DELAWARE VALLEY GEO-INSTITUTE

DVGI May 2024 Volume 24 Issue 5

GEO-INSTITUTE
Delaware Valley Chapter

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May 2024 DVGI Dinner Meeting

SPEAKER: Jeffrey C. Evans, Ph.D., P.E., F.ASCE, Professor Emeritus at Bucknell University

TOPIC: Gardner Lecture: Slurry Walls and In Situ Mixing for Construction of Vertical Barriers

DATE: Tuesday May 14, 2024 – 5:30 PM to 8:30 PM EST

WHERE: Valley Forge Casino– Parkview Ballroom,1160 1st Ave,King of Prussia, PA 19406

COST: $60 Standard, $30 Government/Retired, $10 Students

MEETING ABSTRACT:

Slurry trench cutoff walls for the construction of low-permeability vertical barriers have been in use for over 50 years in the US. Our understanding of both soil-bentonite (SB) and cement-bentonite (CB) slurry walls has advanced significantly since they first came into common usage as groundwater barriers for dewatering and barriers for control of contaminant migration. Developments such as the addition of Portland Cement to SB mixtures and granulated ground blast furnace slag to CB mixtures are now common. At the same time, developments in methods to construct in situ mixed vertical barriers have led to a wide variety of options in terms of construction techniques. These include chain mixers such as Keller's Trench Remixing and Deep wall (TRD) and Dewind's One Pass Trenching (OPT) methods, cutter soil mixers (CSM), and mixing with vertical augers. Each of these newer techniques offers both advantages and disadvantages as a means to construct a low permeability cutoff wall. This talk will present current developments in our understanding and implementation of the various means and methods of constructing a subsurface vertical barrier of low permeability.

ABOUT THE SPEAKER:

Dr. Evans is Professor Emeritus of Civil and Environmental Engineering at Bucknell University, Lewisburg, PA. He earned BSCE, MSCE and Ph.D. degrees in Civil Engineering from Clarkson University, Purdue University, and Lehigh University, respectively. Before joining Bucknell, he spent over 10 years as a consultant with Woodward-Clyde Consultants (now AECOM) where he was named "Young Professional of the Year" in 1984. His experience also includes the U.S. Army Corps of Engineers Reserves where he served as a 2nd Lieutenant, 1st Lieutenant, where he attained the rank of Captain. He has also authored or co-authored over 100 publications in the areas of geotechnical, ground improvement and geoenvironmental engineering. He has also co-authored three books (Hazardous Waste Management, Fundamentals of Ground Improvement and Slurry Trenching: History, Uses, Fundamentals and Construction) along with Chapters in eight other books. He is currently a Principal Geotechnical Engineer at Parsons.

Please register with QR code by May 7th :

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2024 JOINT ASCE/DVGI - Multi-Technical Meeting

Speaker : Brandon T. Buschmeier, P.E., PMP, Menard USA

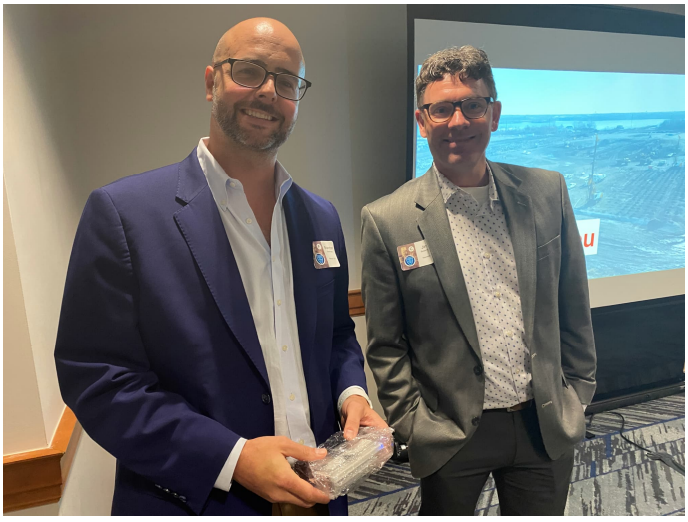
Topic: Rigid Inclusion Support for the Potomac Yard Metro Station

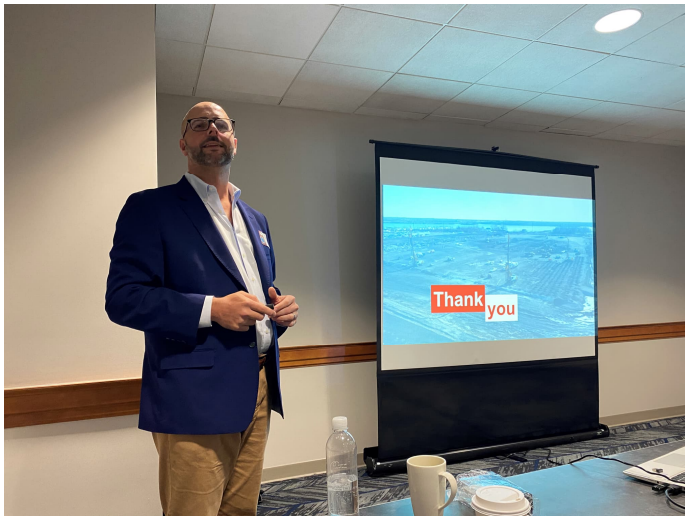
MEETING ABSTRACT:

The Potomac Yard Metro Station, inaugurated in May 2023, serves as a crucial link between Alexandria, Virginia, and Washington, DC. This station, along with the new rail lines and associated pedestrian walkways and bridges, is supported by Controlled Modulus Columns (CMC's). Employing different diameters, spacings, and depths, the CMC's are designed to increase the bearing capacity and reduce the long-term settlement of the station and associated structures while providing a more cost-effective solution compared to a traditional deep foundation pile scheme. Building upon the knowledge and perspectives acquired from the Potomac Yard Station, this presentation explores the design principles of CMC's across various soil compositions and under differing load conditions. It also examines the strengths and limitations inherent in utilizing CMC's for construction projects in the DMV area and beyond.

ABOUT THE SPEAKER:

Brandon T. Buschmeier serves as the Vice President at Menard USA, operating from the Media, Pennsylvania office. Leading projects across the east coast, he brings a wealth of expertise to his role. Brandon earned his Bachelor of Science in Civil Engineering from Carnegie Mellon University in 2008 and embarked on his journey with Menard USA as a field engineer. With 15 years dedicated to the design-build geotechnical contracting industry, Brandon's professional trajectory is a testament to his unwavering commitment and expertise in the field. Previously serving as the Director of Engineering for Menard USA, he utilizes his technical skills and innovative thinking to approach geotechnical challenges and consistently delivers effective solutions to his clients.





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DVGI Project of the Year 2023-24 Contestant : Pennoni

Project Name:

SPARK – Gene Therapy Innovation Center

Client/Owner(s):

SPARK Therapeutics

Contractor(s):

Jacobs (GC)

Engineer(s):

Structural/Architect – Jacobs

Civil/Geotech – Pennoni

Submitting Company:

Pennoni

Submitting Person(s):

Elisha Brinker, EIT; Elisabetta Iannetti, EIT; Daniel Marano, PE

Project Description:

Pennoni Associates is thrilled to spearhead the engineering of Spark's new $575M Innovation Center, strategically located in University City, east of Drexel University. Nestled between Ludlow and Chestnut Streets with Lower 30th Street to the east, this state-of-the-art facility is just 500 feet from the Schuylkill River, positioning it at the heart of Philadelphia's hub of innovation.

Our expert Geotechnical, Civil, Survey, and Environmental Teams are collaboratively laying the groundwork for what will become a global flagship for Roche Pharmaceuticals. This project extends over 90,000 square feet, featuring a six-story structure dedicated to advanced manufacturing and research laboratories, alongside a level of below-grade parking. Initiated in February 2023, the center is designed not only to enhance Roche's capacity for gene therapy production but also to broaden their impact across various disease categories.

Projected to complete in 2026, this facility is set to become a crucible for scientific advancement and a beacon of new treatments and therapies. Through meticulous planning and innovative construction techniques, Pennoni is committed to delivering a project that meets the highest standards of sustainability and technological integration, ensuring that the Spark Innovation Center becomes a landmark in both design and functionality.

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Geotechnical Challenge:

During the construction of Spark's Innovation Center, our team faced significant geotechnical challenges due to its proximity to the Schuylkill River and varied subsurface conditions. Positioned directly adjacent to the 100-year flood elevation, the project required enhanced flood protection measures for its below-grade structures, surpassing typical groundwater management practices.

The site presented a complex geology characterized by sporadic alluvial deposits on the eastern side and shallow decomposed rock to the west. This variability necessitated a comprehensive geotechnical investigation, including test borings, test pits, and a pump test to accurately understand the subsurface conditions. The findings revealed a significant dip in rock elevation from east to west, ranging from Elev 5 down to Elev -20, complicating the foundation design.

To address these issues and ensure structural resiliency, drilled piers were chosen for foundation support due to their effectiveness in managing axial compression and tension loads amidst varying soil conditions, including layers of soft soil and Trenton gravel. Additionally, a 3D seepage analysis was conducted using pump test data to assess hydraulic uplift pressures during storm events, leading to a cost-effective design modification with varied floor slab thicknesses across the site.

Moreover, the project's southern boundary along Chestnut Street involved constructing a retaining wall, where test pits indicated the necessity of underpinning to support the wall during excavation. Different underpinning techniques were employed based on the underlying support—spread footings on the west and piles on the east.

Finally, considering the challenging subsurface conditions and potential uplift forces, an underground stormwater basin was installed with rock anchors to provide uplift support without stressing the basement slab. These geotechnical solutions not only mitigated the risks associated with the site's complex environment but also ensured the long-term stability and functionality of the Innovation Center.

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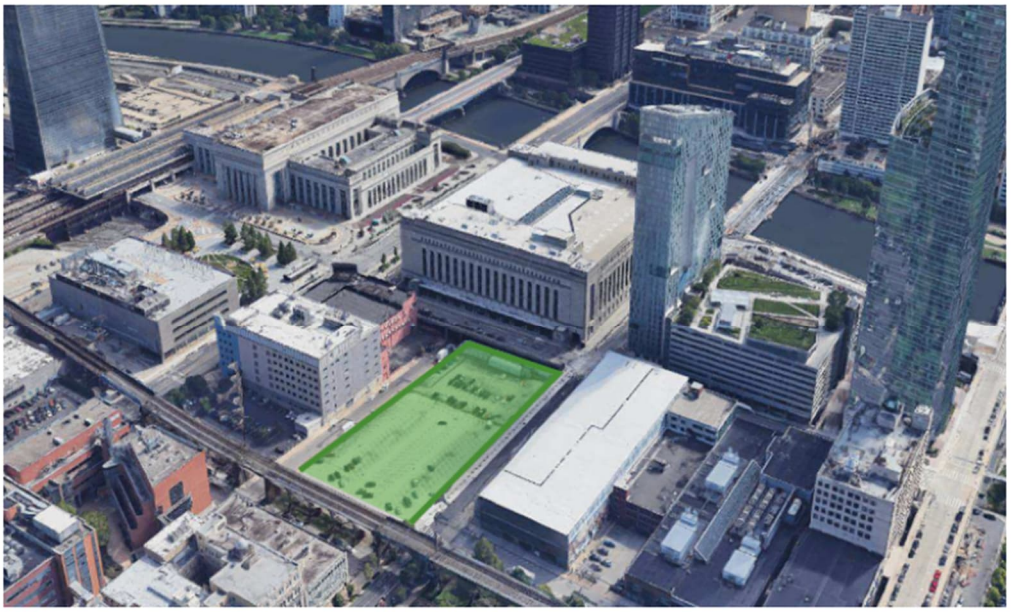

Figure 1: Site Location, 30th & Chestnut Streets, Philadelphia, PA

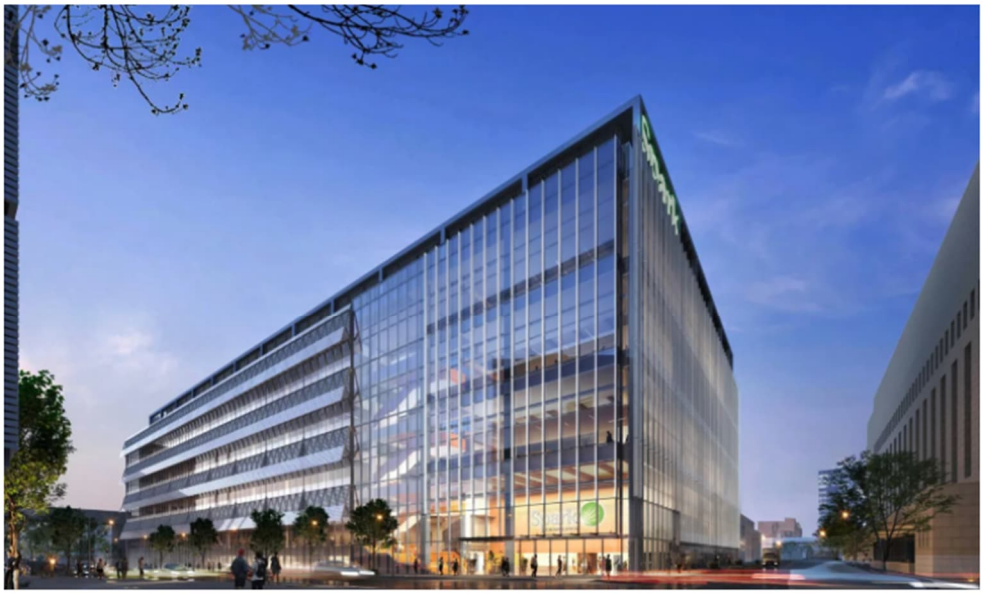

Figure 2: Rendering of the Structure

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Figure 3: Northeast Arial View

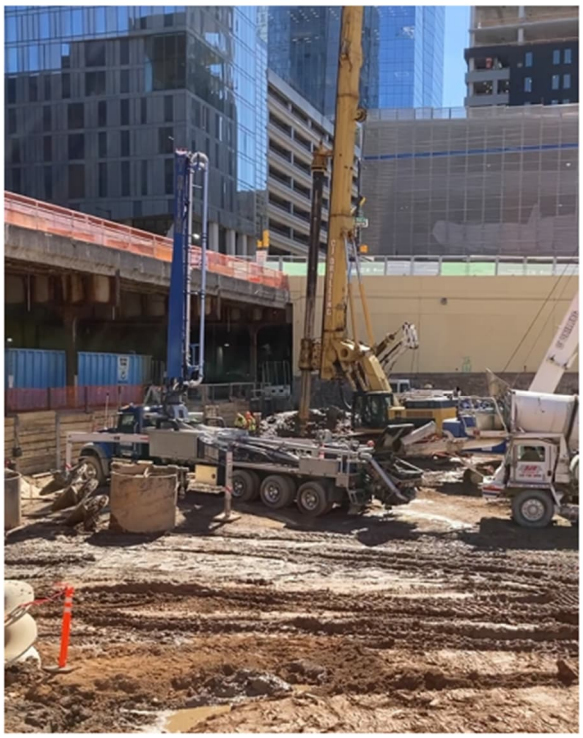

Figure 4: Construction of Drilled Piers

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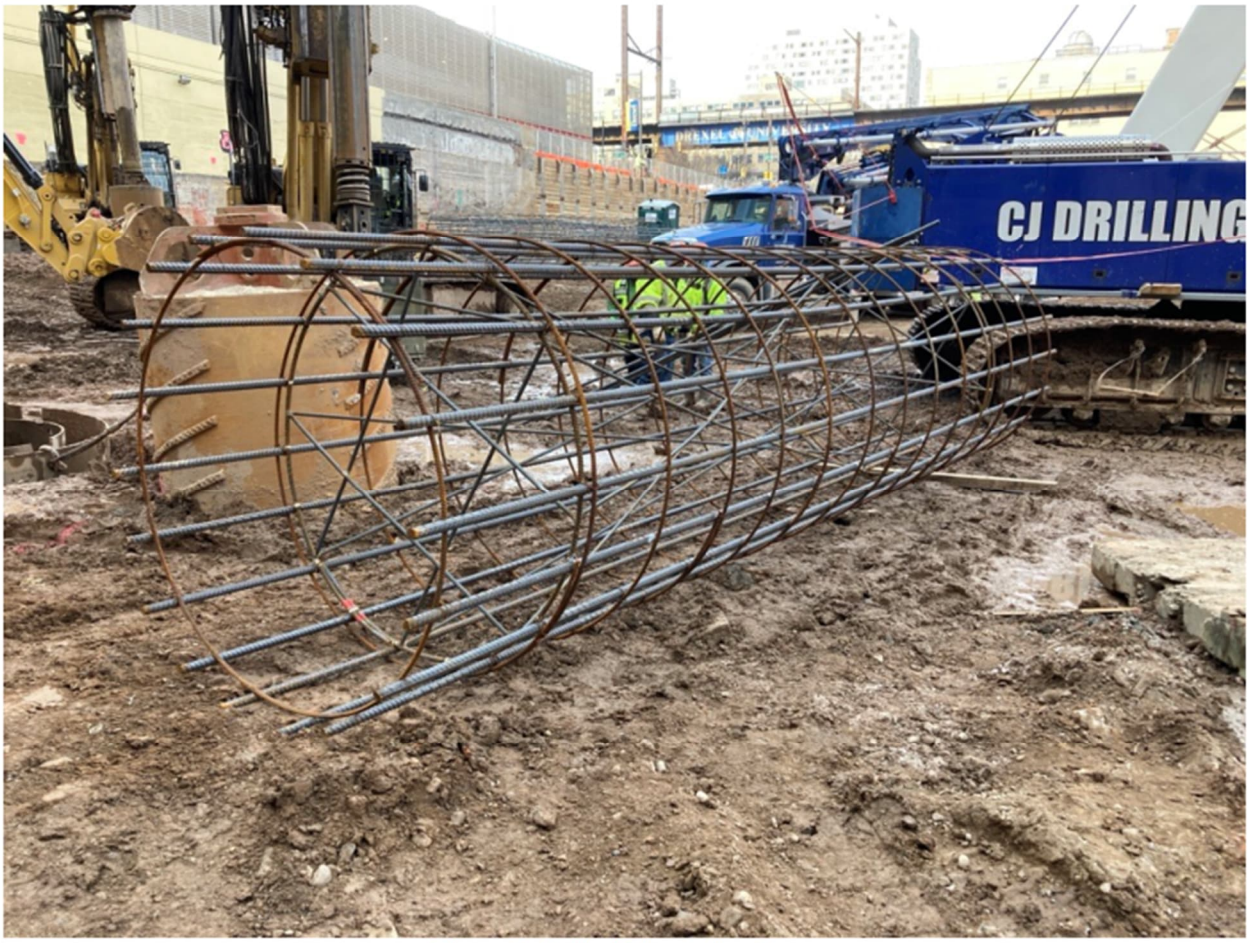

Figure 5: Drilled Pier Rebar Cage

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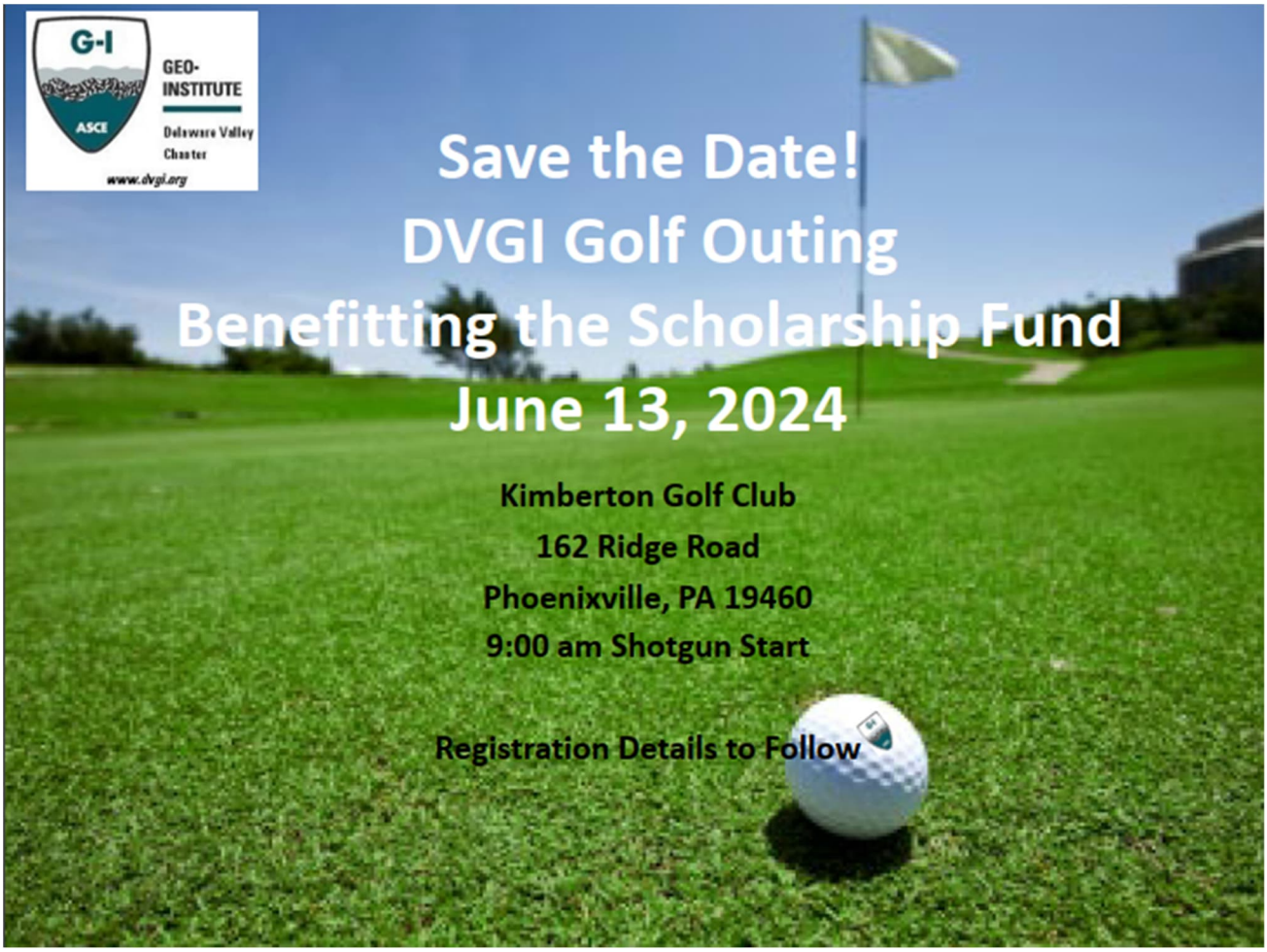
Save the Date!
June 13, 2024
DVGI Annual Golf Outing



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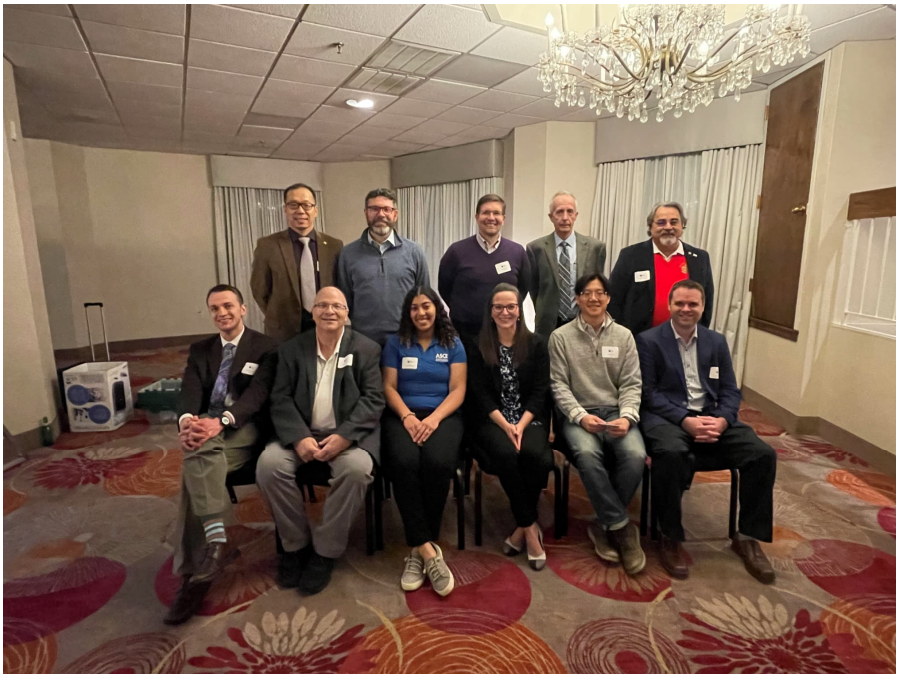
2023-2024 Board of Directors



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Geosynthetic Institute

GSI RECORDED WEBINARS

- Topics, and Registration at www.geosynthetic-institute.org/webinar.htm

- Each Webinar Carries 1.5 Professional Development Hours Upon Completion of a 10-Question Multiple Choice Test

- Each presentation lasts approximately 90 minutes

ALL WEBINARS WILL BE RECORDED AND CAN BE PURCHSED FOR VIEWING AT YOUR CONVENIECE

GSI/GMA Members $200.00 USD per each Webinar

ASCE/G-I Members:
Read past and present issues of Geo-Strata magazine online at www.asce.org

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The Virginia Geo-Institute Chapter of ASCE is hosting a short course for students, professors, practicing engineers, and industry professionals to gain specialized classroom instruction from world renown experts on the design and construction of Ground Improvement, Support of Excavation, MSE Walls, and Slope Stabilization. The venue is the Smithfield Center in beautiful Smithfield, VA on June 24-28, 2024. This event is FREE for FULL TIME faculty and students! (Confirmation of FULL TIME status is needed for gratis registration.) otherwise it is $400/day. Room and board not included.

Sunday June 23 – Travel Day

2:00PM - 8:00PM Arrival Afternoon / Evening Welcome Social Gathering

Monday June 24 - GROUND IMPROVEMENT (DAY 1)

Tuesday June 25 - GROUND IMPROVEMENT (DAY 2)

Wednesday June 26 - SUPPORT OF EXCAVATION

Thursday June 27 - MSE WALLS

Friday June 28 - SLOPE STABILIZATION

See link below for more details and for registration:

https://www.eventbrite.com/e/2024-ground-improvement-short-course-tickets-780192144707

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Upcoming Dates for 2023-24 Dinner Meetings and events are as follows:

05/14/2024 – Tuesday– Gardiner Lecture : Jeffrey Evans Ph.D., P.E., F.ASCE, Professor Emeritus at Bucknell University

06/13/2024 – Thursday– Annual Golf Outing 9:00 AM Shotgun Start

One PDH will be awarded for most meetings that you attend.

If you are interested in presenting at one of our monthly meetings or have ideas about potential speakers, please get in touch with a DVGI board member.

On Director's Cut

Geo-Institute Director Brad Keelor interviews G-I members about anything and everything. You might hear about their favorite geotechnical project, their favorite music, or their favorite pie. In Episode 43 of Season 4, Brad speaks with Eric and Kolleen Backlund!

See the video here: Director's Cut S04 E43 - Eric and Kolleen Backlund - YouTube

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HAVE DVGI PUBLISH YOUR ARTICLE, ADVERTISEMENT, OR JOB POSTING

- Do you have an interesting article on a project or individual in your organization that you would like to have published in the DVGI newsletter?
- Would you like to get the word out about a job opening, new venture, etc. to our membership via the newsletter?

Please submit your articles or news items for consideration in the next edition of the newsletter or get in touch about our reasonably priced advertising by contacting Neil Scafonas (neil.scafonas@aecom.com).

Member Spotlight

See link below for an interview of one of our newest DVGI Board Members, Michael Bennett, P.E. (NJ, PA), in the most recent issue of GeoStrata Magazine. Congratulations Michael!

https://www.readgeo.com/geostrata/april_may_2024/MobilePagedArticle.action?articleId=1967377#articleId1967377.

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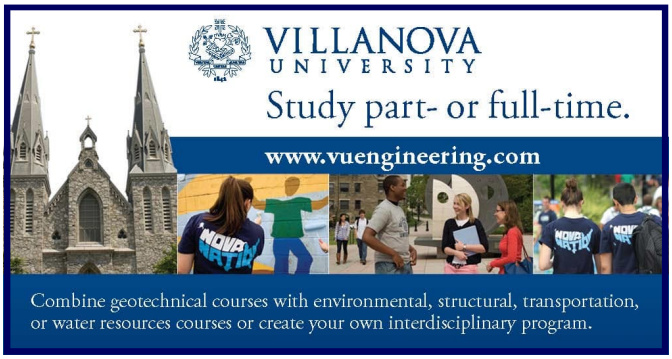

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