



## ANNOUNCEMENT

### AGS (HK) Technical Seminar

#### Monitoring S-wave Velocity of the Ground using Continuous Seismic Ambient Noise Measurements

by

**Dr. Koichi Hayashi**  
**OYO Corporation/Geometrics**

**Date:** 27 April 2023

**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://us02web.zoom.us/webinar/register/WN\\_JhzYL3h3T\\_2kiMEujG7KIw](https://us02web.zoom.us/webinar/register/WN_JhzYL3h3T_2kiMEujG7KIw)

Please register by 25 April 2023. 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:** The youth professionals under 35 years old are encouraged to submit their reports (max. 500 words) in quality on this event. Please refer to the AGS HK's website "The AGS Book Prize Reports–Assessment Framework" for details before the submission. The successful candidate will be awarded with the Book Prize that comprises of a book "Geology of Site Investigation Boreholes in Hong Kong" that written by Chris Fletcher, and a coupon of HK\$500 from Eslite Spectrum (誠品生活) or equivalent. The awarded report will further be uploaded to the website of AGSHK. Please send your report to Mr. Haydn Chan by email: [haydn.chan@arup.com](mailto:haydn.chan@arup.com).



### **Synopsis:**

S-wave velocity ( $V_s$ ) of the ground is one of the most important proxies to evaluate geological or geotechnical ground conditions. The  $V_s$  is not permanent and changes depending on soil or rock properties such as the changes of water contents or overburden pressure associated with weather condition or underground constructions. We developed a non-invasive monitoring method of the  $V_s$  profile from the ground surface using seismic microtremors or ambient noises. The ground surface is always weakly vibrating with seismic surface waves that horizontally propagate along the ground surface generated by various natural and cultural sources such as ocean waves and traffic noise. Propagation velocity of the surface waves depends on  $V_s$  profile of the ground, and we can monitor the changes of  $V_s$  profile by measuring and processing the seismic ambient noise at the ground surface. Our monitoring system consists of several cableless seismograph with velocity sensors (geophones). Each seismograph equips a battery, memory, an A/D converter, a GPS clock, and an internet modem, and uploads ambient noises to a cloud server in real-time without any cable. The ambient noises are automatically processed in the server and the calculated S-wave velocity change is displayed on a web site in real-time. The presentation summarizes the method, equipment, and application examples of the monitoring of an embankment and tunnel construction.

### **About the Speaker:**

Dr. Koichi Hayashi is presently a Senior Technical Manager at OYO Corporation and Geometrics, Inc. in San Jose, California. Over the past 30 years, he has worked as a research geophysicist focusing on providing better tools and algorithms for near-surface geophysical methods. He earned a B.S. degree in Earth Sciences from Chiba University in Japan, a M.S. degree in Earth Sciences from the Massachusetts Institute of Technology, and a Ph.D. in Earth Resources Engineering from Kyoto University in Japan. His main research areas are seismic refraction, active and passive surface waves, finite-difference seismic modeling, distributed acoustic sensing, machine learning and travelttime inversion. He is the author of the SeisImager data analysis suite of programs and has incorporated many of his theoretical developments into the software, making SeisImager one of the premier active and passive surface waves, refraction, and downhole data processing packages available today. He regularly presents papers at the major meetings, publishes in journals of SEG, SEGJ, EAGE, EAGE and SSA, and serves on scientific commissions. In 2014, he was selected as the SEG Near-Surface Honorary Lecturer, with his talk entitled "Integrated Geophysical Methods Applied to Geotechnical and Geohazard Engineering: From Qualitative to Quantitative Analysis and Interpretation". Most recently, he was a contributing author to the textbook entitled "Seismic Ambient Noise". He is currently in charge of a lecturer for a SEG training courses "Passive Surface Wave Methods Using Ambient Noise: from Basic 1D Soundings to High-resolution 3D Imaging".