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Interdisciplinary Modeling and Intelligent approaches in Natural Sciences

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Abstract

The *Journal of SciMeTech* is an interdisciplinary, peer-reviewed publication dedicated to advancing research across the full spectrum of natural sciences. With a special focus on the integration of computational science, artificial intelligence, and programming, the journal provides a platform for innovative studies that address complex scientific challenges through modern technologies. We welcome original research, reviews, and methodological contributions in fields such as physics, chemistry, environmental science, medical physics, biophysics, and geosciences. The journal actively encourages submissions that apply simulation, modeling, machine learning, and open-source programming to natural phenomena. Our goal is to foster a dynamic and collaborative scientific community where high-impact discoveries, reproducible methods, and digital innovation converge to redefine the future of natural science research.

I. Introduction

This journal is a peer-reviewed, interdisciplinary platform dedicated to the advancement of scientific knowledge across the broad domains of the natural sciences. Our mission is to support innovative research that explores the structure, behavior, and interactions of natural systems—from subatomic particles to planetary ecosystems—while embracing the transformative role of modern technologies.

In response to the growing complexity of scientific challenges, we place particular emphasis on computational methods, artificial intelligence, and programming as essential tools for 21st-century science. We welcome submissions that apply these technologies to classical and emerging questions across physics, chemistry, environmental science, geosciences, and beyond. The journal actively supports the expansion of fields such as medical physics, biophysics, and computational biology, where science, technology, and human health intersect. From image processing in radiotherapy to molecular modeling of protein structures, these disciplines exemplify the power of interdisciplinary approaches and algorithmic thinking in solving real-world problems.

We encourage contributions that leverage machine learning, simulation, modeling, and data-driven methodologies to investigate natural phenomena. Whether it's using neural networks for disease diagnosis, deep learning to analyze satellite imagery, or Python scripts to simulate quantum systems, we value research that blends theory, experimentation, and code.

The journal publishes a wide range of article types: original research, reviews, methodological papers, software and code notes, and applied studies. We are especially interested in work that promotes reproducibility, open science, and the development of scientific tools. The specific domains covered by the journal section, highlighting their real-world applications and the transformative impact they hold for various industries.

We recognize the importance of open-source programming, scientific computing libraries, and high-performance computing in accelerating discovery. Submissions that introduce novel algorithms, analytical workflows, or computational pipelines are highly encouraged.

Our goal is to provide a space for scientists, engineers, developers, and innovators to collaborate and communicate their contributions to a global audience. By highlighting research that is rigorous, innovative, and computationally forward-thinking, we aim to shape the future of natural science publication.

As an editorial team, we are committed to ensuring quality, transparency, and interdisciplinary exchange. We invite researchers working at the intersection of natural science and computing to join us in redefining the boundaries of discovery.

II. Physical Sciences

This section is devoted to advancing our knowledge of matter, energy, and the physical laws governing nature. Emphasis is placed on both foundational science and computational applications.

- Theoretical and Applied Physics: Quantum theory, thermodynamics, electromagnetism, and astrophysics.
- Materials Science and Nanotechnology: Synthesis, modeling, and performance prediction of advanced materials.
  → Chemistry:
- Computational Chemistry: Molecular simulations, quantum chemical calculations.
- Cheminformatics: AI in drug and material design, predictive chemical modeling.
- Finite element modeling (FEM) in material behavior analysis.
- Monte Carlo simulations and density functional theory (DFT).
  → Tools used
- AI/ML algorithms for predicting chemical properties.
- Deep learning for spectroscopy, crystallography, or spectral image classification.
- Use of Python, MATLAB, Fortran, or C++ for custom simulations.
- TensorFlow, PyTorch for neural networks in chemistry or physics.
- OpenFOAM or COMSOL for modeling fluid dynamics or electromagnetism.

III. Environmental and Earth Sciences

This section explores the dynamic processes shaping our planet, focusing on Earth systems, climate, and human-environment interactions.

- Geology & Geophysics: Earth structure, plate tectonics, seismic modeling.
- Hydrology & Water Resources: Watershed modeling, aquifer dynamics.
- Climatology & Meteorology: Weather simulation, global warming models.
- Environmental Monitoring: Pollution tracking, ecosystem health, remote sensing.
  → Tools programming:
- Satellite image classification using CNNs.
- Forecasting droughts and floods with LSTM models.
- Climate change simulations using HPC.
- Machine learning in geospatial mapping and risk analysis.
- Geospatial programming (Python with GDAL, Rasterio, ArcPy).
- GIS-based modeling (QGIS, ArcGIS with AI plugins).
- R and Python for environmental statistics.
- Custom climate models and earth system simulations.

IV. Interdisciplinary Natural Science & AI

This flagship section bridges disciplines and showcases the role of artificial intelligence, machine learning, and computational modeling in solving complex scientific problems.

- Biophysics and Systems Biology: Molecular modeling, simulation of biological pathways.

- Computational Ecology: Population modeling, ecosystem simulations, agent-based modeling.
- Scientific Informatics:
- Text mining in scientific literature (e.g., PubMed, Scopus data).
- Knowledge graphs for cross-domain natural science linking.
- Use of convolutional neural networks (CNNs) to classify biological or geological images.
- Deep reinforcement learning in environmental decision-making.
- AI-assisted discovery in physics (e.g., symbolic regression, GPT-based code generation).

V. Software, code and Data Tools in Natural Sciences

A specialized section dedicated to the development of **scientific software**, **custom algorithms**, **data platforms**, and **open-access tools**.

- Release of new scientific libraries, packages, or tools.
- Algorithms for scientific image analysis, simulation engines, or modeling frameworks.
- Datasets with detailed documentation, ideal for machine learning training.
- Best practices in code reproducibility, version control, and open science.