



TUS

**Technological University of the Shannon:
Midlands Midwest**
Ollscoil Teicneolaíochta na Sionainne:
Lár Tíre Iarthar Láir

POSTGRADUATE RESEARCH OPPORTUNITY

Project Title: Advancing Environmentally Friendly Solid-State Hydrogen Storage through AI-enhanced Multi-scale Modelling

Join the Future of Energy Research: PhD Opportunity in Solid-State Hydrogen Storage

Are you passionate about advancing clean energy solutions for a sustainable future? Do you have a background in materials science, chemistry, or related fields? We are seeking highly motivated individuals to join our research team and tackle one of the most pressing challenges in renewable energy today: efficient and safe hydrogen storage.

Project Overview:

Hydrogen fuel holds immense promise as a cleaner alternative to fossil fuels, yet storing it efficiently remains a formidable obstacle. This research project focuses on pioneering solid-state hydrogen storage solutions through innovative material design. By integrating polymers with Carbon Nanotubes (CNTs) and Sustainable Carbon Materials (SCMs), the project aims to develop composite materials with enhanced hydrogen storage capabilities.

Key Responsibilities:

- Develop a manufacturing process for blending polymer matrices with SCMs and CNTs.
- Characterize composite materials through microstructural analysis to assess factors such as nanoparticle dispersion, porosity, and structural integrity.
- Utilize multiscale modelling techniques to simulate polymer composite microstructures and predict hydrogen absorption and desorption behaviour.
- Implement machine learning algorithms, particularly Artificial Neural Networks (ANN), to estimate material properties based on experimental data.

Required Skills and Qualifications:

- A strong background in mechanical engineering, materials science, chemistry, chemical engineering, or a related field.
- Proficiency in experimental techniques such as microscopy, spectroscopy, and materials characterization.
- Experience with computational modelling and simulation tools for materials science.
- Familiarity with machine learning concepts and programming languages (Python, MATLAB, etc.).
- Excellent communication skills and ability to work collaboratively in a multidisciplinary team.



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HEA

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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Benefits:

- Engage in cutting-edge research with real-world impact, collaborating with industry leader ÉireComposites and the University of Limerick (UL).
- Collaborate with experts from academia and industry, accessing top-notch facilities and resources for innovative work.
- Receive mentorship from seasoned researchers and industry professionals, fostering career growth.
- Contribute to scientific progress in renewable energy, shaping a sustainable future.
- Enjoy competitive stipends, opportunities for publications and presentations, and networking avenues.

Minimum Qualifications/Experience Necessary/Any Other Requirements: [list relevant undergraduate programmes]

Applicants should have a strong academic background in mechanical engineering, materials science, chemistry, chemical engineering, or related fields. Specifically, 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:

- Mechanical Engineering with a focus on materials
- Materials Science
- Chemical Engineering
- Chemistry
-

Duration of Project: 48 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: PhD

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: Dr Amit Haldar (TUS), Prof Maurice Collins (UL), Dr Tomás Flanagan (ÉireComposites).

For further information please contact: Dr Amit Haldar at his email address: amit.haldar@tus.ie

Closing date for receipt of completed application form is 5pm on Tuesday, 4th June. Interviews will take place within subsequent weeks.

Download TUS RISE application form here:

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



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