

Linn Abraham

Ph.D. Candidate

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Work Experience

Research Associate - ISRO/RESPOND Project

May 2023 – Present

Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India

➤ Solar Flares: Physics and Forecasting for better understanding of Space Weather

- Developed a Vision Transformer model for flare forecasting from multi-wavelength E(UV) images of solar active regions
- Used model explainability techniques such as Integrated Gradients for model improvement and gaining physical insight into the problem.

Research Experience

Ph.D. Physics - Discovering Latent Structures In Massive Datasets Using Deep Learning

Sep 2018 – Present

Puducherry Technological University (affiliated to Pondicherry University, Puducherry)

- Developed a deep learning model for the automated detection of rings in galaxies using images from the Sloan Digital Sky Survey.
- Developed a deep learning model for the detection of neutral hydrogen emission from radio spectral cubes and benchmarked it with state-of-the-art in the field.
- Developed a deep learning model for the classification of solar active regions into flaring and non-flaring using multi-wavelength ultraviolet images from the Atmospheric Imaging Assembly (AIA/SDO) Telescope.

Research Intern - Project on Pan-Astronomical Deep Learning

Jun 2019 – Apr 2020

Funded by Indo-US Science and Technology Forum (IUSSTF)

- Graduate Visitor to Center for Data Driven Discovery, Caltech - USA

- Developed deep learning tools for the classification of variable stars using photometric light curves for the Zwicky Transient Facility Survey

Masters Thesis - Classification of Transients using Machine Learning Methods

May 2016 – Apr 2017

Mahatma Gandhi University, Kottayam – India

- Used dimensionality reduction and support vector machines to classify variable stars using photometric light curves from Catalina Real-Time Transient Survey.

Publications

Journal Articles

- 1 Rahul Gopalakrishnan, Soumya Roy, Deepak Kathait, et al. “Unraveling the Secrets of the lower Solar Atmosphere: One year of Operation of the Solar Ultraviolet Imaging Telescope (SUIT) on board Aditya-L1”. In: (July 2025). Submitted to JoAA.  [10.48550/arXiv.2508.08801](https://arxiv.org/abs/2508.08801).
- 2 Soumya Roy, Durgesh Tripathi, ... **Rahul Gopalakrishnan** ..., et al. “Near- and Mid-ultraviolet Observations of X-6.3 Flare on 2024 February 22 Recorded by the Solar Ultraviolet Imaging Telescope on board Aditya-L1”. In: *The Astrophysical Journal Letters* 981.1 (Mar. 2025), p. L19. ISSN: 2041-8205, 2041-8213.  [10.3847/2041-8213/adbobe](https://doi.org/10.3847/2041-8213/adbobe).
- 3 Soumya Roy, Durgesh Tripathi, ... **Rahul Gopalakrishnan** ..., et al. “X-class Flare on 2023 December 31 Observed by the Solar Ultraviolet Imaging Telescope on Board Aditya-L1”. In: *ApJL* 983.1 (Apr. 10, 2025), p. L6. ISSN: 2041-8205, 2041-8213.  [10.3847/2041-8213/adc387](https://doi.org/10.3847/2041-8213/adc387).
- 4 Janmejoy Sarkar, VN Nived, ... **Rahul Gopalakrishnan** ..., et al. “Test and Calibration of the Solar Ultraviolet Imaging Telescope (SUIT) on board Aditya-L1”. In: (2025).  <https://doi.org/10.48550/arXiv.2503.23476>.
- 5 Durgesh Tripathi, A. N. Ramaprakash, ... **Rahul Gopalakrishnan** ..., et al. “The Solar Ultraviolet Imaging Telescope on Board Aditya-L1”. en. In: *Solar Physics* 300.3 (Mar. 2025), p. 30. ISSN: 1573-093X.  [10.1007/s11207-025-02423-1](https://doi.org/10.1007/s11207-025-02423-1).
- 6 Divita Saraogi, J Venkata Aditya, ... **Rahul Gopalakrishnan** ..., et al. “Localization of gamma-ray bursts using AstroSat Mass Model”. In: *Monthly Notices of the Royal Astronomical Society* 530.2 (Feb. 2024), pp. 1386–1393. ISSN: 0035-8711.  [10.1093/mnras/stae435](https://doi.org/10.1093/mnras/stae435).

In Preparation

- 1 Rahul Gopalakrishnan, Jitendra Joshi, Navaneeth P.K, et al. “Automated GRB detection using Sum-threshold Algorithm with CZTI”. In Prep. Mar. 2025.
- 2 Rahul Gopalakrishnan, Nived V.N, Soumya Roy, et al. “Data Processing Pipeline of Solar Ultraviolet Imaging Telescope (SUIT) onboard Aditya-L1”. In Prep. July 2025.

Workshops and Conferences

- Jan 6 – 10, 2025**  **AI/ML Applications to Astronomy and Astrophysics: Contributed Hands-on Session** - Workshop for young researchers and faculty with a background in astronomy and astrophysics and an interest in the application of AI/ML techniques in Astronomy.
- Jan 19 – 25, 2025**  **Sun, Space Weather and Solar-Stellar Connection:** Poster Presentation - Meeting to bring together researchers to discuss advances in solar physics, stellar activity, and their impacts on space weather.
- Jan 31 – Feb 04, 2024**  **Annual Conference of Astronomical Society of India - 2024:** Poster Presentation - Meet for astronomers, students, and researchers to share latest results and workshop on topics including solar-heliospheric observations (Aditya-L1), transient follow-ups, UV/optical/IR astronomy, space weather, and planning for India's next-generation facilities.
- Mar 06 – 09, 2024**  **Young Astronomers Meet - 2024:** Oral Presentation - Meet for PhD students across India to present research in astronomy, astrophysics, instrumentation and related fields.
- Dec 12 – 14, 2023**  **IUCAA Data Science Workshop:** [Oral Presentation](#) - Lectures on machine learning, foundational and generative models, and real-world use-cases including a hackathon.

Education

-  **M.Sc. in Physics** Aug 2015 – Jul 2017
Mahatma Gandhi University, Kottayam – India
GPA: 2.82/4
Relevant Courses: Integrated Electronics, Digital Signal Processing
-  **B.Sc. in Physics** Aug 2012 – Jul 2015
Mahatma Gandhi University, Kottayam – India
GPA: 2.85/4
Relevant Courses: Astronomy and Astrophysics, English (**GPA: 3.29/4**)

Skills

-  **Languages** : English. Also fluent in Hindi, Malayalam, and Tamil.
-  **Programming** : Python (Astropy, SunPy, Matplotlib, NumPy, SciPy), L^AT_EX, Bash
-  **Deep Learning Frameworks** : PyTorch, Tensorflow/Keras, Scikit-learn
-  **Tools/Platforms** : Git, DVC, Docker, AWS, GCP, Triton Inference Server
-  **Web Development** : LAMP stack, HTML, CSS, JavaScript, Drupal

Miscellaneous

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| 2023 |  Public Outreach Talk on Aditya-L1 launch day |
| 2024 |  Website Developer : Solar Ultraviolet Imaging Telescope (suit.iucaa.in) |
| 2018 – 2019 |  Course Instructor: Real World Applications of Python |
| 2015 |  Diploma in Computer Assembly and Maintenance, UGC |