# Soumyadeep Das

B.Tech and M.Tech in Engineering Physics · IIT (BHU) Varanasi

*Kolkata, West Bengal, India.*

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*"Only when it's dark enough can you see the stars." – A nice statement lost on Radio Astronomers.*

## Education

**Indian Institute of Technology (BHU), Varanasi** *Varanasi, India*

Integrated Dual Degree (B.Tech. + M.Tech.) in Engineering Physics (Part V) *Aug. 2014 - May. 2019*

- CGPA - 8.75/10. Departmental Rank 2 Holder.
- TOEFL iBTS Score - 109/120 (obtained above 25 in each section).
- Awarded with IIT Color, the second highest honor of IITs for contributing to the growth of astronomy in the institute and outreach.

## Skills

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| **General Programming** | C, Python, Matlab, FORTRAN. |
| **Simulation and Science** | AIPS, CASA, DS9, Astropy, Scipy, APLpy, LaTeX. |
| **Amateur Astronomy** | Telescope fabrication and handling, Night-sky observations, Long exposure astrophotography. |
| **Miscellaneous** | Full Stack Web and App Development, Git, Heroku, Jekyll, SQL, Adobe Photoshop, Lightroom, AfterEffects. |

## Courses and Academic Background

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| **Background** | Synthesis Imaging in Radio Interferometry, Introduction to AGN by Peterson, First Course in General Relativity. |
| **Coursework** | Classical & Quantum Mechanics, Computational Physics, Statistical Physics, Nuclear & Particle Physics, Linear Algebra, Numerical Methods, Relativistic Electrodynamics, Magnetohydrodynamics, Basic Astronomy, Solar Physics. |
| **Other Courses** | Probability and Statistics, Statistical simulations, Pattern Recognition, Programming and Data-structures. |

## Experience

**Looking from All Angles at a Source Straddling the Radio-loud/Radio-quiet AGN Divide.** *Pune, India*

VSRP Summer Internship under Dr. Preeti Kharb, National Center for Radio Astrophysics (NCRA-TIFR). *May. 2018 - July. 2018*

- Imaged and analyzed archival data of the unique AGN – NGC 2329, at all available radio bands, resolutions and sensitivities.
- Studied the hybrid morphology, spectral indices, and calculated age estimates to investigate a possible AGN restart.
- Used AIPS, CASA, Python, and DS9 for calibration, imaging, and analysis of radio, X-ray, and optical data.
- Submitted a first-author paper titled 'The Peculiar WAT NGC 2329 with Seyfert/FRI-like Radio Lobes' to MNRAS.

**Importance of Polarization Calibration in Radio Interferometry.** *Varanasi, India.*

Master's Project under Dr. Prasun Dutta, IIT (BHU), Varanasi. *Jan. 2017 - May. 2019*

- Aims to provide valuable insight into the power spectrum estimation methods and to construct the reionization signal from the observed data.
- Calibration and imaging using CASA. Used the software VISFITS for visibility simulation and modified it for the addition of antenna gains.
- Published a paper in IEEE URSI Regional Conference Proceedings. Poster presented at MMetre Wavelength Sky II (MWSKY II) Conference.

**Understanding Stellar Collapse and Formation of Strange Quark Stars.** *Hong Kong SAR*

Summer Internship under Prof. Ming Chung Chu, Chinese University of Hong Kong. *Jun. 2017 - Aug. 2017*

- Hydrodynamic simulations aimed at understanding stellar collapse and investigating the conditions that lead to formation of Strange Quark Stars, and their attributes and Gravitational Wave signatures.
- Used high-resolution Weighted Essentially Non-Oscillatory (WENO) simulations to simulate the collapse of the supernova gas in FORTRAN.

**Star cluster detection and characterization using generalized Parzen density estimation.** *Thiruvananthapuram, India*

Summer Internship under Dr. Sarita Vig, Indian Institute of Space Science and Technology (IIST) and Dr. Gorthi RKSS Manyam, IIT Tirupati. *May. 2016 - July. 2016*

- Involved the application of generalized Parzen Windows for star cluster detection and identification.
- Wrote a MATLAB pipeline for semi-automatic detection of star cluster in a given field of stars.
- Presented a paper on the same at conference "Star and Planet Formation : Insights and Intricacies" at IIST Thiruvananthapuram. Paper accepted for publication in MNRAS, Oct 2018.

## Teaching Assistant Positions

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| 2019 | PHY 304 - Computational Physics (Theory and Lab) |
| 2018 | PHY 303 - Electromagnetic Waves |
| 2017 | PHY 304 - Solar, Space & Plasma Physics |
| 2017 | PHY 303 - Electromagnetic Waves |
| 2016 | PHY 102 - Physics II (Electromagnetism) |

## Publications

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| 2020 | (Conference Proceedings) J. Kumar, P. Dutta, S. Das, N. Roy, "Instrumental Calibration for Observations of Redshifted 21-cm Signal from Neutral Hydrogen.", URSI-RCRS 2020, IEEE, 11 June 2020. |
| 2018 | S. Nambiar, S. Das, S. Vig, G.R.K.S.S. Manyam, "Star cluster detection and characterization using generalized Parzen density estimation.", MNRAS, accepted for publication, Oct. 17, 2018. |
| —- | (Submitted to MNRAS, Under Review) S. Das, P. Kharb, S. Nandi, R. Morganti, "The Peculiar Wide-Angle-Tailed Galaxy NGC 2329 with an FRI-Seyfert Radio Outflow." |

## Conferences

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| 2019 | Presented a poster on "Instrumental calibration requirements for observation of redshifted 21-cm signal from neutral hydrogen" at the Metre Wavelength Sky II Conference (MYSKY-II) held at National Centre for Radio Astrophysics, Pune, India |
| 2016 | Presented a paper on "Star cluster detection using Parzen Window" at the Star and Planet Formation Conference (SPF2016) held at Indian Institute of Space Science and Technology, Thiruvananthapuram, India |

## Achievements, Awards and Extra-curricular activities

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| 2017 | **Winner**, Codefest Appathon - Android Development Competition, Dept. of CSE, IIT (BHU) Varanasi. | *Varanasi, India* |
| 2016 | **Founder**, Corona - Bi-monthly collegiate astronomy magazine. | *Varanasi, India* |
| 2016 | **Secretary**, Astronomy Club, IIT (BHU) Varanasi. | *Varanasi, India* |
| 2016 | **Winner**, Hackathon - Android Development Contest, Technex, IIT (BHU) Varanasi. | *Varanasi, India* |
| 2015 | **Global Rank 81**, Open Contest "The Pythonist". | *Hackerrank.com* |
| 2015 | **Winner**, Eyes on the Sky - a messier hunting competition. | *Jaipur, India* |