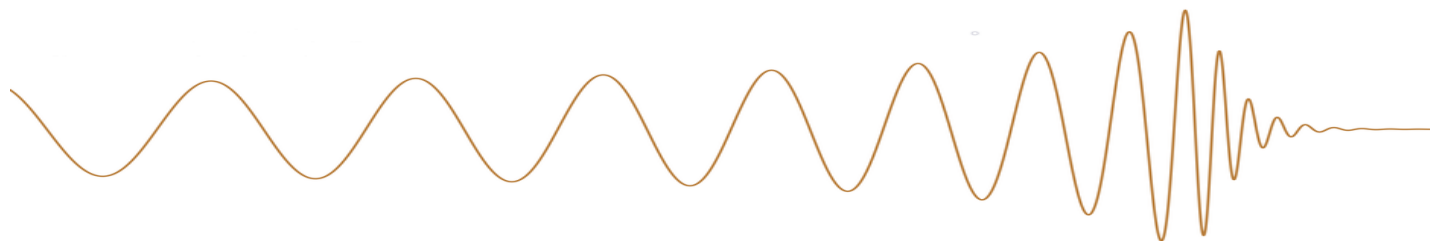# SWETA SETHI

Integrated Master's student, Indian Institute of Science Education and Research, Berhampur, India

✉ sweta18@iiserbpr.ac.in   in Sweta Sethi   ● Physics 'O' Wizards   ○ swetasethi.github.io

EDUCATION

📅 **2018-PRESENT**   Indian Institute of Science Education and Research, Berhampur
                          (Recognised as Institute of National importance by Govt. of India)

📅 **2015-17**   **Grade 12:** Buxi Jagabandhu English Medium School, Bhubaneswar

SCIENCE WRITING AND COMMUNICATION

- Run a personal Physics blog, **Physics 'O' Wizards**, where I present Astrophysics paper in brief that is easily accessible to undergraduate students.
- Co-author and editor at **Jigyansa** an **Odia** science communication platform, which involves a team of students who write and edit science summaries aimed at undergraduate students interested in learning more about the latest research in the field of science and technology. (📅 March 2021-Present)

Outreach Activities:

* N2020-NOX-1IB : Co-organized an Astronomy outreach during the pandemic, where more than 300 school students from grade 9-11 participated in a two-week long program of presentations, quizzes and fun activities. I gave a presentation on 'Are we Alone in the Universe?'
* STREAM: An annually organised outreach for school students from Berhampur, where we offer them visualisation, hands-on experience to the topics they covered in their school. My team was working on Gravitational waves.

PUBLICATION

1. R. Raj, **S. Sethi**, B. K. Behera, and P. K. Panigrahi, **Quantum Simulation of Lattice Protein Models Using Quantum Annealing** DOI:10.13140/RG.2.2.34260.55687 (📅 2020), [**LINK**]

RESEARCH EXPERIENCES

Winter Intern | Gravitational wave Astrophysics
📍 *Indian Institute of Technology, Madras, India*　　　　　　📅December 2021- Present

I am working under Professor Chandra Kant Mishra, learning about parameter estimation and injection analysis for the compact binary mergers. I did the parameter estimation for GW191222 033537 and recently made a self injection and recovery using IMRPhenomD at an inclination of 60 degrees. My objective is to observe how the inclination angle affects the parameter estimation.

Research Student | Planetary Sciences
📍 *University of California, Berkeley, United States*　　　　　　📅June-August 2021

I did an informal remote work under Howard Isaacson, Research Scientist, on Computational methods in Astrophysics particularly Exoplanets. I used the Gaia DR2 Database to get Gaia parameters for the 10,000 Closest Stars, performed codes to extract information from them; and Lightkurve package to access and analyze the TESS data.

Summer School Student | Radio Astronomy
📍*SKA-India, National Centre for Radio Astrophysics, Pune*　　　　　　📅June 2021

Selected to attend the School on 21-cm Cosmology and Reionization.

Undergraduate Researcher | Astrophysics
📍 *International Centre for Theoretical Sciences, Bengaluru, India*　　　　📅August-September 2020

The School was a good exposure to essential ideas related to the physics of the early universe.

Summer School Student | Astrophysics
📍 *Inter-University Centre for Astronomy and Astrophysics, Pune, India*　　　　📅May-June 2020

Here we were introduced to various fields of Astronomy and Astrophysics. It started with a brief introduction of the fundamentals and the recent developments in each field. Unfortunately, due to the pandemic it was impossible to carry out an individual project under the professor.

Research Intern | Quantum Computing
📍 *Indian Institute of Science Education and Research, Kolkata, India*　　　　📅February-April 2020

I worked under the supervision of Prof. Prasanta K. Panigrahi and Bikash Kumar Behera, PhD student on the topic Quantum Computation. Here, I modelled and analyzed the code for 'Quantum Simulation of Lattice Protein Models Using Quantum Annealing', which can be used to determine large protein structures based on sequence information.

RADatHome- India, for citizen Science research in Astronomy
📍 *Indian Institute of Science Education and Research, Berhampur, India*　　　　📅 November 2019

During a full day workshop I was introduced to RGB-contour image analysis of UV-Optical-IR-radio multi-wavelength imaging data on galaxies and radio galaxies. I also received the basic skills of analysing FITS image files from Giant Meterwave Radio Telescope all sky survey at 150 MHz (TGSS ADR1) using SAO ds9 and RGB-contour images. The scientific aim of the workshop was to understand black hole galaxy co-evolution using GMRT and RAD@home.

Robotics workshop 📅 September 2019

📍*National Institute of Science and Technology, Berhampur, India*

SELECTED PROJECTS

Data Science (Course Project) | *Tensorflow*

Topic-Simulation of linear hyperbolic equations using Deep Neural Networks

∗ Addressed the problem of finding solutions to the linear Hyperbolic equation (wave equation) which comes under Partial Differential equations. Unlike, the normal application of Neural Networks, here the problem will not include the training set or testing set or validation set.

Numerical Methods (Course Project) | *Python*

Topic-Unsnarling the chaos: Numerical analysis of Double Pendulum

∗ Concepts from Linear Harmonic Oscillator, Double pendulum, Chaos theory.Implemented computer simulations and numerical method to deal with the chaotic systems.Methods used include Lagrange, fourth order Runge Kutta method, Interpolation

Data Science (Course Project) | *Scikit learn, Python packages*

Topic-Phishing Detection using Machine Learning

∗ Implemented **machine learning techniques** to find a solution to the problem of detecting phishing and malicious web links. Used Logistic Regression, Decision Tree, Random Forest, Support Vector Machine, K-Nearest Neighbour and Naive Bayes classifiers to get the best machine learning algorithm for classifying the phishing URL from the legitimate URLs.

Summer Project on Quantum Computation and Protein Folding | *IBM Q*   📅 Feb-April 2020

Mentor- Prof. Prasant K. Panigrahi, IISER Kolkata

(**Research publication on Quantum Simulation of Lattice Protein Models Using Quantum Annealing**)

COMPUTER AND LANGUAGE SKILLS

- · COMFORTABLE WITH: **Python, C, Quantum Computing (using IBM Q, Qiskit), LaTeX, Machine Learning and Deep Learning (using scikit learn)**
- · Contributed to **International Astronomical Search Collaboration** by observing near-Earth objects, Main Belt asteroids and images from Pan-STARRS, **program supported by NASA.**
- · RGB image analysis of different galaxies along with **FITS** file analysis from **TGSS ADR1** image data taken using **GMRT radio-telescope** (using SAO ds9)

REFERENCES

1. Dr. Md Nasim- Assistant Professor, Department of Physical Sciences, Indian Institute of Science Education and Research, Berhampur, ✉ nasim@iiserbpr.ac.in
2. Dr. Shashi Bhushan Singh- Assistant Professor, Department of Physical Sciences, Indian Institute of Science Education and Research, Berhampur, ✉ sbsingh@iiserbpr.ac.in
3. Dr. Sandeep Chatterjee- Assistant Professor, Department of Physical Sciences, Indian Institute of Science Education and Research, Berhampur, ✉ sandeep@iiserbpr.ac.in