60TH RANKINE LECTURE

Wednesday 18th March 2020 at 5.30pm

The Great Hall, Sherfield Building, Imperial College London, Exhibition Road, SW7 2AZ

(Additional seating in the Clore Lecture Theatre, Huxley Building, Imperial College – see No 13 on map overleaf)

The unusual and the unexpected in geotechnical engineering
Observation – Analogy – Experiment

Professor Stephan Jefferis

Environmental Geotechnics Ltd

In this 60th Rankine lecture I shall explore a wide range of processes which have substantial consequences in geotechnical engineering and yet have received little formal attention.

I shall first examine the behaviour of support fluids used in piling, diaphragm walling, tunnelling and horizontal directional drilling – processes which have been strongly influenced by analogies with oil well drilling operations. However, the role of the support fluid in each of these applications is different and it would be a mistake to assume that the key properties are the same for all of them. For example, for decades it was assumed that an excavation support fluid must form a filter cake and should be markedly denser than the surrounding groundwater. The advent of polymer support fluids, which may have little tendency to form a filter cake and have near water densities, has shown these assumptions to be simplistic.

From support fluids, the next step is to consider slurry trench cut-off walls and then the impact of geotechnical activities on soils more generally. On careful analysis, one finds that many of the natural processes that occur in soils are mediated by micro-organisms. This adds new dimensions of complexity as there can be multiple outcomes. Construction processes that influence microbiological activity include heating/cooling, tunnelling, dewatering, flooding, sealing with liners, grouting and other introduction of chemicals. These are processes that we regularly undertake without a second thought for their potential microbiological consequences. Fortunately, these usually pass unnoticed and innocuously but occasionally, as will be shown, the effects are at the least unexpected!

Stephan Jefferis is a director of Environmental Geotechnics Ltd, a company he established in 1982 anticipating developments in this area. He is a Visiting Professor in the Department of Engineering Science at the University of Oxford. He is a former Chairman of the BGA and was a founder director of WJ Groundwater.

Stephan has worked on major projects across the World including dams, tunnels, shafts and deep foundations. He has over 45 years experience in the investigation and resolution of unusual and unexpected geotechnical problems, often associated with natural chemical and microbiological processes. He has worked on geotechnical processes including fluid supported excavation for decades and is co-author of the book Polymer Support Fluids in Civil Engineering.

This event will be broadcast online, details for which will be published prior to the event

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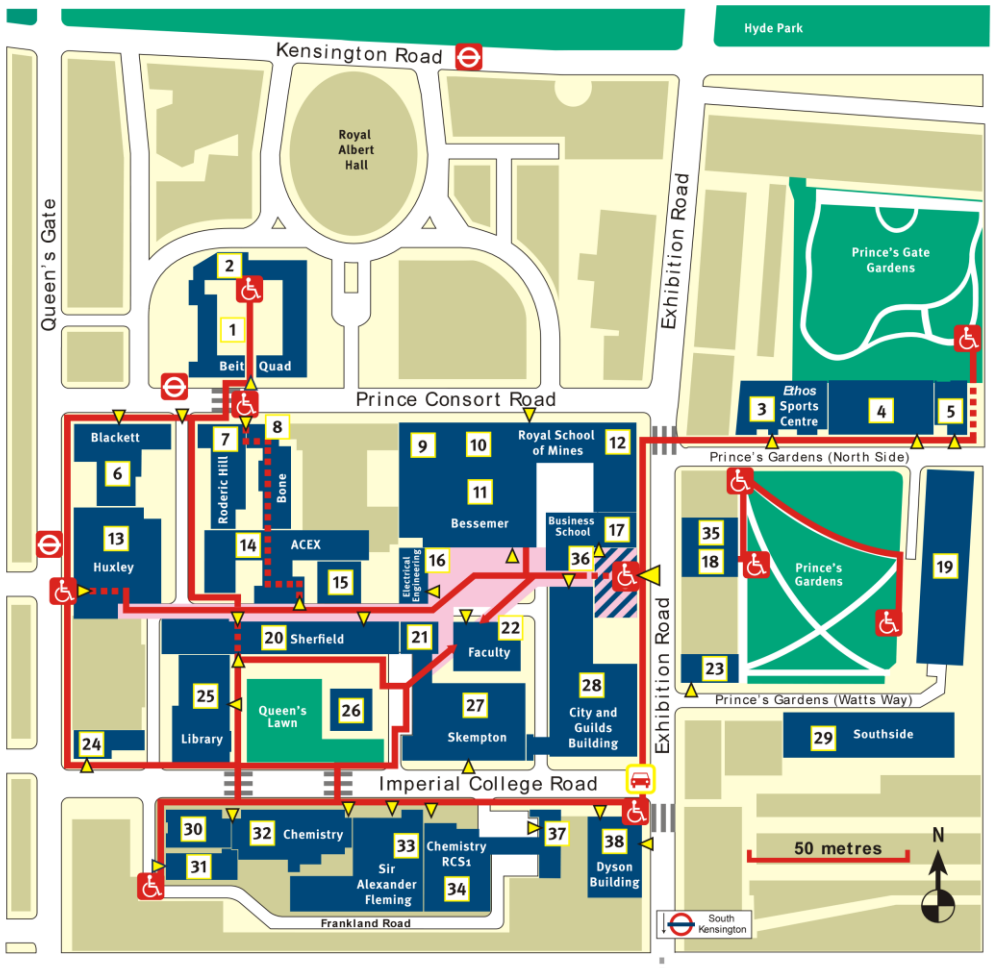

Main walkway
Main entrance
Accessible route
Buildings where wheelchair accessis not possible at this time

South Kensington Underground
Bus stops
Building entrances
Vehicle entrance

1	Beit Quadrangle
2	Imperial College Union
3	Ethos Sports Centre
4	Prince's Gdns, North Side
5	Weeks Hall
6	Blackett Laboratory
7	Roderic Hill Building
8	Bone Building
9	Royal School of Mines
10	Aston Webb
11	Bessemer Building
12	Goldsmiths Building
13	Huxley Building
14	ACE Extension
15	William Penney Laboratory
16	Electrical Engineering
17	Business School
18	53 Prince's Gate
19	Eastside
20	Sherfield Building Student Hub Conference Office
21	Grantham Institute – Climate Change and the Environment
22	Faculty Building
23	58 Prince's Gate
24	170 Queen's Gate
25	Central Library
26	Queen's Tower
27	Skempton Building
28	City and Guilds Building
29	Southside
30	Sir Ernst Chain Building – Wolfson Laboratories
31	Flowers Building
32	Chemistry Building
33	Sir Alexander Fleming Building
34	Chemistry RCS1
35	52 Prince's Gate
36	Alumni Visitor Centre
37	Observatory Building
38	Dyson Building of Design Engineering

THE GROUND FORUM GF **The BGA is a member of the Ground Forum**

Advance booking for Lecture not required
Tea & Biscuits available: 5.00 – 5.30 pm

DINNER TICKETS SOLD SEPARATELY
In case of any query please contact BGA Executive on 020 7665 2007 or email: bga@ice.org.uk

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