

## Abstract

Architected materials are a class of materials whose physical and mechanical properties are predominantly controlled by the details of their small-scale architecture. They are seen as critical enablers for lightweight structural applications that require not only high mechanical robustness but also possess other unique attributes such as self-sensing capabilities and shape programmable features. The physical realization of architected materials has been enabled by rapid advancements in additive manufacturing (or 3D printing) technologies, which have opened new pathways for the design of complex material architectures and empowered researchers to create materials with unprecedented mechanical and functional properties.

This seminar will provide a brief introduction into the field of architected materials and show how their mechanical and functional properties can be tuned by adjusting the geometrical parameters of their smallest building blocks. Attention will also be focused on the underlying material processing techniques that enable the fabrication of architected materials with multifunctional attributes, such as 2D and 3D lattice structures with integrated strain- and damage-sensing capabilities. Finally, the seminar will highlight current limitations and open challenges that impede the widespread adoption of these materials in commercial applications and give directions for future work in this rapidly developing field of research.

## Speaker's Bio

Dr. Andreas Schiffer is an Associate Professor in the Department of Mechanical Engineering at the Khalifa University (KU) in Abu Dhabi, UAE. He obtained his Diploma in Mechanical Engineering from the Graz University of Technology (Austria) in 2009 and his DPhil in Engineering Science from the University of Oxford (UK) in 2013. He also held a post-doctoral position in the Department of Aeronautics at the Imperial College London (UK), prior to joining KU in 2014.

Dr. Schiffer's research interests cover multiple themes in the broad area of Mechanics of Materials and are currently focused on multifunctional composites and architected materials processed via additive manufacturing. In addition, he has a long-standing interest in studying the response of materials and structures subject to blast, shock and impact loading, and he also conducts research in the area of solitary wave-based non-destructive testing. Dr. Schiffer's research has led to several publications in prestigious international journals, book chapters and conference proceedings. He has spent several research visits at the Imperial College in London and delivered invited presentations and seminars at highly-ranked universities, including the University of Cambridge, University of Oxford, Imperial College London and RMIT Melbourne. Dr. Schiffer is a member of the American Society of Mechanical Engineers (ASME) and the European Mechanics Society (EUROMECH) and serves on the Editorial Boards of *Frontiers in Materials* and *Frontiers in Aerospace Engineering*.