Title: Safely responding to critical events in industrial processes (supported by Schlumberger)

Type of award PhD Research Studentship

Department Computer Science

Scholarship Details Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to application) PhD tuition fees and a tax-free stipend at the current RCUK rate (£14,296 in 2016/17; £14,553 in 2017/18), enhanced by an additional industrial top-up of up to £4,000 p.a. EU nationals resident in the EU may also apply but will qualify only for PhD tuition fees

Duration 4 years

Eligibility Home/EU applicants only

Deadline Must be able to start mid-September 2017

PhD Topic Background/Description

Drilling wells is a complex and potentially dangerous process in which equipment failures, unexpected environmental effects due to the poorly understood subsurface, and human errors can lead to potentially catastrophic outcomes. In an effort to reduce the likelihood of these as well as the cost of drilling, Schlumberger is developing systems that can operate autonomously or semi-autonomously as part of human machine teams in complex, dangerous and uncertain environments. Such systems must be able to respond appropriately to unexpected events and one significant challenge in deploying them is in verifying that the system is safe, and that it will detect and respond to critical events appropriately. This is particularly challenging in drilling as the systems tend to be sensor poor and even leaving the system in a safe state in response to an event often involves a non-trivial sequence of activities.

In this project we aim to provide automated support that helps operators to make decisions when unexpected events occur during operations. We will explore techniques to support decision making in critical situations. In particular, we will focus on verifying that proposed sequences of actions that would lead to a safe state once unexpected events have been detected are in fact safe. Our approach will exploit recent developments in model-based test generation, especially the use of multi-agent systems combined with machine learning for test generation and for online testing of complex human-interactive systems.

Further Particulars

Schlumberger is the world's largest supplier of a broad range of services to the oil and gas sector, throughout the life of a field from seismic acquisition and interpretation, through field evaluation and development, to drilling and production management, and eventually decommissioning.
Schlumberger has identified autonomous systems and robotics as key enabling technologies for the safe and economic development of increasingly difficult to access hydrocarbon and other resources.

**Candidate Requirements**
We are looking for an enthusiastic student with at least a 2.1 or first class degree in Computer Science, Computer Systems Engineering or a similar discipline.

Excellent programming, system and data analysis skills are required.
You are creative, able to grasp a problem and willing to learn new techniques including from other engineering disciplines.
You are a competent presenter, writer and communicator.
You seek an intellectual challenge and aim to achieve excellence in your research.

**Scholarship Details**
Research Council £14,296 p.a. in 2016/17 (£14,553 p.a. in 2017/18) plus an industrial top-up (of up to £4,000 p.a.) subject to contracts.

**Informal enquiries**
Please email Prof Kerstin Eder (Kerstin.Eder@bristol.ac.uk)
For general enquiries, please email gsen-pgrs@bristol.ac.uk

**Application Details**
To apply for this studentship submit a PhD application using our [online application system](http://www.bristol.ac.uk/pg-howtoapply)

Please ensure that in the Funding section you tick “I would like to be considered for a funding award from the Computer Science Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor.

**Closing date for applications 25 May 2017.**

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