

Special Issue

Artificial Intelligence Algorithms in Magnetohydrodynamics and Computational Astrophysics

Message from the Guest Editors

This Special Issue explores the intersection of AI with computational astrophysics, emphasizing magnetohydrodynamics (MHDs) and hydrodynamic modeling. It highlights the use of AI-driven algorithms, including physics-informed neural networks (PINNs), neural operators, and generative models, to understand physical and astrophysical processes such as (but not limited to) plasma dynamics, turbulence, accretion flows, and magnetic field evolution. Potential topics of interest include the development of surrogate models for accelerating simulations, advanced techniques for 3D simulations, parameter estimation, and physics-informed modeling. Submissions addressing hybrid modeling frameworks, data assimilation, AI-enhanced numerical simulations, and the interpretation of AI models in astrophysical contexts are also welcome. This Special Issue aims to bring together researchers from diverse disciplines to explore the integration of AI into computational astrophysics, fostering collaboration and inspiring innovative approaches to tackle complex challenges in the field.

Guest Editors

Dr. Sayantan Auddy

Jet Propulsion Laboratory, California Institute of Technology, Pasadena,
CA 91109, USA

Dr. Ramit Dey

Department of Physics & Astronomy, University of Western Ontario,
London, ON N6A 3K7, Canada

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Mathematics
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
mathematics@mdpi.com

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Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

Editor-in-Chief

Prof. Dr. Francisco Chiclana

School of Computer Science and Informatics, De Montfort University,
The Gateway, Leicester LE1 9BH, UK

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