

Special Issue

Machine Learning and High-Performance Computing: Theory and Applications

Message from the Guest Editor

We are pleased to announce this Special Issue, “Machine Learning and High-Performance Computing: Theory and Applications”. It seeks to highlight cutting-edge developments that advance the theoretical understanding, algorithmic innovation, and practical deployment of ML-HPC synergy. We welcome both original research contributions and survey articles that expand the horizons of this interdisciplinary field. Topics of interest include, but are not limited to, the following:

- Scalable ML algorithms for HPC platforms.
- GPU/accelerator-enabled ML frameworks.
- ML-guided optimization of HPC workflows and energy efficiency.
- Hybrid simulation–ML pipelines for scientific discovery.
- Fault tolerance, reproducibility, and resilience in ML-HPC systems.
- Applications in power systems, computational biology, climate science, autonomous systems, and beyond.
- Benchmarking, datasets, and reproducible research artifacts.

By bringing together diverse perspectives from computer science, engineering, and applied sciences, this Special Issue aims to foster collaboration and accelerate innovation in the co-evolution of ML and HPC. We look forward to receiving your contributions to this exciting and rapidly growing area.

Guest Editor

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Deadline for manuscript submissions

31 July 2026



Mathematics

an Open Access Journal
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Impact Factor 2.2
CiteScore 4.6



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About the Journal

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.

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manuscripts are peer-reviewed and a first decision is provided to authors approximately 17.3 days after submission; acceptance to publication is undertaken in 2.8 days (median values for papers published in this journal in the second half of 2025).