**PhD Scholarship Advertisement**

Fully Funded PhD Scholarship in computational model informed design of material recycling for additive manufacturing

Mechanical Engineering, School of Engineering, College of Science and Engineering

Application(s) are invited from suitably qualified candidates for full-time funded PhD scholarship(s) starting in February, 2025 affiliated to the Mechanical Engineering, School of Engineering, College of Science and Engineering at the University of Galway.

**University of Galway**

Located in the vibrant cultural city of Galway in the west of Ireland, the University of Galway has a distinguished reputation for teaching and [research excellence](https://www.universityofgalway.ie/our-research/)

For information on moving to Ireland please see [www.euraxess.ie](http://www.euraxess.ie)

**Detailed Project Description.**

The project is funded by Research Ireland (formerly known as Science Foundation Ireland) through the I-Form Research Centre for Advanced Manufacturing (<https://www.i-form.ie/>). The aim of the project is to deliver predictive modelling and process characterisation for recycling waste alloys in the scenario of additive manufacturing.

Additive manufacturing (AM) is an innovative advanced method of manufacturing, which deposits materials layer by layer to form 3-dimensional engineering components. As a fully automated method of net-shape manufacturing, it enables great design freedom and is particularly suitable for such as the rapid prototyping and the manufacture of customer-tailored high value-added components. Considering the sustainable manufacturing and circular economy, there is high demand in reusing or recycling the waste materials in the context of AM.

In this project, the powder bed fusion laser beam (PBF\_LB) AM is used as the background, and the target material is Ti alloys. Regarding the computational modelling research, a multi-physics physically based computational modelling will be developed to predict the interaction between the AM process and reuse/recycling of waste Ti alloys. The modelling results will be used to train a machine learning model for rapid calculation to facilitate data-informed decision on the design of material reuse/recycling process. A number of Ti alloy specimen will be printed. The material properties of the specimen will be experimentally characterised. The experimental results will be used as the inputs and validation of the physically based computational modelling, and will be also used as the test set of the machine learning model.

This PhD will focus primarily on the development of the physically based computational model, machine learning model, testing and validation of the models, and related experimental research. The objective is to develop a computational tool kit, that can facilitate the design of material reuse/recycling processes for the AM of Ti alloys. The project has close collaboration with other research groups of I-Form Centre. Particularly, Prof. David Browne from UCD is the co-supervisor of the PhD student.

The candidate is expected to have great ability of self-learning, have very good teamwork spirit and be self-motivated. The candidate should have great interest in computational modelling and computer programming as well as decent background in terms of materials engineering. The successful candidate will become a member of the I-Form Research Centre for Advance Manufacturing and have opportunity to take placement at Prof. Browne’s laboratory.

**Living allowance (Stipend):** €22,000 per annum, [scholarship award]

**University fees**: €5,500 per annum, [covered by the scholarship too]

**Start date**: 3rd February, 2025

**Academic Entry Requirements:** 1st class or 2.1honours Bachelor’s or Master’s degree in Materials Engineering or Mechanical engineering or closely related discipline (e.g. Manufacturing Engineering or Biomedical Engineering or Materials Science). Candidates must possess excellent written and verbal communication skills in English and a strong passion and motivation for excellence in engineering research, with a view to publication, international conference presentations and collaborations. Candidates must also be motivated to work within a team to achieve overall project objectives.

Some specific requirements include:

* Knowledge of (and ideally experience with) computational modelling for science or engineering problems
* Knowledge of computer programming (using such as C++, Python etc.)
* Knowledge of material processing or manufacturing
* Knowledge of material testing/characterisation
* Problem-solving, critical thinking and troubleshooting skills.

**To Apply for the Scholarship:** Expressions of interest comprising submission of a covering letter, CV, statement of personal research interests, and the contact details of two referees, to be submitted via e-mail to mingming.tong@universityofgalway.ie

**Contact Name:** Dr Mingming Tong

**Contact Email:** mingming.tong@universityofgalway.ie

**Application Deadline:** 24th January, 2025 at 17:00

**Primary Supervisor name** (if applicable): Dr Mingming Tong