

# Postgraduate Studentships Queen's Doctoral Training Programme on Secure Connected Intelligent Design and Manufacturing

School of Electronics, Electrical Engineering and Computer Science

PhD Studentship 2020/21

<b>Proposed Project Title: DTP:</b> AI and real-time predictive modeling of manufacturing pipeline state of health	
<b>Principal Supervisor: Professor Roger Woods</b>  <b>Contact Details:</b> <b>QUB Address:</b> Room 7.21, Ashby Building <b>Tele No:</b> 02890 974081 <b>E-Mail:</b> r.woods@qub.ac.uk	<b>Research Area</b>  AI, data analytics, computing hardware  <b>Proposal open to other School (indicate area of Interest)</b>  Maths and Physics
<b>Degree linked to ELE (delete as appropriate)</b>	
<b>Degree linked to CSC (delete as appropriate)</b>	
<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>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>	
<b>Project Description:</b>  <p>Many manufacturing companies are recognising the potential of installing sensors in their factories with the aim of gathering information about their manufacturing process. The aim is to gain better insights into problems/faults at an earlier stage in the development cycle. However, in many cases, the data is incomplete and indeed inconsistent, thereby presenting many problems for effectively applying machine learning techniques to provide insights about the status of manufacturing process or reveal insights as to faults in their processes. Moreover, there can be a gap between the format needed by manufacturers and the typical output produced by data analytic scientists.</p> <p>The purpose of this project is to bring together data analysts, manufacturing staff and software engineers to build upon initial work (carried out with Seagate), in the creation of a framework for effectively analysing manufacturing data. The initial work provided the manufacturer with information on data quality, data missingness, etc.. in a format easily understood by their staff and also some initial developments on visualisation tools. The purpose of this PhD is to build upon work to further develop and enhance this work, and create and explore a working framework that can be used with a wider range of manufacturing companies.</p>	
<b>Objectives:</b> <ul style="list-style-type: none"> <li>• Create a software environment for the data analytics framework which allow manufacturing staff to easily incorporate their manufacturing data into the framework and allow them to visualise the status of their data.</li> <li>• Provide a series of visualisation tools to allow more in-depth data exploration, thus helping manufacturing staff to make sense of their data;</li> <li>• Establish algorithms to allow faster detection of data quality issues, such as missing data, and also highlight to engineering staff the necessary steps required for further analysis;</li> <li>• Undertake a series of experiments with available datasets and implement the framework with a suitable commercial partner.</li> </ul>	
<b>Academic Requirements:</b>	

A minimum 2.1 honours degree or equivalent in Computer Science or Electrical and Electronic Engineering or Applied Maths/Statistics or relevant degree is required.

**GENERAL INFORMATION**

This 3.5 year PhD studentship, potentially funded by the Department for Employment and Learning (DfE), commences on 1 October 2020.

Eligibility for both fees and maintenance (approximately £15,000) depends on the applicants being either an ordinary UK resident or those EU residents who have lived permanently in the UK for the 3 years immediately preceding the start of the studentship. Non UK residents who hold EU residency may also apply but if successful may receive fees only.

Applicants should apply electronically through the Queen's online application portal at: <https://dap.gub.ac.uk/portal/>

Further information available at: <https://www.gub.ac.uk/schools/eeecs/Research/PhDStudy/>

**Closing date for applications: 15 March 2020**