



# BU PhD STUDENTSHIPS 2018

## PROJECT DESCRIPTION

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| <b>PROJECT DETAILS</b>  |
| <b>Project Title</b>  |
| Peer to Peer Distributed Business Process Management  |
| <b>Project Summary</b>  |
| <p>The manufacturing industry is entering a new era in which new ICT technologies and collaboration applications are integrated with traditional manufacturing practices and processes to increase flexibility in manufacturing, mass customization, increase speed, better quality and to improve productivity. EU H2020 “vF Interoperation supporting business innovation” (FIRST) provides new technology and methodologies to describe manufacturing assets; to compose and integrate existing services into collaborative virtual manufacturing processes; and to deal with evolution of changes.</p> <p>Various Internet technologies and other economic developments have driven increased collaboration of businesses, with tighter integration being essential. Examples of this can be found in outsourcing, virtual enterprises and cloud computing. Within companies, these Internet technologies have become the main mode of systems integration (through process management and otherwise). These developments mean that the fundamental technologies are now ready to allow for cross-organizational business process management.</p> <p>We are looking for a PhD candidate to performance research in the area of collaborative business process management. Within this context, a significant challenge can be found in distributed coordination/management of processes, as well as their reliability. This is in particular an issue for collaboration amongst peers where there is limited trust in each partner. This project aims to develop an approach to manage the execution of distributed business process management without requiring a trusted party responsible for the execution. The PhD candidate is also expected to travel to our partners’ locations within the consortium (outside the UK) for up to of 12 months.</p> |
| <b>Academic Impact</b>  |
| <p>The proposed project will have significant impacts in two aspects. Firstly, it addresses the critical aspect of peer to peer execution of business processes that maintain confidentiality and provide robustness. Second, through extending formalization of business processes to peer to peer approaches, it will provide further understanding of business processes.</p> <p>Existing process management methodologies are generally focussed on single organisations or distributed process lead by a single trusted party. This project contributes to the area by removing these limitations to existing technology, providing reliable, confidential, trusted execution of distributed business processes.</p> <p>The research results are expected to be published in prestigious international conferences and journals in the areas of service management and information system etc. such as ICSOC, ICWS, PRO-VE, and Springer’s Service Oriented Computing and Applications. An applicable SOA based prototype will be built and demonstrated at international conferences, seminars and workshops for knowledge dissemination. Extensions to current model and prototype for access control will be considered in service based IT systems.</p>  |
| <b>Societal Impact</b>  |
| <p>At the heart of the Information and Communication Technology (ICT) objectives lie provision of secure enterprise computing and the facilitation of business collaboration. The project aims to be of unique value to British industry and provides a means to achieve excellence in secure e-business technology. The research aims to make an impact to the security aspect of service oriented collaborations. The developed generic infrastructure will be broadly applicable to several industry sectors and applications such as e-health, e-logistics or e-government. The expected outcomes of this project will significantly improve the security provision in the service based IT environment.</p>  |

Application of the outcomes in business will result in cost reductions in the management of security, or even enabling new business models to be employed.

Advances in this project will establish us as an internationally leading group in SOA security management. The formal study on security requirement analysis and access control model will contribute to the theoretical advance in service architecture research communities. The proposed framework will contribute to existing Web service standards of W3C and OASIS on service security and business process management for industrial purposes.

### Training Opportunities

The training programme will be directed by Dr. Lai Xu, Prof. Keith Phalp and Prof. Hongnian Yu. The training programme required will be structured in line with the research programme. The training will be achieved via completion of training courses, participating our EU H2020 Research and Innovation Staff Exchange FIRST project, monitoring and hands-on, one-to-one experiential training, as appropriate. The knowledge acquired through the work will be further disseminated through seminars and joint papers.

The PhD researcher focus lies on general business modelling classifications, ontologies related data/information, services and processes; semantic process discovery methods, service-oriented process verification methods, business process variability as well as process verification methods. This includes the analysis of different ontologies, integrated/mapped different ontologies, and ontology evolutions. Further we encourage the student to attend conferences and workshops for his/her submissions.

### SUPERVISORY TEAM

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| <b>First Supervisor</b>  | Lai Xu  |
| <b>Additional Supervisors</b>                                      | Keith Phalp, Hongnian Yu  |
| <b>Recent publications by supervisors relevant to this project</b> | <ul style="list-style-type: none"> <li>- Xu L., de Vrieze P., Yu H., Phalp K., and Bai Y. (2018) Interoperability of Virtual Factory: an Overview of Concepts and Research Challenges. International Journal of Mechatronics and Manufacturing Systems. (Accepted)</li> <li>- de Vrieze P, Xu L. (2018) Resilience Analysis of Service Oriented Collaboration Process Management systems. Service Oriented Computing and Applications. Springer. (Accepted)</li> <li>- Xu L, de Vrieze P. (2017) Supporting Collaborative Business Processes: a BPaaS Approach. International Journal of Simulation and Process Modelling. Inderscience.<br/>(<a href="http://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=IJSPM">http://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=IJSPM</a>)</li> <li>- Aiello M., Bai Y., Cabri G., Eder N., Mandreoli F., Mecella M., Mu H., Phalp K., de Vrieze P., Xu L. and Yu H. (2017) FIRST - virtual Factories: Interoperation supporting business innovation. (Poster). European Project Space (EPS) at the 9th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management. Funchal, Madeira, Portugal, 1-3 Nov. 2017.</li> <li>- Sang G, Xu L, de Vrieze P. (2017) Simplifying Big Data Analytics System with A Reference Architecture. In: 18th IFIP Working Conference on Virtual Enterprises (PRO-VE 2017), Vicenza, Italy, 18 - 20 Sep 2017. Springer.</li> <li>- Kasse JP, Xu L, de Vrieze P (2017) A Comparative Assessment of Collaborative Business Process Verification Approaches. In: 18th IFIP Working Conference on Virtual Enterprises (PRO-VE 2017), Vicenza, Italy, 18 Sep 2017 - 20 Sep 2017. Springer.</li> <li>- Aiello M., Bai Y., Cabri G., Eder N., Mandreoli F., Mecella M., Mu H., Phalp K., de Vrieze P., Xu L. and Yu H. 2017. EU H2020 FIRST- vF Interoperation supporting business innovation. In: Network Plus: Industrial Systems in the</li> </ul> |

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|  | <p>Digital Age Conference 2017 20-21 June 2017 Glasgow, UK.</p> <p>- Samdantsoodol, A., Cang, S., Yu, H., Eardley, A. and Buyantsogt, A., 2017. Predicting the relationships between virtual enterprises and agility in supply chains. EXPERT SYSTEMS WITH APPLICATIONS, 84, 58-73.</p> <p>- Shamim, S., Cang, S., Yu, H. and Li, Y., 2017. Examining the Feasibilities of Industry 4.0 for the Hospitality Sector with the Lens of Management Practice. ENERGIES, 10 (4).</p> |
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| <p><b>INFORMAL ENQUIRIES</b></p>  |
| <p>To discuss this opportunity further, please contact Lai Xu via email: <a href="mailto:lxu@bournemouth.ac.uk">lxu@bournemouth.ac.uk</a></p>   |
| <p><b>ELIGIBILITY CRITERIA</b></p>  |
| <p>Studentship candidates must demonstrate outstanding academic potential with preferably a 1<sup>st</sup> 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.</p> <p><b>Additional Eligibility</b></p> |
| <p><b>HOW TO APPLY</b></p>  |
| <p>Please complete the online application form by <b>XXXX</b>. Further information on the application process can be found at: <a href="http://www.bournemouth.ac.uk/studentships">www.bournemouth.ac.uk/studentships</a></p>   |