

Harshal Raut

MS (Research) - Space Science & Engineering
Research Domain - Galaxy Evolution and Data Analytics
Indian Institute Of Technology Indore

+91-7045665352
ms2204121003@iiti.ac.in
harshal1908.hr@gmail.com
linkedin.com/in/[Harshal Raut](#)

EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
M.S. (Research)	Indian Institute of Technology Indore	9.7 (Current)	2022-Present
B.Tech.(Electronics)	Mumbai University (V.J.T.I)	6.84	2015-2019
Higher Secondary	CBSE Board (D.P.S. Nagpur)	84.5%	2015
Secondary	CBSE Board (R.G.P.S.)	10.0	2013

PROJECTS

- **Developing Novel method to find Multi-component stellar Disk in galaxy** Nov. 2022 - Present
Asst. Prof Dr Narendranath Patra [Github](#)
 - Constructed a 3D model of galaxy using the combined Poisson-Boltzmann equations which combine the surface density and the velocity dispersion of star, Atomic gas and Molecular gas.
 - Leveraged advanced statistical techniques, including 2D Gaussian fitting (MGEFit) and Markov Chain Monte Carlo (MCMC), to extract precise measurements of density of stars and dark matter halo respectively.
 - Designed and implemented custom algorithms to optimize the fitting process and account for deprojection inherent in astronomical observations.
 - **Developed a novel method to observe thin disk in an external spiral galaxy**
- **Developing Visualizing Software for IITI Radio Interferometer** Dec 2022 - Feb 2023
Asst. Prof Dr. Narendranath Patra
 - Developed software for demonstration of the IITI Radio Interferometer, showcasing the interference patterns.
 - Created dynamic plots displaying the cross-correlation, auto-correlation of multiple antenna signals, enabling researchers to gain insights into radio source properties and interference patterns.
 - **Conducted successful Sun Transit experiments, demonstrating the running of the interferometer.**

TECHNICAL SKILLS

- **Programming:** Python, C, C++, Linux, Latex, Matlab
- **Electronics:** VHDL*, Raspberry Pi, Arduino, FPGA* * Elementary proficiency

RELEVANT COURSEWORK

- **MS(R) in Space Science and Engineering:** Detectors and Sensors, Space Engineering System, **Astrophysical fluids & Plasma**
- **B.Tech in Electronics:** Applied Physics, Applied Chemistry, Mathematics for Engineers, Computer Programming and problem Solving, Signals and Systems, **Probability and Statistics, Electromagnetic Field and Waves, Microwave and Optical Communications**, Wireless communications, Satellite communications, Neural Networks and Fuzzy logic

RESEARCH INTEREST

Galaxy Structure and Formation, Optical, Infrared and radio Spectroscopy and Photometry, Data Analysis

CONFERENCES

- Presented my thesis work as a poster during the annual meet of the Astronomical Society of India (ASI) 2023, held at IIT Indore
- Gave an oral talk about my Thesis at the National Space Science Symposium(NSSS 2024), held at Goa University.

POSITIONS OF RESPONSIBILITY

- **Academics:** Performed the role of TA for the subjects Astro Labs I & II in my 2nd & 3rd Semester, respectively.
- **Management:** Volunteered for the URSI 2022, Radio conference and ASI 2023 conference.
Provided technical support during oral presentations. Helped in conducting the overall event smoothly.

OUTREACH

Participated in various Astronomy Outreach events, including solar and lunar eclipse observations, planet conjunction events, and stargazing sessions for both school students and the general public.