

Engineering Doctorate (EngD) Studentship

'Improving non-contact surface temperature measurement'

Advanced Forming Research Centre (AFRC), Glasgow & National Physical Laboratory (NPL), Teddington.

This is a call for applications for an industrially funded EngD studentship with the Advanced Forming Research Centre (AFRC), University of Strathclyde and the National Physical Laboratory (NPL).

NPL is the UK's National Measurement Institute, and is a world-leading centre of excellence in developing and applying the most accurate measurement standards, science and technology available. NPL has developed and maintained the nation's primary measurement standards. These standards underpin the National Measurement System infrastructure of traceability throughout the UK and the world that ensures accuracy and consistency of measurement. The AFRC is a state of the art facility focused on developing forming and forging technologies to support the development of high integrity components. NPL together with the AFRC have proposed an industrial doctorate to investigate methods towards improved non-contact surface measurements for hot-forming processes.

Robust manufacturing control systems rely on robust and repeatable measurement systems. In order to make improvements to a manufacturing process you must first be confident in the data the process monitoring system is producing. In-process contact measurement methods can often be difficult or impractical to execute and often require modification to the surface condition of the measured material. Hence there is a strong requirement to improve the robustness of non-contact temperature measurement.

The determination of surface temperatures by non-contact methods is both very necessary for a wide variety of industrial processes and also very difficult. This is due to several factors; the unknown emissivity of the surface, the unknown reflected radiation from the surface as well as the often hostile conditions in typical industrial environments. These environments include the interior of industrial preheat furnaces, autoclaves, kilns, glass float lines, plate metal extrusion lines, hot forming processes and heat treatment equipment. In addition highly reflective alloys make infrared measurement quite challenging. Surface condition, environmental conditions and crystallographic state will also affect the apparent emissivity.

The aims of the doctorate are:

1. *Develop and demonstrate one (or ideally two) novel surface temperature measurement methods that give reliable temperature measurement that can be implemented in industrial environments.*
2. *Use thermal imaging, in conjunction with the "true" surface temperatures determined in 1) and a thermal radiation model to establish the traceable low uncertainty surface temperatures in an industrial environment.*

The outcome of the EngD project is to demonstrably improve temperature measurement techniques for hostile industrial environments. The research will also increase confidence from the industrial community in the use of non-contact temperature measurement techniques. The wider impact of the project can lead to demonstrable cost reductions for manufacturing community through reduced material scrap and increased process efficiency through improved process control.

The student should have a first or second class Honours degree (minimum 2.1) or an MSc in an engineering, mechanical engineering, physical science or mathematics based discipline. A solid understanding of physics is advantageous. Previous experience in use of scientific instrumentation and practical experimentation desired. Good analytical skills, excellent communication skills, and a 'hands-on approach' are also highly sought after.

The 4 year studentship will cover student fees as well as a tax free stipend of over £15,000. To apply for the studentship, candidates should complete an online application on the University website:

<http://www.strath.ac.uk/prospectus/postgraduateapplications/> naming *'Improving non-contact surface temperature measurement'*

Candidates should supply **CV, 2 reference letters and a brief statement of research interests**. **Closing date for applications: 30/09/2014**