MONASH
ENGINEERING

MONASH University

Faculty of Engineering
Summer Research Program 2023-2024

Project Title: Design and fabrication of digital hybrid/architectured materials via additive manufacturing process

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Objective

Hybrid or architectured material is a type of material that combine two or more existing materials so as to allow a superposition of their properties. This project aims to develop hybrid/architectured materials that can achieve light weight but high energy absorption and stiffness.

Project Details

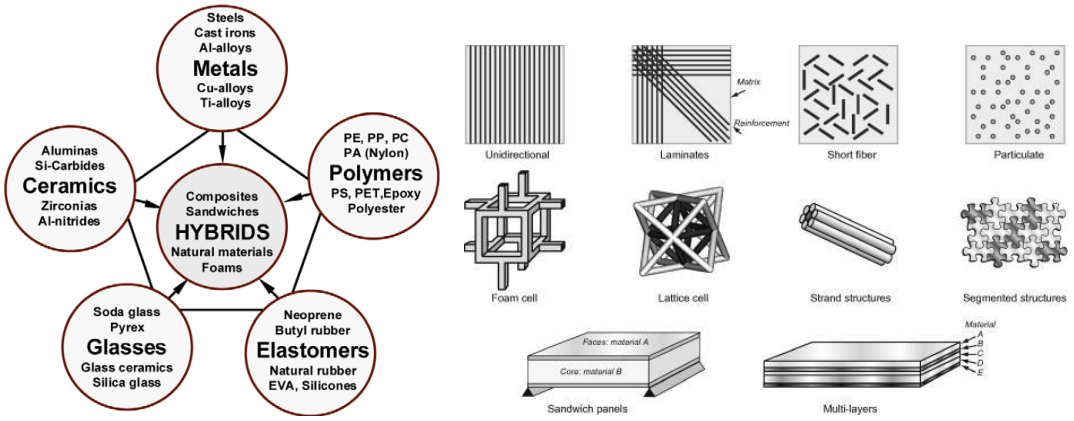

Figure 1 Typical architectured or hybrid materials Image from M.F.Ashby,Y.J.M.Bre´chet/ActaMaterialia51(2003)5801–5821

Thanks to the design freedom of additive manufacturing process, architectured materials with complex meso or microscale structures can be fabricated. Their meso or microscale structures can be designed to achieve many different unique material properties such as high stiffness strength weight ratio, negative Poisson ratio. In this project, student are expected to design an architectured materials that combine multitype of materials (polymers, composite fibres) to achieve the tailored mechanical properties such as high energy absorption or high stiffness/weight ratio. The designed structures can be fabricated and tested by the AM machine (Anisoprint A4) we have.

Prerequisites

Students should have experience with CAD/CAE software. Experience with 3D printing is preferred.