

## Interface design using reduced order mesoscale models

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Computational materials science brings a physics-based materials design capability within reach. However, design of materials for properties such as strength or stability is challenging because it deals with inherently collective mechanisms operating at multiple time and length scales. I will present a design strategy built on reduced order mesoscale models, which afford simplified descriptions of the essential physics of complex, collective materials phenomena. To illustrate this approach, I will describe design of solid-state interfaces for templated precipitation, tailored diffusivity, and controlled shear resistance. I will describe applications of such engineered interfaces in the creation of high performance composite materials.