



POSTGRADUATE RESEARCH OPPORTUNITY

Project Title: Data-Driven Optimization of Reusable Medical Device Cleaning for Sustainable Healthcare Practices (SHEC)

Short Project Description:

Healthcare-associated infections are linked to inadequate cleaning of reusable medical devices. The ease with which soils such as blood, fat, or mucus can be removed depends on the device's material, geometry, type of detergent, and how long the soil has dried. This PhD project will systematically evaluate how combinations of test samples (coupons and reusable medical devices), soils, detergents, water quality, geometry, and drying time affect the probability that a device will be clean. Standardised soils will be applied to test samples made from stainless steel. Variables such as soil type, drying duration, detergent type, wash temperature, and water quality will be systematically varied using a factorial design. Quantitative assays (protein and ATP) measure cleaning success and residual risk. The resulting dataset will be used to train predictive machine-learning models that estimate the probability of being clean under defined conditions and the residual risk. The research will improve risk-based cleaning validation and guide the development of safer, more sustainable cleaning protocols. It will build research capacity and align with the TUS RDI goals by embedding a pioneering research culture, targeting priority areas in sustainable development, health, and materials science, while fostering innovation and industry engagement.

Type of Degree Offered: PhD

Duration of Project: 48 Months

Funding Agency: TUS Strategic Research Fund

Minimum Qualifications/Experience Necessary/Any Other Requirements:

The candidates must have a primary degree in a field related to Mechanical Engineering, Biomedical Engineering, Materials Science and Chemistry or related field

Minimum classification of *2.1 honours or equivalent*.

IELTS [International English Testing System] Applicants must have a minimum of 6.5 with no component score less than 6.5.

Project Lead Supervisor: Dr Lisa Henihan, Prof Neil Rowan, Dr Javed Iqbal and Dr Daniela Butan

For further information, please contact: Dr Lisa Henihan lisa.henihan@tus.ie

Closing date for receipt of completed application form is **14th June 2026**. Interviews will take place within subsequent weeks.

Download TUS Scholarship application form below, put project title in the subject line and email pro@tus.ie:

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