# MATHEMATICS AND ALGORITHMS FOR PREDICTIVE DIGITAL TWINS (DT)

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## MINISYMPOSIUM

Digital Twins are rapidly becoming a key enabling technology that capitalizes on decades of investment in computational modeling to bring about capabilities beyond forward simulations such as dynamic data assimilation and data-driven decision making informed by system-specific analysis.

This minisymposium will provide a forum for exchange of ideas spanning foundational DT technologies such as data-driven, reduced order and surrogate models, advanced couplings, and data assimilation. Also of interest is the rigorous and agile coupling of arbitrary combinations of data-driven and conventional methods, particularly in relation to the heterogeneous physics, multifidelity, and multiscale components that constitute at DT.

The main themes of this session include:

- nonlinear dimensionality reduction
- preservation of topological, structural, and qualitative properties under model order reduction
- development of deep learning surrogates
- couplings between data-driven, first-principles models, and multi-fidelity models
- software architectures supporting the DT paradigm