EDITORIAL

Inaugural Editorial: *Intelligent Computing for Engineering*

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1 Introduction

Engineering, as a discipline, has always evolved in response to the tools and methods available to it. However, this evolution has accelerated in an unprecedented manner in recent years. The increasing availability of data, coupled with advances in computational methods, has begun to reshape not only how engineering problems are approached but also how they are fundamentally understood.

Intelligent Computing for Engineering (*ICE*) is introduced within this rapidly transforming landscape. The journal is established as a dedicated and rigorous platform at the intersection of intelligent computational methods and engineering practice. Rather than treating these domains as separate, *ICE* explicitly recognizes their deep and growing interdependence and aims to foster a tightly integrated research perspective.

Despite the significant progress in both computational intelligence and engineering sciences, the interaction between these domains often remains fragmented. *ICE* is positioned to bridge this gap by promoting research that is not only computationally advanced but also firmly grounded in engineering principles, physical interpretability, and real-world applicability.

2 Evolving Nature of Engineering Problems

Contemporary engineering systems are increasingly characterized by complexity, scale, uncertainty, and dynamic behavior. Modern infrastructures, smart grids, autonomous systems, and advanced manufacturing processes generate large volumes of heterogeneous data while operating under uncertain and time-varying conditions.

Traditional deterministic modeling approaches remain essential; however, they are often insufficient when addressing nonlinear, multi-layered, and data-intensive systems. In this context, intelligent computing methods provide complementary capabilities, enabling adaptive modeling, predictive analytics, and data-driven decision-making.

Machine learning, data-driven modeling, and computational intelligence techniques—particularly optimization frameworks such as metaheuristic algorithms and hybrid learning-based approaches—enable engineers to extract meaningful patterns, enhance system performance, and manage uncertainty more effectively. These approaches are increasingly central to modern engineering workflows.

However, this transformation also introduces critical challenges, including model transparency, robustness, generalization, and reproducibility. *ICE* emphasizes that addressing these challenges requires not only algorithmic innovation but also strong integration with domain knowledge, physically meaningful modeling, and validation against realistic or real-world data.

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3 Scope and Intellectual Direction

ICE is designed to provide a focused yet coherent scope centered on intelligent, data-driven, and optimization-oriented engineering methodologies. The journal prioritizes contributions that demonstrate clear methodological innovation, engineering relevance, and analytical rigor.

Core focus areas include:

- Artificial intelligence and machine learning in engineering systems;
- Data-driven modeling and simulation;
- Intelligent and optimization-based control systems;
- Metaheuristic and hybrid optimization algorithms for engineering applications.

Supporting and emerging themes include:

- Digital twin technologies and cyber-physical systems;
- Internet of Things (IoT) and intelligent sensing infrastructures;
- Smart manufacturing and autonomous engineering systems.

ICE particularly encourages studies that move beyond purely tool-based simulations and instead contribute novel modeling frameworks, optimization strategies, or integrative methodologies. Submissions that demonstrate quantitative rigor, reproducibility, uncertainty-aware analysis, and real-world validation are strongly prioritized.

Furthermore, recognizing that engineering solutions operate within broader socio-technical systems, the journal welcomes contributions addressing system-level integration, sustainability, and human-centered engineering design.

4 Editorial Approach

The editorial approach of *ICE* is guided by a commitment to clarity, rigor, and relevance. Submissions are The editorial philosophy of *ICE* is grounded in rigor, transparency, and relevance. Manuscripts are evaluated through a structured and expert-driven peer-review process, focusing on both technical quality and the significance of the contribution.

Particular emphasis is placed on:

- Methodological clarity and reproducibility;
- Proper formulation and justification of models and assumptions;
- Quantitative validation and robustness analysis;
- Clear articulation of novelty relative to existing literature.

ICE adopts a constructive review approach aimed at improving the scientific quality of submissions while maintaining high publication standards. The journal strictly adheres to established ethical guidelines in academic publishing, ensuring the integrity and reliability of the scholarly record.

5 Position of the Journal

ICE is positioned as a specialized platform for engineering-driven intelligent computing, where computational methods are not treated as standalone tools but as integral components of engineering problem-solving.

The journal distinguishes itself by emphasizing:

- Strong coupling between computational intelligence and engineering physics;
- Methodological contributions beyond conventional simulation-based studies;
- Integration of optimization, control, and data-driven approaches;
- Practical relevance supported by realistic scenarios or empirical validation.

This positioning reflects a forward-looking perspective: future advancements in engineering will depend not only on algorithmic developments but also on their meaningful integration into real-world systems.

6 Closing Remarks

The establishment of *ICE* is the result of a collective effort involving numerous contributors who have provided their expertise and support. Their contributions have been instrumental in shaping the foundation of the journal.

As *ICE* begins its publication journey, its long-term impact will depend on the active engagement of the research community. We invite researchers, engineers, and practitioners to contribute high-quality work that advances both theoretical understanding and practical implementation of intelligent computing in engineering.

ICE is intended to evolve alongside the field it represents. By maintaining a strong focus on quality, methodological rigor, and engineering relevance, the journal aims to become a trusted and impactful platform for scientific exchange.

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AI Use Statement

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Ethical Approval and Consent to Participate

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