

## PhD Research Project

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### **Additive Manufacturing (3D printing) of Architected Functional Polymeric Composites for Engineering Applications**

The automotive and aerospace industries driven by regulatory changes are going through a Renaissance in materials research. The European Commission set a mandatory emission reduction of 27 percent for all new cars between 2015 and 2021. This target can only be achieved through the innovative development of new materials.

This project seeks to make use of existing commercial 3D printers (Fused Deposition Modelling and Direct writing) and develop novel polymer materials/filaments which can be utilised for the creation of complex engineering structures. The main objective of the project is to obtain complex architected structures with various functionalities such as electrical conductivity, thermal conductivity and outstanding mechanical properties. The Department's laboratories are modern and well outfitted with a broad range of equipments relevant to this project, including equipment to measure mechanical properties (tensile, fatigue, impact and fracture testing), materials processing, imaging and microscopy capabilities, as well as the ability to measure the thermal, electrical, magnetic, optical and rheological properties of materials. The student will have access to a number of 3D printers such as the recently acquired GeSiM BioScaffolder and Leapfrog Creatr HS. GeSiM BioScaffolder is able to incorporate up to 4 polymeric materials of various modulus and strength in a single build, and will be one of the key processing devices used in this project. In addition to experimental work the student will also gain skills in numerical modelling and help drive the research into multi-material topology optimisation.



The student will obtain diverse training in additive manufacturing, polymer chemistry, processing, characterisation and numerical modelling. The project will be conducted

with collaborators from Warwick University and the candidate will have the opportunity to receive a travel grant and top up scholarship.

Interested candidates should send their **CV, academic transcripts** and **copies of English Language tests** and a **short motivation statement** to Dr Andrey Molotnikov (Andrey.Molotnikov@monash.edu) before **28<sup>th</sup> of October 2016**.

Applicants should also refer to information on admission requirements and scholarship eligibility on the university website at <http://www.monash.edu/migr/future-students/eligibility/phd>