

**University of Dundee**  
**Discipline of Civil Engineering, School of Science and Engineering**

***Post-doctoral research opportunity in slope bioengineering (job ref# SSEN0049)***

<b>Job title:</b>	Post-Doctoral Research Associates – centrifuge modelling of climate-change effects on the performance of bioengineered clay slopes
<b>Grade:</b>	Grade 7
<b>Salary scale:</b>	Grade 7 point 29
<b>Duration of post:</b>	This position is <i>full-time</i> and available for <i>12 months</i>
<b>Location:</b>	Fulton building, University of Dundee, DD1 4HN, Scotland, United Kingdom
<b>Responsible to:</b>	Dr Anthony Leung, Lecturer, PI of the project

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**Background**

The post seeks a postdoctoral research associate (PDRA) with experience in centrifuge modelling to join a new EPSRC-funded project, “*Climate-change effects on the performance of bioengineered clay fill embankments*”, supported by *Network Rail (NR)* and *Highways England (HE)*, the two government agencies who manage transport assets and infrastructure in most of the UK.

The project aims to use centrifuge modelling technique to critically evaluate the effectiveness of using stem cuttings (i.e., known as live poles) to combat adverse climate-change effects on the behaviour of clay fill slopes. A specific research question to answer by this post is whether suction induced by pole transpiration may be preserved to enhance slope stability under extreme rainfall events (ultimate limit state, ULS), while not causing excessive ground movements (serviceability limit state, SLS) due to the shrink-swell of clay.

The PI and his research team comprising of a PDRA and a PhD student have recently developed new and novel water-uptake pole models that can simulate the effects of transpiration-induced suction in Dundee’s geotechnical beam centrifuge. Such modelling enables simultaneous consideration of pole transpiration and reinforcement. The PDRA post will be expected to liaise closely with the team members to apply the new pole models to study short- and long-term climate-change effects on the stability and serviceability of pole-supported compacted clay slopes in the centrifuge. Various climate-change scenarios following the UKCP09 climate projections will be simulated using Dundee’s unique centrifuge-mounted environmental chamber.

The PDRA post is also expected to work and communicate closely with the representatives from *NR* and *HE* to agree on test details that the project outcomes will be of utmost usefulness to both the project partners.

More project details can be found in <http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/N03287X/1>

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**About the city, the University of Dundee, and the geotechnics research group**

Dundee has a very attractive setting on the Tay Estuary on the east coast of Scotland. Dundee has a population of about 150,000 people, and is located within very easy reach of beautiful mountains and coastline. The University is a few minutes’ walk from the City Centre. Dundee was recently named UNESCO City of Design, and will see the V&A at Dundee Museum open in 2018.

The University of Dundee is an institution in the top 20 worldwide universities less than 50 years old (THE World University Rankings) and the top ranked UK University in this list. It is also in the World’s top 200 Universities. The University of Dundee increasingly attracts students, researchers, and academics from across the world, with well over 100 countries represented in the University community.

Civil Engineering research at Dundee achieved excellent results in the 2014 Research Excellence Framework (REF; 41% 4\*; 49% 3\*), placing us 3<sup>rd</sup> in the UK for Civil Engineering. The Geotechnical research group has a strong track record in studying soil bioengineering and ecological engineering, receiving significant funding from RCUK, European Commission and Forestry Research. The group owns a **150 g-ton geotechnical beam centrifuge**, equipped with a unique **environmental chamber** capable of simulating long-term climate-change effects and vegetation effects on model geotechnical infrastructure.

### Principal duties

- Apply the new pole models to carry out highly-instrumented centrifuge model tests to investigate the effects of plant transpiration on the stability and serviceability of bioengineered clay slopes;
- Evaluate whether plant selection and arrangement (through the control of the level of transpiration-induced suction) could optimise the amount of suction in a compacted slope for minimising seasonal ground surface settlement/heave while simultaneously enhancing slope stability.
- Work and communicate with the team members at Dundee and practicing engineers of *NR* and *HE*;
- Presentation of data at project meetings, national and international conferences;
- Active collaboration with the team members in preparing journal and conference publications

### Person specification

Essential:	Desirable:
<ul style="list-style-type: none"> <li>• PhD in Civil Engineering or related discipline;</li> <li>• <b>Experience in centrifuge modelling;</b></li> <li>• Interest in soil bioengineering and ecological engineering related research topics;</li> <li>• Enthusiasm for research, and attention to detail;</li> <li>• Ability to fit into research group and work with others;</li> <li>• Experience of data handling and data management;</li> <li>• Experience of preparing data for publication;</li> <li>• Evidence of ability to publish research output</li> </ul>	<ul style="list-style-type: none"> <li>• PhD in Geotechnical Engineering;</li> <li>• Knowledge of unsaturated soil mechanics and slope engineering;</li> <li>• Experience in suction measurements in geotechnical centrifuge</li> <li>• Experience in using Particle Image Velocimetry (PIV) in geotechnical centrifuge</li> <li>• Experience in working and communicating with practicing engineers</li> <li>• Track record of publication</li> </ul>

### How to apply:

To apply on-line please visit: [www.dundee.ac.uk/jobs](http://www.dundee.ac.uk/jobs). Please quote reference number **SSEN0049**, enclose a *covering letter* explaining why you are applying for the position, and a CV with the names of three referees. Skype interviews can be conducted for overseas applicants.

For informal enquiries please send an email to Dr Anthony Leung ([a.leung@dundee.ac.uk](mailto:a.leung@dundee.ac.uk)) quoting reference **SSEN0049** in the subject line.

*The University of Dundee is committed to equal opportunities and welcomes applications from all sections of the community.*

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