



## **Institute of Technology**

### **Ciência sem Fronteiras / Science Without Borders**

#### **Postgraduate Project Template**

<b>Institution:</b>	Institute of Technology Sligo
<b>Title of Postgraduate Opportunity:</b> (include level of study)	Masters by Research / PhD Geotechnical infrastructure modeling for piled embankments, ground improvement and reinforced soil structures.
<b>PI Name &amp; Contact Details:</b>	Dr Patrick Naughton <a href="mailto:naughton.patrick@itsligo.ie">naughton.patrick@itsligo.ie</a>
<b>Department/School:</b>	School of Engineering & Design
<b>Research Centre /Group:</b>	Geotechnical Research Group
<b>Research Centre/Group website:</b>	<a href="http://itsligo.ie/research-innovation/research-welcome/research-groups/geotechnical-research-group/">http://itsligo.ie/research-innovation/research-welcome/research-groups/geotechnical-research-group/</a>
<p><b>Brief Summary of PI research / research group / centre activity</b></p> <p>The Geotechnical Research Group (GRG) was formerly established in 2008, to conduct applied research that is highly relevant to issues currently facing the geotechnical industry. The core of its research is utilisation of the IT Sligo geotechnical centrifuge to investigate soil-structure interaction problems to develop innovative design concepts for complex geotechnical problems. Geotechnical centrifuge modeling is the most powerful investigative tool for revealing the mechanisms that govern the behaviour of complex soil-structure interaction problems. In view of this, IT Sligo have established the first and only geotechnical centrifuge facility in Ireland, and in so doing, have greatly enhanced the group's capabilities.</p> <p>Research in the group falls within the thematic area of geotechnics for infrastructure, specifically piled embankments, ground improvement and reinforced soil structures. The Group's approach is to utilise centrifuge modelling to obtain experimental data that can be used as a performance indicator for foundation and retaining systems, and as a means of validating and developing analytical design tools that can be readily implemented by industry.</p>	
<p><b>Brief Description of Masters or PhD Project</b></p> <p>The construction of infrastructure on soft soil deposits is problematic. One solution is to use piled embankments. While this solution has been used successfully for over 25 years the fundamental mechanism of load distribution in these systems is still poorly understood. This project will use the IT Sligo geotechnical centrifuge to investigate the plane strain mechanism of soil arching in piled embankments incorporating geo-synthetic reinforcement. The primary aim of the project is to develop a better understanding of the complex soil-structure interaction taking place and to use the</p>	

experimental results to develop new design approaches for piled embankments.

**Key Attributes of Project for Brazilian Postgraduate Students**

The graduate should have a good knowledge of fundamental geotechnical engineering and soil mechanics. The project is largely experimental, so it would be desirable, but not essential, that the graduate have knowledge of experimental testing, instrumentation and data acquisition systems.

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

As above

**Please indicate graduate disciplines which are eligible for application:**

Civil Engineering & Structural Engineering

**Alignment with Science Without Borders Priority Areas:**

Engineering and other technological areas	✓
Pure and Natural Sciences (e.g. mathematics, physics, chemistry)	
Health and Biomedical Sciences	
Information and Communication Technologies (ICTs)	
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	