The Geo-Institute Technical Committees will be live streaming the Underground Construction Engineering Technical Committee December 11 at 2 PM EST. The topics include:

“State-of-the-practice in Geotechnical Instrumentation and Monitoring of Urban Underground Constructions,”
Zhangwei Ning, PhD, A.MASCE

In this presentation, the design and implementation of the geotechnical instrumentation and monitoring system on recent urban tunneling and deep excavation projects in Northern America will be introduced. The complementary technical features of the conventional geotechnical transducers and the more advanced remote sensing technologies will be discussed. Emphasis will also be given to the reduction of interruption to the construction activities and traffic when implementing the monitoring system.

“Construction of the Albany Park Stormwater Tunnel in Chicago,” Sotirios Vardakos, PhD, C.Eng, M.ASCE

The Albany Park neighborhood in the City of Chicago has suffered historically from various flood events that resulted in frequent community hardship, residential and business damages. As a result of these events the City decided the construction of a 18 ft diameter, one mile long diversion tunnel that can relieve excess flow during storm events from the North Branch of the Chicago River. This presentation will focus on the shaft construction, the challenges encountered during the TBM tunneling and the methodologies set in place for successful completion of this key project in a dense urban setting with multiple stakeholders.

“Innovative SOE Solutions for Shaft Construction: Getting to Depth with Diaphragm Walls at Westerly Storage Tunnel,” Jewels Stover, M. ASCE

The Westerly Storage Tunnel (WST) Project is part of Project Clean lake, the North East Ohio Regional Sewer District’s program designed to reduce pollution in Lake Erie by 4 billion gallons over the next 25 years. When completed in 2020, WST will be nearly 2 miles of 25-ft diameter tunnel 200-250 ft below ground. The storage tunnel will manage higher flow volumes, keeping stormwater out of the combined sewer system reducing overflow occurrences. This presentation will focus on the construction of three deep shafts that provide access to the tunnel at the TBM launch and retrieval sites, as well as a vent shaft. Support of excavation for the access shafts was constructed utilizing unreinforced concrete diaphragm walls. This innovative, value-engineered alternate design significantly reduced risks associated with traditional secant piles combined with a rib and liner plate system. Implementation of the diaphragm wall technology resulted in a water tight, continuous shaft keyed into rock. This case study examines the design, methodology, and installation challenges unique to each shaft, as well as the benefits of the final product to the overall project.

“Intercepting a Deep Tunnel utilizing Precision Drilling Techniques,” Tom Pennington, PE, M. ASCE

This presentation will discuss innovated shaft construction techniques planned for the East Bay Municipal Utility District’s (EBMUD) Pardee Chemical Feed Shaft Project located at the Pardee Reservoir in Valley Springs, California. The project involves construction of two 255-foot-deep (77 m), 16-inch-diameter (405 mm) stainless steel chemical feed shafts that will penetrate the crown of the existing Pardee Tunnel and provide additional treatment capabilities to the District’s raw water supply system. Shaft construction will use top-down, blind bore drilling methods, and will penetrate the
existing 8-foot-diameter (2.4 m) horseshoe-shaped tunnel while it is in operation. Due to the depth of the tunnel, guided, direction drilling techniques will be used to ensure the tight tolerances required for the shafts are maintained during installation. Additional remote monitoring using remotely operated vehicles (ROVs) and optical cameras will be used to eliminate the need for manned tunnel entry and minimize service impacts to the District. This presentation will discuss the design and construction approach utilized for the shafts, as well as other unique approaches that are intended to reduce the risks and logistical challenges of taking the tunnel out of service.