



ME Seminar



Architected Material Analogs for Shape Memory Alloys

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ABSTRACT

We propose a design for a building block of a periodic cellular material that mimics both of the salient behaviors exhibited by shape memory alloys namely, superelasticity and the shape memory effect. Unlike thermal bimorphs, which rely on differential thermal expansion, and shape memory polymer based structures, which rely on changes in the macromolecular structure of the constituent polymers, the proposed design exploits the temperature dependence of the two constituent base materials as well as the mechanics of the block's structure to reproduce these complex thermo-mechanical behaviors. By demonstrating the ability to design an architected material that mimics the complex thermo-mechanical behavior of a naturally occurring material, this work highlights the potential for architected materials to mimic the response of any natural material, and by extension, improve on naturally occurring materials.

ABOUT THE SPEAKER

Dr. Nilesh Mankame has been with General Motors since 2004. His research interests are in modeling of and design with smart materials and architected materials. He got his master's and PhD from the University of Pennsylvania.



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