

Queen's Doctoral Training Programme on **Secure Connected Intelligent Design and Manufacturing**

Title: DTP: Development of a Digital Twin for the manufacture of sustainable packaging.	
<p>This project is part of the Queen's Doctoral Training Programme in Secure Connected Intelligent Design and Manufacturing. Many of today's industrial approaches require transformative changes to ensure long term societal, economic and environmental resilience and sustainability. PhD projects in this programme explore the potential of emerging digital technologies, such as artificial intelligence, robotics, and the Internet of Things, to transform the way we design, manufacture and operate products and services.</p> <p>Project description: The manufacture of packaging today still relies on empirical design, trial and error and manual tweaks of manufacturing processes. This leads to material wastage, product defects and machined downtime. The aim of this project is to develop a virtual twin of the stretch blow moulding process with the aim of providing real time feedback for diagnosing manufacturing problems, enabling predictive maintenance and ultimately automated process control.</p> <p>Aims and Objectives: The overall aim of the project is to develop a digital twin enabling efficient and reliable manufacture of sustainable packaging.</p> <ol style="list-style-type: none"> 1. Develop reduced order models representing the manufacture of biobased polymers using existing Finite Element simulations. 2. Develop digital twin by combining real life process data with simulation data to verify accuracy and develop error estimates. 3. Use digital twin to diagnose manufacture problems 	
Key skills required for the post:	
<p>Key transferable skills that will be developed during the PhD: The programme offers a bespoke research and training programme that aims to develop students into cross-disciplinary, industry-conscious thinkers and leaders who will influence the roadmaps of future advanced manufacturing technologies and their applications. They will have a balanced understanding of ICT (security, communications and data analytics) in the context of their application to Advanced Manufacturing and High Value Design.</p>	
Lead supervisor:	Dr Gary Menary, School of Mechanical and Aerospace Engineering
Other supervisor(s):	Dr Wasif Naeem, School of Electrical and Electronic Engineering Dr Marco Geron, School of Mechanical and Aerospace Engineering
Guaranteed stipend:	<p>This is a 3.5 year funded Queen's DfE DTPs studentship with Training Grant, to commence on 1 October 2020 (N.B. stipend for 20/21 is not yet known, but is likely to exceed £15,000). The studentship covers fees and maintenance and is available for UK residents (see full eligibility criteria - nationality, residency, and academic qualification at: http://go.qub.ac.uk/dfeterms).</p> <p>When applying using the Queen's portal please ensure you include "DTP:" along with the project title.</p>
Conditional top-up available:	£3300/year for students who are in top 5% of their cohort.
<p>PhD students in the School have the opportunity to apply to be demonstrators on undergraduate modules. Compensation for this can amount to in excess of £2,400 per year.#</p>	

Queens University Belfast is a diverse and international institution which is strongly committed to equality and diversity, and to selection on merit. Currently women are under-represented in research positions in the School and accordingly applications from women are particularly welcome.