



PhD Opportunity in Engineering Geophysics

Project title: Development of a DAS based slope monitoring approach

Supervisor: Assoc. Prof. Shane Donohue

Project description: Geotechnical infrastructure slopes (cuttings/embankments/dams) are an essential part of the transportation and flood defence networks that require sustainable, cost-effective management, while maintaining an appropriate service level to meet social, economic and environmental needs. Early identification of deteriorating slope condition generally allows lower cost preventative remediation to be undertaken and reduces the risk of failures. Conventional approaches to condition monitoring do not, however, capture the heterogeneous nature of these structures and they fail to identify the incremental development of conditions that ultimately trigger failure, and therefore limit the basis for early intervention. The overall aim of the project is to develop a novel fibre optic approach for temporally and spatially characterising the condition of geotechnical infrastructure slopes. Recent enhancements in Distributed Acoustic Sensing (DAS) of fibre optic cables, for strain and shallow seismic data acquisition, will be built upon and used to improve our ability to (a) monitor slope surface deformation patterns, (b) forensically analyse the internal mechanical properties driving instability and (c) monitor the development of these internal property changes. The ultimate goal of the work is to make early, subsurface precursors to failure available to geotechnical asset managers, thereby removing a key barrier to preventative management.

Position Description: This four-year full-time PhD position is funded through iCRAG, the SFI Research Centre in Applied Geosciences. The successful candidate will join a vibrant research community in iCRAG as well as the engineering geophysics research group in the School of Civil Engineering, University College Dublin.

Candidate Experience: The candidate should have a minimum 2.1 in an honours Masters degree in Geophysics, or an equivalent standard. Some experience in ground investigation and geophysical methods would be an advantage.

Application: Please e-mail a CV, including the names of two referees, as well as a cover letter, outlining your experience and motivation, to Assoc. Prof. Shane Donohue (shane.donohue@ucd.ie). The deadline for applications is the 12th August 2022 at 17.00.