The Geo-Institute Sustainability in Geotechnical Engineering Technical Committee will live-stream the session **"Bridging the Gap: Integrating Academia and Industry for Sustainable Advances in Geotechnical Engineering"** on Monday, December 2, at 11 AM EST. The topics include:

"Re-use and Lean foundations - the joint efforts required to make that a common practice"

Gerald Verbeek, M. ASCE.

When the topic of sustainability is raised in combination with foundations, the emphasis is often placed on more economic designs. After all, the leaner the foundation, the less concrete and steel are required, which in turn reduces the carbon footprint (and thus makes it "cleaner'? But when we include the option of re-using existing foundations, in other words, using an existing asset at little or no extra cost (so basically free) for the new superstructure, the options get a lot more interesting for project developers. To be fair, though, additional research is required to address various open questions associated with the re-use of foundations. In this presentation the roles that academia and the industry can play and are playing in answering these open questions will be highlighted, which hopefully will promote activity in this area to make foundation re-se a common practice in the near future.

"Insights into the engineering performance of chemically stabilized soil through analytical and computational geochemistry" **Pavan Akula**.

Evaluating the engineering performance of stabilized soil materials can help in developing resilient is critical to address the needs of our aging infrastructure and has significant benefits in infrastructure management and maintenance. For example, rapid deterioration of subgrades in pavements is considered a major factor for the poor performance. Conventional engineering approaches do not focus on the change in mineralogical and geochemical conditions, which are key criteria for defining the material's performance. In such settings, computational methods that use mineralogical and geochemical characterization data to reliably predict the stability of the components will play a vital role in enhancing the durability of infrastructure materials. In this talk, I will present a novel computational approach that utilizes mineralogical data to simulate geochemical reactions and reliably predict the formation of both favorable and unfavorable reaction products. The approach is discussed in the context of evaluating current infrastructure materials and developing novel materials.

"Integrating Reliability-Based Design and Life Cycle Assessment for Sustainable Geotechnical Structures" **Mina Lee**.

There has been a shift in the paradigm of geotechnical engineering design from the working stress design (WSD) to limit state design (LSD) to better tackle the uncertainties in design and soil parameters. Using reliability-based design (RBD) methods, designers can quantify the risk of designs and make informed decisions to avoid the designs being excessively conservative. Thus, RBD can help reduce environmental impacts indirectly through the optimization of risk and performance of geotechnical structures. To incorporate environmental impact considerations in the design process, a strong understanding of the trade-offs between the engineering reliability and environmental sustainability of geotechnical structures is needed. This paper aims to provide a comprehensive analysis of the relationship between reliability and environmental impact of drilled shaft designs. To achieve sustainable geotechnical designs, the choice of reliability index (i.e., probability of failure) has a direct relationship with environmental impacts. For example, a pile foundation with extremely high reliability requires larger design dimensions than that with lower reliability. The quantities of construction materials (e.g., concrete and steel) will differ for the pile designs; hence, the emissions generated throughout the life cycle of the pile foundations will differ accordingly. In this paper, the first-order reliability method (FORM) and a standardized environmental impact assessment, called life cycle assessment (LCA), are used to investigate the relationship between reliability and global warming impact of drilled shaft designs considering uncertainties in (i) soil properties, (ii) applied load, (iii) design equations, and (iv) pile dimension. Parametric and sensitivity studies are systematically conducted to study the effects of uncertainties, mentioned above, on the global warming impact of drilled shafts. Charts are developed for quick estimation of the global warming impact of drilled shaft designs that have different target probability of failure (safety requirement), applied load, and design dimensions. The charts are useful for designers who do not have access to specialized software packages for conducting FORM and LCA and can be helpful for achieving a balance in the reliability, cost, and environmental sustainability of drilled shaft designs.

"Research and Development of Foam Glass Aggregates in North America" **Archie Filshill.**

This presentation provides an overview of the research and development of foam glass aggregate for the North American market. Ultra-lightweight foam glass aggregate (UL-FGATM) is a manufactured aggregate, produced from post-consumer recycled glass. Although new to North America, its use in Europe dates back over 3 decades. Aero Aggregates of North America is the first vertically integrated producer of foam glass aggregate in North America, and as such, needed to develop test data and proof of concept testing to support the use of foam glass. This development was completed in partnership with Aero Aggregates and several universities and testing labs.