

# Aniket Nath

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## Education

2020 - 2025 **National Institute of Science Education and Research Bhubaneswar**,  
*Integrated Masters in Physical Sciences(major), Computer Sciences(minor)*, Affiliated to HBNI,  
CGPA - 8.65/10.

## Research Experience

LTVSP **Investigating polarisation signatures in Black holes**,  
*Supervisor: Dr. Pallavi Bhat, ICTS-TIFR.*  

- This project is under Long Term Visiting Students program of ICTS.
- Studying the effect of gas physics on electromagnetic observables from black holes.
- Using relevant general relativistic magnetohydrodynamic simulations from BHAC and HARM.
- The work is in progress.

Master's Thesis **Constraining Galactic Magnetic Field properties from Radio observations**,  
*Supervisor: Dr. Tuhin Ghosh, NISER Bhubaneswar.*  

- This is in continuation with the Summer 2023 work.
- Simulated Synchrotron maps using best fitted parameters with respect to WMAP data.
- Studying the statistics of these fields using Power spectrum, Minkowski Functionals.
- Looking into the specific scales of interest.
- The work is in progress.

Summer 2024 **Construction of Dark Matter Halo Merger Trees**,  
*Supervisor: Dr. Sambit Giri, Nordic Institute of Theoretical Physics, NORDITA.*  

- The aim of this project was to study dark matter halo merger trees for different cosmologies.
- *GALFORM* algorithm, based on Extended Press Schechter Theory was used to construct merger trees.
- Merger trees were constructed for different cosmological parameters, and their variation was observed.

Summer 2023 **Correlating properties of Galactic Magnetic Field and Galactic Synchrotron**,  
*Supervisor: Dr. Pravabati Chingangbam & Dr. Tuhin Ghosh, IIA Bengaluru, NISER Bhubaneswar.*  

- The aim of this project was to study Galactic Magnetic Field (GMF), using two-point correlation function and higher statistics.
- Synchrotron maps have been simulated using models and different input parameters using the *gpempy* module.
- Statistics were evaluated for these maps, and the properties were being studied using the statistics.
- Tried to match the statistics with data, by exploring the parameter space.

Summer 2022 **Analysing X-ray spectra of Dual AGNs**,  
*Supervisor: Dr. Mousumi Das & Dr. Santanu Mondal, IIA Bengaluru.*  

- The project aimed at analysing x-ray spectral signatures from dual AGNs.
- Observed Fe K  $\alpha$  spectral signature in a binary system, previously unreported.
- This work has been accepted in Astronomy & Astrophysics, the manuscript can be found here

## Publications

2024 **Detection of the Fe K lines from the binary AGN in 4C+37.11**,  
*Santanu Mondal, Mousumi Das, K. Rubinur, Karishma Bansal, Aniket Nath, Greg B. Taylor,*  
[arxiv][A&A].

## Achievements

2024 **NORDITA Summer Intern, Nordic Institute of Theoretical Physics(NORDITA)**, Intern.  
2023 **SERB MATRICS Fellow (Science and Engineering Research Board, Govt. of India)**, Fellowship.  
2022 **Summer Research Fellow (IASc, INSA, NASI)**, Fellowship.

2020 **DISHA (DAE Incentive Scheme for Holistic Science Education and Augmentation) Scholarship, Govt. of India, Scholarship.**

## Schools, Workshops, Conferences

October 2025 **Future of Gravitational Wave Astronomy, ICTS-TIFR.**

- Hosted by ICTS-TIFR.
- Attended as a participant.

Summer 2024 **COBRA: Conference on Blazars and Restless AGNs, Presidency University, IUCAA.**

- Hosted by Presidency University, in collaboration with IUCAA.
- Attended as a participant in Workshop and the Conference.

Monsoon 2024 **Physics of Life Monsoon School, NCBS-TIFR.**

- Hosted by National Centre for Biological Sciences, Tata Institute for Fundamental Research, at Bengaluru.
- Attended as a participant, and had the opportunity to explore some domains of biophysics.

Winter 2023 **Advanced 21 cm Cosmology Winter School, NISER Bhubaneswar.**

- Hosted by NISER Bhubaneswar as a part of the SKA-India Collaboration.

Winter 2022 **Radio Astronomy Winter School, IUCAA, NCRA.**

- Jointly hosted by Inter-University Centre for Astronomy and Astrophysics (IUCAA) and National Centre for Radio Astronomy - Tata Institute of Fundamental Research (NCRA-TIFR),

## Teaching Experience

Teaching Assistant CS460/660 Machine Learning 2024

## Computer Skills

Languages Python, Julia, FORTRAN

Utilities Anaconda, Git, Jupyter Notebook,  $\text{\LaTeX}$

Libraries Healpy, NaMaster(pymaster), Numpy, Astropy, Pandas, Scipy, Matplotlib

Softwares NASA-HEASOFT, XSPEC, Chandra CIAO

## Communication Skills

English Full Professional Proficiency

Hindi Native or Bilingual Proficiency

Bengali Native or Bilingual Proficiency

## Relevant Courses

P474 Introduction to Cosmology, Grade:8/10

P452 Computational Physics, Grade:9/10

P457 General Theory of Relativity and Cosmology, Grade:10/10

P464 Plasma Physics and Magnetohydrodynamics, Grade:8/10

P453 Quantum Field Theory-I, Grade:9/10

P463 Astronomy and Astrophysics, Grade:9/10

## Talks and Seminars

ICTS-TIFR Astrophysics and Relativity Seminar, *Unveiling the Statistical properties of Galactic synchrotron emission*

## Extra Curricular

2021 - **Vaktavya (Debating Club), NISER, Founding Member.**

Current I am a member of the Vaktavya (Debating Club) in NISER. I often participate in various debating competitions, in different formats. I have also participated in a Lok Sabha (Mock Parliament). I am also serving as the President of Vaktavya for the tenure (2024-2025).

- 2020 - **NISER Astronomy Club, NISER**, *Core-Member*, Talks Organizing Committee.
- Current I am a core member of NISER Astronomy Club. I am mainly involved in outreach and organizing of talks, in order to popularize and make astronomy and astrophysics more accessible to people of all levels.
- 2017 **The Bharat Scouts and Guides, India**, *Rajya Puraskar Scout*.
- I have been a member of the Bharat Scouts and Guides, and I was awarded the Rajya Puraskar in scouting by the Hon'ble Governor of the State of West Bengal.