



Institute of Technology

Ciência sem Fronteiras / Science Without Borders

Postgraduate Project Template

Institution:	Institute of Technology Blanchardstown
Title of Postgraduate Opportunity: (include level of study)	MEng/PhD
PI Name & Contact Details:	Dr Catherine Deegan Catherine.deegan@itb.ie
Department/School:	Informatics and Engineering
Research Centre /Group:	ITS Research Group
Research Centre/Group website:	
Brief Summary of PI research / research group /centre activity To date the ITS group has been working on stereo vision and its integration into mobile mapping systems. Machine vision (image processing) techniques have been the focus of innovation in this group and we are seeking to expand the image processing techniques and expertise into other fields.	
Brief Description of Masters or PhD Project This project is to employ machine vision techniques to automate the analysis of microscope images. Specifically, it is to design and implement a machine vision based technique for the identification, classification and tallying of certain microscopic organisms known to cause damage in turfgrass. These organisms, plant parasitic nematodes (PPNs) are categorised by genus (17 in number) and growth stage (I-IV). Currently, populations of these organisms are monitored using a hand –counting technique using a compound microscope, this is time consuming and requires training and expertise to perform properly. Automating this counting process would provide significant advantages as regards time and specialist training requirements. It is intended that the project be approached by the assessment and implementation of some of the standard image processing techniques, with attention given to machine learning algorithms.	

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 pivotal role in regional economic development

The PI is currently supervising an undergraduate project on PPNs in turfgrass. This is in collaboration with the nematology expert Dr Colin Fleming of the Agri Food and Biosciences Institute and Queen's University, Belfast, Northern Ireland. Dr Fleming has verified the interest in automated techniques such as that explained here and is not aware of any significant progress on this specific problem. Dr Fleming's laboratory will provide all specimen images and assist in the manual identification of organisms of interest for comparison with any automated algorithms.

Machine vision as a discipline has multiple industrial applications. Previous research undertaken by this group is now in the process of being commercialised. Masters and PhD qualifications in machine vision, regardless of the specific application, are in demand in industry. All postgraduates of the ITS group are now working in Machine vision specific industries in Ireland (Valeo , Galway, Ireland and Hewlett Packard Ireland)

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

Same as PI

Please indicate graduate disciplines which are eligible for application:

**Computer Science,
Computer Engineering
Information Technology**

at honours degree level

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)	V
Aerospace	
Pharmaceuticals	
Sustainable Agricultural Production	
Green Chemistry	
Oil, Gas and Coal	
Renewable Energy	
Minerals	
Biotechnology	
Nanotechnology and New Materials	

Climate Change	
Biodiversity and Bioprospection	
Marine Sciences	
Productive Inclusion and Social Technologies	
Housing and Sanitation	