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Title of the Theme Lecture
Soil-structure interaction in changing urban areas

Abstract
Widespread damage within urban centres has highlighted the need to better understand seismic structure-soil-structure interaction (SSSI), particularly given increasing urbanisation. The lecture will explore the performance of low-rise structures when adjacent structures are explicitly accounted for, based on centrifuge model tests and Finite Element analysis. The sensitivity of SSSI to pre-earthquake initial conditions (settlement and tilt of foundations) and subsequent evolution of these due to successive earthquakes will be demonstrated, along with sensitivity to the relative dynamic characteristics of the adjacent structures (e.g. changing the urban environment to address urbanisation). Sensitivity to position within a larger group of adjacent structures will also be investigated along with the impact of building underground infrastructure for urban mass-transit systems. The results presented will demonstrate the importance of accurately describing and modelling the surrounding urban environment in soil-structure interaction analyses, in order to understand the future influence of increasing urbanisation on populous areas.

Bio
Jonathan joined the University of Dundee as a Lecturer in 2006, following MEng and PhD degrees at the University of Cambridge, and was promoted to Professor of Civil Engineering in 2018. His expertise includes centrifuge modelling and Finite Element simulation, with research interests in three areas associated with innovative design against extreme dynamic environmental actions: (i) Earthquake Engineering; (ii) Biomediated Geotechnical Engineering; and (iii) Anchoring systems for marine renewable energy. This has been funded by UK Research Councils, European Commission, and various overseas, charitable and industrial organisations. In 2009 he was awarded the British Geotechnical Association Medal, in 2010 the TK Hsieh Award for Civil Engineering Dynamics (ICE/IStructE) and in 2017 the 13th Géotechnique Lecture. He was Chairman of the Editorial Panel of the International Journal of Physical Modelling in Geotechnics (2014-2018), served on the Géotechnique Advisory Panel (2011-2013) and is a current UK National Representative on ISSMGE Technical Committee TC104 (Physical Modelling) and Corresponding Member of TC203. Jonathan is also driven by education, being an instructor on the annual UK courses in Computational Modelling in Geotechnics run by PLAXIS BV, principal author of Craig’s Soil Mechanics, 8th Ed. and co-author of Design of Piles in Liquefiable Soils.