



TUS

Technological University of the Shannon:

Midlands Midwest

Ollscoil Teicneolaíochta na Sionainne:

Lár Tíre Iarthar Láir

POSTGRADUATE RESEARCH OPPORTUNITY

Project Title: Investigating mechanical and viscoelastic properties of 4D printed acrylate/epoxy dual-cure blend system with wide-ranged switching temperature for smart multipurpose applications

Short Project Description: The objective of this MSc research project is to manufacture 3D printed acrylate/epoxy dual-cure (UV and thermal) objects and to investigate the shape memory, mechanical and mixed mode fracture properties. The 3D printed objects will have a variety of mechanical properties and shape-switching temperatures (in terms of shape programming and shape recovery) to offer encouraging opportunities for use in sustainable applications like soft robotics, deployable space structures, flexible electronics and medical devices.

Duration of Project: 24 months

Funding Agency: TUS RISE Scholarship comprises of a monthly stipend, materials budget and postgraduate fee for the duration of the award only.

Type of Degree Offered: MSc

Minimum Qualifications/Experience Necessary/Any Other Requirements: Applicants should have a strong academic background in mechanical engineering, polymer engineering, chemical engineering, and materials science. In addition, candidates should hold a bachelor's degree with a minimum classification of 2.1 honours or equivalent in one of the following relevant undergraduate programs:

- Polymer engineering
- Mechanical Engineering with a focus on polymeric materials
- Chemical Engineering with a focus on polymeric materials

The successful candidate should possess a strong foundation in the development of thermosets & thermoplastic materials, polymer composite materials, or a related field. It is preferable to have knowledge of 3D printing techniques.

Applicants should have the following abilities, skills, and knowledge of the analytical techniques and methodologies:

- Thermal and chemical characterisations such as differential scanning calorimetry (DSC), dynamic mechanical analysis (DMA) and Fourier transform infrared spectroscopy (FTIR).
- Mechanical experiments like tensile flexural impact and hardness.
- Good skills in Computer-Aided Design (CAD) like SolidWorks.
- Proffered to have skills in Machine Learning, particularly in developing empirical predictive models using Artificial Neural Networks (ANN).
- Be a team member and have good communication and collaborative skills.
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Applicants must have a minimum overall score of 6.0 on the IELTS test, with no individual component score (Reading, Writing, Listening, Speaking) falling below 6.0.

Research Supervisors:

Lead Supervisor: Dr Mohamad Alsaadi

Co-Supervisor: Prof. Declan Devine



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AN tÚDARÁS um ARD-OIDEACHAS
HIGHER EDUCATION AUTHORITY

TU RISE is co-financed by the Government of Ireland and the European Union through the ERDF Southern, Eastern & Midland Regional Programme 2021-27 and the Northern & Western Regional Programme 2021-27



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For further information, please contact:

Dr Mohamad Alsaadi: Mohamad.Alsaadi@tus.ie

Closing date for receipt of completed application forms (including a personal statement) is 5pm on Tuesday, 4th June. Interviews will take place within subsequent weeks. Applicants called for interview will be required to give a short presentation.

Download TUS RISE application form here:

<https://tus.ie/rdi/research/office/funded-research/>

Please reference your email the Project Acronym (**4DP-SmartMats**) in all correspondence.



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