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DIGITAL TWINS FOR DATA SCARCE APPLICATIONS

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ABSTRACT

Digital twins often depend on high fidelity data upon which a digital representation of a physical state is built. However, for many applications, capturing data – or capturing sufficient high-quality data for building digital representations – is prohibitively costly or physically unrealistic. This minisymposum highlights current efforts to build digital twins when data is scarce, unreliable or unattainable. Examples of such efforts include problems include multimodal or multifidelity algorithms; incorporating first-principles or constitutive equation modeling; transfer learning; data augmentation; and Bayesian or statistical methods. Towards this end, this minisymposium will convene world-class researchers in a forum to present advances in data science, digital modeling, scientific computing, and machine learning, drawing upon expertise in these fields, specific domain applications, and digital workflows, focusing on digital twins for systems in mechanics and materials sciences.