

ADVANCES IN AI, MACHINE LEARNING AND DATA SCIENCE FOR MULTI-PHYSICS MODELLING: ALGORITHMS, APPLICATIONS AND FUTURE DIRECTIONS

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ABSTRACT

Artificial intelligence, machine learning, and data science are transforming predictive capabilities in multi-physics systems. These technologies offer unprecedented advances in accuracy and uncertainty quantification for complex applications spanning energy, chemical processing, environmental science, healthcare, and transportation. This symposium will address the critical challenges of dynamic complexity, physics coupling, non-linear behaviors, and computational scalability through next-generation AI-driven approaches.

The symposium will showcase cutting-edge advances at the intersection of computational methods, data sciences and intelligent systems. It will foster discussion and collaboration among scientists and professionals on cutting-edge on novel algorithms, data-driven methodologies, and hardware implementations that push the boundaries of predictive multi-physics modelling. In particular, it will cover fundamental research areas on computational methods, machine learning algorithms, data sciences, optimisation and data assimilation.

All application areas in structural mechanics, single/multi-phase flow dynamics, radiation and robotics are welcome. Contributions are sought on, but not limited to, the following topics:

- Computational structural/fluid/radiation dynamics;
- Predictive methods for sensitivity and uncertainty quantification;
- Coupling models for multi-physics problems, and;
- Data integration and assimilation.