Curriculum Vitae

SOUVIK ROY

Souvik Roy

Center of Excellence in Space Science India (CESSI),
Indian Institute of Science Education and Research (IISER) Kolkata,
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Education

PhD in Astrophysics and Space science

Center of Excellence in Space Sciences India (CESSI), IISER Kolkata

August 2018 - PRESENT, Mohanpur, India
CGPA (Course-work): 9.38/10.00
Advisor: Prof. Dibyendu Nandy

M.Sc in Physics

West Bengal State University (WBSU)

July 2015 - June 2017, Barasat, India
CGPA: 5.13/6.00

MSc Thesis: Accretion properties of rotating naked singularities and the generalised pseudo-Newtonian potential for studying accretion disk dynamics of rotating naked singularities.
Institute: Centre for Astroparticle Physics & Space Sciences, Bose Institute
Advisor: Prof. Partha Sarathi Joarder

B.Sc in Physics

Rishi Bankim Chandra College, WBSU

2012 - 2015, Naihati, India
Marks: 72.38%, First Class Honours

Expertise

Theoretical

Astrophysics, Fluid and magnetohydrodynamics, Solar physics, Space science, Star-planet interactions, Planetary magnetospheres, Interplanetary coronal mass ejection (CME), Geomagnetic storms, Space weather predictions, Lunar atmosphere, Geometry and coordinate

transformation, Introductory level General Relativity and Cosmology

Computational

Architectural modeling of space plasma, Data analysis, High-performance computing, Satellite database handling including OMNI, CDAWeb, Kyoto, Chandrayaan-2 databases, Satellite drag analysis, 3D Data visualization, Graphical representation, Image processing, Introductory level machine learning.

Technical Skills

Programming Languages, Packages, and Softwares

PLUTO, BAT-S-RUS, Python, Matlab, C, Mathematica, Bash-script, NumPy, SciPy, Pandas, PyPLUTO, Pillow, SunPy, SpacePy, AstroPy, ephem, CdasWs, etc.

Visualization Tools

Matplotlib, Matlab, Gnuplot, VisIt, Paraview, Tecplot, Kdenlive, etc.

Miscellaneous Tools

Latex, HTML, MS Excel, Word, Office, Powerpoint, OBS Studio, etc.

Publications

Roy, S., & Nandy, D. (2023). A Time-efficient, Data-driven Modeling Approach for Predicting the Geomagnetic Impact of Coronal Mass Ejections. **Astrophysical Journal Letters**, Vol. 950, Issue 2, p. L11. DOI: 10.3847/2041-8213/acd77c

Nandy, D., …., **Roy, S.**, et al. (2023). Causality in heliophysics: Magnetic fields as a bridge between the Sun's interior and the Earth's space environment. **Journal of Atmospheric and Solar-Terrestrial Physics**, Vol. 248, p. 106081. DOI: 10.1016/j.jastp.2023.106081

Baruah, Y., **Roy, S.**, et al. (2023). Demystifying the extraordinary Starlink satellite losses of February 2022. (in communication, **GRL**)

Roy, S., Tadepalli, S., Dastidar, R., et al. (2023). A dynamic lunar environment in the geotail. (in communication, **Science Advances**)

Roy, S., & Nandy, D. (2023). Investigating the Impact of Twist in Coronal Mass Ejections on Earth's Magnetosphere: Implications for Space Weather. (in preparation)

Teaching Experience

Teaching Assistant at IISER Kolkata, Autumn, 2022
Subject: Introductory Astrophysics (PH4102)

Teaching Assistant at IISER Kolkata, Spring, 2022
Subject: Fluid and Magnetohydrodynamics (SS4201)

Teaching Assistant at IISER Kolkata, Autumn, 2021
Subject: Introductory Astrophysics (PH4102)

Teaching Assistant at IISER Kolkata, Spring, 2021
Subject: Fluid and Magnetohydrodynamics (SS4201)

Teaching Assistant at IISER Kolkata, Autumn, 2020
Subject: Introductory Astrophysics (PH4102)

Teaching Assistant at IISER Kolkata, Spring, 2020
Subject: Intermediate Electricity Magnetism (PH3202)

Assistant Teacher at Idrakpur Primary School, Nadia District Primary School Council, 2017-2018
Subject: Basic mathematics, science, and languages

Achievements and Awards

Senior Research Fellowship from Council of Scientific & Industrial Research (CSIR)
2020

Junior Research Fellowship from Council of Scientific & Industrial Research (CSIR), June 2017
2018

West Bengal Government Swami Vivekananda Merit cum Means (SVMCM) Scholarship
2015–2017

2nd Rank Holder in M.Sc in Physics in West Bengal State University
2017

Avik Mukherjee Memorial Award (College Topper in Honours)
2015

10th Rank Holder in B.Sc in Physics in University
2015

Nagendra Nath Pal Memorial Award (First Rank in B.Sc in Physics Honours)
2015

Indian Oil (IOCL) Scholarship
2010–2012

West Bengal Government Merit Cum Means Scholarship
2010–2012

West Bengal Government Merit Cum Means Scholarship
2008–2010

Conferences and Workshops

Fourth Aditya L1 Support Cell Workshop 2023
28 June - 7 July 2023
Invited Talk: The connections between A Star and its Planets

European Geosciences Union (EGU) General Assembly 2023
23 - 28 April 2023
Oral: A magnetohydrodynamic modelling approach to simulate CME-forced planetary magnetospheres and predict geomagnetic impacts
DOI: https://doi.org/10.5194/egusphere-egu23-16801

Multi-scale Phenomena on the Sun: Present Capabilities and Future Challenges, USO-PRL Solar Physics Workshop (USPW-2023)
3 - 5 April 2023
Solicited Talk: Utilizing magnetohydrodynamic modeling towards the understanding of CME-driven magnetospheric storms and prediction of their geoeffectiveness

41th Annual Meeting of the Astronomical Society of India (ASI)
2 - 5 March 2023
Oral: A magnetohydrodynamic modeling approach to simulate CME-forced planetary magnetospheres and predict geomagnetic impacts

The GLUON talk, Department of Physical Sciences, IISER Kolkata
30 January 2023
Invited Talk: A data-driven modelling approach to predict the impacts of coronal mass ejections on space weather

NASA Heliophysics Science Division (HSD) Seminar
04 January 2023
Invited Talk: A magnetohydrodynamic modelling approach to simulate CME-forced planetary magnetospheres and predict geomagnetic impacts.

American Geophysical Union Fall Meeting 2022
12 - 16 December 2022

e-Poster: An MHD modelling approach to understand and predict the geomagnetic consequences of coronal mass ejections
https://ui.adsabs.harvard.edu/abs/2022AGUFMSM32D1746R/abstract

NASA Heliophysics Summer School 2022
1 - 12 August 2022

44th COSPAR Scientific Assembly
16 - 24 July 2022
Oral: Magnetohydrodynamic simulations of the impact of a coronal mass ejection on (exo)planetary magnetospheres: Predicting Impact-Effectiveness
https://ui.adsabs.harvard.edu/abs/2022cosp...44.1392R

40th Annual Meeting of the Astronomical Society of India (ASI)
25 - 29 March 2022
Poster: Characteristics study of the impact of coronal mass ejections on the planetary magnetosphere using MHD simulations.

15th Quadrennial Solar-Terrestrial Physics (STP-15) symposium
21 - 25 February 2022
Oral: Magnetohydrodynamic Simulations Of The Impact Of A Coronal Mass Ejection On The Global Magnetosphere

21st National Space Science Symposium (NSSS - 2022)
31 January - 4 February 2022
Oral: Magnetohydrodynamic simulations of the impact of a coronal mass ejection on the global magnetosphere

American Geophysical Union Fall Meeting 2021
13 - 17 December 2021
Oral: Estimating magnetospheric currents and geoeffectiveness of interplanetary CMEs with magnetohydrodynamic simulations
DOI: https://doi.org/10.1002/essoar.10511097.1

European Geosciences Union (EGU) General Assembly 2021
19 - 30 Apr 2021
Oral: Modelling the Impact of Magnetic Storms on Planetary Environments
DOI: https://doi.org/10.5194/egusphere-egu21-8863

Aditya Science Meet - 3

19 - 20 April 2021
Invited Talk: Modeling the Impact of CMEs on the Earth's Magnetosphere - Link between Aditya-L1 and Ground-Based Magnetometers

Indian Planetary Science Conference (IPSC-2021)
25 - 26 February 2021
Oral: Modelling the Impact of Magnetic Storms on Planetary Environments

39th meeting of the Astronomical Society of India (ASI)
18 - 23 February 2021
Oral: Magnetohydrodynamical Understanding of the Interactions Between Coronal Mass Ejections and Earth's Magnetosphere

American Geophysical Union Fall Meeting 2020
1 - 17 December 2020
e-Poster: Magnetohydrodynamical Understanding of the Interactions Between Coronal Mass Ejections and Earth's Magnetosphere
DOI: https://doi.org/10.1002/essoar.10505902.1

38th Annual Meeting of Astronomical Society of India (ASI)
13 - 17 February 2020
Poster: Magnetohydrodynamic Simulations of the Solar Forcing of Planetary Magnetospheres

Conference on Plasma Simulation (CPS-2020)
23-24 January 2020
Poster: Magnetohydrodynamic Simulations of the Solar Forcing of Planetary Magnetospheres

Non-Technical Skills

Teaching, Time Management, Communication, Critical Thinking, Problem Solving, Flexibility, Adaptability, Resilience, Collaboration, Teamwork, Networking, Leadership and Initiative, Ethics and Integrity, Emotional Intelligence, Public Outreach, Science Communication, Project Management, Self-Care and Yoga.

Languages

English: Read, Write, Speak
Bengali: Read, Write, Speak
Hindi: Read (Devnagari), Speak

Professional Memberships

Student member of Astronomical Society of India (ASI)

Student member of American Geophysical Union (AGU)

Member of Indian Network for Dynamical and Unified Solar Physicists (INDUS)