### Project Title
Novel Material Railway Drainage Systems – field trials and physical modelling using a geotechnical centrifuge

### Supervisor
Alec Marshall

### Supervisor Position and Research Priority Area
Associate Professor
Sustainable Societies - Life in Changing Environments; Sustainable and Resilient Cities

### Supervisor email
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### Project summary
This project is linked to an ongoing EPSRC/RSSB/DfT funded project which is investigating the use of novel materials within railway drainage systems:

- [http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/M023028/1](http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/M023028/1)

Reliable drainage solutions are critical for ensuring the long-term and cost-effective provision of railway infrastructure. Water plays a significant role in the degradation of railway infrastructure and can cause poor track geometry and accelerated deterioration of ballast. Climate change is predicted to result in more extreme weather and flash flood events. The railway drainage systems will therefore be put under severe strain with increased likelihood of disruption to rail services. In light of these issues, railway drainage system modernisation is considered to be a key factor for improving railway network safety and capacity, and ensuring the infrastructure's resilience to changing weather and climate events.

This project focuses on providing novel and easily installed railway drainage solutions which make use of lightweight and cost-effective 'new materials'. 'New materials' includes those recently developed as well as materials that can be newly applied within drainage systems.
The project benefits from the involvement of experts from railway industry, including Network Rail, AECOM, and ASPIN.

The project student will be involved in two experimental programmes that are being conducted as part of the larger project. These involve on-site trials of a new material drainage system within a full-scale railway track model (site-based work), as well as advanced small-scale physical modelling using the University of Nottingham 4m diameter geotechnical centrifuge. In addition, materials testing in the laboratory may also be conducted.

The project student will work closely with a post-doctoral researcher employed on the EPSRC project and will get the opportunity to learn about geotechnical instrumentation, laboratory materials testing methods, and geotechnical centrifuge testing, as well as develop contacts with the project’s industrial partners.

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<tr>
<th>Project start date</th>
<th>Monday 20th June 2016</th>
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<td>Project length</td>
<td>8 weeks.</td>
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**Desirable skills and knowledge**

The candidate should have an interest in geotechnical engineering and/or transportation engineering, more specifically the railway industry. The student should have some appreciation of laboratory testing methods, and the health and safety issues related to working in a laboratory and on-site. Good communication skills are imperative for working effectively within a group and working safely on-site.