QUB-
Mechanical and Aerospace Engineering
2018-2019

Title: Manufacturing automation for Next Gen Bus	
Organisation	Queen's University Belfast
Industrial Partner	Wrights Group Ltd.
Qualification	PhD
Funding Amount	Fee/studentship funding may be available for UK nationals or EU nationals who have lived in the UK for over 3 years (EU nationals not resident in the UK are only eligible for fees element). Further information regarding DfE studentship eligibility criteria can be found at: http://www.qub.ac.uk/graduate-school/funding-scholarships/uk-eu-prospective-research/. Successful candidates for this post eligible for DfE funding may also be eligible for an industrial top-up for this project of £3,500 per annum from the Industrial sponsor.
Duration	3 years
Anticipated Start Date	October 2018

Project description:

Groups of tools exist to design and optimise factory automation at various levels of abstraction. The benefit of modelling is to gain full understanding of the true cost and risk implications of automation. Open research questions remain on how best to use tools to develop automation for the most challenging production environments in which volume is low, variation is high and automation hardware must be flexible and scalable. In particular to understand which combination of future scenarios should be modelled, at what fidelity, how to model with limited data, time and resource, how to rapidly construct models and efficiently interrogate model output, and how to perform model driven optimisation are all critical unknowns. By answering these questions and formulating an efficient modelling tool kit valuable business advantage can be gained. The core objectives of the project can thus be summarised as:

- Literature review, COTS review and current industry partner methods review to identify current-practices, best-practice, and critical issues appropriate for the project to investigate.
- Propose and complete the requirements for three case studies which characterise the full challenge and risk of introducing automation in a low volume, high variation production chain.
- Propose and demonstrate (for the three case studies) a systematic approach for reducing automation solution uncertainty through modelling.
- Propose and demonstrate (for the three case studies) methods to assess sensitivity to future demand rates and future product / product variants.
- Propose and demonstrate (for one case study) an approach to reduce model development time for a new production process or product change (rapid construction of models and output interrogation).
- Propose and demonstrate (for one case study) an approach to enable model reuse for evolving production process or product change (modelling with limited data).
- Develop and demonstrate (for one case study) a structured method for assessing and quantifying the quality of estimates (capturing uncertainty, model subjectivity).
- Bring together the methods to provide a framework which will improve the process of design / tendering for automation solutions.
- Document the framework and develop a series of workshops to enable effective knowledge transfer to the industrial partners.

It is anticipated that the successful candidate will start in October 2018.

Key skills required for the post:

A minimum degree of 2:1 (or equivalent) in one of the following areas is required: Engineering, Science, IT, Mathematics or a closely related subject area. Candidates must be able to demonstrate a significant level of mathematics and/or data analysis in their primary degree area.

It would be desirable to have some understanding and knowledge in the areas of automotive engineering and data analytics.

Good computer skills are desirable as the project will involve computer modelling, simulations and analysis of results.	
Key transferable skills that will be developed during the PhD: This research project will enable the successful student to acquire valuable experience of manufacturing simulation tools, advanced production processes and systems. All of which are highly sought after within industry. The project will use a combination of advanced commercial simulation tools, validating their predictive capability against real industrial data.	
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Second Supervisor and their contact details:	
Top up available for this project?	Yes – Wright Centre linked project
Linked to DTC?	No