Baibhav Srivastava

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EDUCATION

BS-MS Dual Degree | 2023

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (IISER), BERHAMPUR, INDIA

- Major: Physical Sciences | Minor: Biological Sciences
- Grade Point Average: 9.56

All India Senior Secondary Certificate Examination | 2018

ARMY PUBLIC SCHOOL, BARRACKPORE, INDIA

- Percentage: 94.6%

RESEARCH INTERESTS

- Protoplanetary Disks - Hydrodynamics-driven evolution of dust and its coupling with gases
- Planetary Dynamics - Evolution of planetary system architecture and their long-term stability
- Astrochemistry - Distribution of molecules in molecular clouds and planet-forming regions

RESEARCH EXPERIENCE

Modelling the Millimetre/Sub-millimetre Emissions in Protoplanetary Disks

MASTERS' THESIS | **MAY 2022 - JUNE 2023**

Supervisor: Dr Liton Majumdar, Exoplanets and Planetary Formation Group, School of Earth and Planetary Sciences, NISER Bhubaneshwar

- Simulating the millimetre/sub-millimetre emissions from molecular transitions to study the distribution of molecules, using RADMC3D and NAUTILUS
- **RADMC3D** is a radiative transfer module that can generate the temperature and flux distribution in the disk. **NAUTILUS** is an astrochemical code that solves coupled rate equations to generate the chemical abundance and distribution, using a given set of physical parameters
- We created a consistent coupling of the two tools that allows us to understand how chemistry is affected by the dust and gas distribution in such protoplanetary disks, hinting at the materials available to planets during formation.

Classification of Kepler Objects of Interest (KOI) using Machine Learning

SEMESTER PROJECT | **NOVEMBER 2021**

Supervisor: Prof P. Radha Krishna, Department of Computer Science and Engineering, National Institute of Technology (NIT), Warangal

- Project aimed to compare supervised clustering algorithms using KOI Data set from NASA Exoplanet Archives.

First Principles Study of the Malkus Water Wheel

SEMESTER PROJECT | **DECEMBER 2020**

Supervisor: Prof Achanta Venugopal, Department of Condensed Matter Physics and Material Sciences, Tata Institute of Fundamental Research (TIFR), Mumbai

- Involved using various numerical techniques (like the Runge Kutta Method for the solution of ODEs) to solve for the motion of the Malkus Water Wheel, a widely studied chaotic system (based on Matson 2007).

Exploding Massive Stars Using Computer Simulations

SHORT-TERM WINTER PROJECT | **DECEMBER 2019**

Supervisor: Dr Alak Kumar Ray, Department of Astronomy & Astrophysics, Tata Institute of Fundamental Research (TIFR), Mumbai

- Radial variations in density, temperature and entropy were studied at different stages of stellar evolution

The Impact of Sex-biased Migration on the Stability of Metapopulation

BIOLOGICAL SCIENCES MINOR THESIS | **AUGUST 2021 - APRIL 2022**

Supervisor: Dr Bodhisatta Nandy, Department of Biological Sciences, IISER Berhampur

- A generic model was developed that combined Migration, Metapopulation Growth and Sexual Conflict

PUBLICATIONS

- A Fast and Flexible Python-based Three Phase Astrochemical Code with Non-diffusive Grain Surface Chemistry (in prep)
  Liton Majumdar, Baibhav Srivastava, Varun Manilal, Prathap Rayalacheruvu, Maitrey Sharma

FELLOWSHIPS

- INSPIRE Scholarship, Department of Science and Technology, India | 2018 – 2023
- Summer Research Fellowship, Indian Academy of Sciences | Summer, 2022
- Jagadish Bose National Science Talent Search Junior Scholarship, JBNSTS, Kolkata | 2016 - 2018

SKILLS

- Programming Languages: Python (proficient), C (basic) and Fortran (Basic)
- Typesetting: LaTeX
- Technical Skills: Numerical Modelling, Data Analysis, Machine Learning
- Language Proficiency:
  - Hindi (Native)
  - English (TOEFL iBT Scores - 113: Reading 30, Listening 30, Writing 29, Speaking 24)

CONFERENCES AND WORKSHOPS

- Contributed Talk titled “The Jovian Factory Unveiled - Physics and Gas Phase Chemistry in Protoplanetary Disks” at the Strange New Worlds Conference, IISER Pune | 2023
- Sagan Exoplanet Summer Workshop on Planet Formation and Protoplanetary Disks, NASA Exoplanet Science Institute (NExScI) | Summer, 2021

- Introductory Summer School for Astronomy and Astrophysics, Inter-University Centre for Astronomy and Astrophysics (IUCAA), India | 2021
- National Initiative on Undergraduate Science (NIUS) Physics Camp 16.1 and 16.2, Homi Bhabha Centre for Science Education (HBCSE), Tata Institute for Fundamental Research (TIFR), India | 2019
- VIJYOSHI Camp, Indian Institute of Science (IISc), Bangalore | 2018

EXTRA-CURRICULARS

Student Talks

- "Keep Calm and Let the Planets Form!" - Talk on introductory planet formation theories organised by NISER Astronomy Club (NAC)
- "Is the Pale Blue Dot Really Special?" – Talk on Exoplanets and Biosignatures in the Beyond Solar System Talk Series by NAXATRA, Astronomy Club, IISER Berhampur
- "A Random Walk Through the Sun" – Talk on introductory Solar Physics in NOX2021, Astronomy Outreach Program by NAXATRA, Astronomy Club, IISER Berhampur
- "Curbing the Curves" – Talk on introductory General Theory of Relativity in the MatSci Series, Project Spiral, Mathematics Club, IISER Berhampur

Articles

- "It's a Transit!" - Blog post on Exoplanets and the Transit method of detection
- "Logistically Chaotic" – Blog post on Logistic Maps and introductory Chaos Theory
- "Grandma's Recipe for Planet Formation" – Blog post on introductory Planet Formation

Outreach

- Tutor in 'Visualizing the Universe through Astronomical Image Processing' module of Infinitus, an outreach workshop conducted by Jigyansa, an online science communication platform
- Tutor in Programming in Python (PIP) Workshop 2022, an outreach workshop on basic Python aimed at school students and undergraduate students, organised by 137-Inverse, Physics Club, IISER Berhampur
- Demonstrator in STREAM 2019 and STREAM 2020, an outreach program aimed at school students, organised by IISER Berhampur
- Demonstrator in NOX2020 and NOX2021, Astronomy outreach program aimed at school students, organised by IISER Berhampur

Others

- Formerly a Core Committee Member of 137-Inverse, Physics Club, IISER Berhampur
- Participated in the "Why can't we travel at the speed of light" episode of the "Science Up!" podcast series.
- Formerly a part of the Contents Team, NAXATRA, Astronomy Club, IISER Berhampur