

Call for Papers

IISE Transactions Special Issue on

Data Science for Computational Modeling (DSCM): Design, Uncertainty Quantification, and Optimization

Sponsored by Focus Issue of Data Science, Quality, and Reliability (DSQR)

From aircraft design and climate forecasting to advanced manufacturing and precision medicine, high-fidelity computer simulations play an important role in modern science and engineering. The value of these models is increasingly unlocked through data-centric methods that make them faster, smarter, and more reliable. The convergence of large-scale computing and breakthroughs in statistics and machine learning has created a powerful new toolkit: adaptive experimental designs that learn where to sample next, surrogates that deliver real-time emulators of expensive solvers, physics-informed networks that embed conservation laws for accurate extrapolation, and risk-aware optimization schemes that openly confront uncertainty. Integrated verification-, validation-, and uncertainty-quantification (VVUQ) loops extend these capabilities to digital twins, ensuring their virtual replicas remain faithful to physical assets as new data arrive. Coupled with massive parallel architectures and automatic differentiation, these innovations routinely compress month-long design cycles into overnight jobs, enabling rapid materials discovery, resilient energy-grid planning, digital-twin monitoring of industrial assets, and countless other transformative applications. At the same time, they introduce fresh challenges—combining multifidelity data streams, quantifying model-form error, scaling algorithms to exascale, and translating theory into robust software for industry applications. **This special issue aims to capture the state of the art in this fast-moving field and to stimulate cross-disciplinary dialogue that will shape the next generation of data-driven computational modeling.**

Relevant topics include, but are not limited to:

- Experimental design for computer experiments
- Surrogate modeling and emulator construction
- Sensitivity analysis
- Verification, validation, and uncertainty quantification
- Physics-informed and hybrid machine learning
- Optimization under uncertainty
- Scalable implementations
- Statistical learning for reduced-order modeling
- Multimodal modeling and risk-aware decision-making
- Case studies on emerging complex systems and applications

All papers are to be submitted through <http://mc.manuscriptcentral.com/iietransactions>. Please select “Special Issue” under Manuscript Category of your submission. All manuscripts must be prepared according to the IISE Transactions publication guidelines.

Important Dates

- Manuscript submission: March 31, 2026
- Completion of 1st round review: July 31, 2026
- Completion of 2nd round review: December 31, 2026
- Final manuscript submission: January 31, 2027
- Tentative publication date: March 31, 2027

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