QUB-CSC Scholarship PhD Project Proposal
2018-2019

Title: Optimised motion control of robot based rotational moulding processes

Project Description:

Rotational moulding, also called rotomoulding, is a method to produce hollow plastic articles by melting polymer powders against the hot internal surface of a metallic mould. The heating, shaping and cooling of the plastic all take place inside the mould. A wide range of products are produced in this processes, such as oil tanks, automotive dash boards, kayaks, light weight vehicle bodies, turbine blades, and toys. Conventional biaxial rotomoulding machines are not flexible and can only produce limited geometrical shapes to a certain level of quality. Robot driven rotational moulding is now emerging to address the flexibility issue, but substantial technical barriers still exist and the new constraints from the robot need to be addressed. Collaborated with world leading companies, this project is to investigate motion optimization methods of the new robot based rotomoulding process, aiming to break the conventional barriers and provide ground breaking solutions, so as to unlock the potential of making complex high value products using the low cost rotomoulding processes.

Key Skills Required for the post:

- A bachelor degree in Engineering (Mechanical/Aerospace Engineering, Manufacturing, Mechatronics, or relevant) with an overall average at 83% or above; or a master degree with an overall average at least 80%.
- Knowledge of rotomoulding processes considered as advantage
- Knowledge robot kinematics and control considered as advantage
- Project management skills
- Oral and written communication skills

Key Transferable Skills that will be developed during the PhD:

- Innovative thinking in robot based motion control
- robot modelling and control method
- Experimental methods for evaluating rotomoulding processes
- Project and time management training to ensure milestones of the project are delivered.
- Effective dissemination of research findings through presentation at international conferences and publication in high quality technical journals.
  Interpersonal skills within a multidisciplinary team including academics and industrialists

First/Lead Supervisor and their contact details	Dr Yan Jin, Associate Professor, Email: y.jin@qub.ac.uk Tel: +44 (0)28 9097 4102
Second Supervisor and their contact details:	Dr Joe Butterfield, Email: j.butterfield@qub.ac.uk Tel: +44 (0)28 9097 4878