BARSHAN RAY

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PERSONAL PROFILE

A BS/MS graduate from IISER Kolkata and a PhD student at the Argelander-Institut für Astronomie, I aspire to pursue a career in physical sciences.

My work lies broadly in the realm of astrophysics, with an emphasis on astrophysical plasmas and magnetic fields.

I am an IMPRS Doctoral Student at the Argelander-Institut für Astronomie. My PhD project involves study of the properties and signatures of the turbulent hydromagnetic dynamo, via Pencil Code simulations and theoretical modelling.

Work during my master's degree has focused on the protoplanetary disk, and how magnetic fields affect its formation and evolution via non-ideal magnetohydrodynamics.

Besides astrophysics, I am frequently found obsessing over some beautiful computational solution or the other.

PUBLICATIONS

(2024) Protoplanetary disk size under non-ideal magnetohydrodynamics: A general formalism with inclined magnetic field
The Astrophysical Journal Letters
Yueh-Ning Lee, Barshan Ray, Pierre Marchand, Patrick Hennebelle

EMPLOYMENT

September 2025-Current
Argelander-Institut für Astronomie, Germany
Doctoral Student under Dr. Jennifer Schober

August 2025-Current
Max-Planck-Institut für Radioastronomie, Germany
Guest Scientist

EDUCATION

2020-2025
BS-MS Dual Degree
Indian Institute of Science Education and Research Kolkata

EXPERIENCE

August 2024-May 2025
Indian Institute of Science Education and Research (IISER) Kolkata

- Master's thesis on "Time Evolution of Protoplanetary Disk Size under Non-ideal Magnetohydrodynamics," under the supervision of Dr. Yueh-Ning Lee.

LANGUAGE PROFICIENCY

Python — *Great*

Neural Networks (PyTorch) — *Good*

Julia — *Decent*

C — *Great*

Java — *Good*

C++ — *Good*

LaTeX — *Great*

C♯ — *Decent*

EXPERIENCE

June 2023-August 2023

National Taiwan Normal University (NTNU), Taiwan

- Worked on "Establishing Stable Protoplanetary Disc Radii Threaded by horizontal magnetic fields," as a summer intern under Dr. Yueh-Ning Lee.

June 2022-June 2023

Center of Excellence in Space Sciences, India (CESSI)

- Helped maintain the CESSI space weather website.
- Tinkered around with neural networks, training them on solar light curves.

CONFERENCES & SCIENCE CAMPS

August 2025

Star Formation in Different Environments, Rencontres du Vietnam 2025

- A star formation conference organised at ICISE, Quy Nhon.
- Presented a talk on my master's thesis.

October 2025

Pencil Code School and User Meeting 2025

- Organised at CERN.
- Participant at this conference for Pencil Code, which is extensively used as a part of my PhD project for turbulent MHD simulations.

February 2024

- Speaker at a talk organised by Singularity, The Astronomy Club of IISER-K. Presented to an audience of primarily early undergrads.

June 2023-August 2023

NCTS Theoretical and Computational Astrophysics Summer Student Program

- Organised by and at the National Center for Theoretical Sciences (NCTS), Taiwan.
- Interacted with eminent researchers active in the field of astrophysics in the Asian region.

MY HOBBIES

Amateur Astrophotography
I like engaging in deep-sky astrophotography with my budget Canon EOS 1500D.

Coding
I love a challenge. Although I love fidgeting around with code, a challenge is what gets my blood pumping.

Gaming
I play competitive shooters and a fair share of single-player campaigns.

Ricing
The link describes it all! I maintain a personal Arch Linux system.

Music
I dabble with blues and rock, and am always open to a jam session! I mostly play the guitar with a bit of the bass, but tinker around with the keyboard too.

CONFERENCES & SCIENCE CAMPS

June 2022-July 2022
SPARC Workshop on Machine Learning in Solar Physics and Space Weather
- Organised by and held in CESSI.
- Attended a week-long workshop detailing machine learning and neural network techniques employed in the solar physics domain.
- Interacted with eminent researchers working in solar physics and space weather, from India and Sweden.

February 2022
SOKENDAI Asian Winter School on astronomy and astrophysics (Online)
- Attended a week-long workshop on ongoing research in the astrophysical domain.

December 2019
Vijyoshi National Science Camp
- Organised by KVPY in IISER Kolkata.

June 2019
JBNSTS Summer Science Workshop Program
- Organised by JBNSTS in 2019, in IISER Kolkata.

FELLOWSHIPS & GRANTS

2025
International Max Planck Research Schools, Astronomy and Astrophysics (IMPRS A&A) Doctoral Scholar.

2018
Kishore Vaigyanik Protsahan Yojana (KVPY)
SA fellow, All India rank *381*.

2018
Jagadis Bose National Science Talent Search (JBNSTS)
Junior Scholar (+2 level).