

63RD RANKINE LECTURE

WEDNESDAY 19TH MARCH 2025 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 20 on map overleaf)

From Geo-monitor to Geo-adapt: leveraging distributed sensing and data analytics for performance-based design, construction, and maintenance

Professor Kenichi Soga

University of California, Berkeley, USA

Geotechnical engineers ensure the safety and cost-effectiveness of infrastructure assets by addressing uncertainties related to their lifespan and performance during hazards. Safety is often achieved by minimizing adverse outcomes through evaluating the probability of failure based on past experience and reliability analysis. At the same time, emerging technologies in sensing, communication, and computing now make it feasible to continuously and economically monitor geotechnical structures during construction and operation. This enables us to: (a) respond appropriately and effectively if a failure starts to happen, (b) cope with future unknown demands, and (c) find potential improvements for future design, construction, and operation of new infrastructure. The lecture will present three case studies (tunnels, pipelines, and deep foundations) to demonstrate how distributed sensing data and data analytic techniques can provide geotechnical insights, enabling us to adapt to ever-changing demands.

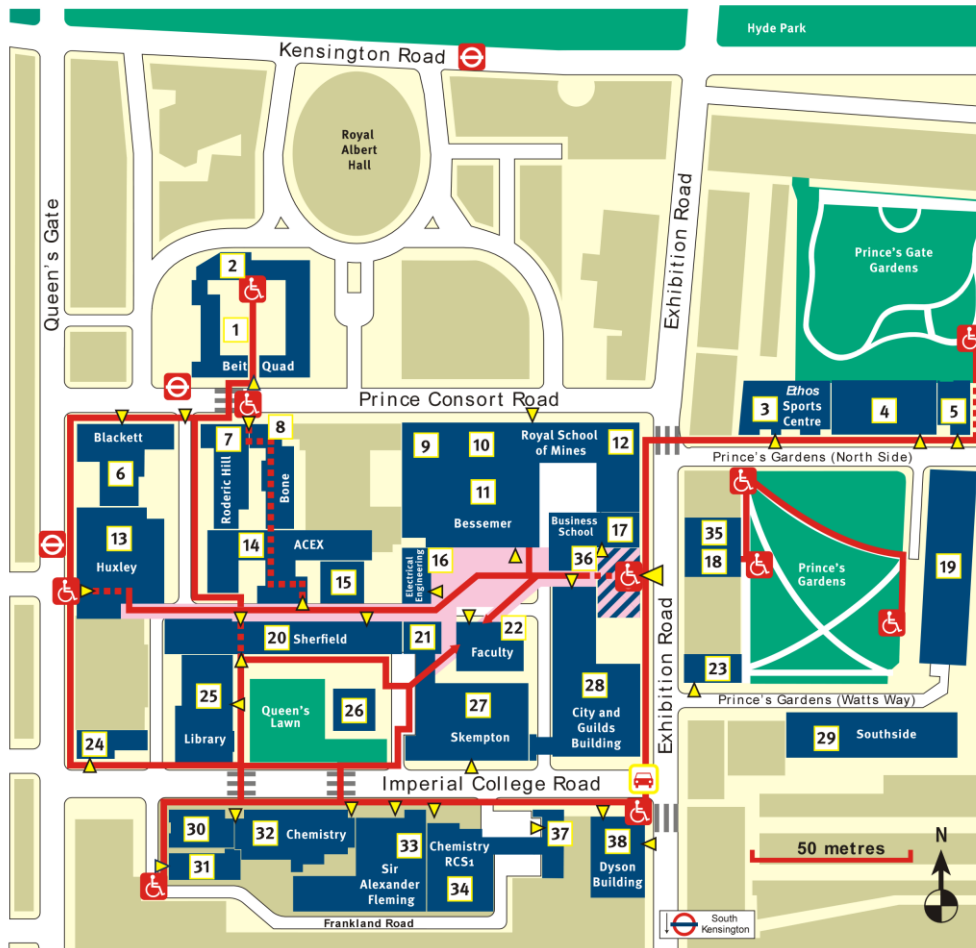


Kenichi Soga is the Donald H. McLaughlin Chair in Mineral Engineering and a Distinguished Professor at the University of California Berkeley. He earned his BEng and MEng from Kyoto University in Japan and Ph.D. from the University of California at Berkeley. Prior to joining UC Berkeley in 2016, he was a Professor of Civil Engineering at the University of Cambridge. He has authored more than 450 journal and conference papers and co-authored the book "Fundamentals of Soil Behavior". His research focuses on infrastructure sensing, performance-based design and maintenance of underground structures, energy geotechnics, and geotechnics from micro to macro. He is a Fellow of the UK Royal Academy of Engineering, a Fellow of the Institution of Civil Engineers and a member of the US National Academy of Engineering. He has received numerous awards, including the George Stephenson Medal and Telford Gold Medal from the Institution of Civil Engineers, and the Walter L. Huber Civil Engineering Research Prize from the American Society of Civil Engineers. He is also a Bakar Fellow of UC Berkeley, working to promote the commercialization of smart infrastructure technologies.

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