**Title:** Service level assurance of Smart Infrastructures  
*(supported by BT)*

**Type of award**  
PhD Research Studentship

**Department**  
Civil Engineering

**Details**  
Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to 1st September 2017) PhD tuition fees and a **tax-free** stipend at the current EPSRC rate (£14,553 p.a. in 2017/18), enhanced by an additional industrial top-up when all contracts are in place.

**Duration**  
4 years

**Eligibility**  
Home/EU applicants only

**Start Date**  
2 October 2017

**PhD Topic Background/Description**

An EPSRC Industrial CASE award PhD studentship is available at the University of Bristol in collaboration with BT.

The Internet of Things has emerged as a new paradigm able to drive extra efficiencies out of existing city infrastructures, decreasing the size of new investment necessary to meet growth requirements. By installing sensors in a city environment, authorities could get a near real-time view of situations and take appropriate actions to improve citizens quality of life.

BT’s Data Hub approach provides additional benefits through the delivery of a platform to pull sensor data feeds together but also supporting an ecosystem of partners and tools to trade the data; that is the Data Hub brings together Data Providers who make sensor data feeds available with own licences, privacy terms and SLA guarantees and Data Consumers (citizens, app developers or even SMEs) who subscribe to use certain data feeds of interest. In this digital ecosystem, the key challenge is how to guarantee and maintain SLAs, when end-to-end service delivery engages multiple authorities, each authority owing a separate domain of control over the part of the service they are responsible for.

Additionally, with computational logic being pushed to the edge, e.g. analytics closer to gateways and sensors, end-to-end orchestration becomes an overarching concern aimed at optimal co-ordination of multiple aspects of the ecosystem e.g. edge apps (containers), network (NFV), cloud apps, data streams. Also, the physical nature of sensors being devices installed around the city manifests a further SLA challenge: how do we guarantee reliable data feeds from sensors over dire circumstances such as extreme weather conditions or vandalism.

The PhD should focus on techniques and approaches for End-to-end SLA management in an IoT/Data hub ecosystem environment considering areas like:
(i) predictive analytics that can foretell trends and could determine a high possibility of disrupting SLAs
(ii) how we can best detect problems with feeds and where there have been SLA affecting matters, how to handle reporting these without a large strain of searches etc. on the hub, and how to issue repudiation e.g. service credits
(iii) orchestration techniques that optimise deployment of IoT devices, network connectivity parameters, app logic deployment etc, to guarantee end-to-end customer SLAs.

Further Particulars

Doing research at the University of Bristol

The quality of research at the University of Bristol places it within the top five Universities in the UK based on the Research Excellence Framework and Times higher Education rankings 2014-15. The PhD candidate will be a part of a friendly and diverse community, with the Bristol Doctoral College (BDC) as the focal central coordinating facility. Alongside the specialist training the candidate will receive in PhD-specific topics, the BDC offers approximately 200 courses, interactive workshops and seminars as a part of the University’s Personal and Professional Development Programme for PGR students. The BDC organises University-wide events and provides a hub of information, guidance and resources to help researchers to get the most of their time at Bristol.

Candidate Requirements

We are looking for an enthusiastic student with at least a 2:1 Honours degree or equivalent in Computer Science, Electrical & Electronic Engineering or Communications Engineering. Candidates should have a deep knowledge of computer networking in a variety of environments (particularly UNIX), excellent understanding of system architectures for big data computation (high performance computing, very large databases), knowledge of Internet of Things networking and data harnessing protocols, understanding of computer security fundamentals.

Scholarship Details

Research Council £14,553 per annum, PhD tuition fees plus an industrial top-up when all contracts are in place.

Informal enquiries

For informal enquiries please email Dr Theo Tryfonas, theo.tryfonas@bristol.ac.uk

For general enquiries, please email came-pgr@bristol.ac.uk

Application Details

To apply for this studentship, submit a PhD application using our online application system [www.bristol.ac.uk/pg-howtoapply] and select the Civil Engineering programme.

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

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