

## Postgraduate Research Scholarship Available

### Computer Science, Artificial Intelligence, Data Analytics & Industrial Sensing

IMaR (Intelligent Mechatronics and RFID) at IT Tralee is an applied research centre delivering expertise in the areas of hardware (mechatronics, robotics, control systems), software (data management and intelligent systems), IoT (RFID, Sensors) and data analytics for increased productivity in the manufacturing, agriculture and process sectors to our regional industry partners.

IMaR is currently offering a Master Scholarship to a suitable candidate who will investigate an industrial Internet of Things project around sensor deployment, data analytics and AI on industrial machinery. The project is funded by SFI Confirm: Smart Manufacturing Research Centre in collaboration with a major multinational industrial partner.

#### Project Description:

This project will focus on the development of sensing and data analytics to enable Predictive Maintenance (PdM) in legacy industrial machines, focusing on the use of artificial intelligence (AI) techniques which can allow for the rapid re-training of analytic algorithms to account for machine variability.

This project proposes the development of a smart-sensing embedded software system with adaptable edge processing via machine learning as a solution to implement OT and PdM on legacy machinery. While research exists on the creation of bespoke OT systems for legacy machinery, this has proved difficult to roll-out to multiple machines, due to variations in machines, ie. machine model types, deviations of operation due to degradation, maintenance variations and historic machine upgrades. This proposal hopes to address machine to machine variation through a machine learning technique called 'One-shot Deep Learning'. A recent advancement in the field of artificial neural network (ML/AI), 'One-Shot' allows the creation and training of a software model of the machine sensor data garnered from a limited number of machines but at a later stage, during deployment, an additional smaller quantity of data from a specific machine can be added to the Neural Network training 'on-the-fly' to customise the model to a specific machine.

In addition, processing advancements in embedded systems allowing off-line (non-cloud) neural computing (ie. Intel Neural Compute Stick and similar) have allowed the deployment of such Machine Learning software models at-machine, allowing seamless integration of legacy machines to factory MES.

#### Minimum Qualifications:

Applicants are required to have a minimum of a grade of Honour Degree (2.1 or better) in Computer Science, Engineering, Applied Physics, or equivalent.

The following skills would be desirable:

- Familiarity with Python, R or similar languages
- Familiarity with Artificial Intelligence Techniques or data analytics.
- Familiarity with sensing technologies
- Good technical writing skills
- Self-motivated, reliable and hard-working.

### **Scholarship:**

IMaR are offering a 2 year Masters scholarship to a suitable candidate, which will cover all postgraduate student fees and provide a monthly stipend to cover living expenses. A budget for equipment, material and travel will also be provided.

### **Location:**

This post is located at IMaR in the Institute of Technology, Tralee however occasional visits will be made to collaborate with Industrial and Academic Partners and attend academic conferences.

### **Enquiries & Applications**

Enquiries and Applications should be addressed to Dr. Daniel Riordan, email: [daniel.riordan@staff.ittralee.ie](mailto:daniel.riordan@staff.ittralee.ie)