

Department	School of Engineering and the Built Environment
Supervisors	Dr Keng Goh, Dr Naghmeh Moradpoor and Dr Brian Davison
Project Title	Robotic systems for Smart Manufacturing

PROJECT DESCRIPTION

Fourth industrial revolution technologies have enabled the distribution of intelligence over many devices including various forms of programmable controllers and smart sensors. The increasing demand on robotic and control systems in manufacturing process have increased where data gathering is added to the fundamental tasks of the control system. The analysis of this data allows tasks like predictive diagnostics, manufacturing optimisation etc the outcomes of which can then be used to modify the control function to optimise the manufacturing process.

This work will explore current and evolving technologies and design methodologies to investigate the vulnerability of the robotics and control systems in manufacturing process and propose a design methodology frame work for optimising the security system.

The work will be based on our existing 6-axis robotic arm system and Flexible Manufacturing System, will be linked to other research on manufacturing optimisation through simulation & modelling where data gathered from existing systems and smart sensors will be fed to the cyber physical model to optimise the manufacturing process.

It will also consider our ongoing research work on Industrial Control System Cyber Security where outcomes of previous work influences the way in which we design our control systems to make them more robust against cyber-attack.

Academic qualifications

A first degree (at least a 2.1) ideally in robotics, automation & control, industry 4.0, cybersecurity with a good fundamental knowledge of industry robot programming, smart manufacturing or Master degree in the same subjects.

English language requirement

IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. [Full details of the University's policy](#) are available online.

Essential attributes:

- Experience of fundamental industrial robotic programming, programmable logic control (PLC), smart sensors
- Competent in hardware implementation, robotic system simulation and practical implementation
- Knowledge of industrial robotic operating platform, Matlab Simulink software
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

Indicative Bibliography	DOI 10.1109/TII.2020.3016990 DOI: https://doi.org/10.1016/j.micpro.2020.103479
Enquiries	For informal enquiries about this PhD project, please contact Dr Keng Goh (k.goh@napier.ac.uk)
Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process