## Project Details

### Project Title
Best Practice Design for Autonomic Applications in the Cloud

### Project Summary
In collaboration with British Telecom (BT) Adastral park which is BT’s Global Research and Development Headquarters in Ipswich, this project will investigate best practice of assured autonomic (self-adaptive) applications in the cloud.

BT’s research team has strong interests and experience in autonomic (self-learning, self-configuring etc) modelling in different application scenarios that are ranging from networks to business processes. Lately, they are interested in applying their autonomic inventions in the cloud domain. Cloud computing is increasingly used inside BT’s infrastructure in order to facilitate flexible and changeable application requirements (e.g. storage requirements for Big Data applications). Autonomic applications also need to migrate to cloud environments in order to take advantage of cloud’s flexibility and enhance their performance. The application of autonomies in the cloud is becoming increasingly important and therefore part of BT’s strategic research objectives.

Summarizing, the studentship will focus on the emerging and challenging research area of using BU’s software engineering and neurocomputational modeling research for BT’s autonomic models in the cloud. Therefore, the project has the following objectives:

1. Analysis of BT’s autonomic applications with emphasis on their transferability to the cloud.
2. Research on available cloud architectures.
3. Middleware design and development to enable autonomic applications in the cloud.
4. Assurance of adaptivity properties such as stability, robustness, etc.
5. Definition of best practice design framework for autonomic applications in the cloud.

The project will be mainly driven by the industrial partner’s requirements. BT will set specific application scenarios in the course of the project execution thus providing "real-world" case studies as well as dissemination of the project's outcome.

This project aims at innovative and timely work inline with EU societal challenges. Autonomic systems are an important step towards the societal challenge of "smart environments with dynamic and adaptive configuration capabilities". Increasing utilisation of cloud computing is part of the European Cloud Strategy.

### Academic Impact
The last decade has seen a significant increase in autonomics and will have a huge impact in the future as they are part of the "smart" systems societal challenge. On the other hand, cloud computing is becoming the dominant technology for flexible, stable and scalable solutions. The PhD research work is timely and innovative dealing with important research questions. There are at least three types of academic impact that will be achieved through this project: (1) Scientific output should be published in high-impact journals; (2) Networking: The candidate will collaborate with researchers from BU, the BT’s research headquarters in UK; (3) Prototype: The project will deliver fully functional autonomic applications in the cloud and the resulting best practice design.

### Societal Impact
Using autonomies in the cloud of large corporations is a technological breakthrough and addresses the need of a
new class of applications that require dynamic resource adaptation. Making sure that these new systems are designed safely and work as expected (assurance) is paramount for their commercial success. Large companies like BT have millions of customers who will benefit from autonomies through improved service experience. The main contributing factor is that autonomies in the cloud will enable resource optimisation and flexibility. Customers will subsequently enjoy higher service availability and better service performance. In contemporary society a proliferation of intelligent consumer devices displaying different levels of autonomies is apparent, for example home intelligent thermostats adapting to user behaviour or self-driving cars adapting to traffic situations. On the other hand, cloud computing is dominating the computing world and is increasingly used for applications such as big data. The research in the proposed project will contribute to the state of the art of autonomies in cloud computing leading to societal benefits like energy savings or increased safety.

Training Opportunities

This project offers a very interesting learning and training opportunity for the candidate. Different subjects are involved in the project like autonomies, cloud computing, AI methods, biological modelling etc. Issues like project planning and management will also be part of the learning process. The candidate will be exposed to the academic and industrial environments having access to periodic secondments at BT. While at BU, the candidate will receive research-based training, at BT, he/she will get familiar with research and development in the industrial setting and will be given insights into the exploitation of the results of this project. The candidate will gain various skills, especially scientific skills, employability skills and industrial experience from interacting with the industrial partners. Moreover, the candidate will have the opportunity to interact with local and international researchers. Last but not least, he/she will be expected to attend international conferences to present the results of the project.

SUPERVISORY TEAM

<table>
<thead>
<tr>
<th>First Supervisor</th>
<th>Dr Sofia Meacham (BU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Supervisors</td>
<td>Dr Emili Balaguer-Ballester (BU)</td>
</tr>
<tr>
<td></td>
<td>Dr Stephen Cassidy (BT)</td>
</tr>
<tr>
<td></td>
<td>Dr Botond Virginas (BT)</td>
</tr>
</tbody>
</table>

Recent publications by supervisors relevant to this project


### INFORMAL ENQUIRIES

To discuss this opportunity further, please contact Dr Sofia Meacham via email: smeacham@bournemouth.ac.uk

### ELIGIBILITY CRITERIA

Studentship candidates must demonstrate outstanding academic potential with preferably a 1st class honours degree and/or a Master’s degree with distinction or equivalent Grade Point Average. An IELTS (Academic) score of 6.5 minimum (with a minimum 5.5 in each component) is essential for candidates for whom English is not their first language. In addition to satisfying basic entry criteria, BU will look closely at the qualities, skills and background of each candidate and what they can bring to their chosen research project in order to ensure successful completion.

**Additional Eligibility**

You will need a strong first degree in Computer Science, Mathematics, Engineering or related subjects. Excellent technical ability and programming skills are essential. Specifically, we are seeking candidates with very good knowledge in software engineering (design and development) and at least one of the areas of systems modelling, artificial intelligence, and software development. Applied mathematics or ability to learn is desirable.

### HOW TO APPLY

Please complete the online application form by **25 May 2017**. Further information on the application process can be found at: [www.bournemouth.ac.uk/studentships](http://www.bournemouth.ac.uk/studentships)