



## ANNOUNCEMENT

### AGS (HK) Technical Seminar

#### Observational Method & Machine Learning Back-analysis - Data-driving design solutions in Ground Engineering

by

**Dr Ying Chen (Vice Chair of ISSMGE TC206)**

**Date :** Thursday, 27 June 2024

**Time :** 18:30 – 19:30 (Hong Kong Time)

**Venue :** The webinar will be conducted through Zoom.

Successful applicants will be informed by emails with a Zoom's link to the webinar. Participants should arrange for their own device with a stable network environment to join the webinar.

**Enquiry :** [agshk.org@gmail.com](mailto:agshk.org@gmail.com)

**Fee :** Free of charge

**Registration :** <https://www.ags-hk.org/event-details/observational-method-machine-learning-back-analysis-data-driving-design-solutions-in-ground-engineering>

Please register by 26 June 2024. Successful applicants will receive webinar details after registration. CPD certificate will be sent to the attendees, who attended more than 80% of the webinar time, within 2 weeks after the webinar.

**Book Prize :** Professionals under 35 years of age are encouraged to submit a Book Prize Report (max. 500 words) on webinars and site visits arranged by AGS (HK).

Contributors to successful Book Prize Reports will be awarded a Book Prize that comprises of a book "Geology of Site Investigation Boreholes in Hong Kong" written by Chris Fletcher, and a coupon of HK\$500 for Eslite Spectrum (誠品生活) or equivalent. The successful Book Prize Report will also be published on the AGS (HK) website to showcase your accomplishment.

Prior to report submission, please refer to the "The AGS Book Prize Reports – Assessment Framework"\* on the AGS (HK) website. You may submit your Book Prize Report to our assessors by uploading the report file through the AGS (HK) website at <https://www.ags-hk.org/book-prize>. Should you have any questions, please contact us at [agshk@meinhardt.com.hk](mailto:agshk@meinhardt.com.hk).

\*Link to the AGS Book Prize Reports – Assessment Framework:  
[https://www.ags-hk.org/files/ugd/521a4c\\_b94496034732484687441cf4ed4d0b9.pdf](https://www.ags-hk.org/files/ugd/521a4c_b94496034732484687441cf4ed4d0b9.pdf)



### **Synopsis:**

In Infrastructure and underground construction works, uncertainties from ground, groundwater, and construction led to inaccurate predictions of soil-structure interactions. Supported excavations are often over-designed, which underscores a significant potential for cost optimization and sustainable design. However, the conventional design approach has less room for leaner designs at the start of the project due to uncertainties. The emergence of advanced analysis tools enables the development of an Observational Method approach for a decision-making process, in which data can be best utilized to deliver real value, confidence, and control.

More digital solutions for ground engineering become available, such as Digital Twin, Big Data, Automation, and AI-assisted design, as well as newly developed tools, e.g., cloud-based machine learning algorithm method supported back analysis platforms, and monitoring data platforms. An integrated digital solution framework will significantly improve the efficiency of the project, connecting design with construction, as well as operation (e.g., asset management). Eventually, this will offer a data-driven decision-making tool, maximize the data values, and enable the visualization of design, better control of construction, and good assistance of asset management.

### **About the Speaker:**

Dr. Ying Chen is a chartered Geotechnical Engineer and researcher with over 17 years of experience in a wide range of geotechnical design and construction activities for railway infrastructure, urban area basements, and high-rise building foundations. Major infrastructure project experience includes HS2 /Crossrail in the UK, Metro project in Hong Kong, Shenzhen China, and Doha.

She completed her Ph.D. at the University of Cambridge, on the “Application of the New Observational Method on deep excavation retaining wall design in London Clay”, since then, she had been continued research work on the Observational Method at Arup (2018-2020) and Mott MacDonald (2020 to 2022) to provide the OM design solution for deep excavation achieving savings in cost and construction time. The collaboration with SAALG Geomechanics successfully trialled the innovative ‘DAARWIN’ – a platform holding project data, visualizing design against the monitoring data, and performing Machine Learning back analysis. The trial proved concept of the 'real-time' back analysis in a real construction environment. The success of the trial led to the Observational Method modification proposal on tunnel portal construction at the HS2 project, to optimise the construction program and achieve time and cost savings.