Divyanshu Ranjan

Personal Data

Place and Date of Birth:	India | 07 August 1996
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Education

September 2019 Erasmus Mundus Joint Masters Degree programme in Astronomy & Astrophysics

- *I Semester* | **Leopold-Franzens-Universität Innsbruck**, Austria
- *II Semester* | **Università Degli Studi Di Padova**, Italy
- *III Semester* | **Univerzitet u Beogradu**, Serbia
- *IV Semester* | **Georg-August-Universität Göttingen**, Germany

July 2017 Bachelors of Science
Fergusson College, **Savitribai Phule Pune University**, India
Score: 2223/3100

May 2014 All India Senior Secondary Certificate Examination (AISSCE)
Central Academy Senior Secondary School, Lucknow, India
Score: 415/500

Work Experience

December 2020 - Now Doctoral Student
Helmholtz-Zentrum Dresden-Rossendorf and
Institut für Physik, Universität Rostock

Projects Undertaken

- **Kinematics of NGC 5927** (December 2017)
  Prof. Marco Gullieuszik (INAF - Osservatorio Astronomico di Padova)
  Project is based on spectroscopic data from the Gaia-ESO Survey (GES) obtained to study 71 stars that are candidate members of the galactic globular cluster NGC 5927. The project was based on programming in Python language.

- **Galaxy classification** (December 2018)
  Prof. Dragana Ilić (University of Belgrade)
  Extraction of the required data, the analysis of the data using a programming language and classifying the galaxies in the Sloan Digital Sky Survey (SDSS) and Wide-field Infrared Survey Explorer (WISE) as an AGN, based on different excitation mechanism in the galaxies.

- **Statistical Project** (2015)
  Prof. Deepa S. Kulkarni (Fergusson College, Pune)
  Finding the correlation between number of hours spent on electronic media(TV, Mobile, Laptop) and the source of light used during study or work with the power of spectacle lens of an individual. Also found the relation between a person using a vision aid and their parents having the same, and the family diabetes history affecting the same.

- **Statistical Project** (2016)
  Prof. Charu P. Dabir (Fergusson College, Pune)
  Analysis of the data obtained from a Haemogram Test held in college, to test the claims regarding health of students and compare it with the National Average figures separately for each gender.

- **A Bookshop Handling Software/Program using C++ Programming** (2014)
  The project has been prepared with the purpose of aiding the shop management of a Book Shop through a 'Shop Management System' that facilitates maintenance of the Database of the shop as well as guides the customer in buying the desirable products with ease. This was built as a part of coursework for AISSCE.

Research Experience

- **Bachelor Thesis** (2017)

  Prof. Raka V. Dabhade (Fergusson College, Pune)

  Comparative analysis of light curves of variable stars in Pegasus cluster

  The basic aim of this project was to analyse the light curves of variable stars in order to shed light on the cause of variability, as also the type of the variable in question.

- **Master Thesis** (2019)

  Prof. Ansgar Reiners (Georg-August-Universität Göttingen, Germany

  Evolving cavity width between the two reflecting surfaces in the Fabry-Perot Interferometeres (FPIs)

  FPIs are used as next-generation wavelength calibrators for echelle spectrographs to obtain superior radial velocity precisions, which assume the cavity width to be constant, but on observations, it has been found that even after maintaining constant temperature and mechanical stress, the cavity width varies with time. Applying the concept of calibrating the effective cavity width using standard calibrators proves to be more difficult for real FPIs. The cavity width is not constant throughout the wavelength range covered by high- resolution echelle spectrographs. FPIs are usually soft coated, allowing photons of different energy to penetrate to different depths of the dielectric surface. Hence, photons of different wavelengths see different cavity widths. The assumption that the wavelength dependency of the cavity width is smooth, is verified and well exploited. This cavity width for a particular wavelength should be fixed if the mechanical stress and constant temperature are maintained to be constant. But even after the maintained conditions, the cavity widths seem to evolve over time. The main aim was to study these changes by studying the calibration data for the FPIs in Visual and Near-Infrared regime, and point towards the underlying reason for the evolution.

- **Other During Masters**

  During various courses, I learned to perform photometric analysis, x-ray analysis of the supernova remnant 3C397 data from XMM-Newton using Heasoft. I also performed optical data reduction of 7-Vul star, and the photometric magnitude measurements of the stars. I also learned the application of Artificial Neural Network for the detection of exoplanets from the lights curves.

- **Pre-Bachelors**

  Worked on a group project dealing with the "Study of Soils collected from different sources (garden, chemical industry, roadside, riverside etc)" to compare and determine different properties of these samples, and the effect these surroundings have on the soil. This study qualified upto the State level of 18^th National Children's Science Congress (NCSC).

Co-curricular Activities

Activities as a part of Astro Club, Fergusson College, Pune:

- Organized 3-days National Students' Seminar 'Frontiers in Physics-X' (January-2017), 'Frontiers in Physics-IX' (January-2016), 'Frontiers in Physics-VIII' (January-2015) in Fergusson College.
- Organized a 2-days exhibition on Space Missions, dedicated for historical as well as upcoming space missions (September-2016), 2-days exhibition 'Remembering Kalam' as a tribute to the former president of India Late Dr A.P.J. Abdul Kalam (August-2015) and a 3-Day Exhibition 'Eyes On The Universe' on New technologies in Astronomy & Astrophysics (September 2014)
- Organized Astronomy Outreach, star-gazing and meteor-shower observation sessions for college students. Observations of the meteor shower were taken and uploaded to the database of International Meteor Organization's website and their ZHR were calculated.

Scholarships

- Recieved scholarships amounting to €11,260.98 from the Erasmus+: Erasmus Mundus Joint Master Degree programme AstroMundus in Astrophysics consortium for the study during the course.
- Recieved scholarships amounting to ₹35,000 from the Tata Motors Limited for continuous high grades during the education period.

Conferences & Events

- Attended the 4-days conference '19th National Space Science Symposium' 2016 organised by Indian Space Research Organisation at Vikram Sarabhai Space Center, Kerala, India.
- Participated in the 13^{th} Heidelberg Summer School hosted by the International Max Planck Research School for Astronomy and Cosmic Physics at the University of Heidelberg (IMPRS-HD) on 'Gaia Data & Science'
- Participated in Golden Week of Webinars in Astrophysics hosted by Institute of Astrophysics, Pontificia Universidad Católica, Chile
- Participated in 2020 Sagan Exoplanet Summer Virtual Workshop on 'Extreme Precision Radial Velocity' hosted by The NASA Exoplanet Science Institute

Languages

English, Hindi(Mothertongue), Marathi, French(learning), German(learning)

Computer Skills

Programming Languages:	Python, C, C++, sql, html, R, IDL
Softwares & Tools:	topcat, IRAF, XMM-NEWTON, dipso, ds9, LaTeX, CLOUDY

Work Experience

Conducted tutions in Physics, Chemistry And Maths for school students of standard 9^{th} and 10^{th} in Lucknow.

Interests and Activities

Travelling and Exploration
Cooking, Sketching, Reading
Football, Cricket, Computer Games