

Updated Sections and Scope of Computation

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1. Introduction

Computation (ISSN 2079-3197) is embarking on a new journey by broadening its academic scope and refining the disciplinary structure of computational science and engineering. Driven by the pervasive interdisciplinary integration between artificial intelligence paradigms and computational methodologies across fundamental sciences and engineering disciplines, computational intelligence has emerged as a pivotal research pillar for contemporary computational research. In response to such evolving scholarly landscapes, we are pleased to introduce a new section, Computational Intelligence, which will operate in parallel with the journal's existing thematic areas.

2. Updated Section

The Computational Intelligence Section is dedicated to the advancement of adaptive, learning-based, and intelligent computational methods for complex systems. While rooted in the traditional foundations of computational intelligence—including neural computation, fuzzy systems, evolutionary computation, and swarm intelligence—the Section embraces contemporary AI paradigms such as deep learning, trustworthy and explainable AI, federated learning, generative models, foundation models, large language models, and physics-informed machine learning. The Section provides a multidisciplinary platform for research that integrates computational modeling with intelligent decision-making across science, engineering, and society. Topics of interest include, but are not limited to, the following:

Core methods and algorithms:

- Artificial intelligence and intelligent systems;
- Machine learning and representation learning;
- Deep neural architectures;
- Reinforcement and adaptive learning;
- Evolutionary computation and genetic algorithms;
- Swarm and collective intelligence;
- Nature-inspired and bio-inspired computation;
- Fuzzy logic and hybrid intelligent systems;
- Probabilistic reasoning and Bayesian learning;
- Graph-based learning and network intelligence.

Trustworthy and emerging AI paradigms:

- Explainable and trustworthy AI;
- Transfer, continual, and lifelong learning;
- Federated, distributed, and privacy-preserving learning;
- Generative models;
- Large language models;



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- Physics-informed and theory-guided machine learning;
- Multi-agent systems and cooperative intelligence;
- Robustness, security, and adversarial intelligence.

Intelligent systems and applications:

- AI for scientific discovery and computational simulation;
- Digital twins and intelligent predictive modeling;
- Intelligent control, robotics, and autonomous systems;
- Smart manufacturing and cyber–physical systems;
- Computer vision and pattern recognition;
- Natural language understanding and text analytics;
- Multimodal learning and interaction;
- Edge intelligence and real-time embedded AI;
- AI for energy, sustainability, and smart infrastructure;
- AI for transportation, mobility, and logistics;
- Human–AI collaboration and cognitive computing.

3. Updated Scope

In addition, the scope of the journal has been updated; topics of interest include, but are not limited to, the following:

Computational engineering:

- New theories, methodology, and the application of computational fluid dynamics (CFD);
- Optimization techniques and/or application of optimization to multidisciplinary systems;
- System identification and reduced order modeling of engineering systems;
- Parallel algorithms and high-performance computing in engineering.

Computational intelligence:

- Artificial intelligence, machine learning, and deep learning;
- Explainable, trustworthy, and federated learning;
- Intelligent control, robotics, and autonomous systems;
- Digital twins, predictive modeling, and scientific simulation;
- Natural language processing (NLP) and computational linguistics;
- Computational intelligence in business.

Computational social science:

- Computational methods in economic modeling and risk management;
- Computational modeling and simulation of epidemic infectious diseases;
- Theoretical and applied research on sociological models;
- Computational methods in management analytics.

Computational biology:

- Bioinformatics;
- Mathematical modeling, simulation, and prediction of nucleic acid (DNA/RNA) and protein sequences, structure, and functions;
- Mathematical modeling of pathways and genetic interactions;
- Neuroscience computation, including neural modeling, brain theory, and neural networks.

Computational chemistry:

- New theories and methodology, including their applications in molecular dynamics;
- Computation of electronic structure;
- Density functional theory;

- Designing and characterization of materials with computation methods.

4. Future

We invite researchers, scholars, and enthusiasts from around the world to contribute to *Computation*. Your groundbreaking research and innovative insights fuel our journal's growth and global academic impact.

As we embark on this exciting new phase, we look forward to your continued support and collaboration. Together, we will explore the vast horizons of computational science and further advance computational science and engineering.

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