

# PhD Project Proposal

*School of Electronics, Electrical Engineering and Computer Science*

**Proposed Project Title: Sensor and Data Analytics Systems for Structural Health Monitoring in Smart Infrastructure**

**Principal Supervisor:** Prof R Woods (Systems & Sensors)    **Second Supervisor:** Dr David Hester (NBE, Civil Eng.)  
**Third Supervisor:** Georgios Karakonstantis (DSSC, ECIT)

## **Project Description:**

There is considerable interest in employing Structural Health Monitoring (SHM) for evaluating health of engineering structures and is particular relevant for infrastructure for smart city and new transport systems. SHM has been used in Mechanical Engineering applications for some decades now but is increasingly being looked at for Civil Infrastructure, where there are largely two challenges; (i) data collection and (ii) data interpretation. To identify what information can be garnered from measurements, much of the research to date has understandably focused on data interpretation and this work is ongoing. However, for practical implementation there is an urgent need for sensing solutions that can (a) collect the necessary data on structures that may have no power or communications and (b) be sufficiently low cost to make large scale data collection financially practicable. For example in the case of many bridges, this is a particular problem as these structures provide vital transport interconnections particularly in the countryside; therefore, providing low-cost, practical solutions that can monitor performance on a continual basis is vital.

The purpose of this PhD programme is to tackle this challenge from a multidisciplinary perspective and look at creating innovate sensor systems with edge computing functionality for smart infrastructure. Data transmission needs can then be reduced when data is sent to centralised computing resources for processing; in this project, the approach will be applied directly to a number of civil engineering applications. The project will be supervised by staff from the Systems and Sensor Research Theme and Centre of the Science and Scalable Computing (DSSC) within the EEECS/ECIT and Civil Engineering within the School of Natural and Built Environment (NBE). The output will be to create an innovative sensing solution that will provide enhanced health monitoring for built infrastructure for functional, maintenance and safety reasons. Prospective candidates will need to be comfortable in creating hands-on practical systems and be prepared to undertake experiments that can capture data from the real world.

## **Contact details**

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