



Institute of Technology

Ciência sem Fronteiras / Science Without Borders

Postgraduate Project Template

Institution:	Dundalk Institute of Technology
Title of Postgraduate Opportunity: (include level of study)	A Comparative Study of Software Process in Irish and Brazilian software companies (PhD)
PI Name & Contact Details:	<p>Dr. Gerry Coleman Department of Computing and Maths / Director Software Technology Research Centre Dundalk IT Dublin Road Dundalk Ireland Email gerry.coleman@dkit.ie</p> <p>Prof. Dr. rer. nat. Christiane Gresse von Wangenheim Federal University of Santa Catarina (UFSC) Florianópolis/SC BRAZIL Email gresse@gmail.com</p>
Department/School:	Computing and Mathematics
Research Centre /Group:	Software Technology Research Centre
Research Centre/Group website:	https://ww2.dkit.ie/research
Brief Summary of PI research / research group /centre activity The Software Technology Research Centre at DkIT has a long track record of research in software process improvement and software engineering methods. The Centre comprises 6 academic staff, 2 post-doctoral researchers, 12 Doctoral/PhD researchers and 3 research assistants. Centre staff have a track record of publication in high-quality journals such as IEEE Software, Journal of Systems and Software and Information and Software Technology. In the past couple of years we have also regularly presented papers at international conferences including the International Conference on Software Engineering (ICSE). Centre staff frequently act as journal and conference reviewers and are members of ISO Boards for Software Process Standards development and Software Testing Boards. The Centre has an extensive international collaboration programme including joint research with Prof. Christiane Gresse von Wangenheim of UFSC – Federal University of Santa Catarina, Florianópolis/SC – BRAZIL who will be	

joint partner in this project.

Supervisory Team

Dr Gerry Coleman, Dundalk Institute of Technology

Dr Fergal McCaffery, Dundalk Institute of Technology

Prof. Dr. rer. nat. Christiane Gresse von Wangenheim, UFSC – Federal University of Santa Catarina

Background to the Project Collaboration and Track Record of Supervisors

Dr Gerry Coleman is Director of the Software Technology Research Centre and has over 50 peer-reviewed publications in the area of Software Process Improvement and Software Engineering and Testing. He is a Director of the Irish Software Testing Board, represents Ireland on the International Software Testing Qualifications Board and reviews for a number of Software journals and conferences.

Dr Fergal McCaffery is Director of the Regulated Software Research Group within DkIT and has an established track record of publication in the area of Software Process Improvement with specific emphasis on medical devices. He holds a 'Stokes Lectureship' from SFI and is also an SFI-funded Principal Investigator. He currently represents Ireland on the ISO working group for software process standardisation for medical device software.

Prof. Dr. rer. nat. Christiane Gresse von Wangenheim is a professor at the Computer Science department at the Federal University of Santa Catarina (UFSC). Her principal research interests are in the area of software process and product improvement. She participates in several research projects, developing, transferring and disseminating software quality research specifically to small software organizations in Santa Catarina/ Brazil. She has various experiences in the execution and management of research and industrial projects, as she worked in this area at the UNIVALI as coordinator of the Laboratory on Software Quality and Productivity (Laboratório de Qualidade e Produtividade de Software – LQPS) and as a consultant at Incremental Tecnologia Ltda. and before at the Fraunhofer Institute for Experimental Software Engineering in Germany, as a consultant for various companies, such as, Allianz, Daimler-Benz, Bosch, Siemens e Digital. She participates in the ISO Working Group ISO/IEC JTC1/SC7/WG24 – SE Lifecycle Profiles for VSE (Very Small Enterprises), the working group on EnterpriseSPICE and the working group CE – 21:101.04 – Software Process Assessment of the Brazilian Standardization Organization ABNT. She is a member of the IEEE Computer Society, member of the program committee of various conferences and has published more than 50 papers in books, journals and conferences.

A couple of years ago a post-graduate student of Prof. von Wangenheim's, Jean Carlo Hauck, spent a year in SToRC at DkIT and this collaboration resulted in a number of recent joint publications as follows:

GRESSE VON WANGENHEIM, C. ; HAUCK, J. C. R.; ZOUCA, A.; SALVIANO, C. F.; MCCAFFERY, F.; SHULL, F. Creating Software Process Capability/Maturity Models. IEEE Software, vol. 27 no. 4, pages 92 -94, July/August 2010.

GRESSE VON WANGENHEIM, C.; VON WANGENHEIM, A.; HAUCK, J. C.; MCCAFFERY, F.; BUGLIONE, L. Tailoring Software Process Capability/Maturity Models for Telemedicine Systems. Proc. of 18th Americas Conference on Information Systems, Seattle/USA, 2012.

BUGLIONE, L.; HAUCK, J. C.; GRESSE VON WANGENHEIM, C.; MCCAFFERY, F. Hybridizing CMMI and Requirement Engineering Maturity & Capability Models. ICISOFT – 7th International Conference on Software Paradigm Trends, Italy, 2012. (BEST STUDENT PAPER AWARD)

BUGLIONE, L.; MCCAFFERY, F.; HAUCK, J. C.; GRESSE VON WANGENHEIM, C. FIRST: Common-sense Process Scopes for Starting a Process Improvement Program. SPICE Conference, Palma de Mallorca/Spain, 2012.

BUGLIONE, L.; GRESSE VON WANGENHEIM, C.; MCCAFFERY, F.; HAUCK, J. C. The LEGO Strategy: Guidelines for a Profitable Deployment. Proc. of EuroSPI – Conference on European System, Software and Service Process Improvement & Innovation, Vienna/Austria, 2012.

BUGLIONE, L.; GRESSE VON WANGENHEIM, C.; HAUCK, J. C. R.; MCCAFFERY, F. The LEGO Maturity & Capability Model Approach. 5th World Congress on Software Quality, China, 2011.

This project will significantly extend and enhance an already successful relationship between the two partners.

Brief Description of Masters or PhD Project

In this **PhD project**, the student will be required to carry out a comparative study of the software processes currently in use in small software companies in Ireland and in Brazil. STORC, the host research centre, has a large network of contacts amongst small software companies in Ireland and these will form the local study base. Federal University of Santa Catarina has similar contacts in Brazil. Independently, and to a developing extent jointly, both institutions have previously investigated the software development activities of software SMEs in their native countries. This study significantly extends the independent research carried out by DkIT and UFSC to determine how processes in the software industry in the two countries compare, how standards are applied and differ, what factors influence the processes used by software producers and importantly what generalised lessons can be learned from a study of sample companies which will benefit the sector in the 2 respective nations.

The project will be managed as follows:

The student will be based primarily in Ireland for the duration of the study but will also spend a short period with our project partner UFSC – Federal University of Santa Catarina in Brazil. A prospective timetable for the research, indicating where the student will be based, is as follows:

- . Registration and Study Commencement – **Ireland**
- . Literature Review – **Ireland**
- . Data Gathering - Preliminary Study – to finalise research question and study objectives – **Ireland**
- . Data Gathering – Full Study of Irish Software SMEs – **Ireland**
- . Data Gathering – Full Study of Brazilian Software SMEs – UFSC, Florianópolis/SC – **Brazil**
- . Data Analysis – **Ireland**
- . PhD Write-up and Submission – **Ireland**

Key Attributes of Project for Brazilian Postgraduate Students

Should outline why projects offer something that is not available in Brazil – specific equipment, multi-disciplinarity, aspects of structured programme, links with industry, placements, links with other research groups, etc. Good opportunity for IoTs to emphasise their close working relationships with industry and particularly SMEs and their pivotal role in regional economic development

By studying within SToRC at DkIT, the Brazilian student will gain direct access to key decision makers within the Irish software industry and learn some of the factors that make the industry so successful and respected worldwide. As Software Process covers all aspects of software development the student will gain a broad picture of activity across multiple teams and product sectors in Ireland. Through a replicated study in Brazil, whereby the student will visit a number of selected software companies, the student will be able to evaluate and compare Brazilian practices with those used in Ireland. This, coupled with a systematic literature review of international practice in Software Process Improvement, will provide the student with the widest possible perspective of software process best practice worldwide. The student will have access to companies both regionally and nationally including Northern Ireland.

Apart from having a post-doctoral student with a specialism in this area, and a number of PhDs students studying complementary topics, SToRC is also a partner in the Science Foundation Ireland funded Centre 'Lero' (www.lero.ie). The student will benefit from interaction with other researchers in SToRC, and within Lero, many of whom are investigating software process improvement questions. SToRC also has very close contacts, and joint research initiatives, with other Irish Universities such as Dublin City University, Queens' University Belfast, and University of Limerick.

In addition to the educational benefits, the on-site company visits will provide the student with key technical and cultural perspectives of how Irish industry works. This will offer the student a unique insight into the Irish software industry, and extant Irish work practices, which would not otherwise be available through secondary research, or report/presentation analysis. SToRC's contacts are located throughout Ireland so the student will be required to travel across the country, thus benefitting from exposure to all parts of the country and Irish life.

Name and contact details for project queries, if different from PI named above:

As PI above. For Brazil, please contact: Prof. Dr. rer. nat. Christiane Gresse von Wangenheim is a professor at the Computer Science department at the Federal University of Santa Catarina (UFSC) email gresse@gmail.com.

Please indicate graduate disciplines which are eligible for application:

Software Development, Software Engineering, Information Systems

Alignment with Science Without Borders Priority Areas:

Please indicate the specific programme priority area under which the proposed postgraduate project fits – choose only one (tick box)

Engineering and other technological areas	
Pure and Natural Sciences (e.g. mathematics, physics, chemistry)	
Health and Biomedical Sciences	
Information and Communication Technologies (ICTs)	X
Aerospace	
Pharmaceuticals	
Oil, Gas and Coal	
Renewable Energy	
Minerals	
Biotechnology	
Nanotechnology and New Materials	
Technology of prevention and remediation of natural disasters	
Biodiversity and Bioprospection	
Marine Sciences	
Creative Industry	
New technologies in constructive engineering	