

Project proposal template – Faculty studentships Summer 2014

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<i>Project title</i>	<input style="width: 100%;" type="text" value="Sustainable pile foundations - A new method to integrate geotechnical, structural and electro-mechanical"/>	<i>Director of Study</i>	<input style="width: 100%;" type="text" value="Dr Joshua Omer"/>
<i>Second Supervisor</i>	<input style="width: 100%;" type="text" value="Dr Homa Hadavina"/>	<i>School</i>	<input style="width: 100%;" type="text" value="Civil Engineering and"/>
<i>Other members of supervisory team</i>	<input style="width: 100%;" type="text" value="Dr Samireh Vahid"/>	<i>Any requirements from applicant (eg degree in specific subject area)</i>	<input style="width: 100%;" type="text" value="BEng/BSc Civil Eng."/>
Project summary (max 1,000 characters)			
<p>Installing energy loops in piled foundations can save up to 70% fuel cost and reduce carbon emissions by up to 50%. Typically 1 m² contact area between pile and soil can produce 35 W/m² of energy, equating to a saving of about £27,000 per annum and a payback period of just 5 years, for 100 energy piles in a building. The problem is that there is as yet no method available for predicting the loaded behaviour of energy piles and design methods for conventional piles are inapplicable because the effects of energy loops on the complex pile-soil interaction mechanisms are not well understood.</p> <p>The proposed research will utilise vast data from full-scale pile load tests, provided by industry collaborators, together with 3D finite element analysis to quantify how various factors (e.g. intensity/configuration of energy loops, installation technique and ground characteristics) influence the load carrying capacity and settlement behaviour of energy piles. This will lead to development of a new numerical method and a computer program integrating geotechnical, structural and electro-mechanical design aspects to enable compliance with design codes.</p>			