

Proceedings of the IUTAM Symposium

Architected Materials Mechanics

Architected materials are an emerging and exciting class of materials with the promise of advantageous performance and multifunctional properties. These materials are characterized by specific and periodic structural features that are larger than what is typically considered a microstructural length scale (such as a grain size) but smaller than the size of the final component made of the architected material. This class of materials includes but is not limited to lattice materials and cellular material systems, dense material systems composed of building blocks of well-defined size and shape. The key characteristic distinguishing architected materials from other materials is their very high morphological control, and architected materials can therefore be considered high information materials. The tight control of the morphological characteristics allows to predefine and control specific mechanisms of local stress transfer, elastic/plastic buckling, gliding of building blocks, or propagation of cracks along predefined paths. Well-designed architected materials can generate new and attractive combinations of properties that can be programmed in the material. In particular, the empty spaces and gliding interfaces contained in architected materials can be exploited to overcome the theoretical bounds that apply to monolithic materials.

This IUTAM symposium provided a state of the art on the engineering science of architected materials and focus on the mechanics, design, fabrication, and mechanical performance of all categories of architected materials including but not limited to lattice materials, metamaterials, and topologically interlocked materials.

Symposium co-chairs:

Thomas Siegmund (Purdue University),
Francois Barthelat (McGill University)

Symposium Date and Location

September 17-19, 2018, Chicago, IL

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Symposium Contributions

Abueidda, D., Jasiuk, I., & Sobh, N. (2018). Acoustic Band Gaps, Sound Attenuation, and Elastic Stiffness of PMMA Cellular Materials Based on Triply Periodic Minimal Surfaces. In T. Siegmund & F. Barthelat (Eds.) Proceedings of the IUTAM Symposium Architected Materials Mechanics, September 17-19, 2018, Chicago, IL: Purdue University Libraries Scholarly Publishing Services, 2018.

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