh Nayak, IISER Kolkata
LISA stands for Laser Interferometer Space Antenna, it will be a spaced based gravitational wave detector with an array of three spacecrafts in heliocentric orbit. I tried to show how a three body system can be used to model the system and reduce the flexing in the arms of LISA over a period of time.

Dec. 08 - Dec. 25, 2018   **Deriving Geodesic equations for different types of metrics**
Dr. Naresh Dadhich, IUCAA Pune
A reading project of paper "**Curved Space, curved Time, and curved Space-Time in Schwarzschild geodetic geometry (arxiv:1812.03259)**
This project was primarily a reading project, I derived and calculated all the geodesic equations for different types of metrics associated with Schwarzschild geometry, considering space and time curvatures separately.

May 15 - July 15, 2018   **Reading project in Cosmology, General Relativity and Dark Matter**
Dr. Subhadip Mitra, IIIT Hyderabad
A reading project in General Relativity, Cosmology and Dark Matter
I studied General Relativity and Cosmology following textbooks by Scott Dodelson, Bernard F. Schutz and James Hartle.

May 20 - July 20, 2017   **Quantum transport in mesoscopic system**
Dr. Sourin Das, IISER Kolkata
I primarily simulated quantum and mesoscopic systems in Python using Kwant module of Python. I simulated different types of topological insulators and varied the position of gates in it and show the periodicity in conductance offered. I also simulated Quantum Hall effect as well as 2D electron gas.

Conferences/Workshops attended :

1. Attending Advances in Computational Relativity at ICERM, Brown University (September 9, 2020 onwards)
2. Presented my work at UMassD over summer of 2020 at UMassD Physics colloquium (September 3, 2020)
3. North American Einstein Toolkit Workshop 2020 (August 3-7, 2020), CCT, Louisiana State University (Virtual)
4. TCAN on Binary Neutron Stars Workshop 2020 (July 6-10, 2020) CCRG, Rochester Institute of Technology (Virtual)
5. 23rd Capra Meeting on Radiation Reaction in General Relativity June 22-26, 2020) University of Texas at Austin (Virtual)
6. Cosmology Summer School 2020 (June 1-5, 2020), University of Michigan (Virtual)
7. BHPToolkit Spring 2020 workshop (May 25-27, 2020), Astronomical Institute of the Czech Academy of Sciences (Virtual)
8. Applications of Data Science in Astrophysics and Gravitational Wave Research (DSAP 2019) workshop held at IIIT Allahabad (November 1-3, 2019)
9.GPU based High Performance Computing workshop at IISER Kolkata (October 14-15, 2019)
10. Quantum Information and Quantum Technology (QIQT) 2019 at IISER Kolkata (June 13-July 27, 2019)
11. VIJYOSHI 2017-Science Camp conducted at IISER Kolkata (10th- 12th December 2017)
12. VIJYOSHI 2016-Science Camp conducted at IISER Kolkata (5th- 7th December 2016)
13. Colloquium of Prof. Cedric Villani (Field's medalist) at IISER Kolkata on 29th August 2016.

Personal Skills

Digital Skills   Programming Languages:- C, Python (modules: AstroPy, SciPy, NumPy, SymPy, pandas, Kwant, QuTip), R, SQL, jQuery, HTML, PHP, TeX

Softwares : - Origin, GnuPlot, ImageJ, Matlab, Mathematica, LaTeX, Android Studio

Foreign language(s)	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

Common European Framework of Reference for Languages

Education and Training:

Aug. 2016 - Present **5 Year BS-MS Dual Degree**
Indian Institute of Science Education and Research, Kolkata(India)
Department:- Physics
CGPA:- 8.2 (as of 9th semester)

2013-2015 **All India Senior Secondary Certificate Examinations**
Creane Memorial High School, Central Board of Secondary Education (CBSE), Gaya, Bihar (India)
Score :- 95%

Teaching Assitantships:

1. Teaching Assistant for SS4101 (Space Astronomy) course offered by Center of Excellence in Space Sciences India (CESSI), IISER Kolkata to 4th year students.
2. Teaching Assistant for PH1201 course (basic Electricity and Magnetism) offered by Department of Physical Sciences, IISER Kolkata at freshman level.

Academic Awards:

Aug. 2017 - Present **KVPY** Scholarship, India (offered by the Department of Science and Technology, Government of India, to attract exceptionally highly motivated students for pursuing basic science courses and research career in science.)

Aug. 2016 - July 2017 **INSPIRE (Innovation in Science Pursuit for Inspired Research)** Fellowship (offered by the Department of Science & Technology to top **1%** students to pursue a career science)

2013 Awarded **Gold medal** for top performance in 10th standard.

Additional Information:

References 1. Dr. Rajesh Nayak, IISER Kolkata.
2. Dr. Gaurav Khanna, UMass Dartmouth.
3. Dr. Scott Field, UMass Dartmouth.
4. Dr. Subhadip Mitra, IIIT Hyderabad.

Other Achievements
1. Selected for Super-30 in 2013 (a program which selects 30 talented candidates among thousands of applications each year to prepare them for **JEE,** an engineering entrance exam)
2. Qualified several Olympiads organized by Science Olympiad Foundation
3. Made an android application for Inquivesta, largest science fest of India.
4. Made my own reflecting type telescope at **Telescope Making Workshop** held at IISER Kolkata