Prathamesh Ingale

Email +491774242269 LinkedIn GitHub

EDUCATION

Master of Science in Astrophysics October 2022 - present
University of Bonn, Germany

- *CGPA*: 2.4/5.0 (1.0 is the highest CGPA)
- *Thesis:* Mapping the Spectral Energy distribution and spatial extent of M81* through coordinated Effelsberg, VLBA, and EVN observations (Supervisors : Dr. Sebastiano von Fellenberg (MPIfR) and Prof. Dr. Eduardo Ros (MPIfR))

Bachelor of Science in Physics July 2019 - July 2022
Fergusson College (Autonomous), Pune, India

- *CGPA*: 9.01/10 (10.0 is the highest CGPA)
- *Thesis:* Obtaining Dispersion measure time series for J0613-0200 and J1643-1224 using uGMRT (Mentors: Dr. Pratik Trarafdar (IMSc) and Prof. Bhalchandra Joshi (NCRA))

INTERESTS

Radio Astronomy
Active Galactic Nuclei (AGN)
Very Long Baseline Interferometry (VLBI)
Stellar objects and Transients

RESEARCH PROJECTS

Master's Project (July 2024 - present)

- *M81* has a precessing jet possibly due to a binary blackhole. Thesis work is focussed on confirming the binary blackhole hyposthesis and study source properties.*
- *VLBA archival data (C, X, and K band) has been calibrated using rPICARD pipeline (M.Janssen et al. 2019). The post calibration files need consistency checks after each data calibration. Further, Difmap is used for imaging using the generated files. Until January 2025 35 datasets have been calibrated, imaged and modelled which strongly support the jet precession hypothesis.*
- *Variability of the source can be studied via lightcurve and spectral energy distribution (SED). The Effelsberg is monitoring the source since November 2023. Average flux values are obtained after data reduction and calibration. So far, SED for each epoch and preliminary lightcurve of six months have been plotted.*

Bachelor's Project (December 2021 - July 2022)

- *The aim of the project was to find the Dispersion Measure Time Series for two Pulsars J0613-0200 and J1643-1224 using the DMcalc method (Krishnakumar et al. 2021). The data was obtained from the upgraded Giant Meterwave Radio Telescope (uGMRT) and reduced using the PINTA pipeline (Susobhanan et al. 2020).*
- *Professor B.C Joshi introduced me to the Indian Pulsar Timing Array (InPTA). The project was successfully completed under the guidance of the InPTA collaboration. I was also grateful to co-author the first data release of the Indian Pulsar Timing Array (InPTA).*
- *Publication link: Tarafdar, inc. Ingale et al., 2022.*

SWANtenna Project (June 2020 - present)

- *Indian Sky Watch Array Network (SWAN) Antenna Design Challenge 2020 is a national-level competition organised by IUCAA-TLC and Raman Research Institute. Participating teams are supposed to design a unique antenna with characteristics specified by SWAN.*
- *Our team was able to simulate and build a prototype antenna fitting in a 1 sq. meter area with optimal working in the 80-320MHz band and sensitive to linear orthogonal polarization. We are among the top 3 teams in India which qualified for the prototyping phase.*
- *Ongoing tests of mismatch loss and radiation pattern show excellent results.*

WORKSHOPS AND SUMMER SCHOOLS

- *European Radio Interferometry School 2024 (ERIS 2024), Granada, Spain (October 2024): The summer school was very important for the on-going Master project. Lectures on radio interferometry and hands-on tutorials on interferometric data enhanced my understanding and skills about the subject.*
- *European VLBI Network (EVN) Symposium, Bonn, Germany (September 2024): The symposium embodied ongoing research and future prospects of VLBI. Topics such as AGNs, starburst galaxies, and transients were covered during this five-day conference, providing valuable insights into branches connected to VLBI.*
- *Machine Learning Workshop, Cologne, Germany (June and September 2024): The first session in June covered the basics of machine learning, deep learning, and neural networks, including hands-on exercises. The second session in September was an advanced version, exploring regression, Markov Chain Monte Carlo (MCMC), Bayesian statistics, and deep learning applications in radio astronomy. Hands-on exercises provided a thorough overview of the field.*
- *Neutron Star Workshop at Max Planck Institute for Radio Astronomy, Bonn, Germany (April 2023 and May 2024): The workshop focused on transient science, presenting results from pulsar timing, X-ray and gamma-ray observations of transients, and newly discovered pulsars. It provided a comprehensive overview of current research in transient science.*
- *Green Bank Observatory (GBO) Online Workshop, West Virginia, USA (September 2020): The workshop aimed to detect the 21cm H-1 line emission from the Milky Way using the Green Bank 20m telescope via remote observations. The collected data was analyzed to plot the Galactic Rotation Curve, which serves as indirect evidence of dark matter.*

ORGANIZATION AND OUTREACH

- *As a part of AstroClub of Fergusson College organized an event 'Frontier in Physics' (FiP), a seminar series where professors are invited to present their research (2020-2022). I presented a poster about gravitational waves detection using Pulsar Timing at FiP 2022.*
- *Volunteered for Science Park Pimpri-Chinchwad, Pune in an outreach event aimed to popularize the Solar eclipse of December 2019 in several schools of the city.*
- *Delivered a talk on different types of Antennas in the workshop (Realm of Radio), organized by Astroclub of Fergusson College.*

- *As a part of Fergusson College physics department, organized and volunteered for 'Gravity,' a departmental fest aimed to outreach ongoing research in Physics and Astronomy (2020-2022).*
- *Astro Club of Fergusson College in collaboration with Inter-University Centre for Astronomy and Astrophysics (IUCAA) organized the Guru Dhwani Antenna Designing Competition. The task for the participants was to design and simulate the antenna sensitive to the radio bursts from Jupiter.*

PROFESSIONAL EXPERIENCE

- *Tutor at University of Bonn, Germany for Radio Interferometry lab course (S262). Tasks as a tutor includes conducting oral exam, guiding students during the lab and deciding the final grade based on the submitted report (April 2024 - October 2024).*
- *Student job at VLBI Correlator department of Max Planck Institute for Radio Astronomy (MPIfR), Bonn,Germany. Tasks includes creating directory files for the received modules, shipping of modules worldwide and registering the influx and outflux of the same (October 2023 - present).*

SKILLS

- *Programming and Scripting Languages: Python, Bash.*
- *Operating Systems: Windows, Linux (Ubuntu 20.04).*
- *Softwares and tools: CASA, Difmap, FEKO, HFSS, Github, Visual Studio code, TEMPO2, PSRCHIVE.*
- *Languages: English, Marathi, Hindi, German (beginner).*
- *Other: Writing poems, charcoal drawing, cooking, football and cricket.*