

# Anirudh Salgundi

Research Assistant at IIT Bombay

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## EDUCATION

Master of Science (Physics), CHRIST University, India

June 2020 – May 2022

Thesis: “Spectral properties of GX 5-1”

GPA 8.5/10

Bachelor of Science, Bangalore University, India

June 2017 – Sep 2020

Physics, Chemistry and Mathematics

GPA 7.89/10

## PUBLICATIONS

*Below is a list of Refereed Publications which have been published/under preparation*

1. **Salgundi, A.**, et al. (*in prep*) (2024), “Bursts, Beats, and Beyond: Uncovering landscape from accretion to ignition of 4U 1728-34 using *AstroSat*” (*submitting to JAA*)
2. Ahumada, T., Anand, S., ....., **Salgundi, A.**, et al. (2024), “Searching for gravitational wave optical counterparts with the Zwicky Transient Facility: summary of O4a”, *PASP*, 136, 114201.
3. Srinivasaragavan, G., ....., **Salgundi, A.**, et al. (*in prep*) (2024), “AT 2023sva: Multi-wavelength Analysis of an Optically-Discovered Afterglow Without a Detected Gamma-ray Counterpart”. (*submitting to PASP*)
4. Mondal, S., **Salgundi, A.**, et al. (2023), “Evolution of low-frequency quasi-periodic oscillations in GX 339-4 during its 2021 outburst using *AstroSat* data”, *MNRAS*, 526, 4718.
5. **Salgundi, A.**, et al. (*in prep*) (2025), “Timing and spectral studies of 4U 1735-44 using *AstroSat*” (*submitting to JAA*)

*Below are some of my important non-refereed publications. **Here** is a full list (43 GCNs, 3 TNS, and 2 ATels).*

1. **Salgundi, A.**, Swain, V., Kumar, H., et al. (2023), GRB Coordinates Network, “GRB 230812B: Zwicky Transient Facility Identifies Optical Afterglow Candidate of Fermi GRB (Trigger 713559497)”, **34397, 1.**
2. **Salgundi, A.**, Swain, V., Kumar, R., et al. (2023), GRB Coordinates Network, “AT2023sva/GRB230916B: GIT observations of the afterglow”, **34780, 1.**
3. Pathak, U., **Salgundi, A.**, Waratkar, G., et al. (2023), GRB Coordinates Network, “GRB 230812B: Chandra late-time detection of the X-ray afterglow”, **34632, 1.**
4. Swain, V., Andreoni, I., ... .., **Salgundi, A.**, (2023), Transient Name Server AstroNote, “AT2023lcr: Zwicky Transient Facility discovery of a fast fading red transient”, **Transient Name Server 178, 1.**
5. Thomas, N. T., **Anirudh, S.**, Giridharan, L., Gudennavar, S. B., et al. (2022), The Astronomer’s Telegram, “*AstroSat* observes XTE J1701-462 in its Z phase”, **15654, 1.**

## RESEARCH EXPERIENCE

Research Assistant (Indian Institute of Technology Bombay)

Jan 2023 - Present

Supervisor: **Prof. Varun Bhalerao**

**“Thermonuclear bursts in Neutron Star Low Mass X-ray Binaries”**

- Studying a sample of 15 thermonuclear X-ray Bursts from two transient Low Mass X-ray Binary sources 4U 1728-34 & 4U 1735-44 using *AstroSat* data.
- Developed pipelines for basic data reduction, time-resolved burst spectral analysis, and timing analysis for exploring accretion phenomena and rapid variability in lightcurves.
- Studied millisecond variability (Quasi Periodic Oscillations) in persistent emission from the accretion disk, and estimated spin period and magnetospheric radius.
- Performed Measurements for Photospheric radius, distance of the source and the spin frequency of the Neutron Star in the system, through thermonuclear bursts.

### ***“Fast Transients with GROWTH-India”***

- Led the Discovery of optical counterpart of GRB230812B using Zwicky Transient Facility.
- Led observations with GROWTH-India Telescope for the orphan afterglow candidate AT2023sva.
- Part of the Discovery team for “ZTF23aaoohpy/AT2023lcr”, fast fading transient.
- Part of the GROWTH-India Telescope team in searching Electromagnetic Counterparts to Gravitational Wave Events, in collaboration with the Zwicky Transient Facility team led by Caltech.
- Following up transient X-ray binaries undergoing outbursts.
- Daily scanning for fast transients in ZTF data through ZTFRest.

### **2. Visiting Student Researcher (Indian Institute for Astrophysics)**

Nov 2022 - Dec 2022

Supervisor: **Dr. Santanu Mondal**

- Conducted energy-dependent time-averaged temporal analysis of a transient black hole X-ray binary GX 339-4 by utilising archival data from *NICER* and *AstroSat* missions
- Studied energy dependence and time evolution of Quasi Periodic Oscillations (QPOs) and their harmonic components in the power density spectrum.
- Developed pipelines energy dependent and time resolved temporal studies of persistent sources.
- Co-authored a Publication.

## **APPROVED TARGET OF OPPORTUNITY PROPOSALS**

### ***Chandra DDT (Co-PI)***

Sep 2023

50 ks observations with ACIS instrument

*“Observing GRB230812B - To understand Jet Physics for an Extremely Bright GRB”*

### ***AstroSat ToO (Co-PI)***

Aug 2022

40 ks observations with LAXPC and SXT instrument

*“AstroSat/SXT confirms GX 339-4 to be in the low-hard state”*

### ***AstroSat ToO (Co-PI)***

Sep 2022

40 ks observations with LAXPC and SXT instrument

*“AstroSat observes XTE J1701-462 in its Z phase”*

## **SKILLS**

<b>Astronomy Softwares</b>	XSPEC, XSELECT, FT00LS, ds9, IRAF
<b>Programming Languages</b>	Python, Bash
<b>Python Packages</b>	Astropy, Stingray, Numpy, Scipy, Pandas, Matplotlib, Seaborn
<b>Languages</b>	English, Kannada, Telugu, Hindi

## **CONFERENCES AND WORKSHOPS**

1. Transients 2024 (*Conference - Poster Presentation*) April 2024  
*Broadband spectral and timing analysis of Slow Burster 4U 1728-34 using AstroSat*
2. The 42nd meeting of the Astronomical Society of India (*Conference - Poster Presentation*) Feb 2024
  - a. *Broadband spectral and timing analysis of Slow Burster 4U 1728-34 using AstroSat*
  - b. *GRB 230812B - Exploring Jet physics and Polarization for an extremely bright Gamma Ray Burst*
3. Zwicky Transient Facility Summer School (*Summer school - Remote attendee*) July 2023
4. The 41st meeting of the Astronomical Society of India (*Conference - Poster Presentation*) March 2023  
*Spectro-Temporal behaviour of Black Hole X-ray Binary GX 339-4 using AstroSat data*
5. Conference on 7 years of AstroSat (*Conference - Attendee*) Sep 2022
6. Time Domain and Multi-Messenger Astronomy workshop (*Workshop - Remote Attendee*) Aug 2022

## PROJECT MENTORING

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<b>Nishanth Karthik Nayak</b> First Year undergraduate (Physics) at Pennsylvania University “Determining Distances and Ages of Open Clusters”	Nov 2022
<b>Shibam Sundar Mahakud</b> First Year undergraduate (Mechanical Engineering) at Indian Institute of Technology Bombay “Determining Distances and Ages of Open Clusters”	Nov 2022
<b>Manan V Jain</b> Final Year undergraduate (Aerospace Engineering) at Amrita Vishwa Vidyapeetham “Building Citizen Science program back end infrastructure for SSERD (a Non Profit Organization)”	Sep 2022

## AWARDS AND FELLOWSHIPS

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Indian Institute for Astrophysics Visiting student fellowship	Nov 2022
Best Student Science Communicator Award ( <i>Awarded by Govt. of Karnataka, India</i> )	Sep 2018

## OUTREACH AND POSITIONS OF RESPONSIBILITIES

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Student POC, TechConnect, IIT Bombay	Dec 2024
LOC member, Transients 2024 conference	April 2018
Booth Co-ordinator, TechConnect, IIT Bombay	Dec 2023
Program Head - Asteroid search campaign at SSERD	March 2020 - Present
Astronomy Education Content Developer for ISRO's YUVIKA program	June 2022
Associate editor - Shasthra Snehi	2020-2023

## EXTRACURRICULAR AWARDS AND ACHIEVEMENTS

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Cultural Patronage - State level inter college Theatre arts competition	Feb 2020
Sri Thirunarayana Memorial Prize - For best freshman student in Cultural activities.	Sep 2017

## REFERENCES

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**Prof. Varun Bhalerao**  
Associate Professor  
Department of Physics, Indian Institute of Technology Bombay  
[varunb@iitb.ac.in](mailto:varunb@iitb.ac.in)

**Prof. Blesson Mathew**  
Assistant Professor  
Department of Physics and Electronics, CHRIST University  
[blesson.mathew@christuniversity.in](mailto:blesson.mathew@christuniversity.in)

**Dr. Santanu Mondal**  
Ramanujan Fellow  
Indian Institute for Astrophysics  
[santanu.mondal@iiap.res.in](mailto:santanu.mondal@iiap.res.in)