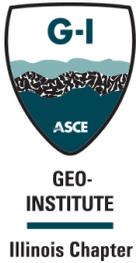


2026 Chicago Geotechnical Lecture Series



University of Illinois at Chicago • Student Center East, Illinois Room
750 S. Halsted Street, Chicago, IL 60607 • Public parking is available onsite.

Friday, May 1, 2024

Organized by:
Geo-Institute Chapter of the ASCE Illinois Section



PROGRAM

8:00 AM Exhibitor set-up
8:15 – 9:00 AM Breakfast / Registration / Exhibitors

Morning Session

09:00 AM - 09:15 AM Welcome
09:15 AM - 10:15 AM “3D SLOPE STABILITY ANALYSES IN PRACTICE,” *Timothy D. Stark, PhD, PE, BC.GE, University of Illinois – Urbana-Champaign*
10:15 AM – 10:45 AM Break / Exhibitors
10:45 AM - 11:45 PM “Monitoring of Dams and Levees using InSAR – Lessons Learned”, *Georgette Hlepas, PhD, PE, USACE*
11:45 PM - 12:45 PM Lunch

Afternoon Session

12:45 - 1:45 PM “Milestones and Challenges in the Construction of a 42-Acre Containment Facility in Milwaukee Harbor,” *Justin Johnson, Michels Construction, Inc, and Kevin R. Johnson, PhD, PE, Mi-Tech Services, Inc*
1:45 - 2:00 PM Break / Exhibitors
2:00 - 3:00 PM “Tunneling Through Complexity: Subsurface Challenges for O’Hare’s Stormwater Conveyance System”, *Mark Stephani, PE, HNTB*
3:00 - 3:15 PM Break / Exhibitors
3:15 - 4:15 PM “Design and Construction of the World’s Largest DMM Retaining Structure”, *William Tanner, PE, Geosyntec Consultants and Matthew Chartier, PE, Geosyntec Consultants*
4:15 PM Happy Hour (Location TBD)

REGISTRATION AND EXHIBITORS

Registration: The full registration fee covers lecture attendance, continental breakfast, and lunch*. Firms are invited to exhibit your products, services, or emerging technologies to the engineering community. Exhibitor space consists of a table and electric and includes one general registration to the conference. You may register online using a credit card or check. Registration fees and payment links are as follows:

Registration Type	Registration/ Payment Link	Early Bird (by April 1, 2026)	April 1 to April 28, 2026
General	Link	\$350	\$450
Educator/Government		\$250	\$350
Student (with valid ID)		\$50	\$50
Exhibitor (includes 1 General)		\$850	\$1,000
Company Sponsorship: Link			

For questions regarding registration or meal requests, contact Mark Abtahi (abtahim@bv.com).

*Vegetarian and other meal options are available upon request. Please contact GI with your request.



CHICAGO GEOTECHNICAL LECTURE SERIES HISTORY

The Chicago Geotechnical Lecture Series (formerly called the Soil Mechanics Lecture Series) was established in 1962 to educate the local engineering community and keep them informed of recent developments in geotechnical and geoenvironmental engineering. Many nationally recognized experts in several areas of geotechnical engineering practice have presented papers in this Lecture Series.

- 1963 Foundation Construction in the Chicago Area (Inaugural Lecture)
- 1964 Design of Structures to Resist Earth Pressure
- 1968 Foundation Engineering
- 1970 Observational Methods in Soil and Rock Engineering
- 1973 Innovations in Foundation Construction
- 1974 Computer Applications in Foundation Engineering and Construction
- 1976 Problems in Soil Mechanics and Foundation Engineering
- 1978 Problems in Construction and Geotechnical Engineering
- 1982 Groundwater Flow and Contamination Control
- 1986 Practice and Innovations in Geotechnical Engineering
- 1988 Soil-Structure Interaction
- 1990 Geosynthetics in Geotechnics: State of the Practice in Geomembranes and Geotextiles
- 1992 Geotechnical Aspects in Transportation
- 1994 Current Topics in Geotechnical and Geoenvironmental Engineering
- 1996 Current Topics in Tunneling
- 1998 Innovations in Earth Retaining Systems
- 2000 Geotechnical Failures and Lessons Learned
- 2003 Geotechnical Performance Monitoring
- 2006 Geotechnical Aspects of Earth Retention and Shoreline Protection
- 2008 Current Topics in Foundation Engineering
- 2010 Case Studies in Geotechnical Engineering
- 2012 Earth Structure – Ground Improvement
- 2014 Geotechnical Earthquake Engineering
- 2017 Innovative Geotechnologies
- 2019 Case Studies and Lessons in Geotechnical Engineering
- 2022 Lectures in Geotechnical Engineering
- 2024 Lessons in Underground Construction



3D SLOPE STABILITY ANALYSES IN PRACTICE

Timothy D. Stark, PhD, PE, BC.GE /University of Illinois – Urbana-Champaign

Abstract: Professor Stark will present an update on the use of three-dimensional (3D) slope stability analyses in geotechnical practice and some of the issues with using 3D analyses. Field case histories will be presented to illustrate the use of a 3D analysis in inverse stability analyses for static and seismic slope failures, modeling complex slope geometries, and accommodating geosynthetic reinforcement anisotropy in factor of safety (FoS) calculations. The research shows that 3D analyses are more important for translational than circular failure masses and recommendations for adjusting 2D values of FoS to incorporate 3D side resistance will be presented.



About the Speaker: Timothy D. Stark is a Professor of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign (UIUC) with expertise in static and seismic slope stability. Professor Stark has received a number of awards for his research, teaching, and service including: 2025 Ralph B. Peck Professor of Civil Engineering (UIUC), 2024 Distinguished Member, American Society of Civil Engineers (ASCE), 2023 J.E. Jennings Award, South African Institution of Civil Engineering; 2023 Martin S. Kapp Memorial Lecturer, ASCE Metropolitan Section; 2022-2023 Cross-USA Lecturer, ASCE; 2022 T.H. Wu Lecture at The Ohio State University; 2019 George H. Norman Medal, ASCE; Best Paper in Geosynthetics International Journal, 2016; 2015 James M. Hoover Lecture at Iowa State University; Thomas A. Middlebrooks Award, ASCE, 2013 and 1998; Associate Editor Award, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 2012; Journal of Legal Affairs and Dispute Resolution in Engineering Scholarly, Paper, ASCE, 2011; R.S. Ladd D18 Standards Development Award, Standard Designation, ASTM, 2014, 2011, 2002; R.M. Quigley Award from the Canadian Geotechnical Society, 2003, and Walter L. Huber Research Prize from ASCE, 1999.





Monitoring of Dams and Levees using InSAR – Lessons Learned

Georgette Hlepas, PhD, PE, USACE

Abstract: Instrumentation and monitoring programs are essential for assessing dam performance, informing risk evaluations, and providing early warning. Monitoring needs to be scaled to risk levels, and a risk-informed approach can help prioritize resources. Traditional monitoring tools include surveying, piezometers, and inclinometers. Recently, Satellite-based Synthetic Aperture Radar (SAR), especially C-Band SAR, has gained attention for its potential to detect sub-centimeter deformations. While SAR data is cost-effective and widely available, there is limited guidance on its application for dam safety, risking poor decision-making and costly errors. This discussion explores SAR's use in dam monitoring through case studies, highlighting its advantages, limitations, and effectiveness depending on dam characteristics and surface materials. The findings show that SAR can be a valuable tool in some cases but is not suitable for all dams.

About the Speaker: Dr. Georgette Hlepas leads the US Army Corps of Engineers (USACE) Geotechnical, Geology, and Materials Community of Practice. She has ~20 years of experience working as a geotechnical engineering on a variety of large projects including dams, levees, and confined disposal facilities. Dr. Hlepas has focused much of her career on advancing the state of the practice for subsurface investigations and instrumentation and performance monitoring. She has taught multiple international courses and workshops, and has authored numerous papers on dam safety, monitoring, project risk, and subsurface investigations. She has master's degrees in both civil engineering and geological engineering, a doctorate degree in civil and materials engineering and is a licensed Professional Engineer in the state of Illinois.





Milestones and Challenges in the Construction of a 42-Acre Containment Facility in Milwaukee Harbor

Justin Johnson, Michels Construction, Inc.

Kevin R. Johnson, Ph.D., P.E., Mi-Tech Services, Inc.

Abstract: The Dredged Material Management Facility (DMMF) is a landmark 42-acre infrastructure project at Port Milwaukee, serving as the central component in the federal initiative to delist the Milwaukee Estuary from the EPA's Area of Concern list. This presentation details the geotechnical and geo-structural milestones involved in constructing this \$115.4 million facility, designed to provide secure storage for 1.9 million cubic yards of impacted sediment.

The facility's structural integrity relies on a complex, mile-long perimeter consisting of a steel combination wall and a cutter soil-mixed (CSM) cutoff wall. The combination wall incorporates 950 king piles (54-inch diameter) driven up to 85 feet into the lakebed, 2.5-inch tie-rods, and 920 pairs of sheet piles. Within the double-wall configurations, approximately 280,000 tons of structural sand fill was placed and densified via underwater vibro-compaction to establish a stable working platform and confining medium for the CSM wall.

A primary focus is the technically demanding CSM cutoff wall, which creates a continuous, low-permeability barrier to the surrounding Lake Michigan waters. To satisfy stringent performance criteria – including a hydraulic conductivity of $\leq 5 \times 10^{-7}$ cm/s, an unconfined compressive strength of ≥ 500 psi, and deflection limit on the combi-wall of ≤ 0.5 -inch – the team had to navigate a highly variable subsurface profile of soft lacustrine deposits and dense glacial tills. This required an extensive nine-month laboratory testing program and a month-long field trial program to optimize mix designs and penetration techniques. Furthermore, the presentation discusses overcoming the logistical hurdles of year-round marine construction, navigating variable weather patterns, and utilizing high-accuracy GNSS-based positioning for real-time layout in open-water conditions. Ultimately, the DMMF project represents a significant engineering and construction achievement that facilitates regional habitat restoration and long-term environmental health for the Milwaukee community.

About the Speaker: Kevin R. Johnson, Ph.D., P.E. is a Principal Geotechnical Engineer at Mi-Tech Services, Inc. (a Michels company) in Chicago, Illinois. He brings 12 years of specialized experience in the design, construction, and testing of deep foundations and ground improvement systems, with a technical focus on rigid inclusions, ACIP/DD piles, and drilled shafts. An active contributor to the geotechnical community, Dr. Johnson serves on the DFI Ground Improvement and ACIP/DD committees and is the co-chair for the Ground Improvement Chapter of ASCE 90 Design of Foundations for Buildings and Other Structures. His expertise in integrity testing and finite element analysis is reflected in his recent publications for the ACI Materials Journal, ASTM Geotechnical Testing Journal, and ASCE Geo-Congress. Dr. Johnson earned his B.S., M.S., and Ph.D. in Civil Engineering from the University of South Florida, where his doctoral research focused on advancing Thermal Integrity Profiling (TIP) for drilled shafts and ACIP piles.



About the Speaker: Justin Johnson is a Project Manager for the Deep Foundations Division of Michels Construction, Inc. in Milwaukee, WI. He has over eight years of experience installing a wide range of deep foundation and earth retention systems throughout Wisconsin. Most recently, on the Dredged Material Management Facility (DMMF) project, he played a key role in the oversight of sequencing, field testing, and installation of major scopes of work, most notably the steel combination wall and the soil-mixed cutoff wall. As Project Manager, Mr. Johnson is involved in critical infrastructure and building projects that require coordinated stakeholder engagement, rigorous schedule and risk management, and careful alignment between design, engineering, and construction teams. He earned a Bachelor of Science degree in Civil Engineering from Marquette University in Milwaukee, WI.





Tunneling Through Complexity: Subsurface Challenges for O'Hare's Stormwater Conveyance System

Mark Stephani, PE, HNTB

Abstract: As one of the busiest transportation hubs in the world, O'Hare International Airport faces growing demands on its airside and landside infrastructure—including the need for resilient stormwater systems capable of supporting ongoing expansion. This presentation highlights the planning, design, and construction of three major storm sewer tunnels that form the backbone of O'Hare's next-generation stormwater conveyance network. The presentation will summarize the project's anticipated subsurface conditions and risks and discuss how these influenced mitigation strategies implemented to maintain safety, minimize surface disruption, and ensure successful tunnel construction.

About the Speaker: Mark is an Associate Vice President and Associate Fellow for HNTB. He has more than 25 years of experience of tunnel, underground, and geotechnical design and construction and currently serves as HNTB's Central Region Tunnel Practice Lead responsible for performance and delivery of all tunnel projects throughout the region.



Design and Construction of the World's Largest DMM Retaining Structure

William Tanner, PE and Matthew Chartier, PE, Geosyntec Consultants

Abstract: The Deep Mixing Method (DMM) is a versatile ground improvement technology that is used for a variety of geotechnical and environmental applications. Typical applications include foundations, embankment and slope stabilization, groundwater cut-off walls, and liquefaction mitigation. DMM is also being increasingly used for the construction of earth retention structures.

For this project, DMM was used to construct retention structures for the support of an industrial landfill during dewatering, excavation and removal of coal combustion residual material (CCR) at a site in the southeastern United States. Two distinct wall sections were constructed: the West Wall, approximately 2,680 ft in spline-curved length and with a maximum retained height of approximately 78 ft, and the East Wall, approximately 475 ft in straight length with a maximum retained height of approximately 41 ft. The West Wall, up to approximately 126 ft in width and consisting of over 600,000 cubic yards of mixed material, is currently both the world's largest DMM retaining wall and one of the few DMM walls constructed primarily in CCR material. A site-specific soil and CCR sampling and bench scale testing program was performed to optimize DMM mix design prior to construction. The DMM system was analyzed and designed primarily using Plaxis 2D finite element software. 2D Plaxis staged construction numerical analyses allowed evaluation of installation effects on in situ soil stresses, wall and retained ground movements, groundwater flow conditions and seepage gradients, and factors of safety for both global and internal structural stability for a range of cellular configurations. Given the 3D nature of the non-linear wall alignment and DMM cellular structure, Plaxis 3D analyses were performed to validate the 2D analyses, with an emphasis on internal DMM column stresses and structural stability. Limit equilibrium software was also used to validate the global stability factors of safety calculated with Plaxis. A site-wide groundwater model was also used to determine transient and final groundwater conditions and effects from wall construction on existing groundwater flow for design.

Prior to construction, a geotechnical instrumentation monitoring system was installed to evaluate wall DMM wall system behavior in relation to anticipated performance and to provide advance warning if remedial measures were required during dewatering and excavation activities. Instrumentation monitoring thresholds were determined based on the numerical analysis results and compared to measured values. An advanced data management and visualization software system was integrated into the monitoring program and used to evaluate the data on a continuous basis.

This presentation discusses the analysis, design, and construction of the world's largest DMM earth retention structure. Discussion topics include pre-construction sampling and bench scale testing, soil mix design, the establishment of QA/QC performance and testing requirements, the methods used for geostructural analysis and design of the DMM structure, comparisons between calculated behavior using 2D and 3D analysis methods, the monitoring and data visualization systems used to evaluate performance during construction, and construction phase challenges that arose and how these challenges were overcome to successfully construct this first-of-its-kind structure.

About the Speaker: William Tanner has over 20 years of experience in geotechnical and geostructural engineering, design, and construction. He has served in roles ranging from engineer of record to director on major heavy civil, marine, industrial, transportation, and commercial infrastructure projects. His expertise includes construction technologies for deep and shallow foundations, earth retention, dewatering, and ground improvement, as well as their interactions within the built environment. With experience as both a consultant and specialty contractor, he brings a comprehensive understanding of project conception, execution, and maintenance. civil, marine, industrial, transportation, and commercial infrastructure projects. His expertise includes construction technologies for deep and shallow foundations, earth retention, dewatering, and ground improvement, as well as their interactions within the built environment. With experience as both a consultant and specialty contractor, he brings a comprehensive understanding of project conception, execution, and maintenance.





About the Speaker: Mr. Chartier has 25 years of experience in geotechnical and geostructural design, analysis and construction of large-scale civil engineering projects, and project management. He has worked extensively on a wide range of above- and below-grade structures including buildings, bridges, flood protection systems, waterfront structures, deep basements, stormwater infrastructure, ground improvement, earth embankments and earth retaining structures. Mr. Chartier specializes in complex designs involving soil-structure interaction, with an emphasis on staged construction geostructural numerical modeling, and has provided geotechnical and structural design and construction phase support for both public and private clients, including heavy civil contractors, developers, and several state Departments of Transportation. He also has expertise in construction phase coordination and oversight, subsurface site investigations, specialized geotechnical laboratory testing and the engineering behavior of soft, compressible soils.

