The Geo-Institute Embankments, Dams and Slopes Technical Committee will live-stream the *session* "The Nexus of EDS and AI: Impact and Management" on Wednesday, December 9, at 11 AM EST. The talks include:

Talk #1: Cyclic Loading Effects and AI-Assisted Design of Rigid Inclusion Ground Improvement Systems (presented by Daniel Dias, Ph.D. – Universie Grenoble Alpes)

Rigid inclusion (RI) ground improvement systems have been widely used since the late 1970s to enhance soft soil performance in transportation and civil projects. This presentation is part of the French national research program ASIRI+, which seeks to improve the understanding and design of RI systems. Numerical simulations investigate the effects of load transfer platform thickness, loading eccentricity, and material properties. Data-driven approaches identify influential design parameters and support practical recommendations. The impacts of geosynthetic reinforcement and cyclic loading are also assessed through advanced numerical analyses and experimental back-analyses.

Talk #2: Machine Learning Back-analysis & Innovation Application on Earth Structure Asset Management (Presented by Ying CHEN, Ph.D., F.ICE, C.Eng)

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.

Talk #3: An Update on Advances in Geotechnical Asset Management in the United Kingdom (Presented by Chris POWER, Ph.D., C.Geol, F.GS – Mott MacDonald)

The United Kingdom is underlain by an incredibly broad range of geological materials, experiences quite contrasting climatic conditions in different regions and has geotechnical assets supporting transportation networks that date from the 18th century to the present day. This combination of challenges, coupled with increasing demand on our transportation networks and higher expectations of safe, reliable travel, means that the practice of geotechnical asset management has, of necessity, advanced at a considerable rate in the last 30 years. This presentation will give an update on the most recent advances that have been made by major transportation infrastructure owners in the UK and will look ahead to the developments that are on the horizon. Many of the advances have been driven by increasing availability of new and exciting data sets of ever-increasing accuracy, and more rapid means of analysis, but they are all underpinned by sound engineering geological and geotechnical fundamentals. The presentation will also describe how predictions of climate change are being brought into the work being undertaken, so that resilience of the UK transportation networks is better understood not just for the present day, but into the future.

Talk #4: Artificial Intelligence for Landslide Risk Assessment and Resilience Enhancement of Transportation Networks (Presented by Debasish JANA, Ph.D., P.E – Colorado State University)

Landslides triggered by extreme rainfall and earthquakes pose significant threats to transportation infrastructure, leading to widespread mobility disruptions and economic losses. This presentation highlights recent developments in AI-driven frameworks for landslide risk assessment and resilience-informed retrofit planning under different triggering mechanisms. For rainfall-induced landslides, probabilistic susceptibility models combined with generative rainfall simulations are used to quantify network-level disruptions under thousands of hazard scenarios. For earthquake-induced landslides, a Siamese Graph Convolutional Network surrogate model enables efficient estimation of transportation performance degradation across large networks. Reinforcement learning and optimization techniques are subsequently employed to identify cost-effective retrofit strategies that maximize resilience benefits under budget constraints. Case studies from landslide-prone regions of California demonstrate the potential of AI-based approaches to support proactive, risk-informed infrastructure investment decisions.