

## Géotechnique Lecture 2015

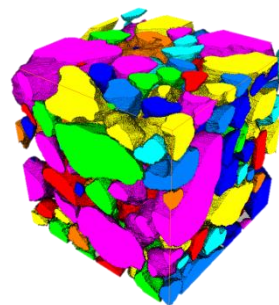
Tuesday 17<sup>th</sup> November 2015 at 18:30

Institution of Civil Engineers, One Great George Street, Westminster, London SW1P 3AA

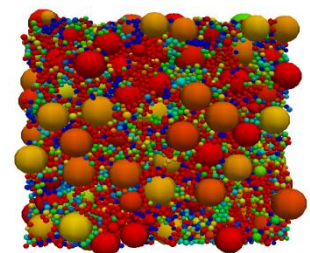
# A Particulate Perspective on Soil Mechanics

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**Summary:** The challenges associated with predicting soil response to loads and deformations arise in part from the particulate nature of the material. Discrete element method (DEM) simulations and high resolution micro-computed tomography (microCT) now allow geotechnical engineers to study the particle-scale mechanics that underlie the complexity of soil response. This lecture gives an overview of recent research that has used DEM and microCT to revisit important contributions to soil mechanics that were published in Géotechnique over the past 30 years.



MicroCT image of sand  
Image courtesy of Howard Taylor



Virtual DEM sample of gap  
graded material (30% Fines)  
Image courtesy of Dr. Tom Shire

Specific topics to be considered include the internal instability of dams and embankments subjected to seepage loading; the strength and stiffness of the locked sand deposits in South-East England; and the use of the critical state soil mechanics framework and the state parameter to describe and predict sand behaviour. In each case the lecture will show how applying a particle scale perspective has improved understanding in a way that will benefit both geotechnical research and practice.



**Biography:** Catherine O'Sullivan is a Reader in Particulate Soil Mechanics at Imperial College London. Originally from Ireland, she obtained her PhD from the University of California at Berkeley in 2002. Since arriving at Imperial College in 2004 she has continued to develop research that examines soil behaviour focussing on the particulate scale. She has authored a textbook on the use of discrete element modelling in geomechanics and has authored/co-authored over 50 contributions to international journals, 13 of which have been published in Géotechnique. Funding for her research has been provided by the O'Reilly Foundation, the IRCSET, the EPSRC, the ICE and ARUP. Catherine was a member of the Géotechnique Advisory Panel 2010-2012 and is currently a member of the editorial boards of Soils and Foundations, Computers and Geotechnics and the ASCE Journal of Geotechnical and Geoenvironmental Engineering. She served on the BGA Executive Committee from 2009-2012.

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