

# FINAL PROGRAM



# GEO-CONGRESS 2019

8th International Conference on Case Histories in Geotechnical Engineering  
Philadelphia, Pennsylvania | March 24-27

**Case Histories – Capturing the Accomplishments of Our Profession**



Pennsylvania Convention Center/Loews Philadelphia Hotel

[www.geocongress.org](http://www.geocongress.org)

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# Welcome to **Geo-Congress 2019**

## Schedule at a Glance *(Subject to change)*

All functions take place in the Pennsylvania Convention Center, unless otherwise noted.

### Sunday, March 24, 2019

- 7:00 a.m. – 1:30 p.m. Short Course Registration Only – *Loews Philadelphia Hotel, 2nd floor*
- 8:00 a.m. – 12:00 p.m. Short Course 1: Geotechnical Earthquake Engineering, with Emphasis on the Central and Eastern U.S. – *Loews Philadelphia Hotel, Commonwealth A1*
- 8:00 a.m. – 12:00 p.m. Short Course 5: Soil Shear Strength – *Loews Philadelphia Hotel, Commonwealth C*
- 8:00 a.m. – 12:00 p.m. Short Course 7: Foundation Cost Estimating for Geotechnical Engineers – *Loews Philadelphia Hotel, Commonwealth D*
- 8:00 a.m. – 4:30 p.m. Short Course 11: 2D/3D Slope Stability and Seepage – *Loews Philadelphia Hotel, Washington C*
- 12:00 – 7:00 p.m. Conferencer Registration Open – *Broad Street Entrance*
- 1:00 – 5:00 p.m. Short Course 4: Introduction to Tunneling – *Loews Philadelphia Hotel, Commonwealth C*
- 1:00 – 5:00 p.m. Short Course 6: Geotechnical Site Characterization – *Loews Philadelphia Hotel, Commonwealth A1*
- 1:00 – 5:00 p.m. Short Course 8: Practical, Qualitative Risk Evaluation for Geotechnical Projects – *Loews Philadelphia Hotel, Commonwealth D*
- 1:00 – 5:00 p.m. Short Course 10: Ethics in Geotechnical Engineering – *Loews Philadelphia Hotel, Commonwealth B*
- 1:00 – 5:00 p.m. **Exhibitor Setup** – *Exhibit Hall E*
- 2:00 – 2:30 p.m. GI Student Orientation – *Room 122B*
- 2:30 – 3:30 p.m. GI Student Professional Development Workshop – *Room 122A*
- 3:30 – 4:30 p.m. GI Geo-Wall Captains Meeting – *Room 123*
- 4:30 – 5:00 p.m. AGP Induction Ceremony – *Terrace Ballroom IV*
- 5:00 – 6:30 p.m. Opening Remarks and H. Bolton Seed Award Lecture – *Terrace Ballroom IV*
- 6:30 – 8:00 p.m. **Welcome Reception** – *Exhibit Hall E*

### Monday, March 25, 2019

- 7:00 a.m. – 6:30 p.m. Registration Open – *Broad Street Entrance (12:15 – 1:15 p.m. Registration Closed for lunch)*
- 8:00 – 8:30 a.m. Welcoming Remarks from the Honorable Edward G. Rendell – *Terrace Ballroom IV*
- 8:30 – 10:00 a.m. Geo-PIT: Powerful, Informative Talks on Geotechnical Topics – *Terrace Ballroom IV*
- 10:00 – 10:30 a.m. **Morning Networking Break** – *Exhibit Hall E*
- 10:30 a.m. – 12:00 p.m. Special Session: History of Case Histories in Geotechnical Engineering; Legacy of Dr. Shamsheer Prakash – *Room 120B*
- 10:30 a.m. – 12:00 p.m. Panel Session: Deep Foundations in Urban Environments – *Room 126A*
- 10:30 a.m. – 12:00 p.m. Technical Sessions – *See pages 12-13*
- 10:00 a.m. – 3:00 p.m. **Student Competitions** – *Exhibit Hall E*
- 12:00 – 1:30 p.m. **Lunch** – *Exhibit Hall E*
- 1:00 – 2:30 p.m. Panel Session: MSE Walls – Milestone Case Histories that Changed the Profession – *Room 126A*
- 1:30 – 3:00 p.m. Special Session: A 50-Year Tribute to Ralph Peck and the Observational Method, Part I – *Room 120B*
- 1:30 – 3:00 p.m. Technical Sessions – *See pages 14-15*
- 3:00 – 3:30 p.m. **Afternoon Networking Break** – *Exhibit Hall E*
- 3:30 – 5:30 p.m. Special Session: A 50-Year Tribute to Ralph Peck and the Observational Method, Part II – *Room 120B*
- 3:30 – 5:00 p.m. Panel Session: State Department of Transportation Executives (Invitation Only) – *Room 126A*
- 3:30 – 5:30 p.m. **Poster Session** – *See pages 16-18*
- 6:00 – 7:30 p.m. Organizational Member Executive Leadership Dinner and Workshop (Invitation Only) – *Loews Philadelphia Hotel – Lescaze Room, 33rd Floor*
- 6:30 – 9:00 p.m. Surprise Offsite Special Events – *Depart from Pennsylvania Convention Center*
- 7:45 – 8:45 p.m. GI Student Program: Organizational Members and Student Travel Grant Winners Career Fair (Invitation Only) – *Room 122B*
- 8:45 – 9:45 p.m. GI Student Program: Organizational Member and Student Reception – *Room 122B*

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## CONFERENCE APP



Be sure to download the mobile app to create a personalized schedule, see all the session details and speakers, last minute changes, and contact other attendees.

To download the app, visit: [https://attendify.com/attendify\\_app/download](https://attendify.com/attendify_app/download) and search for 'GeoCon 2019'.



## Tuesday, March 26, 2019

- 7:00 a.m. – 5:30 p.m. Registration Open – *Broad Street Entrance*  
(12:15 – 1:15 p.m. Registration Closed for lunch)
- 8:00 – 8:30 a.m. Inspiring Remarks from Bibop G. Gresta –  
*Terrace Ballroom IV*
- 8:30 – 10:00 a.m. Geo-PIT: Powerful, Informative Talks on  
Geotechnical Topics – *Terrace Ballroom IV*
- 10:00 – 10:30 a.m. **Morning Networking Break** – *Exhibit Hall E*
- 10:30 a.m. – 12:00 p.m. Panel Session: Panel: GBA: Events That Changed  
Our Practice – *Room 120B*
- 10:30 a.m. – 12:00 p.m. Panel Session: Fostering Innovation in Tunneling  
and Underground Construction – *Room 126A*
- 10:30 a.m. – 12:00 p.m. Technical Sessions – *See pages 19-20*
- 12:00 – 1:30 p.m. **Lunch** – *Exhibit Hall E*
- 12:30 – 1:30 p.m. Geo-Institute Business Meeting – *Room 126A*
- 1:30 – 3:00 p.m. Panel Session: Urban Excavation Support –  
*Room 126A*
- 1:30 – 3:00 p.m. Technical Sessions – *See pages 21-22*
- 3:00 – 3:30 p.m. Afternoon Networking Break – *Exhibit Hall E*
- 3:30 – 5:00 p.m. Panel Session: 7 Year Itch: What Have We  
Learned from Hurricane Sandy – *Room 126A*
- 3:30 – 5:30 p.m. **Poster Session** – *See pages 23-25*
- 5:30 – 6:00 p.m. Professional and Student Competition Awards  
Presentation – *Terrace Ballroom IV*
- 6:00 – 7:00 p.m. Karl Terzaghi Award Lecture –  
*Terrace Ballroom IV*
- 7:30 – 10:00 p.m. Terzaghi Dinner (Invitation Only) – *Loews  
Philadelphia Hotel – Lescaze Room, 33rd Floor*

## Wednesday, March 27, 2019

- 7:30 a.m. – 1:00 p.m. Registration Open – *Broad Street Entrance*
- 8:00 – 9:30 a.m. Geo-PIT: Powerful, Informative Talks on  
Geotechnical Topics – *Terrace Ballroom IV*
- 9:30 – 10:00 a.m. **Morning Networking Break** – *Exhibit Hall E*
- 10:00 – 11:30 a.m. Panel Session: Changing the Paradigm for  
Large Landslides: Forecasting Time-to-Failure –  
*Room 126A*
- 10:00 – 11:00 a.m. Special Session: Robert M. Koerner Lecture  
- Lessons Learned: An Adventure in 4 Decades of  
Geosynthetics Engineering – *Terrace Ballroom III*
- 10:00 – 11:30 a.m. Technical Sessions – *See pages 26-27*
- 11:30 a.m. – 1:00 p.m. **Lunch** – *Exhibit Hall E*
- 1:00 – 2:00 p.m. Ralph B. Peck Award Lecture –  
*Terrace Ballroom IV*
- 2:00 – 2:30 p.m. Closing Ceremony – *Terrace Ballroom IV*



**GEO-  
INSTITUTE**  
**ASCE Metropolitan Section  
Chapter**



**GEO-  
INSTITUTE**  
**Delaware Valley  
Chapter**

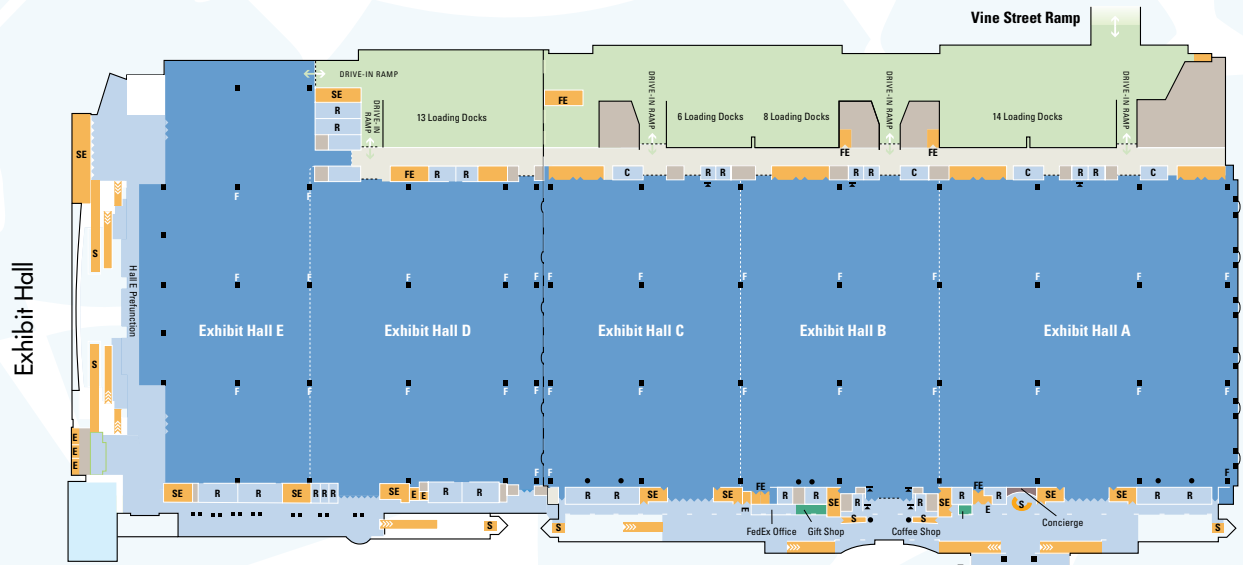


# Pennsylvania Convention Center Floor Plans

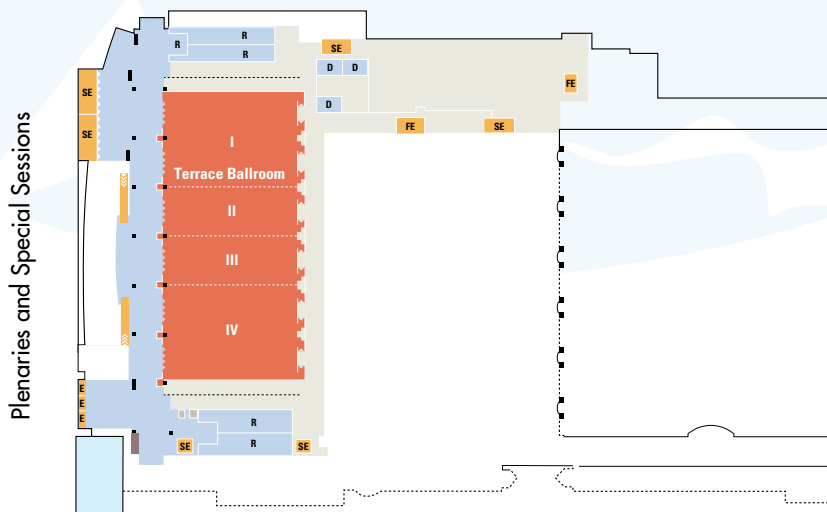
## First Floor



## Second Floor



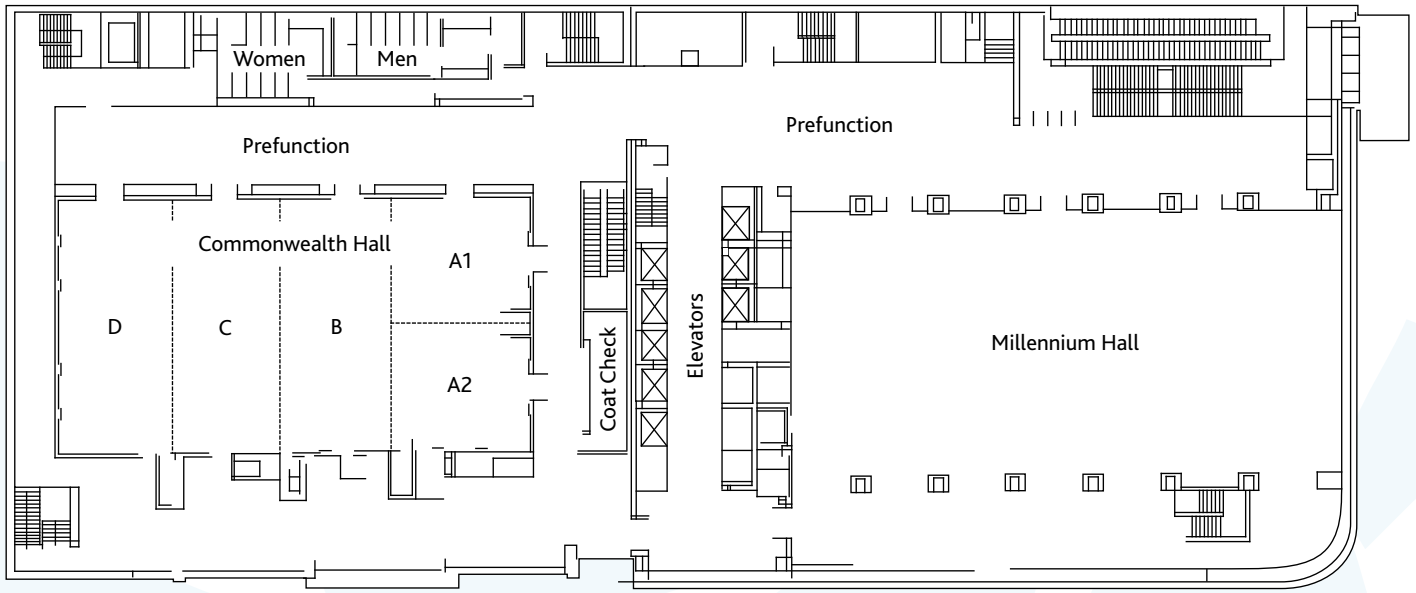
## Fourth Floor



### KEY

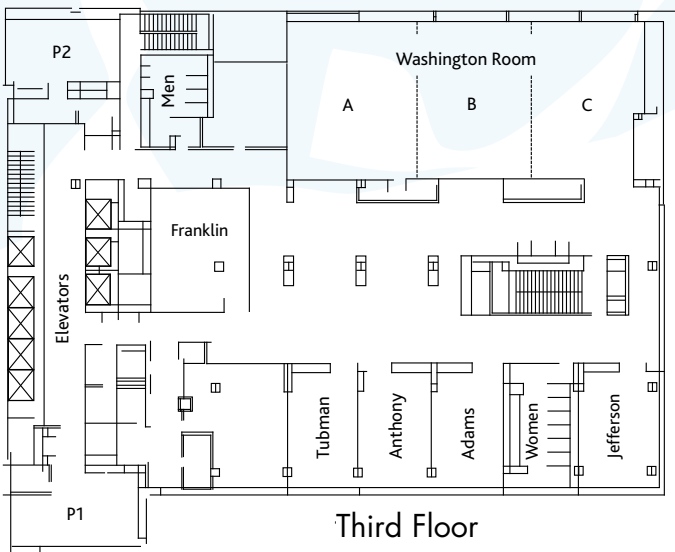
- Entrances
- Exhibit Halls
- Meeting Rooms
- Ballrooms
- Public Areas
- Shops
- Stair, Elevator, Escalator
- Loading Dock
- House Storage
- Offices
- Back of House
- Concession Stand
- Dressing Rooms
- Elevator
- Freight Elevator
- Fire Hose Connection
- Restrooms
- Ticket Offices
- Columns
- Telephone
- Water Fountain

# Loews Philadelphia Hotel Floor Plans



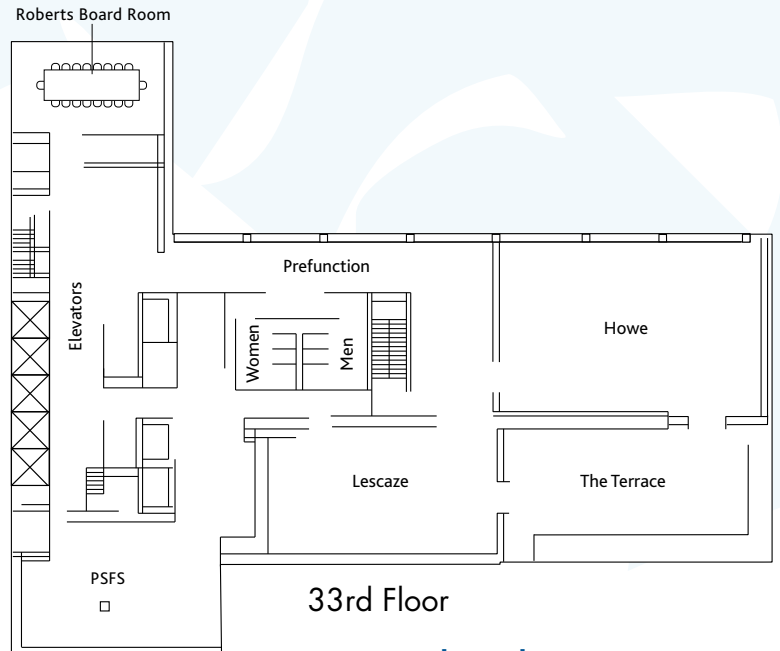
**Short Courses 1-10 and  
Committee Meetings**

**Second Floor**



**Short Course 11 and  
Committee Meetings**

**Third Floor**



**Organizational Member Executive  
Leadership Dinner and Workshop  
and Terzaghi Dinner**

**33rd Floor**

# Welcome & Program Committee

## Welcome from the Conference Co-Chairs

The Program Committee hopes you enjoy your experience here at the *Geo-Congress 2019: The Eighth International Conference on Case Histories in Geotechnical Engineering* and the wonderful experiences the City of Philadelphia has to offer.

From the early days of modern geotechnical engineering, sharing field experiences of the performance of geotechnical structures – dams, foundations, tunnels, landfills – in the form of case histories has driven the advancement of knowledge for the geo-profession. Starting in 1984, Professor Shamsheer Prakash formalized this tradition and organized the First International Conference on Case Histories in Geotechnical Engineering. This conference brought together more than 190 engineers from 30 countries to share their experiences, learn from each other, and advance the profession. By 2013, the 7th conference in this series drew nearly 320 engineers from 40 countries spanning the globe, culminating in symposia to honor Ralph B. Peck and Clyde Baker. But the essence of the conference had not changed: to advance our profession through shared engineering judgment.

Geo-Congress 2019 continues this tradition and features experiences and observations from hundreds of geotechnical projects. The conference includes a wide range of informative technical and panel sessions, short courses, and workshops. Join us in celebration of our geo-accomplishments!



**Scott M. Olson, Ph.D., P.E., M.ASCE**  
University of Illinois at Urbana-Champaign



**Allen Cadden, P.E., D.GE, F.ASCE**  
Schnabel Engineering

## Program Committee

### Conference Co-Chairs

**Scott M. Olson, Ph.D., P.E., M.ASCE**  
University of Illinois at Urbana-Champaign  
**Allen Cadden, P.E., D.GE, F.ASCE**  
Schnabel Engineering

### Technical Program Co-Chairs

**Christopher L. Meehan, Ph.D., P.E., F.ASCE**  
University of Delaware  
**Sanjeev Kumar, Ph.D., P.E., M.ASCE**  
Southern Illinois University Carbondale  
**Jared M. Green, P.E., M.ASCE**  
Langan

### Proceedings Editors

**Christopher L. Meehan, Ph.D., P.E., F.ASCE**  
University of Delaware  
**Sanjeev Kumar, Ph.D., P.E., M.ASCE**  
Southern Illinois University Carbondale  
**Joseph Thomas Coe, Jr., Ph.D., EIT, A.M.ASCE**  
Temple University  
**Miguel A. Pando, Ph.D., P.Eng., A.M.ASCE**  
University of North Carolina at Charlotte

### Student Activities Chair

**Stacey Kulesza, Ph.D., P.E., M.ASCE**  
Kansas State University

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**George Koerner, Ph.D., P.E., M.ASCE**  
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**Archie Filshill, Ph.D., A.M.ASCE**  
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**Ben Dutton, P.E.**  
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**John Grillo, P.E., F.ASCE**  
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### Local Liaisons

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Earth Engineering, Inc.  
**Michael Fritzges, P.E., M.ASCE**  
Langan  
**Conrad Cho, P.E., LEED AP, M.ASCE**  
Langan

### Geo-Institute Staff

**Bradley Keelor**, Director  
**Lucy King, CMP**, Senior Manager, Geo-Institute & COPRI Conferences  
**Tatiana Vlasova**, Program Coordinator and Board Specialist  
**Elizabeth Cuscino**, Administrative Specialist  
**Caitlin Galietti**, Program & Board Coordinator

### Sponsorship and Exhibit Sales

**Drew Caracciolo**, Manager, ASCE Sponsorship & Exhibit Sales



*Proud to be a  
Platinum Sponsor of  
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and the Karl Terzaghi  
Award Lecture.*

*Congratulations to  
this year's winner,  
Dr. Izzat M. Idriss.*

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# Short Courses

## SUNDAY, MARCH 24, 2019

**SHORT COURSE 1: Geotechnical Earthquake Engineering, with Emphasis on the Central and Eastern U.S.\***

8:00 a.m. – 12:00 p.m., *Loews Philadelphia Hotel - Commonwealth A1*

**Instructor: Russell A. Green, Ph.D., P.E., M.ASCE, Virginia Tech**

**SHORT COURSE 5: Soil Shear Strength\***

8:00 a.m. – 12:00 p.m., *Loews Philadelphia Hotel - Commonwealth C*

**Instructor: Dan Vanden Berge, Ph.D., P.E., M.ASCE, Tennessee Tech**

**SHORT COURSE 7: Foundation Cost Estimating for Geotechnical Engineers\***

8:00 a.m. – 12:00 p.m., *Loews Philadelphia Hotel - Commonwealth D*

**Instructor: Jeffrey D. Given, P.E., M.ASCE, Loftus Construction; Todd Culp, Hayward Baker; Michael Cowell, P.E., M.ASCE, GeoStructures, Inc.; Robert Crawford, P.E., M.ASCE, James J. Anderson Construction; Dave Hicks, Richard Goettle, Inc.; with Moderator Archie Filshill, P.E., M.ASCE, Aero Aggregates**

**SHORT COURSE 11: 2D/3D Slope Stability and Analysis\***

8:30 a.m. – 4:30 p.m., *Loews Philadelphia Hotel - Washington C*

**Instructors: Murray D. Fredlund, Ph.D., P.E., President/CEO, SoilVision Systems Ltd.; Mitchell Bauche, B.Sc. Engineering, Sales Engineer, SoilVision Systems Ltd.**

*\*Additional ticket purchase required*

**SHORT COURSE 4: Introduction to Tunneling\***

1:00 – 5:00 p.m., *Loews Philadelphia Hotel - Commonwealth C*

**Instructor: Fulvio Tonon, Ph.D., P.E., M.ASCE, University of Colorado-Boulder**

**SHORT COURSE 6: Geotechnical Site Characterization\***

1:00 – 5:00 p.m., *Loews Philadelphia Hotel - Commonwealth A1*

**Instructor: Mark Styler, Ph.D., ConeTec**

**SHORT COURSE 8: Practical, Qualitative Risk Evaluation for Geotechnical Projects\***

1:00 – 5:00 p.m., *Loews Philadelphia Hotel - Commonwealth D*

**Instructor: Gregory Baecher, Ph.D., M.ASCE, University of Maryland; Scott Raschke, Ph.D., P.E., M.ASCE, Schnabel Engineering; Robert Patev, U.S. Army Corps of Engineers**

**SHORT COURSE 10: Ethics in Geotechnical Engineering\***

1:00 – 5:00 p.m., *Loews Philadelphia Hotel - Commonwealth B*

**Instructor: Victor R. Donald, P.E., M.ASCE, Terracon**

## GLOBAL LEADERS IN SITE CHARACTERIZATION



### SECTORS

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- INFRASTRUCTURE
- ENVIRONMENTAL
- EARTHQUAKE ENGINEERING

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## SUNDAY, MARCH 24, 2019

### AGP Induction Ceremony – Terrace Ballroom IV

4:30 – 5:00 p.m.

#### Opening Remarks

5:00 – 5:30 p.m., *Terrace Ballroom IV*

**Conference Co-Chairs:** **Scott M. Olson, Ph.D., P.E., M.ASCE**, University of Illinois at Urbana Champaign; **Allen Cadden, P.E., D.GE, F.ASCE**, Schnabel Engineering



#### H. Bolton Seed Award Lecture Geotechnical Judgment and Risk

5:30 - 6:30 p.m., *Terrace Ballroom IV*

**W. Allen Marr, Ph.D., P.E., D.GE, NAE, F.ASCE**

Sponsored by **JACOBS**

### Welcome Reception in the Exhibit Hall

6:30 – 8:00 p.m., *Exhibit Hall E*

Be among the first to see innovations in the industry by attending the Welcome Reception and touring the exhibits. Join colleagues and friends in the Exhibit Hall for this opportunity to network and make valuable future contacts.

Sponsored by  **SALTUS**  
Construction Monitoring Services

## MONDAY, MARCH 25, 2019

### Welcoming Remarks from The Honorable Edward G. Rendell

8:00 – 8:30 a.m., *Terrace Ballroom IV*



#### The Honorable Edward G. Rendell

News Analyst, NBC - Special Counsel, Ballard Spahr, LLP  
Governor of Pennsylvania (2003-2011) –  
Mayor of Philadelphia (1992-2000)

After 34 years of public service, including 24 years as an elected official, Governor Rendell continues to pursue many of the same issues he was passionate about while serving. His commitment to making America a cleaner, more efficient place and to fostering investment in our nation's crumbling infrastructure is as strong as it has ever been.

### Geo-PIT: Powerful, Informative Talks on Geotechnical Topics

8:30 – 10:00 a.m., *Terrace Ballroom IV*

#### Speakers:

**Lelio Mejia, Ph.D., P.E., M.ASCE**, Geosyntec: **The Panama Canal: A Wonder of Engineering**

**James Mitchell Sc.D, P.E, D.GE(Ret)**, NAE, Dist.M.ASCE, Virginia Tech: **Geotechnics Goes Out of This World**

**Nina Stark, Ph.D.**, Virginia Tech: **Of Ice and Erosion: Geotechnics in the Arctic Coastal Zone**

**Mary Ellen Large, P.E., D.GE, M.ASCE**, DFI: **Non-Profit Profits**

### Morning Networking Break

10:00 – 10:30 a.m., *Exhibit Hall E*

### Student Competitions

10:00 a.m. – 3:00 p.m., *Exhibit Hall E*

### Special Session: History of Case Histories in Geotechnical Engineering | Legacy of Dr. Shamsheer Prakash

10:30 a.m. – 12:00 p.m., *Room 120B*

**Moderator:** **Sanjeev Kumar, Ph.D., P.E., F.ASCE**, Southern Illinois University Carbondale

**Speakers:** **I.M. Idriss, Ph.D., P.E., NAE, Dist.M.ASCE**, University of California, Davis; **James K. Mitchell Sc.D, P.E, D.GE(Ret)**, NAE, Dist.M.ASCE, Virginia Tech; **Richard Woods, Ph.D., P.E., D.GE(Ret.)**, NAE, Dist.M.ASCE, R.D. Woods; **Ahmad Elgamal, Ph.D. M.ASCE**, University of California San Diego; **Jonathan Bray, Ph.D., P.E., NAE, F.ASCE**, University of California Berkeley; **Dimitrios Zekkos, Ph.D., P.E., M.ASCE**, Geoengineer; **Vijay K. Puri, Ph.D. M.ASCE**, Southern Illinois University Carbondale



#### Shamsheer Prakash, Ph.D., P.E., D.GE(Ret), Dist.M.ASCE

Shamsheer Prakash has been nationally and internationally recognized for his work in the area of earthquake engineering and soil dynamics, including pioneering work on liquefaction of fine-grained soils, seismic design of piles, and seismic analysis of rigid retaining walls. He revolutionized the use of geotechnical engineering case

histories in professional practice and education, chaired six international conferences on case histories in geotechnical engineering, and wrote several books. Prakash was elected Distinguished Member of the American Society of Civil Engineers in 2011 and was certified a Diplomate of the Academy of Geo-Professionals in 2010. Prakash received the Distinguished Alumnus Award from the Indian Institute of Technology, Roorkee in 2008.

### Panel: Deep Foundations in Urban Environments

10:30 a.m. – 12:00 p.m., *Room 126A*

**Moderator:** **George E. Leventis, P.E., F.ASCE**, Langan

**Panelists:** **Peggy Hagerty Duffy, P.E., D.GE**, ADSC; **Charlie Huynh**, Case Foundation Company; **Thomas Jousselein**, Soletanche Bachy; **Tony Mazzo, P.E.**, Urban Foundation Engineering; **Silas Nichols, P.E.**, FHWA; **Kathryn Petek, Ph.D., P.E.**, Shannon & Wilson, Inc.

### Lunch

12:00 – 1:30 p.m., *Exhibit Hall E*

### Panel: MSE Walls: Milestone Case Histories that Changed the Profession

1:30 – 3:00 p.m., *Room 126A*

**Moderator:** **Barry R. Christopher, Ph.D., P.E., M.ASCE**, Christopher Consultants

**Panelists:** **John Sankey, P.E., M.ASCE**, ReEngineering LLC; **Ryan Berg, P.E., D.GE, M.ASCE**, Ryan Berg and Associates; **Robert D. Holtz, Ph.D., P.E., D.GE, Dist. M.ASCE**, Professor Emeritus, University of Washington; **Daniel Alzamora, P.E., M.ASCE**, Senior Geotechnical Engineer, Federal Highway Administration

### Special Session: A 50-Year Tribute to Ralph B. Peck and the Observational Method, Part I

1:30 – 3:00 p.m., *Room 120B*

#### Use of the Observational Method as the Sole Basis for Design

**Speakers:** **J. Michael Duncan, Ph.D., P.E., D.GE(Ret.)**, Dist.M.ASCE, Virginia Tech; **Thomas L. Brandon, Ph.D., P.E., M.ASCE, W.C.** English Geotechnical Research Laboratory, Virginia Tech

#### Repairs to Whitehouse Lake Dam

**Speakers:** **Garry H. Gregory, Ph.D., P.E., D.GE, M.ASCE**, Gregory Geotechnical; **Stephen R. Richards, P.E., M.ASCE**, EITL Engineers and Consultants, Inc.

# Program Highlights

## Afternoon Networking Break

3:00 – 3:30 p.m., *Exhibit Hall E*

## Special Session: A 50-Year Tribute to Ralph B. Peck and the Observational Method, Part II

3:30 – 5:00 p.m., *Room 120B*

### An Irrefutable Case for Case Histories: Seismic Design of Municipal Solid Waste Landfills

**Speakers:** Edward Kavazanjian, Jr., Ph.D., P.E., D.GE, NAE, Dist.M.ASCE, Arizona State University

### Two Observational Method Applications: An Ideal Solution for Geotechnical Projects with Uncertainty

**Speakers:** Suzanne M. Lacasse, D.Eng., P.E., D.GE(Ret.), F.ASCE, Norwegian Geotechnical Institute

## Poster Session

3:30 – 5:30 p.m., *Exhibit Hall E*

See pages 16-18 for listing.

## Organizational Member Executive Leadership Dinner and Workshop (Invitation Only)

6:00 – 7:30 p.m., *Loews Philadelphia Hotel – Lescaze Room, 33rd floor*

## G-I Student Program: Organizational Members and Student Travel Grant Winners Career Fair (Invitation Only)

7:45 – 8:45 p.m., *Room 122B*

## G-I Student Program: Organizational Member and Student Reception

8:45 – 9:45 p.m., *Room 122B*

## TUESDAY, MARCH 26, 2019

### Inspirational Remarks from Bibop G.Gresta

8:00 – 8:30 a.m., *Terrace Ballroom IV*



#### **Bibop G. Gresta**

Chairman, Co-Founder at Hyperloop Transportation Technologies - Founder Digitalmagics - TedX Speaker - WEF Tech Pioneer

As the Co-Founder and current Chairman of Hyperloop Transportation Technologies (HTT), Bibop Gresta leads a team of 800 professionals in 40 countries across six continents. HTT was the first company to begin development of the Hyperloop™ and is the largest company ever built upon a collaborative business ecosystem. HTT, under Gresta's leadership, has been revolutionizing both mobility and the outdated business models. In 2018 HTT has been declared Technology Pioneer by the World Economic Forum.

## Geo-PIT: Powerful, Informative Talks on Geotechnical Topics

8:30 – 10:00 a.m., *Terrace Ballroom IV*

### **Speakers:**

**Harry Poulos, Ph.D., P.E., D.Eng., Dist.M.ASCE:** Tall Building Foundations – Challenges, Solutions, and the Future

**Jennifer Nicks, P.E., M.ASCE:** Leap Not Creep: A Case History of a Technology Gone Rogue

**Paul Schmall, P.E., D.GE., F.ASCE:** Moretrench, Sharing the Underground Experience

**Menzer Pehlivan, Ph.D., P.E., M.ASCE:** Inclusion starts with I  
**Silas Nichols M.ASCE:** Could we have known?

## Morning Networking Break

10:00 – 10:30 a.m., *Exhibit Hall E*

## Panel Session: GBA: Events That Changed Our Practice

10:30 a.m. – 12:00 p.m., *Room 120B*

**Moderator:** Victor R. Donald, P.E., M.ASCE, Terracon

**Panelists:** Michael Yost, P.E., Esq., Terracon; James Hamilton, P.E., Esq., GAI

## Panel Session: Fostering Innovation in Tunneling and Underground Construction

10:30 a.m. – 12:00 p.m., *Room 126A*

**Moderator:** Elizabeth M. Dwyre, P.E., D.GE, M.ASCE, WSP

**Panelists:** Conrad W. Felice, Ph.D., P.E., P.Eng., D. GE., F.ASCE, C.W.

Felice, LLC; Debra F. Laefer, Ph.D., M.ASCE, New York University; Tom

Pennington, P.E., M.ASCE, McMillen Jacobs Associates; Frank Pepe, P.E.,

M.ASCE, WSP; Zuzana Skovajsova, P.E., M.ASCE, COWI Tunnel

## Lunch

12:00 – 1:30 p.m., *Exhibit Hall E*

## Panel Session: Urban Excavation Support

1:30 – 3:00 p.m., *Room 120B*

**Moderator:** Andrew Burns, P.E., M.ASCE, Skanska

**Panelists:** Arthur Alzamora, P.E., M.ASCE, Langan Engineering; Theodore

Civetta Jr., P.E., M.ASCE, John Civetta & Sons; Joseph A. Sopko, Ph.D., P.E.,

M.ASCE, Moretrench; Greg Sanchez, Treviicos; Andrew Burns, Underpinning

& Foundation Skanska; Toben Jerry, GFL Infrastructure

## Afternoon Networking Break

3:00 – 3:30 p.m., *Exhibit Hall E*

## Poster Session

3:00 – 5:00 p.m., *Exhibit Hall E*

See pages 23-25 for listing.

## Panel Session: 7-Year Itch: What Have We Learned from Hurricane Sandy

3:30 – 5:00 p.m., *Room 126A*

Hurricane Sandy affected metropolitan New York in ways that no storm previously had. In this panel discussion, 3 Geo-Institute members involved in Sandy reconnaissance and 3 local public officials will present their experiences during and after the 2012 superstorm. The discussion will focus on engineering aspects of the immediate aftermath, as well as resilience, mitigation, and adaptation strategies employed in the years since. Each panelist will give a brief prepared presentation followed by discussion and Q&A.

**Moderator:** Nadine M. Post, ENR

**Panelists:** Aspasia Nikolaou, WSP USA; Youssef Hashash, University of

Illinois at Urbana-Champaign; Thomas O'Rourke, Cornell University; Michael

Moriarty, Federal Emergency Management Agency; Carter Strickland, The

Trust for Public Land; Anthony Fevola, NJ Transit (invited)

## Professional and Student Competition Awards Presentation

5:30 – 6:00 p.m., *Terrace Ballroom IV*

**Conference Co-Chairs:** Scott M. Olson, Ph.D., P.E., M.ASCE, University of Illinois at Urbana-Champaign; Allen Cadden, P.E., D.GE, F.ASCE, Schnabel Engineering



### **Karl Terzaghi Award Lecture Response of Soil Sites During Earthquakes A 60-Year Perspective**

6:00 – 7:00 p.m., *Terrace Ballroom IV*

**Speaker:** Izzat M. Idriss, Ph.D., P.E., NAE, Dist.M.ASCE, University of California, Davis

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### **Terzaghi Dinner (Invitation Only)**

7:30 – 10:00 p.m., *Loews Philadelphia Hotel – Lescaze, 33rd Floor*

## **WEDNESDAY, MARCH 27, 2019**

### **Geo-PIT: Powerful, Informative Talks on Geotechnical Topics**

8:00 – 9:30 a.m., *Terrace Ballroom IV*

#### **Speakers:**

Michelle L. Barry, Ph.D., P.E., M.ASCE, *University of Arkansas*

Kevin Franke, P.E., M.ASCE, *Brigham Young University: Drones: An Engineering Reconnaissance Tool of Tomorrow - Here Today!*

Jason DeJong, Ph.D., M.ASCE, *University of California at Davis*

Kord Wissmann, Ph.D., P.E., D.GE, M.ASCE, *Geopier Foundation Co., GeoTransformation – Getting it All Back Again*

Scott Anderson, P.E., M.ASCE, *BGC Engineering: We All Saw It the Same Way*

### **Morning Networking Break**

9:30 – 10:00 a.m., *Exhibit Hall E*

### **Special Session: Robert M. Koerner Lecture Lessons Learned: An Adventure in 4 Decades of Geosynthetics Engineering**

10:00 – 11:00 a.m., *Terrace Ballroom III*

**Speaker:** Barry R. Christopher, Ph.D., P.E., M.ASCE, *Christopher Consultants*

### **Panel: Changing the Paradigm for Large Landslides: Forecasting Time-to-Failure**

10:00 – 11:30 a.m., *Room 126A*

**Moderator:** Joseph Wartman, Ph.D., P.E., M.ASCE, *University of Washington*

**Panelists:** Siobhan Whadcoat, UBC ; Paolo Mazzanti, *Sapienza Università di Roma*; Steve Borron, *IDS GeoRadar*

### **Lunch**

11:30 a.m. – 1:00 p.m., *Exhibit Hall E*



### **Ralph B. Peck Award Lecture Observations and Findings from Christchurch Case Histories on Soil Liquefaction**

1:00 – 2:00 p.m., *Terrace Ballroom IV*

**Speaker:** Misko Cubrinovsky, Ph.D.

**Sponsored by** 

### **Closing Ceremony**

2:00 – 2:30 p.m., *Terrace Ballroom IV*



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# Technical Program

## Monday, March 25, 2019

8:00 – 8:30 a.m.	<b>Welcoming Remarks from the Honorable Edward G. Rendell, Terrace Ballroom IV</b>						
8:30 – 10:00 a.m.	<b>Geo-PIT: Powerful, Informative Talks on Geo-Topics, Terrace Ballroom IV</b>						
10:00 – 10:30 a.m.	<b>Morning Networking Break, Exhibit Hall E</b>						
10:30 a.m. – 12:00 p.m.	<b>Special Session: History of Case Histories in Geotechnical Engineering; Legacy of Dr. Shamsher Prakash, Terrace Ballroom III</b>						
10:30 a.m. – 12:00 p.m.	<b>Panel Session: Deep Foundations in Urban Environments, Room 126A</b>						
10:30 a.m. – 12:00 p.m.	<b>Technical Sessions</b>						
<b>Track A   Room 122A</b>	<b>Track B   Room 125</b>	<b>Track C   Room 123</b>	<b>Track D   Room 124</b>	<b>Track E   Room 121B</b>	<b>Track F   Room 120C</b>	<b>Track G   Room 121A</b>	
<b>Shallow Foundations</b> <b>Moderators:</b> Xiong Zhang, A.M.ASCE, Hosam Salman, P.E., FASCE	<b>Embankments, Dams, and Slopes: Dams and Levees</b> <b>Moderators:</b> Ben A. Leshchinsky, A.M.ASCE, Michael R. Simac, P.E., M.ASCE	<b>Earthquake Engineering and Soil Dynamics: Soil-Structure Interaction</b> <b>Moderators:</b> Shideh Dashti, Ph.D., A.M.ASCE, Deepankar Choudhury, Ph.D., M.ASCE	<b>Soil Improvement: Case Histories</b> <b>Moderators:</b> Michael P. McGuire, Ph.D., P.E., M.ASCE, Brian C. Metcalfe, Ph.D., P.E., M.ASCE	<b>Rock Mechanics</b> <b>Moderators:</b> Joseph F. Labuz, Ph.D., P.E., FASCE, Martin Woodard, Ph.D., P.G., P.E.	<b>Geosynthetics</b> <b>Moderators:</b> Marco Isola, P.E., M.ASCE, Melissa S. Beauregard EIT, A.M.ASCE	<b>Engineering Geology and Site Characterization: Part I</b> <b>Moderators:</b> David A. Saffner, Ph.D., A.M.ASCE, Ara G. Mouradian, P.E., M.ASCE	
<b>Comparing Direct Cone Penetration Testing Foundation Designs and Traditional Foundation Designs,</b> Ryan Dagger S.M.ASCE, <i>University of Minnesota Duluth</i> ; David Dasenbrock, P.E., FASCE, <i>Minnesota DoT</i> ; Paul Mayne, Ph.D., P.E., M.ASCE, <i>Georgia Institute of Technology</i> ; David Saffner, A.M.ASCE, <i>University of Minnesota Duluth</i> <b>Analysis of Differential Settlement of Circular Tank Foundations on Multilayered Soil,</b> Suranga Gunerathne, Ph.D., <i>East Carolina University</i> ; Hoyoung Seo, Ph.D., P.E., <i>Texas Tech University</i> ; William Lawson, Ph.D., P.E., <i>Texas Tech University</i> ; Priyantha Jayawickrama, Ph.D., <i>Texas Tech University</i>	<b>Capacity Restoration and Slope Stabilization of the Gull Island Confined Disposal Facility,</b> Tse-Wei 'Jerry' Chen, P.E., M.ASCE, <i>WSP USA Inc.</i> ; Ragui Wilson-Fahmy, Ph.D., P.E., M.ASCE, <i>WSP USA Inc.</i> ; Matthew Lunemann, <i>WSP USA Inc.</i> ; Scott Douglass, <i>NJDOT</i> <b>Effects of Load History on Seepage-Induced Deformation and Associated Performance in Terms of Probability of Exceeding Limit States - Case Study of Princeville, Levee Rowshon Jadid MS,</b> S.M.ASCE, <i>North Carolina State University</i> ; Brina Montoya, Ph.D., <i>North Carolina State University</i> ; Victoria Bennett, Ph.D., <i>Rensselaer Polytechnic Institute</i> ; Mo Gabr, Ph.D., FASCE, <i>North Carolina State University</i>	<b>Hazard-Resistant Steel Pipeline Response to Large Fault Rupture,</b> Brad Wham, Ph.D., A.M.ASCE, <i>University of Colorado Boulder</i> ; Blake Berger, <i>Cornell University</i> ; Thomas O'Rourke, Ph.D., Dist.M.ASCE, <i>Cornell University</i> <b>Large Scale Liquefaction-Induced Lateral Spreading Shake Table Testing at the University of California San Diego,</b> Ahmed Ebeido M.S., S.M.ASCE, <i>University of California, San Diego</i> ; Ahmed Elgamal, Ph.D., M.ASCE, <i>University of California, San Diego</i> ; Muhammad Zayed, M.S., S.M.ASCE, <i>University of California, San Diego</i>	<b>Rockin' the Foundations at the Hard Rock Casino,</b> Jeffrey Hill, P.E., M.ASCE, <i>Hayward Baker, Inc.</i> ; Nicolas Syriopoulos M.ASCE, <i>Hayward Baker, Inc.</i> ; Jeremiah Filjones, A.M.ASCE, <i>Hayward Baker, Inc.</i> ; Andres Baquerizo, P.E., <i>HJ Foundation, Inc.</i> ; Dustin Walkenhorst, P.E., A.M.ASCE, <i>Hayward Baker, Inc.</i> <b>Decades of Engineering Experiences with Sinkholes,</b> M. Ayub Iqbal, Ph.D., P.E., <i>Applied Geoscience &amp; Engineering, Inc.</i>	<b>Stability Assessment of Large Caverns in Horizontally Bedded Strata Considering Time-Dependent Response,</b> Mohammad Moridzadeh, Ph.D. Candidate, S.M.ASCE, <i>Stantec</i> ; Mohammad Djavid, Ph.D., P.E., <i>Stantec</i> ; Barry Doyle, P.E., <i>Stantec</i> <b>Rock Slope Remediation at the Penobscot Narrows Bridge,</b> Bryan Steinert, P.E., <i>Haley &amp; Aldrich, Inc.</i> ; Laura Krusinski, P.E., <i>MaineDoT</i> ; Amber Granger, P.G., <i>Haley &amp; Aldrich, Inc.</i> ; Wayne Chadbourne, P.G., <i>Haley &amp; Aldrich, Inc.</i>	<b>Mechanical Properties of Recycled Concrete Aggregates and Recycled Asphalt Pavements Reinforced with Geosynthetics,</b> Ali Soleimanbeigi, Ph.D., P.E., <i>University of Wisconsin-Madison</i> ; William Likos, Ph.D., <i>University of Wisconsin-Madison</i> <b>Utilization of Pond Ash as Structural Fill Material in Reinforced Soil Structures,</b> Aali Pant, M.Tech, <i>Indian Institute of Technology Delhi</i> ; Manoj Datta, Ph.D., <i>Indian Institute of Technology Delhi</i> ; Gunturi Ramana, Ph.D., <i>Indian Institute of Technology Delhi</i> ; Abinash Mahanta M.Tech, <i>Indian Institute of Technology Delhi</i>	<b>Developing a Calibration Model for Moisture Content Determination Utilizing a Hybrid Nuclear-Electric Gauge,</b> William Baker E.I., S.M.ASCE, <i>University of Delaware</i> ; Christopher Meehan, Ph.D., P.E., FASCE, <i>University of Delaware</i> <b>Uppermost Subaqueous Soil Variability in Front of the Situk River Inlet, Alaska, from Portable Free Fall Pentrometer,</b> Dennis Kiptoo Msc, <i>Virginia Tech.</i> ; Nina Stark, Ph.D., <i>Virginia Tech.</i> ; Ali Albatal, Ph.D., <i>Virginia Tech.</i> ; Cagdas Bilici, Ph.D., <i>Virginia Tech</i>	

Track A   Room 122A	Track B   Room 125	Track C   Room 123	Track D   Room 124	Track E   Room 121B	Track F   Room 120C	Track G   Room 121A
10:30 a.m. – 12:00 p.m						
<b>Technical Sessions</b>						
<p><b>Shallow Foundations</b> Moderators: Xiong Zhang, A.M.ASCE, Hosam Salman, P.E., F.ASCE</p>	<p><b>Embankments, Dams, and Slopes: Dams and Levees</b> Moderators: Ben A. Leshchinsky, A.M.ASCE, Michael R. Simac, P.E., M.ASCE</p>	<p><b>Earthquake Engineering and Soil Dynamics: Soil-Structure Interaction</b> Moderators: Shideh Dashti, Ph.D., A.M.ASCE, Deepankar Choudhury, Ph.D., M.ASCE</p>	<p><b>Soil Improvement: Case Histories</b> Moderators: Michael P. McGuire, Ph.D., P.E., M.ASCE, Brian C. Metcalfe, Ph.D., P.E., M.ASCE</p>	<p><b>Rock Mechanics</b> Moderators: Joseph F. Labuz, Ph.D., P.E., F.ASCE, Martin Woodard, Ph.D., P.G., P.E.</p>	<p><b>Geosynthetics</b> Moderators: Marco Isola, P.E., M.ASCE, Melissa S. Beauregard EIT, A.M.ASCE</p>	<p><b>Engineering Geology and Site Characterization: Part I</b> Moderators: David A. Saffner, Ph.D., A.M.ASCE, Ara G. Mouradian, P.E., M.ASCE</p>
<p><b>Inspection Protocol for Investigating Structures Subjected to Distress Due to Expansive Soils</b>, Muawia Dafalla, Ph.D., A.M.ASCE, <i>King Saud University</i>; Mosleh Al-Shamrani, Ph.D., <i>King Saud University</i></p> <p><b>Comparison of Estimated Soil Settlements Using Strain-Dependent and High-Strain Elastic Moduli</b>, John Davie, Ph.D., P.E., CEng, M.ASCE; Tyler Liao; Michael Lewis; Jose Clemente, <i>Betchel</i></p> <p><b>Conical Load Test-Induced Settlement in Central Florida Soils: Class A Prediction of Field Performance with Advanced Soil Models</b>, A. Felipe Uribe-Henoa, <i>University of Central Florida</i>; Luis Arboleda-Monsalve, Ph.D., <i>University of Central Florida</i>; Sergio Savater, <i>University of Central Florida</i>; Manoj Chopra, Ph.D., P.E., <i>University of Central Florida</i>; Larry Jones, <i>Florida DOT</i></p> <p><b>A New Analysis of Circular Raft on Layered Elastic Soil</b>, Hesham Elhuni, <i>University of Waterloo</i>; Bipin Gupta, <i>University of Waterloo</i>; Dipanjan Basu, Ph.D., C. Eng, M.ASCE, <i>University of Waterloo</i></p>	<p><b>Multi-Decadal Earth Dam Deformation Monitoring using Airborne LiDAR and Structure from Motion at Lago Guajataca, Puerto Rico</b>, Andres Villarreal Arango, <i>University of Puerto Rico at Mayaguez</i>; Alesandra Morales-Velez, Ph.D., I.T., <i>University of Puerto Rico at Mayaguez</i>; Stephen Hughes, Ph.D., <i>University of Puerto Rico at Mayaguez</i></p> <p><b>Case History: Rapid Drawdown Analysis of Village Creek Plant Levee</b>, Daniel VandenBerge, Ph.D., P.E., <i>Tennessee Tech</i>; Garry Gregory, Ph.D., P.E., D.GE., <i>Gregory Geotechnical</i>; Prince Turkson, <i>Tennessee Tech</i></p> <p><b>Brownsville Levee Instability</b>, Lucas Walshire, P.E., <i>U.S. Army Corps of Engineers</i>; Joseph Dunbar, Ph.D., R.P.G., <i>U.S. Army Corps of Engineers</i>; Isaac Stephens, P.E., <i>U.S. Army Corps of Engineers</i>; Maureen Corcoran, Ph.D., R.P.G., <i>U.S. Army Corps of Engineers</i></p> <p><b>Deformation Analysis of Ritschard Dam: A Case Study of Rockfill Compression Induced Movements</b>, Masood Kafash, Ph.D., P.E., <i>AECOM</i>; Tiffany Adams, Ph.D., P.E., <i>AECOM</i>; Richard Davidson, P.E., <i>AECOM</i>; Ray Tenney, P.E., <i>Colorado River Water Conservation District</i>; Don Meyer, <i>Colorado River Water Conservation District</i></p>	<p><b>Centrifuge Investigation of the Effects of Liquefiable Soil Interlayering and Structural Strength on the Seismic Performance of Soil-Structure Systems</b>, Balaji Paramasivam, <i>University of Colorado Boulder</i>; Shideh Dashti, <i>University of Colorado Boulder</i>; Abbie Liel, <i>University of Colorado Boulder</i></p> <p><b>Seismic Performance of Buildings at CentrePort Wellington</b>, Jonathan Bray, Ph.D., P.E., NAE, F.ASCE, <i>Univ. of California, Berkeley</i>; Misko Cubrinovski, Ph.D., <i>University of Canterbury, Christchurch, NZ</i>; Christopher de la Torre, P.E., <i>University of Canterbury, Christchurch, NZ</i>; Ribu Dhakal, <i>University of Canterbury, Christchurch, NZ</i></p> <p><b>Numerical Simulation of Dynamic Centrifuge Tests on Concrete Faced Rockfill Dam</b>, Muhsin Acar S.M.ASCE, <i>University of Illinois at Urbana-Champaign</i>; Ozgun Numanoglu S.M.ASCE, <i>University of Illinois at Urbana-Champaign</i>; Youssef Hashash, Ph.D., P.E., F.ASCE, <i>University of Illinois at Urbana-Champaign</i></p> <p><b>Assessing the Significance of Dynamic Soil-Structure Interaction in Bridges by Using Large-Amplitude Mobile Shakers</b>, Sharef Farrag MSc, M.ASCE, <i>Rutgers University</i>; Nenad Gugucnski, <i>Rutgers University</i>; Brady Cox, <i>The University of Texas, Austin</i>; Farryuh Meng, <i>The University of Texas, Austin</i>; Franklin Moon, <i>Rutgers University</i>; John Devitis, Ph.D., <i>Rutgers University</i></p>	<p><b>A Study on the Quality of Improved Bodies Constructed by Jet Grouting Utilizing a Cutting Condition Monitoring System</b>, Takasi Shinsaka, Dr.Eng, P.E.Jp, Sen. Pro.C.E., <i>Sanshin Corporation</i>; Junnichi Yamazaki, P.E.Jp, <i>Sanshin Corporation</i>; Yasuharu Nakanishi, <i>N.I.T. Inc.</i>; Kazuhito Komiya, <i>Chiba Institute of Technology</i></p> <p><b>Sand and PV Drains – Historical Developments, Some Early Research and Case Histories</b>, Robert Holtz, Ph.D., P.E., D. GE., Dist. M.ASCE, <i>University of Washington</i></p> <p><b>Rigid Inclusions Ground Improvement for A New Energy Facility: Design, Construction and Full-Scale Embankment Load Testing and Results</b>, David Mazzei, P.E., <i>Hayward Baker, Inc.</i>; Ken Kniss, P.E., <i>Hayward Baker, Inc.</i>; Fathey Elsaid, Ph.D., P.E., <i>Mueser Rutledge Consulting Engineers</i>; Yan Zhang, Ph.D., <i>Hayward Baker, Inc.</i></p> <p><b>Case Study: Design, Installation and Analysis of Column Supported Embankment Systems at I-295/I-76/Route 42 Direct Connection Contracts 1 &amp; 2</b>, Nina Carney, P.E., M.ASCE, <i>Menard USA</i>; Sarah Ramp, P.E., M.ASCE, DGI, <i>Menard USA</i>; Dylan Davis, A.M.ASCE, DGI, <i>Menard USA</i></p>	<p><b>A Non-Stationary Power Law Model to Predict the Secondary Creep Rate of Rocks</b>, Ruofan Wang M.Eng., <i>École Polytechnique de Montréal</i>; Li Li, Ph.D., <i>École Polytechnique de Montréal</i></p> <p><b>Analysis and Comparison of Measured Static and Dynamic Moduli of a Dolostone Specimen</b>, KC Bijay, M.S, S.M.ASCE, <i>University of Vermont</i>; Maziar Foroutan, M.S, S.M.ASCE, <i>University of Vermont</i>; Ehsan Ghazanfari, Ph.D., M.ASCE, <i>University of Vermont</i></p> <p><b>Numerical Study on Thermally-Induced Displacement Ratcheting of a Thin Rock Slab</b>, Sihyun Kim, Ph.D., <i>Bradley University</i>; Ethan Druszkowski, <i>Bradley University</i>; Jingtao Zhang, <i>University of Nebraska-Lincoln</i>; Seunghee Kim, Ph.D., <i>University of Nebraska-Lincoln</i></p> <p><b>Thermal Effects on Reservoir-Sealing Rock Interactions during Injection Operations</b>, Xinle Zhai, <i>University at Buffalo</i>; Kamelia Montared, Ph.D., <i>University at Buffalo</i></p>	<p><b>Numerical Study of the Behavior of a Fully Encased Stone Column Bearing on a Non-Rigid Layer</b>, Ali Al Saadi, <i>University of Delaware</i>; Christopher Meehan, <i>University of Delaware</i>; Victor Kaliakin, <i>University of Delaware</i></p> <p><b>Case Histories of Multi-Layer Interface Tests for Composite Liners and Comparison to Single Interface Tests</b>, Thevachandran Shenthana, Ph.D., P.E., G.E., <i>Advanced Earth Sciences, Inc.</i>; Kris Khilnani, P.E., G.E., <i>Advanced Earth Sciences, Inc.</i>; Timothy Stark, Ph.D., P.E., D.GE, <i>University of Illinois at Urbana-Champaign</i></p> <p><b>Evaluation of GCL and Geomembrane Characteristics on Failure Modes and Critical Shear Strength of GCL/Geomembrane Composite System</b>, Shahin Ghazizadeh, <i>Colorado State University</i>; Christopher Bareither, Ph.D., P.E., <i>Colorado State University</i></p> <p><b>Lessons Learned Regarding Exit Strategies from Geosynthetic Drainage Composites</b>, Robert Koerner, Ph.D., P.E., <i>Drexel University</i></p>	<p><b>On-Site Particle Size Distribution by FieldSed</b>, Andrea Ventola S.M.ASCE, <i>University of Michigan</i>; Roman Hryciw, Ph.D., M.ASCE, <i>University of Michigan</i></p> <p><b>Site Variability Characterization Using Cone Penetration Test Data</b>, Eshan Ganju, S.M.ASCE, <i>Purdue University</i>; Rodrigo Salgado, Ph.D., P.E., D.GE., F.ASCE, <i>Purdue University</i>; Monica Prezzi, <i>Purdue University</i></p> <p><b>Comparison of Dispersion-Based Analysis of Surface Waves and Full Waveform Inversion in Characterizing Unknown Foundations</b>, Siavash Mahvelati, <i>Temple University</i>; Joseph Coe, Ph.D., <i>Temple University</i></p> <p><b>Interpretation of Distribution of Ancient Rivers in Singapore using 3D Geological Model</b>, Xiaohua Pan, Ph.D., <i>Nanyang Technological University</i>; Zarli Aung, <i>Nanyang Technological University</i>; Aung Nyo, <i>Nanyang Technological University</i>; Kiefer Chiam, <i>Building and Construction Authority, Singapore</i>; Defu Wu, <i>Building and Construction Authority, Singapore</i>; Jian Chu, Ph.D., <i>Nanyang Technological University</i></p>

10:00 a.m. – 3:00 p.m. <b>Student Competitions, Exhibit Hall E</b>							
12:00 – 1:30 p.m. <b>Lunch, Exhibit Hall E</b>							
1:30 – 3:00 p.m. <b>Panel Session: MSE Walls – Milestone Case Histories that Changed the Profession, Room 126A</b>							
1:30 – 3:00 p.m. <b>Special Session: A 50-Year Tribute to Ralph Peck and the Observational Method, Part I, Room 120B</b>							
1:30 – 3:00 p.m. <b>Technical Sessions</b>							
Track A   Room 122A	Track B   Room 125	Track C   Room 123	Track D   Room 124	Track E   Room 121B	Track F   Room 120C	Track G   Room 121A	Track H   Room 121C
<b>Deep Foundations: Piles</b> <b>Moderators:</b> Sarah L. Gassman, P.E., M.ASCE, Sam Sternberg, III, P.E., D.GE, M.ASCE	<b>Embankments, Dams, and Slopes: Embankment and Slope Stability</b> <b>Moderators:</b> Bernardo A. Castellanos, A.M.ASCE, Peter A. Narsavage, P.E., M.ASCE	<b>Earthquake Engineering and Soil Dynamics: Numerical Modeling</b> <b>Moderators:</b> Ashly Cabas Mijares, Ph.D., A.M.ASCE, Zia Zafir G.E., P.E., M.ASCE	<b>Soil Improvement: Biopolymers</b> <b>Moderators:</b> Michael G. Gomez, A.M.ASCE, Maria Chrysochoou A.M.ASCE	<b>Soil Properties and Modeling</b> <b>Moderators:</b> Michelle L. Bernhardt, Ph.D., A.M.ASCE, Inthuorn Sasanakul, P.E., M.ASCE	<b>Sustainability In Geotechnical Engineering</b> <b>Moderators:</b> Boo Hyun Nam, Ph.D., A.M.ASCE, Krishna R. Reddy, Ph.D., P.E., D.GE, ENV SP, F.ASCE	<b>Engineering Geology and Site Characterization: Part II</b> <b>Moderators:</b> Paola Bandini, Ph.D., P.E., M.ASCE, Eric S. Backlund, P.E., M.ASCE	<b>Data and Software for Geotechnical Engineering</b> <b>Moderators:</b> Robert C. Bachus, P.E., D.GE, M.ASCE, Jan Cermak, P.E., M.ASCE
<b>A Continuum Based Nonlinear Analysis of Laterally Loaded Piles,</b> Bipin Gupta, Ph.D. Candidate, <i>University of Waterloo</i> ; Dipanjan Basu, Ph.D., CEng., M.ASCE, <i>University of Waterloo</i> <b>Coupled Numerical Analysis of Variations in the Capacity of an Energy Pile in Clay Soil,</b> Arvin Farid, Ph.D., P.E., M.ASCE, <i>Boise State University</i> ; Daniel Zimmerman, <i>Boise State University</i> <b>Pile Design for Use in High-Tension Cable Median Barriers,</b> Mojdeh Asadollahi Pajouh, Ph.D., P.E., M.ASCE, <i>University of Nevada Las Vegas</i> ; Karla Lechtenberg, <i>University of Nebraska-Lincoln</i> ; Robert Bielenberg, <i>University of Nebraska-Lincoln</i> ; Ronald Faller, <i>University of Nebraska-Lincoln</i>	<b>Primary and Post-Surcharge Secondary Settlements of a Highway Embankment Constructed over Highly Organic Soils: A Case History,</b> Liang Chern Chow, P.E., M.ASCE, <i>American Engineering Testing, Inc.</i> ; Joseph Bentler, P.E., M.ASCE, <i>American Engineering Testing, Inc.</i> ; Richard Lamb, P.E., M.ASCE, <i>MinnesotaDoT</i> <b>Surcharge Embankment on Marine Clayey Silt Case Study and Lessons Learned,</b> Steven Halcomb, P.E., G.E., M.ASCE, <i>CRW, Engineering Group LLC</i> ; Sean Sjostedt, P.E., M.ASCE, <i>PND Engineers, Inc.</i> <b>Application of Instrumentation Monitoring and Observational Methods in Construction of a Large Embankment on Soft Ground,</b> Jiaer Wu, Ph.D., P.E., G.E., M.ASCE, <i>China Harbour Engineering Company USA Ltd</i>	<b>Soil-Structure Interaction Analysis of a Large Diameter Tank on Piled Foundations in Liquefiable Soil,</b> Frederick F Tajirian, Ph.D., P.E., F.ASCE, <i>Chevron Energy Technology Company</i> ; Mansour Tabatabaie, Ph.D., P.E., M.ASCE, <i>MTR and Associates</i> ; Pramod Rao, Ph.D., P.E., M.ASCE, <i>Chevron Energy Technology Company</i> <b>Validation of a Bounding Surface Plasticity Model against the Experimental Response of (Bio-) Cemented Sands,</b> Maya El Kortbawi, <i>University of California, Davis</i> ; Katerina Ziotopoulou, <i>University of California, Davis</i> ; Michael G. Gomez, <i>University of Washington, Seattle</i> ; Minyong Lee, <i>University of Washington, Seattle</i> <b>Impact of Hysteretic Damping on Nonlinear Dynamic Soil-Underground Structure-Structure Interaction Analyses,</b> Yuamar Imarrazan Basarah, S.M.ASCE, <i>University of Illinois at Urbana-Champaign</i> ; Ozgun A. Numanoglu S.M.ASCE, <i>University of Illinois at Urbana-Champaign</i> ; Youssef M.A. Hashash, Ph.D., P.E., F.ASCE, <i>University of Illinois at Urbana-Champaign</i> ; Shideh Dashit, Ph.D., M.ASCE, <i>University of Colorado Boulder</i>	<b>Filler-Stabilized Xanthan Gum for Soil Improvement,</b> Justin Antonette S.M.ASCE, <i>Stony Brook University</i> ; Karam Jaradat, <i>Stony Brook University</i> ; Johnny Donza, <i>Stony Brook University</i> ; Zubin Darbari, <i>Stony Brook University</i> ; Sherif Abdelaziz, Ph.D., <i>Stony Brook University</i> <b>Case Study: Use of Geopolymers to Evaluate the Swell-Shrink Behavior of Native Clay in North Texas,</b> Rinu Samuel, EIT, S.M.ASCE, <i>University of Texas at Arlington</i> ; Oscar Huang, <i>Texas A&amp;M</i> ; Aritra Banerjee, <i>University of Texas at Arlington</i> ; Jasaswee Das, <i>University of Texas at Arlington</i> ; Anand Puppala, <i>University of Texas at Arlington</i> ; Miladin Radovic, Ph.D., <i>Texas A&amp;M University</i> <b>Shear behavior of Hydrogel-Type Biopolymer-Treated Coarse Soils Evaluated by Laboratory Tri-Axial Test,</b> Sojeong Lee, M.S., <i>University of New South Wales (UNSW)</i> ; Jooyoung Im, <i>Korea Advanced Institute of Science and Technology (KAIST)</i> ; Gye-Chun Cho, Ph.D., <i>Korea Advanced Institute of Science and Technology (KAIST)</i> ; Ilhan Chang, Ph.D., A.M.ASCE, <i>University of New South Wales (UNSW)</i>	<b>Influence of Temperature Variation on Complex-Impedance Measuring Instrument Test Results,</b> Jason S. Hertz, P.E., M.ASCE, <i>Skanska</i> ; Christopher L. Meehan, Ph.D., P.E., F.ASCE, <i>University of Delaware</i> <b>Electrical Resistivity Measurements in Advanced Triaxial Tests,</b> Wing Shun Kwan, Ph.D., P.E., M.ASCE, <i>California State University, Los Angeles</i> ; Mark Tufenkjian, <i>California State University, Los Angeles</i> ; James Tuazon, <i>California State University, Los Angeles</i> ; Niccolas Peralta, <i>California State University, Los Angeles</i> ; Kenny Khov, <i>California State University, Los Angeles</i> ; Freddy Garcia, <i>California State University, Los Angeles</i> <b>Frequency Effects on Low-Strain Shear Modulus and Damping for Natural Clays and Silts,</b> Pitak Ruttithivaphanich, <i>University of South Carolina</i> ; Inthuorn Sasanakul, Ph.D., PE, M.ASCE, <i>University of South Carolina</i>	<b>Role of Water Absorption on Rainsplash Erosion Performance of Natural Fiber RECPs,</b> Jennifer L Smith, Ph.D., <i>John P. Stopen Engineering Partnership</i> ; Shobha K. Bhatia, Ph.D., <i>Syracuse University</i> <b>Innovative and Sustainable Uses of Volcanic Ash as a Natural Pozzolan for Dust Abatement and Unpaved Roadway Improvement,</b> Matthew Sleep, Ph.D., <i>Oregon Institute of Technology</i> ; Morgan Masley, <i>Oregon Institute of Technology</i> <b>Application of Triple Bottom Line Sustainability Framework to Select Remediation Method at Industrial Contaminated Site,</b> Krishna R Reddy Ph.D., P.E., D.GE, F.ASCE, ENV SP, <i>University of Illinois at Chicago</i> ; Girish Kumar, S.M.ASCE, <i>University of Illinois at Chicago</i>	<b>Karst Topography Risks – Investigation, Design, and Construction with Case Studies,</b> Jeremy J. Brown, P.E., M.ASCE, <i>Schnabel Engineering</i> ; Mia Painter P.G., <i>Schnabel Engineering</i> ; B. Philip Shull, P.E., <i>Schnabel Engineering</i> <b>Shear Behavior of Weathered Compacted Shales,</b> Lindsey Sebastian Bryson, Ph.D., P.E., M.ASCE, <i>University of Kentucky</i> ; Faisal S. Ahmed, M.ASCE, <i>University of Kentucky</i> <b>Sinkhole Stability Charts in Central Florida Soils,</b> Moataz Soliman, <i>University of Central Florida</i> ; Luis Arboleda, <i>University of Central Florida</i> ; David Horhota, <i>Florida Department of Transportation</i> ; Boo Hyun Nam, <i>University of Central Florida</i>	<b>Case Histories in the Evolution of Geotechnical Data and How it is Changing Our Industry,</b> Allen Cadden, P.E., D.GE, F.ASCE, <i>Schnabel Engineering, Inc.</i> ; Johanna Mikitka Simon, P.E., M.ASCE <i>Schnabel Engineering, Inc.</i> ; Todd Roberts P.G.; <i>Sensometrics</i> <b>The Value of Data – The Qatar Geological Mapping Project,</b> Joseph T. Krupansky, P.G., <i>Gannett Fleming Inc.</i> ; Michael A. Knight, P.G., <i>Gannett Fleming Inc.</i> ; Randall C. Orndrff, <i>U.S. Geological Survey</i> ; Khaled M. Al-Akhras, Ph.D., P.E., <i>Ministry of Municipality &amp; Environment</i> ; Ara G. Mouradian, P.E., <i>Gannett Fleming Inc.</i> ; Ali F. Saleh, <i>Ministry of Municipality &amp; Environment</i> <b>GIS-Based Geotechnical Engineering Data Management: A Case Study at the Alabama DOT,</b> Andrew J. Graettinger, Ph.D., M.ASCE, <i>The University of Alabama</i> ; Kaye Chancellor Davis, P.E. M.ASCE, <i>Alabama Department of Transportation</i> ; Randy K. Smith, Ph.D., <i>The University of Alabama</i> ; Rachel Robinson, <i>The University of Alabama</i>

1:30 – 3:00 p.m. Technical Sessions							
Track A   Room 122A	Track B   Room 125	Track C   Room 123	Track D   Room 124	Track E   Room 121B	Track F   Room 120C	Track G   Room 121A	Track H   Room 121C
<p><b>Deep Foundations: Piles</b>  <b>Moderators:</b> Sarah L. Gassman, P.E., M.ASCE, Sam Sternberg, III, P.E., D.GE, M.ASCE</p>	<p><b>Embankments, Dams, and Slopes: Embankment and Slope Stability</b>  <b>Moderators:</b> Bernardo A. Castellanos, A.M.ASCE, Peter A. Narsavage, P.E., M.ASCE</p>	<p><b>Earthquake Engineering and Soil Dynamics: Numerical Modeling</b>  <b>Moderators:</b> Ashly Cabas Mijares, Ph.D., A.M.ASCE, Zia Zafir G.E., P.E., M.ASCE</p>	<p><b>Soil Improvement: Biopolymers</b>  <b>Moderators:</b> Michael G. Gomez, A.M.ASCE, Maria Chrysochoou A.M.ASCE</p>	<p><b>Soil Properties and Modeling</b>  <b>Moderators:</b> Michelle L. Bernhardt, Ph.D., A.M.ASCE, Inthurn Sasanakul, P.E., M.ASCE</p>	<p><b>Sustainability In Geotechnical Engineering</b>  <b>Moderators:</b> Boo Hyun Nam, Ph.D., A.M.ASCE, Krishna R. Reddy, Ph.D., P.E., D.GE, ENV SP, FASCE</p>	<p><b>Engineering Geology and Site Characterization: Part II</b>  <b>Moderators:</b> Paola Bandini, Ph.D., P.E., M.ASCE, Eric S. Backlund, P.E., M.ASCE</p>	<p><b>Data and Software for Geotechnical Engineering</b>  <b>Moderators:</b> Robert C. Bachus, P.E., D.GE, M.ASCE, Jan Cermak, P.E., M.ASCE</p>
<p><b>Comparison of Settlement Response of Piled-Raft Foundation Subjected to Combined Loads Computed from Finite Element and Analytical Models, Nadarajah Ravichandran, Ph.D., Clemson University; Shweta Shrestha, Clemson University</b></p> <p><b>The Reaction of CPT to Excavation Unloading and its Effect on Laterally Loaded Piles; Jongjiang Li, Southeast University of China; The University of Western Australia; Songyu Liu, Ph.D., M.ASCE, Southeast University; Liyuan Tong, Ph.D., Southeast University; Tao Yang, Southeast University</b></p> <p><b>Load Transfer Mechanism of Micropiles in Weathered Rock, Ed 'Audai' Theinat E.I.T, M.ASCE, Purdue University; Ronaldo Luna, Ph.D., P.E., FASCE, Saint Louis University</b></p>	<p><b>Unmanned Aircraft System (UAS) Photogrammetry for Tracking Streambank Erosion and Geomorphic Change Along a Protected River Corridor, Scott D Hamshaw, Ph.D., P.E., University of Vermont; Kristen I Underwood, University of Vermont; Donna M. Rizzo, Ph.D., University of Vermont; Jarlath O'Neil-Dunne, University of Vermont; Mandar M. Dewoolkar, Ph.D., P.E., University of Vermont</b></p> <p><b>Rupture Failure Modes in Analyses of Stability of Soil and Rock Slopes, Dowon Park M.Sc., University of Michigan; Radoslaw L. Michalowski, Ph.D., FASCE, University of Michigan</b></p> <p><b>Load Displacement Compatibility Method for Design of Column-Supported Embankments: Comparison to Case Histories, Joel A. Sloan Ph.D., P.E., M.ASCE, U.S. Air Force Academy; Michael P. McGuire Ph.D., P.E., M.ASCE, Lafayette College; Aaron P. Gallant Ph.D, P.E., M.ASCE, University of Maine</b></p>	<p><b>An Experimental and Numerical Study of Prefabricated Vertical Drains as a Liquefaction Countermeasure for Mat-Founded Structures, Jenny Ramirez, University of Colorado Boulder; Shideh Dasthi, Ph.D., University of Colorado Boulder; Abbie Liel, University of Colorado Boulder; Balaji Paramasivam, University of Colorado Boulder</b></p> <p><b>Cyclic Behavior and Liquefaction Resistance of Fine Coal Refuse – Experimental and Numerical Modeling; Sajjad Salam, Pennsylvania State University; Ming Xiao, Ph.D., P.E., Pennsylvania State University; Arash Khosravifar, Ph.D., P.E., Portland State University; Jintai Wang, Pennsylvania State University</b></p> <p><b>Propagation of Seismic Settlements at Depth to the Ground Surface – A Case History, Jose L.M. Clemente, Ph.D., P.E., D.GE, FASCE, Bechtel National, Security &amp; Environmental; Michael R. Lewis, P.E., FASCE, Bechtel Infrastructure; Tainfei "Tyler" Liao, Ph.D., P.E., M.ASCE, Bechtel NS&amp;E; Michael D. McHood, P.E., M.ASCE, Bechtel NS&amp;E; Michael Boone, P.E., M.ASCE, Black &amp; Veatch</b></p>	<p><b>Reducing Soil Permeability Using In-Situ Biofilm-Forming Bacteria: Overcoming Testing Apparatus Challenges, Mary J.S. Roth, Ph.D., P.E., M.ASCE, Lafayette College; Laurie Caslake, Ph.D., Lafayette College</b></p> <p><b>A Study on Thermal Consolidation of Fine Grained Soils Using Modified Consolidometer, Mohammad Jashaghani S.M.ASCE, University of Louisville; Omid Ghasemi-Fare, A.M.ASCE, University of Louisville</b></p> <p><b>Effect of Molarity of Geopolymers on CKD and UGc Admixed BC Soil, Prathap Kumar M T, Ph.D., RNS Institute of Technology; Sapna Devendra M.E., Ghousia College of Engineering</b></p>	<p><b>Visualizing the Role of Particle Shape on 2D Inter-Particle Fluid Flow Using a Transparent Soil, Surrogate, Linzhu (Lynn) Li M.Sc., New York University; Mehdi Ormidvar, Ph.D., A.M.ASCE, Manhattan College; Stephan Bless Sc.D., F.APS, E.IBS, NYU; Maqeed Iskander, Ph.D., P.E., FASCE, New York University</b></p> <p><b>Impact of Biology on Particle Crushing in Offshore Calcareous Sediments, Ryan D Beemer, Ph.D., A.M.ASCE, University of Western Australia; Aleksey Sadekov, Ph.D., University of Western Australia; Ulysse Lebrech, Norwegian Geotechnical Institute – Perth; Jeremy Shaw, Ph.D., University of Western Australia; Alexandre Bandini-Maeder, Ph.D., University of Western Australia; Mark J Cassidy D.Phil., The University of Melbourne</b></p> <p><b>Accounting for Strain Rate Dependent Behavior during Consolidation of Saturated Clay, Ross W. Boulanger, Ph.D., P.E., FASCE, University of California, Davis; Scott J. Brandenburg, Ph.D., P.E., M.ASCE, University of California at Los Angeles</b></p>	<p><b>Performance of a Field-Scale Shallow Horizontal Thermal Energy Storage System, Tugce Baser, Ph.D., University of Alberta; Candice Hanna, University of California San Diego; John S McCartney, Ph.D., P.E., M.ASCE, University of California San Diego</b></p> <p><b>Use of Repurposed Fibers to Decrease Hydraulic Conductivity without Compromising Load Restrictions in Urban Roof Farms, Ivan L. Guzman, Ph.D., M.B.A., P.E., M.ASCE, New York City College of Technology; Sandra M. Torres M.ASCE, New York City College of Technology</b></p> <p><b>Geotechnical Resilience Engineering Guidelines for Upland Confined Disposal Facilities: A Case Study Approach, Matthew M Lunemann, P.E., ENV. S.P., M.ASCE, WSP USA; W. Scott Douglas, New Jersey Department of Transportation</b></p>	<p><b>Rockfall in New Jersey: A Proactive and Collaborative Approach, Amber B. Granger P.G., Haley &amp; Aldrich; Edward M. Zamiskie, P.E., Haley &amp; Aldrich; Scott J. Deeck, P.E., New Jersey Department of Transportation; John P. Jamerson, New Jersey Department of Transportation</b></p> <p><b>Mill Creek: Efficient Characterization and Development of 200-Acre Site Underlain by Karst Geology, Ryan T. Walters, P.E., Maser Consulting P.A.; Alexander Ross P.G., Maser Consulting P.A.; Philip E. Gouffreau, P.E., M.ASCE, Maser Consulting P.A.</b></p>	<p><b>Slope Stability Monitoring and Early-Warning System for Kariba Dam South Bank Slope Prospect, Kudakwashe Motsi, MSc (candidate), University of Cape Town; Denis Kalumba, University of Cape Town; Lunga Mapekula, University of Cape Town; Charles Chibvura, University of Southern Queensland</b></p> <p><b>Preliminary Results from a Continuous Compaction Control Data Set Recorded During Active Earthwork Construction, William J. Baker, III E.I., S.M.ASCE, University of Delaware; Christopher L. Meehan, Ph.D., P.E., FASCE, University of Delaware</b></p> <p><b>Distributed Fiber Optic Sensing of Land Deformation: Methods and Case Studies, Cheng-Cheng Zhang, University of California, Berkeley; Bin Shi, Ph.D., Nanjing University; Kenichi Soga, Ph.D., M.ASCE, University of California, Berkeley</b></p>
3:00 – 3:30 p.m. <b>Afternoon Networking Break, Exhibit Hall E</b>							
3:30 – 5:30 p.m. <b>Special Session: A 50-Year Tribute to Ralph Peck and the Observational Method, Part II, Room 120B</b>							
3:30 – 5:30 p.m. <b>Poster Session I, Exhibit Hall E (see pages 16-18)</b>							
6:00 – 7:30 p.m. <b>Organizational Member Executive Leadership Dinner and Workshop (Invitation Only), Loews Philadelphia Hotel – Lescaze Room, 33rd Floor</b>							
7:45 – 8:45 p.m. <b>G-I Student Program: Organizational Members and Student Travel Grant Winners Job Fair (Invitation Only), Room 122B</b>							
8:45 – 9:45 p.m. <b>G-I Student Program: Organizational Member and Student Reception, Room 122B</b>							

## Monday Poster Session

3:30 – 5:30 p.m., Exhibit Hall E

### Deep Foundations: Piles

**PB02 | Experimental and Numerical Analysis of Bearing Capacity of Large Diameter Open-Ended Pipe Piles,** Yuan Guo, Ph.D., *Case Western Reserve University*; Jiale Li, Ph.D., *Case Western Reserve University*; Xiong Yu, Ph.D., P.E., FASCE, *Case Western Reserve University*

**PB03 | Geotechnical Centrifuge Experiments on Bearing Capacity of Pipe Piles,** Jiale Li, Ph.D., *Hebei University of Technology*; Yuan Guo, Ph.D., *Case Western Reserve University*; Xiong Yu, Ph.D., P.E., FASCE, *Case Western Reserve University*

**PB04 | Analysis & Assessment of the Exiting Deep Foundation and Design of Supplemental Deep Foundation for Dolphin Tower,** Said Irvani, Ph.D., P.E., FASCE, *Irvani P. A.*

**PB05 | Performance of Osterberg Cell (O-cell) Load Tests on High-Capacity Production Drilled Shafts at the Kosciusko Bridge,** Matteo Ferruci, P.E., *WSP USA*; Daniela Zellers, *WSP USA*; Sherif Hanna, *WSP USA*; Bob Adams, *NYSDOT*; Jeff Moryl, *NYSDOT*

### Deep Foundations: Drilled Shafts

**PB06 | Sinkhole Development and Propagation During Drilled Shaft Construction in West-Central Florida during the 2017 Atlantic Hurricane Season,** Christopher Benjamin Stryffeler, P.E., M.ASCE, *University of South Carolina*; Inthuom Sasanakul, Ph.D., P.E., *University of South Carolina*

**PB07 | Effects of Cavities on the Mechanical Behavior of Pile Foundations in Weak Rock,** Thao Van Thi Nguyen, *Muroran Institute of Technology*; Shima Kawamura, A.M.ASCE, *Muroran Institute of Technology*; Satoshi Matsumura, *Port and Airport Research Institute*

**PB08 | Numerical Study of Quasi-Static to Dynamic Pullout Capacity of Anchors in Sand,** Bahman Sheikh, M.S., Ph.D. Candidate, *Pennsylvania State University*; Tong Qiu, Ph.D., P.E., *Pennsylvania State University*

### Deep Foundations: Other

**PB09 | A Case History of Installation and Load Testing Challenges for Auger-Cast Piles in the Piedmont Geology,** Bradford Drew, P.E., *Willmer Engineering Inc.*; Sujit K. Bhowmik, Ph.D., P.E., M.ASCE, *Willmer Engineering Inc.*; Jim L. Willmer, P.E., FASCE, *Willmer Engineering Inc.*

**PB10 | Complexities of Mixed Foundation Systems for Boston Highrise,** Kelvin Wong, M.S.C.E., P.E., *Haley & Aldrich, Inc.*; Damian Siebert, P.E., M.ASCE, *Haley & Aldrich, Inc.*; Sandra Iberg, M.S.C.E., P.E., *Haley & Aldrich, Inc.*

**PB11 | High-Capacity Micropiles in Edmonton Shale,** Onur Kacar, Ph.D., P.E., M.ASCE, *Arup*; Andrew Cushing, P.E. *Arup*

**PB12 | Studies on Cyclic Behaviors of Unit Bucket for Tripod Foundation System under Various Loadings via Centrifuge Model Tests,** Yeong-Hoon Jeong, *Korea Advanced Institute of Science and Technology (KAIST)*; Jae-Hyun Kim, *Korea Advanced Institute of Science and Technology (KAIST)*; Heon-Joon Park, *Korea Advanced Institute of Science and Technology (KAIST)*; Dong-Soo Kim, *Korea Advanced Institute of Science and Technology (KAIST)*

**PB21 | Hydraulic Fracturing in Widely-Graded Dam Core Material,** Ross D. Waters, B.E. (Hons), P.E., *University of Canterbury*; Kaley Crawford-Flett, B.E. (Hons), Ph.D., *University of Canterbury*; Mark Stringer, Ph.D., *University of Canterbury*; Jennifer Haskell, Ph.D., *University of Canterbury*

### Embankments, Dams, and Slopes: Dams and Levees

**PB22 | Finite Element Modeling of Partial Penetration Well Uplift Factors,** Andrew M. Keffer, P.E., *U.S. Army Corps of Engineers, Huntington District*; Erich D. Guy, Ph.D., P.G., *U.S. Army Corps of Engineers, Huntington District*; Elisabeth M. Chang, *U.S. Army Corps of Engineers, Huntington District*

**PB23 | Safety Evaluation and Rehabilitation for Buxi High CFRD with Face Slab Rupture,** Yao Xu, *China Institute of Water Resources and Hydropower Research*; Yang Wang, Ph.D., *China Institute of Water Resources and Hydropower Research*; Rong Li, *China Institute of Water Resources and Hydropower Research*

**PB24 | Geotechnical Health Assessment of Roadway Embankment Using Airborne Lidar,** Ahmed H. Elmekati, Ph.D., P.E., M.ASCE, *Maser Consulting, P.A.*; Robert Dannenberg, R.P., *Maser Consulting, P.A.*; Nabil Ghanem, P.E., *Maser Consulting, P.A.*

### Embankments, Dams, and Slopes: Embankment and Slope Stability

**PB25 | Reliability-Based Stability Analysis of Fiber-Reinforced Infinite Slopes,** Assile Abou Diab, Ph.D., *Dar Al Uloom University*; Shadi Najjar, Ph.D., A.M.ASCE, *American University of Beirut*; Salah Sadek, Ph.D., M.ASCE, *American University of Beirut*

**PB28 | Design and Repair of a Reinforced Steep Slope, Pinnacle at Tutwiler Farms, Birmingham, Alabama,** Robert L. Goehring, P.E., D.GE, FASCE, *ECS Southeast*

**PB39 | Seismic Bearing Capacity Factor Nye for Shallow Strip Footing Using Modified Pseudo-Dynamic Method,** Kshitija Nadgouda, S.M.ASCE, M.S., *Indian Institute of Technology Bombay*; Deepankar Choudhury, Ph.D., M.ASCE, *FNASC Indian Institute of Technology Bombay*

### Earthquake Engineering and Soil Dynamics: Soil-Structure Interaction

**PB40 | Shake Table Test of Railway Embankment Consisting of LWA and TDA,** Arezoo Sadrinezhad, Ph.D., P.E., *California State University Fresno*; Fariborz M. Tehrani, Ph.D., P.E., *ENV SP, California State University Fresno*; Bhavesh Jeevanlal, *California State University Fresno*

**PB41 | Numerical Assessment of Seismic Earth Pressure for Integral Abutment Bridges** Mahmood Seid-Karbasi, Ph.D., *Golder Associates Ltd.*

**PB42 | Seismic Behavior or Buried Pipelines in Mexico City Valley,** Raul Flores-Berrones Ph.D., P.E., FASCE, *Mexican Institute of Water Technology*

**PB43 | Comparison of Seismic Response of Gravity and Cantilever Retaining Wall Backfilled with Dirty Coarse-Grained Material,** Faiza Khan, *Southern Illinois University Edwardsville*; Siavash Zamiran, *Marino Engineering Associates, Inc.*; Abdolreza Osouli, Ph.D., P.E., M.ASCE, *Southern Illinois University Edwardsville*

**PB44 | Effects of Soil-Structure Interaction of FRP Confined Reinforced Concrete Structure under Lateral Cyclic Loading,** Vivek B., Ph.D., *BITS Pilani Dubai Campus*; Prishati Raychowdhury, Ph.D., *Indian Institute of Technology Kanpur*

**PB45 | Seismic Retrofit Design of a 110-year Old Railway Bridge Founded on Liquefiable Soils Using Large Diameter Driven Piles,** Ali Ghandeharion, Ph.D., P.Eng., *Klohn Crippen Berger Ltd.*; James Williams, M.Sc., P.E., *Klohn Crippen Berger Ltd.*; Bruce Hamersley, P.E., *Klohn Crippen Berger Ltd.*

**PB46 | Seismic Soil-Structure Interaction Response of Tall Buildings** Jaime A. Mercado, M.Sc., S.M.ASCE, *University of Central Florida*; Luis G. Arboleda-Monsalve, Ph.D., M.ASCE, *University of Central Florida*; Vesna Terzi, Ph.D., *California State University Long Beach*

**PB47 | Measured and Predicted Dynamic Horizontal Sliding and Rocking Response of an Embedded Footing at TAMU NGES Site,** Patrick W. Dunn, Ph.D., P.E., *Duke Energy*; Dennis R. Hiltunen, Ph.D., P.E., M.ASCE, *University of Florida*

**PB48 | Dynamic Numerical Evaluation of Landfill Perimeter Levee on Liquefiable Subgrade Mitigated with Cement Deep Soil Mixing,** Alan F. Witthoef, P.E., G.E., M.ASCE, *Geo-Logic Associates, Inc.*; Robbie M. Warner P.E., G.E., M.ASCE, *Geo-Logic Associates, Inc.*; Neven Matasovic, Ph.D., P.E., G.E., FASCE, *Geo-Logic Associates, Inc.*

### Earthquake Engineering and Soil Dynamics: Numerical Modeling

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Haley, P.E., Haley & Aldrich; Jean Louis Z. Locsin, P.E., Ph.D., Haley & Aldrich; Jesse D. Siegel, P.E., Haley & Aldrich <b>Design and Performance of a Temporary Concrete Diaphragm Wall Excavation Support System in South Boston</b> , Wylan Carswell, Ph.D., Haley & Aldrich; Damian Siebert, P.E., M.ASCE, Haley & Aldrich <b>Numerical Analysis of a TBM Retrieval Shaft Construction Using Deep Soil Mixing</b> , Onur Kacar, Ph.D., P.E., Arup USA; Chu Ho, Sc.D., P.E., Arup USA	<b>Updated Reference Shear Wave Velocity Curves for Near-Surface Site Characterization</b> , Salman Rahimi, University of Arkansas at Fayetteville; Clinton M. Wood, A.M.ASCE, University of Arkansas at Fayetteville; Michelle L. Bernhardt, A.M.ASCE, University of Arkansas at Fayetteville; Ashraf Kamal Himel, University of Arkansas at Fayetteville <b>Long-Term Monitoring of a Slow Moving Landslide before and after Remediation Using Ground-Based Radar Interferometry</b> , Francisco Gomez, Ph.D., R.G., University of Missouri; Brent L. Rosenblad, Ph.D., P.E., M.ASCE, University of Missouri; J. Erik Loehr, Ph.D., P.E., F.ASCE, University of Missouri; Jared Smoot, University of Missouri; Ben Lowry, Colorado School of Mines <b>Theoretical Evaluation of the Interval Method Commonly Used for Downhole Seismic Testing</b> , Mohamad M. Hallal, B.E., S.M.ASCE, University of Texas at Austin; Brady R. Cox, Ph.D., P.E., A.M.ASCE, University of Texas at Austin	<b>Plate Load Testing on Layered Pavement Foundation System to Characterize Mechanistic Parameters</b> , David J. White, Ph.D., P.E., M.ASCE, Ingios Geotechnics, Inc.; Pavana Venappasa, Ph.D., P.E., M.ASCE, Ingios Geotechnics, Inc.; Jeffery R. Roesler, Ph.D., P.E., University of Illinois Urbana-Champaign; William Vavrik, Ph.D., P.E., M.ASCE, Applied Research Associates <b>Long-Term Field Performance of Geosynthetics in Pavement Subgrades in Virginia</b> , M. Shabbir Hossain, Ph.D., P.E., M.ASCE, Virginia Department of Transportation; Edward J. Hoppe, Ph.D., P.E., M.ASCE, Virginia Department of Transportation; Chaz Weaver, P.E., F.ASCE, Virginia Department of Transportation <b>Using Soil-Moisture Active Passive Satellite Data to Evaluate the Performance of Transportation Infrastructure Foundations – A Feasibility Study</b> , Simon Packman, S.M.ASCE, California State University Los Angeles; Sonya R. Lopez, Ph.D., California State University Los Angeles / NASA Data Intensive Research and Education Center for STEM; Aria Fathi, S.M.ASCE, The University of Texas at El Paso; Mehran Mazari, Ph.D., A.M.ASCE, California State University Los Angeles	

10:30 a.m. – 12:00 p.m. Technical Sessions							
Track A   Room 122A	Track B   Room 125	Track C   Room 123	Track D   Room 124	Track E   Room 121B	Track F   Room 120C	Track G   Room 121A	Track H   Room 121C
<p><b>Deep Foundations: Driven Piles</b>  <b>Moderators:</b> Muhannad T. Suleiman, A.M.ASCE, Jared M. Green, P.E., M.ASCE</p>	<p><b>Embankments, Dams, and Slopes: Landslides</b>  <b>Moderators:</b> William K. Petersen, P.E., M.ASCE, Daniel R. Vanden Berge, P.E., M.ASCE</p>	<p><b>Earthquake Engineering and Soil Dynamics: Laboratory Testing</b>  <b>Moderators:</b> Majid Ghayoomi, Ph.D., P.E., M.ASCE, James Kaklamanos, Ph.D., EIT, A.M.ASCE</p>	<p><b>Soil Improvement: Microbially Induced Calcite Precipitation</b>  <b>Moderators:</b> Bret N. Lingwall, P.E., M.ASCE, Leon A. Van Paassen Aff.M.ASCE</p>	<p><b>Unsaturated Soils</b>  <b>Moderators:</b> Kalehiwat Nega Manahiloh, Ph.D., P.E., M.ASCE, Tugce Baser, A.M.ASCE</p>	<p><b>Earth Retaining Structures: Top-Down Construction</b>  <b>Moderators:</b> J. Tanner Blackburn, Ph.D., P.E., M.ASCE, Burak F. Tanyu C.Eng, M.ASCE</p>	<p><b>Geophysical Engineering</b>  <b>Moderators:</b> Clinton M. Wood, Ph.D., P.E., M.ASCE, Barbara Luke, Ph.D., P.E., D.GE, FASCE</p>	<p><b>Pavements: Part I</b>  <b>Moderators:</b> Reza S. Ashtiani, Ph.D., P.E., Ahmed Faheem A.M.ASCE</p>
<p><b>Development of Axial Load Transfer (T-Z) Analytical Model for the PSC Piles,</b>  Md. Nafii Haque, <i>Louisiana State University</i>; Murad Abu-Farsakh, <i>Louisiana State University</i></p> <p><b>A Numerical Study of Pre-Boring Impacts on Side Friction of Piles,</b>  Shengli Chen, Ph.D., <i>Louisiana State University</i>; Lin Li, Ph.D., <i>Louisiana State University</i>; Zhongjie Zhang, Ph.D., P.E., <i>Louisiana Department of Transportation and Development</i></p> <p><b>Evaluation of Direct CPT Methods for Estimating the Ultimate Capacity of Driven Piles,</b> Murad Abu-Farsakh, Ph.D., P.E., FASCE, <i>Louisiana State University</i>; Mohsen Amirmojahedi, <i>Louisiana State University</i></p>	<p><b>Hydrological Behavior of an Infiltration Induced Landslide in Colorado, USA,</b> Alexandra Wayllace, Ph.D., P.E., <i>Colorado School of Mines</i>; Ning Lu, Ph.D., FASCE, <i>Colorado School of Mines</i>; Barbara Thunder M.S., <i>Civil and Environmental Engineering Hart Crowser</i></p> <p><b>Stabilization of Rainfall-Induced Slope Failure and Pavement Distresses using Recycled Plastic Pins and Modified Moisture Barrier,</b> Anuja Sapkota, <i>The University of Texas at Arlington</i>; Asif Ahmed, Ph.D., <i>The University of Texas at Arlington</i>; Pratibha Pandey, <i>The University of Texas at Arlington</i>; Md. Sahadat Hossain, Ph.D., P.E., <i>The University of Texas at Arlington</i>; Nicasio Lozano, <i>Texas Department of Transportation</i></p> <p><b>Investigation, Monitoring and Design of an Anchored Retaining Wall at the Base of a Moving Slope,</b> Jason D. Ross, P.E., M.ASCE, S&amp;ME, Inc.; Michael G Rowland, P.E., M.ASCE, S&amp;ME, Inc.; Brett A Dregler, P.E., M.ASCE, <i>American Electric Power</i>; Charles A. Nutt, P.E., <i>Varo Engineers, Inc.</i></p>	<p><b>Evaluating Seismic Behavior of Intermediate Silty Sands of Low Plasticity from Emilia Romagna, Italy,</b> Daniela Dominica Porcino, <i>University Mediterranea of Reggio, Calabria</i> Paola Monaco, <i>University of L'Aquila</i>; Laura Tonni III, <i>University of Bologna</i></p> <p><b>On the Effects of Inadequate Height Control in Constant Volume Monotonic and Cyclic Direct Simple Shear Test,</b> Kaveh Zehtab, <i>Geocomp Corp.</i>; Seda Gokyer, Ph.D., <i>Geocomp Corp.</i>; Salim K Werden, <i>Geocomp Corp.</i>; W. Allen Marr, Ph.D., P.E. FASCE, NAE, <i>Geocomp Corp.</i>; Artur Apostolov, <i>Geocomp Corp.</i></p> <p><b>Centrifuge Modeling and Analysis of Level Site Liquefaction Subjected to Biaxial Dynamic Excitations,</b> Omar Elshafee, Ph.D., <i>Rensselaer Polytechnic Institute</i>; Tarek Abdoun, Ph.D., <i>Rensselaer Polytechnic Institute</i>; Mourad Zeghal, Ph.D., <i>Rensselaer Polytechnic Institute</i></p>	<p><b>Microbiologically Induced Calcite Precipitation using Surfactants for the Improvement of Organic Soil,</b> Matthew Davies M.S., <i>University of North Florida</i>; Raphael Crowley, Ph.D., P.E., M.ASCE, <i>University of North Florida</i>; Terri N. Ellis, Ph.D., <i>University of North Florida</i>; Nick Hudyma, Ph.D., P.E., M.ASCE, <i>University of North Florida</i>; Paige Ammons, <i>University of North Florida</i>; Christian Matem B.S., <i>University of North Florida</i>; Scott Wasman, Ph.D., <i>University of Florida</i>; Mohammed Yahaya B.S., <i>University of Florida</i>; Jennifer Ford B.S., <i>University of Florida</i>; Andrew R. Zimmerman, <i>University of Florida</i></p> <p><b>Evaluating Shallow Mixing Protocols as Application Methods for Microbial Induced Calcite Precipitation Targeting Expansive Soil Treatment,</b> Bhaskar C. S. Chittoori, Ph.D., P.E., M.ASCE, <i>Boise State University</i>; Tasria Rahman, <i>Boise State University</i>; Malcolm Burbank, Ph.D., CDM Smith; Arif Ali Baig Moghal, Ph.D., M.ASCE, <i>NIT Warangal</i></p> <p><b>Investigating Ammonium By-Product Removal Following Stimulated Ureolytic Microbially-Induced Calcite Precipitation,</b> Minyong Lee, <i>University of Washington</i>; Colin M. Kolbus, <i>University of Washington</i>; Andres D. Yepes, <i>University of Washington</i>; Michael G. Gomez, Ph.D., A.M.ASCE, <i>University of Washington</i></p>	<p><b>Characterizing the Unsaturated Strength Behavior of a Native Transition Soil Used as Backfill in the Construction of US 301, Section 3,</b> Mehdi Kadivar, Ph.D., Candidate <i>University of Delaware</i>; Kalehiwat Nega Manahiloh, Ph.D., P.E., <i>University of Delaware</i>; Victor N. Kaliakin, Ph.D., <i>University of Delaware</i></p> <p><b>Stability of Unsaturated Sand Beds in the Intertidal Zone during Tsunami Loading,</b> Babak Mahmoodi, <i>University of Maine</i>; Aaron P Gallant, Ph.D., P.E., M.ASCE, <i>University of Maine</i>; Benjamin Mason, Ph.D., <i>Oregon State University</i></p> <p><b>Large-Scale Cyclic Plate Loading Tests of Wicking Geotextile-Stabilized Bases with Rainfall Simulation,</b> Jun Guo, <i>Shenzhen University</i>; Jie Han, <i>University of Kansas</i>; Xiong Zhang, <i>Missouri University of Science and Technology</i></p>	<p><b>Deep Excavations in Central Jakarta Area: A Case History and Numerical Simulations,</b> Fuchen Teng, Ph.D., <i>National Taiwan University of Science and Technology</i>; Melisa Kosasi, <i>National Taiwan University of Science and Technology</i>; Benson Hsiung, Ph.D., P.E., <i>National Kaohsiung University of Science and Technology</i></p> <p><b>Restoring RW5 at Yeager Airport: Design and Construction of a Tall Retaining Wall on the Side of a Mountain,</b> Johanna Simon, P.E., M.ASCE, Schnabel Engineering; Allen Cadden, P.E., D.GE, FASCE, Schnabel Engineering; Phil Shull, P.E., M.ASCE, Schnabel Engineering; Michael Senior E.I.T., M.ASCE, Schnabel Engineering</p> <p><b>Ultimate Limit State Design Using FEM and Advanced Soil Model – A Case History of a 30m Deep Excavation in London UK,</b> Hoe-Chian Yeow, Ph.D., CEng, MICE COWI UK Ltd.</p>	<p><b>Detection of Voids in Karst Terrain With 3D Full Waveform Tomography,</b> Khiem Tran, <i>University of Florida</i>; Michael McVay, Ph.D., <i>University of Florida</i>; Majid Mirzanejad, <i>University of Florida</i>; Scott Wasman, Ph.D., <i>University of Florida</i></p> <p><b>Geophysical Study of Natural Bridge, Virginia: A Comparison of Methods,</b> Warren T. Dean, P.G., <i>Draper Aden Associates</i>; Christopher M. Printz, P.G., <i>Draper Aden Associates</i>; Johanna M. Vaughan, <i>Draper Aden Associates</i>; Ethan T. Truman, <i>Draper Aden Associates</i></p>	<p><b>Performance Evaluation of Pavement Subgrade by In-Situ Moisture and Matrix Suction Measurement,</b> Pratibha Pandey, <i>The University of Texas at Arlington</i>; Asif Ahmed, Ph.D., E.I.T., <i>State University of New York (SUNY) Polytechnic Institute</i>; Anuja Sapkota, <i>The University of Texas at Arlington</i>; Sahadat Hossai, Ph.D., P.E., <i>The University of Texas at Arlington</i>; Boon Thian, <i>Texas Department of Transportation</i></p> <p><b>Assessment of Geotextile Effectiveness in Decreasing Subgrade Pumping and Increasing Service Life in Rigid Pavements, Using Scaled Model Mobile Load Simulator,</b> Behnoud Kermani, S.M.ASCE, GSI Fellow, <i>The Pennsylvania State University</i>; Shelley Marie Stoffels, DE, M.ASCE, <i>The Pennsylvania State University</i>; Ming Xiao, Ph.D., P.E., M.ASCE, <i>The Pennsylvania State University</i></p> <p><b>Mechanistic Assessment of Layered Pavement Foundation System using Validated Intelligent Compaction Measurements,</b> David White, Ph.D., P.E., Ingios Geotechnics, Inc.; Pavana Vennapusa, Ph.D., P.E., Ingios Geotechnics, Inc.; Erol Tutumluer, Ph.D., <i>University of Illinois at Urbana-Champaign</i>; Maziar Moaveni, Ph.D., P.E., <i>University of Illinois at Urbana-Champaign</i></p>
12:00 – 1:30 p.m. Lunch, Exhibit Hall E							

1:30 - 3:00 p.m.	<b>Panel Session: Urban Excavation Support, Room 126A</b>						
1:30 - 3:00 p.m.	<b>Technical Sessions</b>						
<b>Track A   Room 122A</b>	<b>Track B   Room 125</b>	<b>Track C   Room 123</b>	<b>Track D   Room 124</b>	<b>Track E   Room 121B</b>	<b>Track F   Room 120C</b>	<b>Track G   Room 121A</b>	<b>Track H   Room 121C</b>
<p><b>Deep Foundations: Drilled Shafts</b>  <b>Moderators:</b> Michael B. Fritzges, P.E., M.ASCE, Jose Luiz Machado Clemente, Ph.D., P.E., D.GE, F.ASCE</p>	<p><b>Lessons Learned from Embankments, Dams, and Slopes: Case Histories</b>  <b>Moderators:</b> Timothy D. Stark, Ph.D., P.E., D.GE, F.ASCE, Rafael A. Prieto</p>	<p><b>Earthquake Engineering and Soil Dynamics: Seismic Hazard Analysis, Site Response, and Liquefaction</b>  <b>Moderators:</b> Menzer Pehlivan, Ph.D., P.E., M.ASCE, Ramin Motamed, Ph.D., P.E., M.ASCE</p>	<p><b>Soil Improvement: Fiber Reinforcement and Soil Stabilization</b>  <b>Moderators:</b> Prabir Kumar Kolay, Ph.D., P.E., M.ASCE, Jonathan F. Hubler A.M.ASCE</p>	<p><b>Computational Geotechnics</b>  <b>Moderators:</b> Marta Miletić, Victor N. Kaliakin, Ph.D., M.ASCE</p>	<p><b>Earth Retaining Structures: Bottom-Up Construction</b>  <b>Moderators:</b> James A. McKelvey, III, P.E., D.GE, F.ASCE, Miguel A. Pando, P.E., M.ASCE</p>	<p><b>Geotechnics of Soil Erosion</b>  <b>Moderators:</b> Stacey E. Tucker-Kulesza, P.E., M.ASCE, Junliang Tao A.M.ASCE</p>	<p><b>Pavements: Part II</b>  <b>Moderators:</b> Reza S. Ashtiani, Ph.D., P.E.; Bora Cetin, Ph.D.</p>
<p><b>Modulus of Elasticity Impact on Equivalent Top-Loaded Curves from Bi-Directional Static Load Tests</b>, Rozbeh B Moghaddam, P.E., Ph.D., M.ASCE, GRL Engineers, Inc.;  Van E. Komurka, P.E., D.GE, F.ASCE, GRL Engineers, Inc.<sup>TM</sup></p> <p><b>Behavior of Rock-Socketed Drilled Shaft under Uni-Axial Loading – A Parametric Study</b>, Saidur M. Rahman, P.E., Gannett Fleming, Inc.; Shafiq I. Siddiqui, Ph.D., P.E., Gannett Fleming, Inc.; Kimberly Sharp, NJDOT</p> <p><b>Hudson Yards: A New Look at High-Capacity Caissons to Bedrock in Manhattan</b>, Michael Paquette, P.E., Langan; Saul Shapiro, P.E., Langan; Marc Gallagher, P.E., LEED AP, Langan</p> <p><b>A Robust Approach for Selecting LRFD Characteristic Values of Uncertain Soil Parameters for Design of Drilled Shaft in Sand</b>, Sara Khoshnevisan, Ph.D., A.M.ASCE, Clarkson University; Xiaohui Tan, Ph.D., Hefei University of Technology; Mengfen Shen, Clemson University; Chang Hsein Juang, Ph.D., F.ASCE, P.E., Clemson University; Yongjie Zhang, Ph.D., Changsha University of Science &amp; Technology Hunan</p>	<p><b>Case Study – Settlement of a Hydropower Dam Structure during 2015 Gorkha Earthquake</b>, Binod Tiwari, Ph.D., P.E., MSCE, California State University, Fullerton; Beena Ajmera, Ph.D., California State University, Fullerton; Vivek Kumar Timbadia MSCE, California State University, Fullerton</p> <p><b>Deformation Analysis of the 233m Shuibuya Rockfill Dam Using Breakage Mechanics</b>, Xiang Zhou, University of Colorado Boulder; Yida Zhang, Ph.D., University of Colorado Boulder; Gang Ma, Ph.D., Wuhan University</p> <p><b>MSE Wall Global Stability and Lessons Learned</b>, Michael T. Lustig, P.E., Iowa State University; Timothy D. Stark, Ph.D., P.E., F.ASCE, University of Illinois at Urbana-Champaign; Richard L. Handy, Ph.D., Iowa State University</p> <p><b>La Conchita Landslide, Case History and Remedial Measures</b>, Daniel Pradel, Ph.D., P.E., G.E., D.GE., F.ASCE, The Ohio State University</p>	<p><b>Mexico City Basin Effects: Past, Present, and Future</b>, Domniki Asimaki Sc.D., A.M.ASCE, Caltech; Juan Manuel Mayoral Villa, Instituto de Ingeniería de la UNAM; Peyman Ayoubi, Caltech; Kevin Franke, Brigham Young University; Tara Hutchinson, University of California, San Diego</p> <p><b>In-Situ Investigation of False-Positive Liquefaction Sites in Christchurch, New Zealand: Palinurus Road Case, History</b>, Kaleigh A. McLaughlin M.S., E.I., Langan Engineering and Environmental Services, Inc.; Brady R. Cox, Ph.D., P.E., University of Texas at Austin; Liam Wotherspoon; Ross W. Boulanger; Sjoerd van Ballegooy; Misko Cubrinovski</p> <p><b>The Importance of Quantifying Spatial Variability in Assessing the Risk of Liquefaction in a Recently Reclaimed Site</b>, Ahmad Kahiel, Ph.D., American University of Beirut; Shadi Najjar, A.M.ASCE, American University of Beirut; Salah Sadek M.ASCE, American University of Beirut</p> <p><b>Generating Synthetic Borehole Data for Applications in Site-Specific and Regional Evaluation of Liquefaction Consequences</b>, Zach Bullock, University of Colorado Boulder; Shideh Dashti, University of Colorado Boulder; Abbie B. Liel, University of Colorado Boulder; Keith A. Porter, University of Colorado Boulder</p>	<p><b>Drained Triaxial Response of Clay Reinforced with Hemp fibers</b>, Mohamad ElAhmad B.E., American University of Beirut; Salah Sadek, Ph.D., M.ASCE, American University of Beirut; Shadi Najjar, Ph.D., A.M.ASCE, American University of Beirut</p> <p><b>Stabilization of Expansive Soil Using Injection of Liquid Ionic Soil Stabilizer: A Case Study Between Field and Laboratory Treatment</b>, Sandeh Gautam, University of Texas at Arlington; Shi He, University of Texas at Arlington; Xinbao Yu, Ph.D., P.E., University of Texas at Arlington</p> <p><b>Effect of Lime Sludge, Polypropylene Fiber on Unconfined Compressive Strength And Shrinkage Behavior of Kaolin Clay</b>, Sandeep G. Burra M.S., Southern Illinois University Carbondale; Prabir K. Kolay, Ph.D., P.E., M.ASCE, Southern Illinois University Carbondale; Sanjeev Kumar, Ph.D., P.E., F.ASCE, Southern Illinois University Carbondale; Vijay K. Puri, Ph.D., Southern Illinois University Carbondale</p> <p><b>Strength Characteristics of Lime and Bottom Ash Reinforced Expansive Soils</b>, Thang Minh Le M.S., University of Technology Sydney; Liet Chi Dang M.Eng., University of Technology Sydney; Hadi Khabbaz, Ph.D., University of Technology Sydney</p>	<p><b>Simulation of the Cutting Process in Softening and Hardening Soils</b>, Zhefei Jin, Northwestern University; James Paul Hambleton, Ph.D., Northwestern University</p> <p><b>Numerical Modeling of a Free Fall Penetrometer Deployment Using the Material Point Method</b>, Luis E. Zambrano-Cruzatty, M.Sc., Virginia Polytechnic Institute and State University; Alba Yerro, Ph.D.; Virginia Polytechnic Institute and State University; Nina Stark, Ph.D., Virginia Polytechnic Institute and State University</p> <p><b>Thermo-Mechanical Behavior of Saturated Clays Using Discrete Element Modelling</b>, Karam A. Jaradat, M.Sc., Stony Brook University; Sherif L. Abdelaziz, Ph.D., A.M.ASCE, Stony Brook University</p> <p><b>Effect of Particle Size on the High Strain Rate Response of Sand</b>, Sudheer Sudhakaran Prabhu, Pennsylvania State University; Tong Qiu, Ph.D., P.E., Pennsylvania State University</p>	<p><b>Observational Design Approach: Foundation Construction beneath the Philadelphia Museum of Art</b>, Timothy S. Becker, P.E., M.ASCE, Haley &amp; Aldrich, Inc.; R. Scott Goldkamp, P.E., Haley &amp; Aldrich, Inc.; Mark X. Haley, P.E., Haley &amp; Aldrich, Inc.</p> <p><b>Numerical Simulation of Stress Distribution Beneath the Foundation of a Geosynthetic Reinforced Soil Bridge Abutment Using Parametric Studies</b>, Majid Talebi, Ph.D., P.E., M.ASCE, Marino Engineering Associates, Inc.; Christopher Meehan, Ph.D., P.E., F.ASCE, University of Delaware</p> <p><b>Perimeter Gabion MSE Wall of a New Combined Cycle Power Plant in Massachusetts</b>, Marco Isola, Ph.D., P.E., M.ASCE, Maccaferri Inc.; Andrew Woodward, Bond; Richard Prejs, Maccaferri Inc.</p> <p><b>A Simple and Rigorous Approach for Probabilistic Internal Stability Analysis and Design of Reinforced Soil Walls</b>, Richard J. Bathurst, Ph.D., M.ASCE, Royal Military College of Canada</p>	<p><b>Influence of Shear Strength and Moisture Content on Aeolian Sand Erosion</b>, Luis E Zambrano-Cruzatty, M.Sc., Virginia Polytechnic Institute and State University; Alba Yerro, Ph.D., Virginia Polytechnic Institute and State University; Nina Stark, Ph.D., Virginia Polytechnic Institute and State University</p> <p><b>A GIS-Based Platform for Near Real Time Bridge Scour Risk Assessment Using the HYRISK Model</b>, James Curra, S.M.ASCE, Manhattan College; Mehdi Omidvar, Ph.D., A.M.ASCE, Manhattan College; Brent Horine, Ph.D., Manhattan College</p> <p><b>Soil Deformation and Mechanical Behavior Induced by Internal Erosion under Complex Stress States</b>, Chen Laura Chen, Hong Kong University of Science and Technology; Limin Zhang, Ph.D., F.ASCE, Hong Kong University of Science and Technology</p> <p><b>Monitoring Stream Bank Geometry at Headwaters in a Densely Developed Watershed</b>, James D. Kugel, S.M.ASCE, Villanova University; Emily E. Caramelas, S.M.ASCE, Villanova University; Andrea L. Welker, Ph.D., P.E., M.ASCE, Villanova University; Stanley J. Kemp, Ph.D., University of Baltimore</p>	<p><b>Case History of a Geosynthetic-Stabilized Base Roadway Founded Over Expansive Clay Subgrade</b>, Liming Zheng, University of Texas at Austin; Gholam Hossein Roodi, University of Texas at Austin; Jorge G. Zornberg, University of Texas at Austin</p> <p><b>Laboratory Testing of an Externally Heated Bridge Deck Subjected to Wind</b>, Mark Timothy Hurley, University of Texas at Arlington; Xinbao Yu, Ph.D., P.E., University of Texas at Arlington; Gang Lei, S.M.ASCE, University of Texas at Arlington</p> <p><b>Cyclic Plate Load Testing for Assessment of Asphalt Pavements Supported on Geogrid Stabilized Granular Foundation</b>, David J. White, Ph.D., P.E., M.ASCE, Ingios Geotechnics, Inc.; Pavana Vennapusu, Ph.D., P.E., M.ASCE, Ingios Geotechnics, Inc.; John Siekmeier, P.E., M.ASCE, Minnesota DOT; Heath Gieselman, M.S., Ingios Geotechnics, Inc.</p> <p><b>Assessment of Tactile Pressure Sensors for Measuring Interface Pressures in Mechanically Stabilized Layers</b>, Madan Neupane, Ph.D., Gannett Fleming, Inc. – Marlton Office; Jie Han, University of Kansas; Robert L. Parsons, Ph.D., University of Kansas; Mike Horton, Tensor International</p>

1:30 – 3:00 p.m.	Technical Sessions						
Track A   Room 122A	Track B   Room 125	Track C   Room 123	Track D   Room 124	Track E   Room 121B	Track F   Room 120C	Track G   Room 121A	Track H   Room 121C
<b>Deep Foundations: Drilled Shafts</b> <b>Moderators:</b> Michael B. Fritzges, P.E., M.ASCE, Jose Luiz Machado Clemente, Ph.D., P.E., D.GE, F.ASCE	<b>Lessons Learned from Embankments, Dams, and Slopes: Case Histories</b> <b>Moderators:</b> Timothy D. Stark, Ph.D., P.E., D.GE, F.ASCE, Rafael A. Prieto	<b>Earthquake Engineering and Soil Dynamics: Seismic Hazard Analysis, Site Response, and Liquefaction</b> <b>Moderators:</b> Menzer Pehlivan, Ph.D., P.E., M.ASCE, Ramin Motamed, Ph.D., P.E., M.ASCE	<b>Soil Improvement: Fiber Reinforcement and Soil Stabilization</b> <b>Moderators:</b> Prabir Kumar Kolay, Ph.D., P.E., M.ASCE, Jonathan F. Hubler A.M.ASCE	<b>Computational Geotechnics</b> <b>Moderators:</b> Marta Miletic, Victor N. Kaliakin, Ph.D., M.ASCE	<b>Earth Retaining Structures: Bottom-Up Construction</b> <b>Moderators:</b> James A. McKelvey, III, P.E., D.GE, F.ASCE, Miguel A. Pando, P.E., M.ASCE	<b>Geotechnics of Soil Erosion</b> <b>Moderators:</b> Stacey E. Tucker-Kulesza, P.E., M.ASCE, Junliang Tao A.M.ASCE	<b>Pavements: Part II</b> <b>Moderators:</b> Reza S. Ashtiani, Ph.D., P.E.; Bora Cetin, Ph.D.
<b>Lateral Load Test for Large Diameter Drilled Shafts for the Kosciuszko Bridge Replacement</b> , Daniela Bastos Zellers, P.E., WSP; Sherif Hanna, P.E., WSP; Matteo Ferrucci, P.E., WSP; Robert Adams, P.E., New York State Department of Transportation; Jeffrey Moryl, P.E., New York State Department of Transportation  <b>Foundation Design Case Study – 1800 Arch Street High Rise Tower</b> , Daniel P. Marano Jr. MS, P.E., M.ASCE, Pennoni	<b>Evaluation of the Mechanical Behavior of Shirin-Dare Earth Dam by the Numerical Analysis and Monitoring</b> , Mohammad Rashidi, University of Texas at El Paso; Reza S. Ashtiani, Ph.D., University of Texas at El Paso; Habib Rasouli, University of Technology Sydney  <b>Column-Supported Embankment: Failure and Remedy</b> , Radoslaw L. Michalowski, Ph.D., F.ASCE, University of Michigan; Andrzej Wojtasik, Ph.D., Poznan University of Technology; Adam Duda M.Sc., Poznan University of Technology; Antoni Florkiewicz, Ph.D., Poznan University of Technology; Downon Park, Ph.D., University of Michigan	<b>Influence of Gaps in Capping Clay Layer on Liquefaction – Induced Settlement</b> , Sara Khoshnevisan, Ph.D., M.ASCE, Clarkson University; Lei Wang, Ph.D., M.ASCE, University of District of Columbia; Wei Wang, Ph.D., Institute of Disaster Prevention; Chang Hsein Juang, Ph.D., F. ASCE, Clemson University  <b>An Analysis of Liquefaction-Induced Free-Field Ground Settlement Using 1,000+ Case-Histories: Observations vs. State-of-Practice Predictions</b> , Mertcan Geyin, M.S., S.M.ASCE, University of Washington; Brett W. Maurer, Ph.D., A.M.ASCE, University of Washington	<b>Behaviors of Expansive Soils Mixed with Polymeric Stabilizing Foams</b> , Xijin Zhang, S.M.ASCE, Case Western Reserve University; Xiong Yu, Ph.D., P.E., F.ASCE, Case Western Reserve University; Yuan Guo, Ph.D., Case Western Reserve University; Xudong Fan, Case Western Reserve University  <b>Effect of Moulding Water Content and Dry Density on Performance of Treated Coir Fiber Reinforced BC Soil</b> , Jai Raj M.E., Nitte Meenakshi Institute of Technology; Prathap Kumar M. T., Ph.D., R N S Institute of Technology	<b>The Effects of Stress Redistribution on the Propagation of Stress Waves beneath the Bottom of Drilled Shaft Excavations</b> , Alireza Kordjazi, Temple University; Joseph Thomas Coe, Ph.D., Temple University  <b>Coupled Analysis of Wave, Structure, and Sloping Seabed Interaction: Response and Instability of Seabed</b> , Amin Rafiei, North Carolina State University; M.S. Rahman, Ph.D., North Carolina State University; M.A. Gabr, Ph.D., P.E., F.ASCE, D.GE, North Carolina State University	<b>Use of Tactile Pressure Sensors to Measure Lateral Pressures at the Face of Geosynthetic Reinforced Soil</b> , Jennifer E. Nicks, Ph.D., P.E., M.ASCE, Federal Highway Administration; Michael T. Adams, M.ASCE, Federal Highway Administration; Jan Li, ESCINC  <b>Excessive Deformation of a Mechanically Stabilized Earth Wall Embankment Constructed on Soft Ground</b> , Stanley R. Boyle, Ph.D., P.E., M.ASCE, Shannon & Wilson, Inc.	<b>Field Performance of Reinforced Dunes for Improving Coastal Resilience</b> , Brian Maggi, P.E., M.ASCE, U.S. Coast Guard Academy; Christopher Baxter, Ph.D., P.E., M.ASCE, University of Rhode Island; Annette Grilli, Ph.D., University of Rhode Island; Stephen Licht, Ph.D., University of Rhode Island; Paolo Stegagno, Ph.D., University of Rhode Island  <b>Observation of Piping Erosion Initiation in a Centrifuge Model</b> , William Ovale-Villamil, M.Sc., S.M.ASCE, University of South Carolina; Inthuorn Sasanakul, Ph.D., P.E., A.M.ASCE, University of South Carolina	<b>Soil Freezing and Its Effects on Pavement Engineering by Random Finite Element Simulation</b> , Dong, Ph.D., S.M.ASCE, Case Western Reserve University; Xiong Yu, Ph.D., P.E., F.ASCE, Case Western Reserve University  <b>Impact of Stabilization of Expansive Clay with Corex Slag and Lime</b> , Radha J. Gonawala, S. V. National Institute of Technology; Rakesh Kumar, Ph.D., S. V. National Institute of Technology; Krupesh A. Chauhan, Ph.D., S. V. National Institute of Technology
3:00 – 3:30 p.m.	<b>Afternoon Networking Break, Exhibit Hall E</b>						
3:30 – 5:00 p.m.	<b>Panel Session: 7-Year Itch: What Have We Learned from Hurricane Sandy, Room 126A</b>						
3:30 – 5:30 p.m.	<b>Poster Session II, Exhibit Hall E</b>						
5:30 – 6:00 p.m.	<b>Professional and Student Competition Awards Presentation, Terrace Ballroom IV</b>						
6:00 – 7:00 p.m.	<b>Karl Terzaghi Award Lecture, Terrace Ballroom IV</b>						
7:30 – 10:00 p.m.	<b>Terzaghi Dinner (Invitation Only), Loews Philadelphia Hotel, Lescaze Room, 33rd Floor</b>						

### Visit Booth 501: The Heart of It All

Make sure to plan plenty of time for your visit to booth 501: that's where you'll find the **Geo-Institute** – and much, much more. Start at the G-I booth to learn more about programs and upcoming activities, and how you can get more involved. You can meet the staff and connect with fellow members, including members from

the **Delaware Valley G-I Chapter**. Then stop by the **ASCE Bookstore** to see what's new and to build your professional library. Learn more about professional certification from the **Academy of Geo-Professionals (AGP)**, and how it can benefit you. **ASCE Member Services** will also be available: join ASCE and G-I, manage your

membership, update your address, subscribe to a journal, or even make a quick donation to the Voluntary Fund for student activities. **ASCE Government Relations** can help you serve the public by advocating for the care and improvement of our infrastructure (ask about PR and GR Universities.)

### Computational Geotechnics

**PB47 | Mesh Size Sensitivity and Effect of Perturbation Intensity on coupled Undrained Instability Analysis in Sands,** Debayan Bhattacharya, B.E., S.M.ASCE, *Indian Institute of Technology Gandhinagar*; Amit Prashant, Ph.D., *Indian Institute of Technology Gandhinagar*

**PB48 | Numerical Modeling of Structural Backfills for Transportation Infrastructure,** Meysam Mashayekhi, A.M.ASCE, *University of Delaware*; Victor N. Kaliakin, Ph.D., M.ASCE, *University of Delaware*; Christopher L. Meehan, F.ASCE, *University of Delaware*; Michael T. Adams, M.ASCE, *Turner-Fairbank Highway Research Center, Federal Highway Administration*; Jennifer E. Nicks, M.ASCE, *Turner-Fairbank Highway Research Center, Federal Highway Administration*

**PB49 | Influence of Particle Rolling and Rotation on the Shearing Response of Clean Sand,** Nick Barnett, *University of South Australia*; Md. Mizanur Rahman, *University of South Australia*; Md. Rajibul Karim, *University of South Australia*; Hoang Bao Khoi Nguyen, *University of South Australia*

**PB50 | The Phase Transformation under Undrained and Drained Triaxial Condition by the Discrete Element Method,** Hoang Bao Khoi Nguyen, Ph.D., *University of South Australia*; Md. Mizanur Rahman, Ph.D., *University of South Australia*; Md. Rajibul Karim, Ph.D., *University of South Australia*

**PB51 | Models for Estimation of Moduli of Unbound Materials with Lightweight Deflectometer,** Aria Fathi, M.SCE, S.M.ASCE, *The University of Texas at El Paso*; Cesar Tirado, Ph.D., *Center for Transportation Infrastructure Systems (CTIS), The University of Texas at El Paso*; Mehran Mazari, Ph.D., A.M.ASCE, *California State University Los Angeles*; Soheil Nazarian, Ph.D., P.E., F.ASCE, *Center for Transportation Infrastructure Systems (CTIS), The University of Texas at El Paso*

**PB52 | Performance of Bounding Surface Constitutive Models in Predicting Cyclic Behavior of Low-Plasticity Fine-Grained Soils,** Mohammad Eslami, Ph.D., *University of California Los Angeles*; Mohammad Zarrabi, *Polytechnique Montréal*; Samuel Ynesta, Ph.D., *Polytechnique Montréal*

**PB53 | Numerical Analysis of Radial Consolidation with Discharge Capacity Reduction Using Finite Strain Theory,** Ba-Phu Nguyen IV, *Pukyong National University*; Yun-Tae Kim, *Pukyong National University*

**PB54 | Numerical Analysis on Feasibility of Thermally Induced Pore Fluid Flow in Saturated Soils,** Mohammadreza Mir Tamizdoust, S.M.ASCE, *University of Louisville*; Omid Ghasemi-Fare, A.M.ASCE, *University of Louisville*

**PB55 | Modeling the Impact Force from a Dry Granular Flow Using Smoothed Particle Hydrodynamics Method,** Bahman Sheikh, MSc, Ph.D. Candidate, *Pennsylvania State University*; Tong Qiu, Ph.D., P.E., *Pennsylvania State University*

**PB56 | Nonlinear Dynamic Analysis of Track Embankments for High-Speed Trains,** Negin Yousefpour, Ph.D., P.E., *Arup*; Eden Almog, *Arup*

**PB57 | Numerical Insight into the Geotechnical Mechanisms Triggering Failure at the Winter Park Sinkhole in Florida,** Moutaz Hesham Soliman, *University of Central Florida*; Luis Arboleda-Monsalve, Ph.D., *University of Central Florida*; Boo Hyun Nam, Ph.D., *University of Central Florida*

**PB58 | Bearing Capacity of a Strip Footing Situated on Reinforced Cohesionless Soil Slope Using Non-Associated Flow Rule,** Koushik Halder, M.E., *Indian Institute of Technology Kharagpur*; Debarghya Chakraborty, Ph.D., *Indian Institute of Technology Kharagpur*

**PB59 | Flat Plate Dilatometer and Finite Element Analysis in Evaluation of Settlement Induced Effects on Utilities,** Dylan Sky Brancato, M.S., P.E., *Parsons*; Edmund Gregory McNulty, Ph.D., P.E., P.G., *Parsons*; Bill Little, P.E., *Parsons*; Timothy M. Williams, P.E., *Walsh Group*

**PB60 | Probabilistic Analysis of a MSE Wall Considering Spatial Variability of Soil Properties,** Sina Javankhoshdal, Ph.D., EIT, *Rocscience Inc.*; Brigid Cami, B.Sc., *Rocscience Inc.*; Thamer Yacoub, Ph.D., *Rocscience Inc.*; Richard Bithurst, P.Eng., Ph.D., FEIC, FCAE, *Geo-Engineering Center at Queen's-RMC*

**PB61 | Three-Dimensional Finite Element Analysis of Reinforced Concrete Box Culverts Using Infinite Elements,** Christy L. Bugher, S.M.ASCE, *University of Delaware*; Kalehiwot Nega Manahiloh, Ph.D., P.E., M.ASCE, *University of Delaware*; Victor N. Kaliakin, Ph.D., M.ASCE, *University of Delaware*; Harry W. Shenton III, Ph.D., P.E., M.ASCE, *University of Delaware*

### Earth Retaining Structures: Top-Down Construction

**PB86 | Three-Dimensional Finite Element Analysis of Soil-Nailed Walls: Effects of Wall Configuration and Soil Properties,** Amr M. Mamon, *Cairo University*; Manal A. Salem, Ph.D., *Cairo University*; Hani A. Lofii, Ph.D., *Cairo University*

**PB91 | Investigating Nonlinear and Time-Dependent Response of Concrete on the Performance of Urban Cofferdams,** A. Felipe Uribe-Henao, S.M.ASCE, *University of Central Florida*; Luis G. Arboleda-Monsalve, Ph.D., M.ASCE, *University of Central Florida*; David G. Zapata-Medina, Ph.D., P.E., *Universidad Nacional de Colombia, Sede Medellin*

### Earth Retaining Structures: Bottom-Up Construction

**PB100 | Supporting Community Health: Foundations and Excavation Support for Brooklyn Methodist Hospital's Center for Community Healthcare,** Samuel W. Singer, M.S., P.E., M.ASCE, *Langan*; Kenneth A. Huber, M.S., P.E., LEED AP, *Langan*

**PB92 | Passive Force-Deflection Curves for Controlled Low-Strength Material (CLSM) and Lightweight Cellular Concrete (LCC),** Kyle M. Rollins, Ph.D., *Brigham Young University*; Rebecca Black, M.ASCE, *Brigham Young University*; Kevin Wagstaff, M.ASCE, *Wagstaff Crane*

**PB93 | Low-Density Cellular Concrete in MSE Structures with Steel Strip Reinforcements – Design and Construction Considerations and Case Histories,** Nicolas Deni, P.E., M.ASCE, *The Reinforced Earth Company*; Robert A. Gladstone, P.E., M.ASCE, *Association for Mechanically Stabilized Earth*

**PB94 | Deployment of the Geosynthetic Reinforced Soil (GRS) Integrated Bridge System (IBS) From 2011 to 2017,** Brian H. Zelenko, P.E., M.ASCE, *WSP USA*; Daniel Alzamora, *Federal Highway Administration*; Jennifer E. Nicks, Ph.D., P.E., *Federal Highway Administration*

**PB95 | Replacement of the Brooklyn Queens Expressway (BQE) Connector for the Kosciuszko Bridge in New York, New York,** Paul B. Pizzimenti, P.E., *Haley & Aldrich*; Edward M. Zamiskie, P.E., *Haley & Aldrich*; Matthew D. Riegel, P.E., Ph.D., *HNTB*; Britain Materek, P.E., *HNTB*

**PB96 | Construction and Monitoring of Alabama's First Geosynthetic Reinforced Soil-Integrated Bridge System,** Randall Jonathan Hogan, S.M.ASCE, *Auburn University*; Robert Pirando, P.E., *Marshall County Commission*; J. Brian Anderson, Ph.D., P.E., M.ASCE, *Auburn University*; Jack Montgomery, Ph.D., P.E., A.M.ASCE, *Auburn University*

**PB97 | Design Optimization of Flood Walls Using Evolutionary Algorithms,** Siavash Sajedi, Ph.D., *AECOM*; Pooya Allahverdzadeh Sheykhlou, Ph.D., P.E., *AECOM*; Amanda Lopez, P.E., *AECOM*

**PB98 | Everything but the Kitchen Sink: Use of Multiple Foundation Types to Allow for Construction on a Boston Hillside,** Michael J. Weaver, P.E., *Haley & Aldrich*

**PB99 | Using Numerical Model To Evaluate Performance of Geogrid-Reinforced Slope with High Embankment on Top,** Hua Xu, Ph.D., *Southwest Jiaotong University*; Xin Ren, *Southwest Jiaotong University*; Jiannan Chen, Ph.D., A.M.ASCE, *Southwest Jiaotong University*; Lei Xia, *Sichuan Surveying & Design Institute of Transportation*; Ziyun Cheng, *Sichuan Surveying & Design Institute of Transportation*

### Geoenvironmental Engineering

**PB67 | Evaluation of Field Scale Unsaturated Soil Behavior of Landfill Cover through Geophysical Testing and Instrumentation,** Md. Jobair Bin Alam, Ph.D., *University of Texas at Arlington*; Md. Sahadat Hossain, Ph.D., P.E., *The University of Texas at Arlington*; Linkan Sarkar, *The University of Texas at Arlington*; Naima Rahman, Ph.D.

**PB68 | Dialysis Method to Measure Diffusion in Sodium and Enhanced Bentonites,** Shan Tong, M.S., *Villanova University*; Kristin M. Sample-Lord, Ph.D., P.E., M.ASCE, *Villanova University*; Gretchen L. Bohnhoff, Ph.D., P.E., M.ASCE, *University of Wisconsin-Platteville*; Andrew B. Balken, *University of Wisconsin-Platteville*; Mustaki Ahmed, *Villanova University*

**PB72 | Bioremediation of High Saline Soil through the Home-Made Collective Microorganisms,** Md. Azizul Moqsd, Ph.D., M.ASCE, *University of California Berkeley*; Kenichi Soga, Ph.D., *UC Berkeley*; M. Azizul Moqsd, Ph.D., A.M.ASCE

**PB73 | Mechanism Study of Borehole Instability in Carbonate Reservoir through Discrete Element Modeling,** Chao Zeng, *Missouri University of Science and Technology*; Wen Deng, *Missouri University of Science and Technology*

**PB75 | Stabilization of Hazardous Solid Waste Landfill on Sloping Ground with Variable Base Inclination,** Abinash Mahanta, M.E., M.IGS, *Indian Institute of Technology Delhi*; Riya Bhowmik, M.E., M.IGS, *Indian Institute of Technology Delhi*; Manoj Datta, Ph.D., M.IGS, *Indian Institute of Technology Delhi*

**PB76 | Monitoring Seasonal Variation of Soil Hydraulic Conductivity for an Evapotranspiration Cover System,** Lucas Hoyos, B.S.C.E., *University of Texas at Arlington*; Md. Jobair Bin Alam, Ph.D., *University of Texas at Arlington*; Md. Sahadat Hossain, Ph.D., P.E., M.ASCE, *University of Texas at Arlington*; Brenda A. Haney, P.E., *City of Irving*

**PB78 | Velocity and Drag Force Distribution of Fluid Flow in Mono- and Binary- Sized Particulate Porous Media,** Bahman Sheikh, M.S., Ph.D. Candidate, *Pennsylvania State University*; Tong Qiu, Ph.D., *Pennsylvania State University*

**PB79 | Field Hydrologic Performance of Water Balance Cover in North Texas,** Md Jobair Bin Alam, Ph.D., *University of Texas at Arlington*; Brett DeVries, Ph.D., P.E., *SCS Engineers*; Md Sahadat Hossain, Ph.D. P.E., *University of Texas at Arlington*; Naima Rahman, Ph.D., *SCS Engineers*

**PB80 | Migration of Aqueous Benzene through a Subsurface Concrete Utility Pipe under Saturated Soil Conditions,** Sultan Alhomain, *North Carolina State University*; Payam Hosseini, *North Carolina State University*; Mohammed Gabr, Ph.D., P.E., F.ASCE, D.GE., *North Carolina State University*; Mohammad Pour-Ghaz, Ph.D., *North Carolina State University*; Detlef Knappe, Ph.D., *North Carolina State University*

**PB81 | Life Cycle Analysis as a Tool to Assess the Sustainability of Waste Management Practices in Bangalore City,** Sugghosh P., M.Tech, *Indian Institute of Science*; Anusree N. B.E.; Sivakumar Babu G. L., Ph.D., FIE, ACCE, ASCE, IGS, IRC, IGS, KGC, *Indian Institute of Science*

**PB82 | Effect of Moisture Content on CO2 Sequestration by BOF Slag in Landfill Cover,** Jyoti K Chetri, S.M.ASCE, *University of Illinois at Chicago*; Krishna R. Reddy, Ph.D., P.E., F.ASCE, *University of Illinois at Chicago*; Dennis G. Grubb, Ph.D., P.E., *Phoenix Services, LLC*

**PB83 | Synthesis of Friedel's Salt for Application in Halide Sequestration using Paste Encapsulation Technology**, Abhisek V. Manikonda, M.S., S.M.ASCE, *University of North Carolina at Charlotte*; Vincent O. Ogunro, Ph.D., A.M.ASCE, *University of North Carolina at Charlotte*; Kirk M. Ellison, M.S., *Electric Power Research Institute*; Keith Moo-Young, Ph.D., F.ASCE, *Washington State University*

**PB62 | Geophysical Engineering to Identify Seepage Channels in the Hager Slough Levee**, Md Zahidul Karim, S.M.ASCE, *Kansas State University*; Stacey E. Tucker-Kulesza, Ph.D., P.E., M.ASCE, *Kansas State University*; Cassandra Rutherford, Ph.D., P.E., M.ASCE, *Iowa State University*; Michelle L. Bernhardt-Barry, Ph.D., P.E., M.ASCE, *University of Arkansas*

### Geotechnics of Soil Erosion

**PB87 | Using Case Studies of Bridge Scour in Rhode Island to Evaluate Simplified Scour Equations**, Aaron S. Bradshaw, Ph.D., P.E., *University of Rhode Island*; Wendy K. Laurent, *Taylor Engineering, Inc.*; Christopher D.P. Baxter, Ph.D., P.E., *University of Rhode Island*; M. Reza Hashemi, Ph.D., *University of Rhode Island*; Paul Sauco, P.E., *University of Rhode Island*; Monique LaFrance Bartley, *University of Rhode Island*; Brian Caccioppoli, *University of Rhode Island*; John King, *University of Rhode Island*

**PB88 | Tracking Piping Phenomenon in Earth Dams**, Fadi Saliba, *Notre Dame University-Louaize*; Ronald Bounassar, *Notre Dame University-Louaize*; Najj Khoury, Ph.D., P.E., *Notre Dame University-Louaize*; Yara Maalouf, *Notre Dame University-Louaize*

**PB89 | Erosion Mechanism of Claypan Soils in Southeastern Kansas**, Mark A Mathis II, S.M.ASCE, *Kansas State University*; Tri V. Tran, S.M.ASCE, *Kansas State University*; Stacey E. Tucker-Kulesza, Ph.D., M.ASCE, *Kansas State University*; Gretchen F. Sassenrath, Ph.D., *Kansas State University*

**PB90 | Experimental and Analytical Studies on the Root Reinforcement Effect of a Grass Species, *Spartina alterniflora***, Sujana Baral, M.S., *Louisiana Tech University*; Jay Xingran Wang, Ph.D., P.E., *Louisiana Tech University*; Shaourav Alam, Ph.D., *Louisiana Tech University*; William Brown Patterson, Ph.D., *Louisiana Tech University*

### Pavements

**PB17 | Development of a Strength Prediction Model for Recycled Base Materials with Soil Intrusion**, Prabesh Bhandari, *The University of Texas at Arlington*; Sita Timsina, *ECS Southwest, LLP-Dallas*; Asif Ahmed, Ph.D., E.I.T., *State University of New York (SUNY) Polytechnic Institute*; Sahadat Hossain, Ph.D., P.E., *The University of Texas at Arlington*; Boon Thian, *Texas Department of Transportation*

**PB12 | Enhanced Lateral Drainage Geotextile to Mitigate the Effects of Moisture Migration from a High Water Table**, Jorge Zornberg, Ph.D., P.E., F.ASCE, *The University of Texas at Austin*; Anthony El Hachem, M.S., *The University of Texas at Austin*

**PB16 | Subgrade Soil Stabilization Using Low-Quality Recycled Concrete Aggregate**, Masoumeh Tavakol, Ph.D. Candidate, S.M.ASCE, *Kansas State University*; Mustaque Hossain, Ph.D., P.E., F.ASCE, *Kansas State University*; Stacey E. Tucker-Kulesza, Ph.D., P.E., M.ASCE, *Kansas State University*

**PB17 | Mechanical Concrete for Enhancing the Properties of Pavement Base/Subbase**, PV Vijay, Ph.D., P.E., M.ASCE, *West Virginia University*; Justin Smith, *West Virginia University*

**PB21 | Parametric Study of Modified Subgrade Reaction Model Using Artificial Neural Network Approach**, Sajib Saha, Ph.D., *Texas A&M Transportation Institute*; Fan Gu, Ph.D., A.M.ASCE, *National Center for Asphalt Technology, Auburn University*; Xue Luo, Ph.D., A.M.ASCE, *Zhejiang University*; Robert L. Lytton, Ph.D., P.E., F.ASCE, *Texas A&M University*

**PB22 | Sustainable Design of Rigid Pavements Using a Hybrid GP and OLS Method**, Abbasali TaghaviGhalesari, S.M.ASCE, *University of Texas at El Paso*; Carlos M. Chang Albitres, Ph.D., P.E., *University of Texas at El Paso*

**PB23 | Development of the Virtual Load Method by Applying the Inverse Theory for the Analysis of Geosynthetic-Reinforced Pavement on Expansive Soils**, Debojit Sarker, B.Sc., *Louisiana Tech University*; Jay X. Wang, Ph.D., P.E., M.ASCE, *Louisiana Tech University*; Md Adnan Khan, Ph.D., M.ASCE, *Shannon & Wilson, Inc.*

**PB24 | Use of Pervious Concrete in Developing Countries for Stormwater Management**, Louis Junior Saad, *Notre Dame University-Louaize*; Najj Khoury, Ph.D., P.E., *Notre Dame University-Louaize*; Charles Saad, Ph.D., *Notre Dame University-Louaize*

**PB25 | Case Study of Military Airfields Emphasizing Asset Management, Rehabilitation, and Implementation of New Technologies**, Thomas M. Synovec, P.E., M.ASCE, *Mississippi State University*; Isaac L. Howard, Ph.D., P.E., F.ASCE, *Mississippi State University*; Lucy P. Priddy, Ph.D., P.E., M.ASCE, *U.S. Army Engineer Research and Development Center*

**PB26 | Effect of Fine Clay Particles on the Strength Characterization of Cement Treated Flex-Base Materials**, Sita Timsina, ECS Southwest, LLP-Dallas; Prabesh Bhandari, *The University of Texas at Arlington*; Nur Basit Zaman, *The University of Texas at Arlington*; Asif Ahmed, Ph.D., E.I.T., *State University of New York (SUNY) Polytechnic Institute*; Sahadat Hossain, Ph.D., P.E., *The University of Texas at Arlington*; Boon Thian, *Texas Department of Transportation*

**PB27 | Mix Design of Roller Compacted Concrete Pavement Using Steel Slag By-Products**, Charbel Khoury, Ph.D., P.E., M.ASCE, *KCI Technologies, Inc.*; Kofi Acheampong, Ph.D., P.E., ENV SP, M.ASCE, *KCI Technologies, Inc.*; Kwabena Ofotri-Awuah, P.E., D.GE, M.ASCE, *KCI Technologies, Inc.*

**PB28 | Cyclic Triaxial Tests on Crushed Limestone for Base Layers**, Pradiip Adhikari, *SIUE*; Abdolreza Osouli, Ph.D., P.E., M.ASCE, *SIUE*

### Risk Assessment and Management

**PB39 | Quantitative Coseismic and Precipitation-Induced Landslide Risk Mapping for the Country of Lebanon**, William Pollock, *University of Washington*; Joseph Wartman, *University of Washington*; Grace Abou-Jaoude, *Lebanese American University*; Alex Grant, *U.S. Geological Survey*

**PB40 | An Adaptive Kriging-Based Approach with Weakly Stationary Random Fields for Soil Slope Reliability Analysis**, Mehrzad Rahimi, *The Ohio State University*; Zeyu Wang, *The Ohio State University*; Abdollah Shafieezadeh, Ph.D., *The Ohio State University*; Dylan Wood, *The Ohio State University*; Ethan J. Kubatko, Ph.D., *The Ohio State University*

**PB42 | Excavation-Induced Structural Responses Due to Inherent Spatial Variability of Soils**, Zhe Luo, Ph.D., P.E., M.ASCE, *Tongji University*; Biao Hu, Ph.D., *Tongji University*; Youwen Wang, M.Sc., *Tongji University*

**PB43 | Fuzzy Reliability Analysis for Elastic Settlement of Surface Footing**, Rajarshi Pramanik, M.E., *Indian Institute of Technology Kharagpur*; Dilip Kumar Baidya, Ph.D., *Indian Institute of Technology Kharagpur*; Nirjhar Dhang, Ph.D., *Indian Institute of Technology Kharagpur*

### Soil Improvement: Case Histories

**PB06 | The Ground Improvement Toolbox for Liquefaction Hazard Mitigation: Three Case Histories**, Tanner Blackburn, Ph.D., P.E., M.ASCE, *Hayward Baker, Inc.*; Jeffrey R. Hill, P.E., M.ASCE, *Hayward Baker, Inc.*

**PB07 | Experimental Study and Evaluation on Surface Grouting in Shallow-Buried Section of Karst Tunnels**, Hua Xu, *Southwest Jiaotong University*; Peng Zhang, *Southwest Jiaotong University*; Jiannan Chen, A.M.ASCE, *Southwest Jiaotong University*; Runfang Sun, *Southwest Jiaotong University*; Yiwei Liu, *Southwest Jiaotong University*

**PB08 | Construction of Citizen's Drop-Off Ramp in South Louisiana by Soil Surcharging**, Jonathan E. Fourrier, M.Sc., P.E., *Fourrier & de Abreu Engineers, L.L.C.*; Ricardo C. de Abreu, Ph.D., P.E., *Fourrier & de Abreu Engineers, L.L.C.*

**PB09 | Ground Modification Techniques for the Christina River Bridge Approaches**, Eric M. Klein, P.E., D.GE, F.ASCE, *RK&K, LLP*; Bibek B. Shrestha, P.E., *RK&K, LLP*

### Soil Improvement: Biopolymers

**PB01 | Examining the Behavior of Compacted Soil-Biochar Specimens**, Renee S. Lamprinakos, S.M.ASCE, *University of Delaware*; Kalehiwot Negu Manahiloh, Ph.D., P.E., M.ASCE, *University of Delaware*

**PB02 | Strengthening of Dune Sand with Sodium Alginate Biopolymer**, Hadi Fatehi, M.Sc, *Isfahan University of Technology*; Maysam Bahmani, *Shahid Beheshti University*; Ali Noorzad, *Shahid Beheshti University*

**PB10 | Unconfined Compressive Strength of Mine Tailings Amended with Fly Ash**, Amin Benjamin Ghorbanpour, P.E., *Golder Associates*; Xinbao Yu, Ph.D., P.E., *University of Texas at Arlington*

### Soil Improvement: MICP

**PB13 | The Effect of Chemical Concentration on the Strength and Erodibility of MICP Treated Sands**, Pegah Ghasemi, *North Carolina State University*; Atefeh Zamani, *North Carolina State University*; Brina M. Montoya, *North Carolina State University*

**PB14 | Leaching Assessment of MICP-treated Coal Combustion Products in Roadways Embankment**, Junke Zhang, *Jackson State University*; Kejun Wen, Ph.D., *Jackson State University*; Lin Li, Ph.D., P.E., F.ASCE, *Tennessee State University*

**PB15 | Simulated Implementation Approach for Microbially Induced Carbonate Precipitation Improvement of Soil adjacent to Piles**, Juning Do, S.M.ASCE, *North Carolina State University*; Brina M. Montoya, Ph.D., P.E., M.ASCE, *North Carolina State University*; Mohammed A. Gabr, Ph.D., P.E., D.GE., F.ASCE, *North Carolina State University*

### Soil Improvement: Fiber Reinforcement and Soil Stabilization

**PB18 | Comparative Study of Sisal and PVA Fiber for Soil Improvement**, Anil Kumar Sharma, Ph.D., *Amrita Vishwa Vidyapeetham*; Swetha Prasanna, *Amrita Vishwa Vidyapeetham*; Sreevalsa Kolathayar, Ph.D., *Amrita Vishwa Vidyapeetham*

**PB19 | Strength Characterization of Expansive Soil Treated with Phosphogypsum and Crumb Waste Rubber**, Babu R. Dayakar, *KITS Divili*; Raviteja KVNS II, Ph.D., A.M.ASCE, *Indian Institute of Technology Hyderabad*; Prasad LNVN, M.Tech., *KITS Divili*

**PB20 | Stress- Strain Behaviour of Steel Fiber-Reinforced Sand**, Jagadanand Jha, *Muzaffarpur Institute of Technology*; Kulbir Singh Gill, Ph.D., *Guru Nanak Dev Engineering College, Ludhiana*; Sanjay Kumar Shukla, Ph.D., *Edith Cowan University*; Anil Kumar Choudhary, Ph.D. NIT, *Jamshedpur*

### Underground Engineering and Construction

**PB29 | Through-Soil Wireless Communication System for Embedded Geotechnical Instrumentation**, Omar Baltaji, MCE, Ph.D. Candidate, *University of Illinois at Urbana Champaign*; Sijung Yang, M.Eng, Ph.D.Candidate, *University of Illinois at Urbana Champaign*; Youssef M.A. Hashash, Ph.D., P.E., F.ASCE, *University of Illinois at Urbana Champaign*; Andrew Singer, Ph.D, *University of Illinois at Urbana Champaign*



3:30 – 5:30 p.m., Exhibit Hall E

**PB30 | Time-History Analysis of Earth Pressure Test on Soil Arching Effect Caused by Deep-Buried Tunneling in Soft Soil**, Liu Shujia, Ph.D., *Shanghai SMI Water (Group) CO., LTD*; Bai Tinghui II, P.E., *Shanghai Water Authority*; Liao Shaoming III, P.E., *Tongji University*; Shen Pangyong IV, P.E., *Shanghai SMI Water (Group) CO., LTD*; Gu Yun V, P.E., *Shanghai SMI Water (Group) CO., LTD*; Bai Zhanwei, *Shanghai SMI Water (Group) CO., LTD*

**PB32 | Effect of Segregation on the Geotechnical Properties Of Hydraulic Backfill**, Jean Békét Dalcé Master, *École Polytechnique de Montréal*; Li Li, Ph.D., *École Polytechnique de Montréal*; Pengyu Yang, Ph.D., *École Polytechnique de Montréal*

**PB33 | Correlating EPB Chengdu Metro Settlement Data with Analysis Predictions in Sandy Cobble Stratum**, Xin Liao, Ph.D., *Southwest Jiaotong University*; Qingfeng Wang, *Southwest Jiaotong University*; Liang Feng, Ph.D., *University of Florence*; Xiyong Wu, Ph.D., *Southwest Jiaotong University*; Deping Guo, *Sichuan Railway Investment Group Co., LTD*; Yingwei Xi, *Sichuan Environmental Monitoring Center*; Jiannan Chen, Ph.D., *Southwest Jiaotong University*

**PB34 | A Numerical Investigation of SSCB Analysis and the Possibility of Applying Arching Inducement Techniques**, Islam Mamdouh Ezz, *Cairo university*; Sherif Adel Akl, Ph.D., *Cairo University*; Mohamed El-Kholy III, *Cairo university*

**PB35 | Monitoring-Assisted Large-Diameter Shield Tunneling Control in Soft Ground: A Case Study of Bund Tunnel Project**, Xuehui Zhang, Ph.D., M.Eng, M.ASCE, *Tongji University*; Xi Jiang, Ph.D., M.Eng, *Tongji University*; Wei Chen, *Tongji University*; Dilu Xu, *Tongji University*; Guodong Cai, M.Eng, *SGIDI Engineering Consulting(Group) Co., Ltd*; Yun Bai, Ph.D., *Tongji University*

**PB36 | Overview of Typical Excavation Failures in China**, Ye Lu, Ph.D., A.M.ASCE, *Shanghai University*; Yong Tan, Ph.D., A.M.ASCE, *Tongji University*

### Unsaturated Soils

**PB101 | A Procedure for Incorporating Climatic and Water Table Data in the Geotechnical Design of Driven Pile Subjected to Axial Load**, Vahidreza Mahmoudabadi, *Clemson University*; Nadarajah Ravichandran, Ph.D., *Clemson University*

**PB102 | Effect of Geotechnical Parameters on the Percolation Performance of an Established Rain Garden in Pennsylvania**, Wessam Mohammed, *Villanova University*; Andrea L. Welker, Ph.D., P.E., M.ASCE, *Villanova University*; James Press, *Villanova University*

**PB103 | Evaluation of Bimodal Water Retention Characteristics for Hydrating Chromium Ore Processing Residue (COPR)**, Mostafa Afzalian, *University of Nebraska-Lincoln*; Jongwan Eun, Ph.D., P.E., *University of Nebraska-Lincoln*; James Tinjum, *University of Wisconsin-Madison*

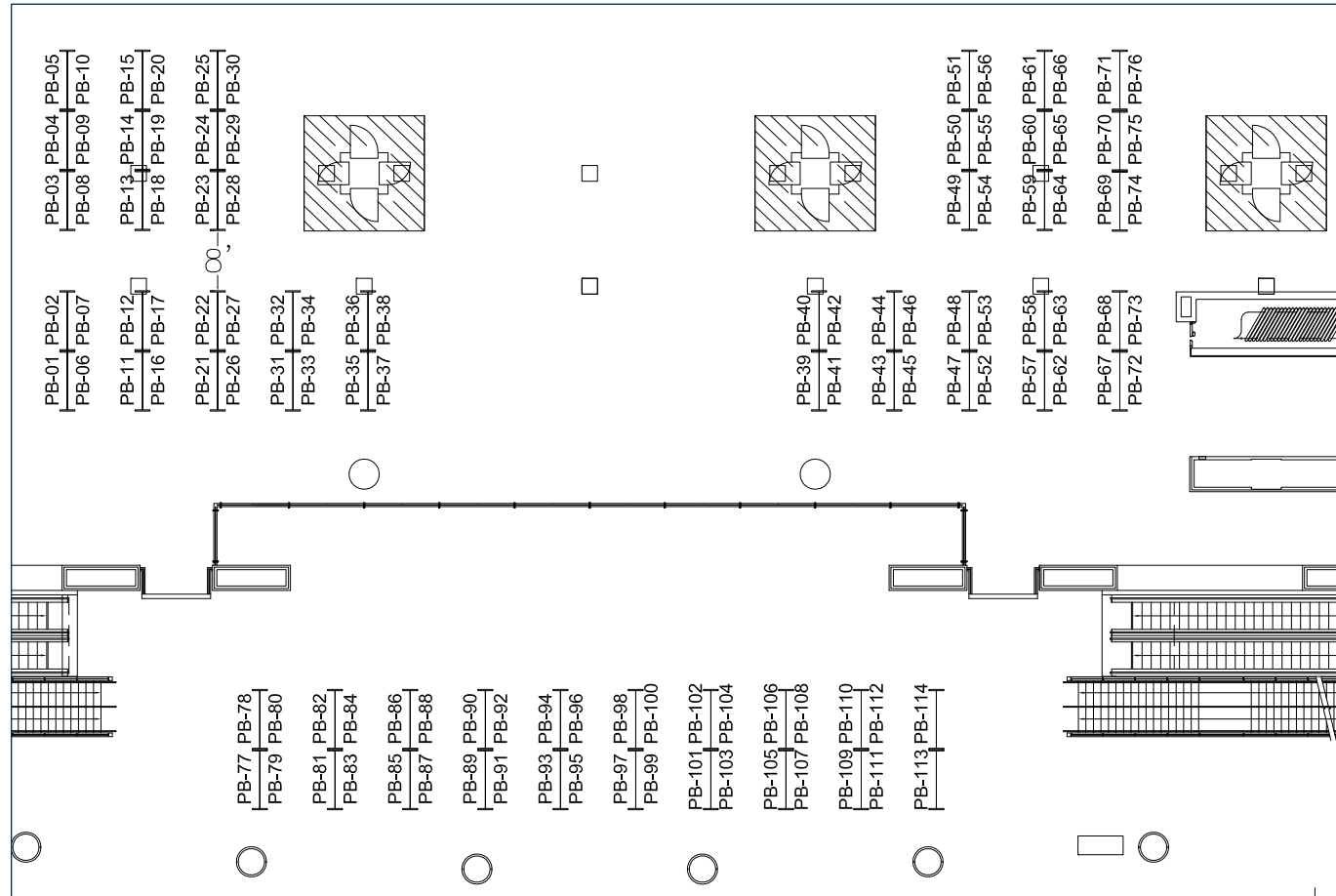
**PB104 | Numerical Investigation of a Saturated/Unsaturated Soil-Atmosphere Model**, Chuang Lin, *Missouri University of Science and Technology*; Xiong Zhang, Ph.D., P.E., *Missouri University of Science and Technology*

**PB105 | Measurement of Thermal Conductivity and Suction for Sands Using a Modified Hanging Column Device**, Xuelin Wang, *University of Texas at Arlington*; Xinbao Yu, Ph.D., P.E., *University of Texas at Arlington*; Nice Kaneza, *University of Texas at Arlington*; Shi He, *University of Texas at Arlington*

**PB106 | A Bounding Surface Based Constitutive Model for Unsaturated Granular Soils**, Mehdi Kadivar, S.M.ASCE, *University of Delaware*; Kalehiwat Nega Manahiloh, Ph.D., P.E., M.ASCE, *University of Delaware*; Victor N. Kaliakin, Ph.D., M.ASCE, *University of Delaware*

**PB107 | Stability Analysis of an Unsaturated Silty Slope under Nonisothermal Conditions**, Sannith Kumar Thota, *Mississippi State University*; Toan Duc Cao, *Mississippi State University*; Farshid Vahedifar, *Mississippi State University*; Ehsan Ghazanfari, *University of Vermont*

**PB108 | Shear-Induced Matric Suction in Unsaturated Clayey Sand during Constant Water Content Triaxial Tests**, Muwataq A. Awad, *University of South Carolina*; Inthuorn Sasanakul, Ph.D., P.E., *University of South Carolina*



8:00 – 9:30 a.m.	<b>Geo-PIT: Powerful, Informative Talks on Geo-Topics</b> , <i>Terrace Ballroom IV</i>				
9:30 – 10:00 a.m.	<b>Morning Networking Break</b> , <i>Exhibit Hall E</i>				
10:00 – 11:00 a.m.	<b>Special Session: Robert M. Koerner Lecture Lessons Learned: An Adventure in 4 Decades of Geosynthetics Engineering</b> , <i>Terrace Ballroom III</i>				
10:00 – 11:30 a.m.	<b>Panel Session: Changing the Paradigm for Large Landslides: Forecasting Time-to-Failure</b> , <i>Room 126A</i>				
10:00 – 11:30 a.m.	<b>Technical Sessions</b>				
<b>Track A   Room 122A</b>	<b>Track B   Room 125</b>	<b>Track C   Room 123</b>	<b>Track D   Room 124</b>	<b>Track F   Room 122B</b>	
<b>Deep Foundations: Special Topics</b> <b>Moderators:</b> Joseph Thomas Coe, Jr., P.E., Matteo Montesì, P.E., M.ASCE	<b>Underground Engineering and Construction</b> <b>Moderators:</b> John S. McCartney, Ph.D., P.E., F.ASCE; Sotirios Vardakos, Ph.D., C.Eng, M.ASCE	<b>Risk Assessment and Management</b> <b>Moderators:</b> Haitham M. Dawood, Ph.D., P.E., M.ASCE; Kallol Seif, Ph.D., EIT, A.M.ASCE	<b>Education for Geotechnical Engineering</b> <b>Moderators:</b> Andrea L. Welker, P.E., M.ASCE; Patricia M. Gallagher, P.E.	<b>Geoenvironmental Engineering</b> <b>Moderators:</b> Kristin Sample-Lord, P.E., M.ASCE; Ehsan Ghazanfari, Ph.D., P.E. M.ASCE	
<b>Verification Load Testing of Micropiles Under Combined Axial and Lateral Forces</b> , John Montgomery Schultz, P.E., G.E., M.ASCE, <i>Petra Geosciences Inc.</i> ; Siamak Jafroudi, Ph.D., P.E., G.E., D.GE., F.ASCE, <i>Petra Geosciences Inc.</i> ; Thang Van Nguyen, P.E. M.ASCE, <i>Hayward Baker Inc.</i>	<b>Shallow Tunnel Not Aligned to the Geostatic Principal Stress Directions</b> , Osvaldo P M Vitali, M.S., Civil Engineer, <i>Purdue University</i> ; Tarcisio B. Celestino, Ph.D., <i>University of Sao Paulo</i> ; Antonio Bobet, Ph.D., <i>Purdue University</i>	<b>Landslide Susceptibility Updating Considering Real-Time Observations</b> , Haojie Wang, BSc, <i>The Hong Kong University of Science and Technology</i> ; Limin Zhang, Ph.D., F.ASCE, <i>The Hong Kong University of Science and Technology</i>	<b>Developing An Engineering Geology Field Trip To Enhance Student Learning: A Case Study</b> , Patricia M Gallagher, Ph.D., P.E., <i>Drexel University</i> ; Walter G. Yerik, <i>Drexel University</i> ; Philip S. Getty, P.G., <i>Boucher &amp; James Inc.</i> ; Kristin M. Sample-Lord, Ph.D., P.E., <i>Villanova University</i> ; Loyc Vanderkluyens, Ph.D., <i>Drexel University</i> ; Robert H. Swan, Jr., <i>Drexel University</i>	<b>Case History of an Exhumed Landfill Double Liner System</b> , George Robert Koerner, Ph.D., P.E., CQA, M.ASCE, <i>Geosynthetic Institute (GSI)</i> ; Robert M. Koerner, Ph.D., P.E., F.ASCE, <i>Drexel University</i>	
<b>Emergency Bridge Abutment Repair with Pressed-in Pipe Piles</b> , Takefumi Takuma, A.M.ASCE, <i>Giken America Corp.</i> ; Hiroyuki Nishimura, <i>Japan Press-in Association</i> ; Masashi Nagano, <i>Giken America Corp.</i>	<b>Photogrammetry for the Characterization of Rock Masses Two Case Histories for Slopes and Caverns</b> , Fulvio Tonon, Ph.D., P.E., M.ASCE, <i>Tanon USA: Engineering, Measurements, and Testing, LLC</i>	<b>Geo-Hydro Forensic Investigation of an Earthen Dam Failure</b> , Christopher J. Brown, Ph.D., P.E., <i>University of North Florida</i> ; Raphael Crowley, Ph.D., P.E., M.ASCE, <i>University of North Florida</i> ; Nick Hudyma, Ph.D., P.E., M.ASCE, <i>University of North Florida</i>	<b>Advanced Geotechnical Education and Acquiring Good Engineering Judgement Through Project Experiences</b> , Peter D. Scott, BSc, MSc, F.ASCE, FICE, CEng, FGS, <i>Buro Happold Limited</i>	<b>Hydraulic Conductivity and Soil Water Retention of Waste Rock and Tailings Mixtures</b> , Mohammad H. Gorakhki, <i>Colorado State University</i> ; Christoher A. Bareither, <i>Colorado State University</i> ; Joseph Scalia, <i>Colorado State University</i> ; Michael Jacobs, <i>Goldcorp Inc.</i>	
<b>Quantifying the Influence of Construction Methods on Hollow-Bar Micropiles' Performance in Sand</b> , Md Ahsanuzzaman, Ph.D., Third Year Student, <i>North Carolina State University</i> ; Alex Smith, P.E., <i>Subsurface Construction Co., LLC</i> ; Mohammed (Mo) Gabr, Ph.D., P.E., F. ASCE, D. GE, <i>North Carolina State University</i> ; Ray Borden, Ph.D., P.E., F.ASCE, <i>North Carolina State University</i>	<b>Jet Grouting for Excavation Support, Underpinning, and Groundwater Control for the Construction of Sewage Treatment Plant Tanks</b> , Russell W. Preuss, P.E. M.ASCE, <i>Gannett Fleming, Inc.</i> ; Daniel V. Vacciola, P.E., M.ASCE, <i>Gannett Fleming, Inc.</i> ; Carlos Medina, <i>Hayward Baker</i>	<b>George B. Stevenson Dam Rehabilitation – The Importance of Uncertainty and Confidence Evaluation in Quantitative Risk Assessments (QRA)</b> , Scott A. Raschke, Ph.D., P.E., M.ASCE, <i>Schnabel Engineering</i> ; Gregory S. Paxson, P.E., D.WRE, <i>Schnabel Engineering</i> ; Edward (Woody) Raptosh, P.E., <i>Pennsylvania Department of Conservation and Natural Resources (DCNR)</i>	<b>Monitoring of Full Scale Tieback Wall and How It Can Improve Student's Learning – Case History Paper</b> , Matheus Barbosa Santos de Miranda, M.ASCE, <i>Rose-Hulman Institute of Technology</i> ; Kyle A. Kershaw, Ph.D., P.E., <i>Rose Hulman Institute of Technology</i>	<b>Factors Affecting the Kinetics of Urea Hydrolysis via Sporosarcina Pasteurii</b> , Shahin Safavizadeh, Ph.D., <i>North Carolina State University</i> ; Brina Mortensen Montoya, Ph.D., P.E., <i>North Carolina State University</i> ; Mohammed A. Gabr, Ph.D., P.E., <i>North Carolina State University</i> ; Detlef R. U. Knappe, Ph.D., P.E., <i>North Carolina State University</i>	

## Professional Development Hours

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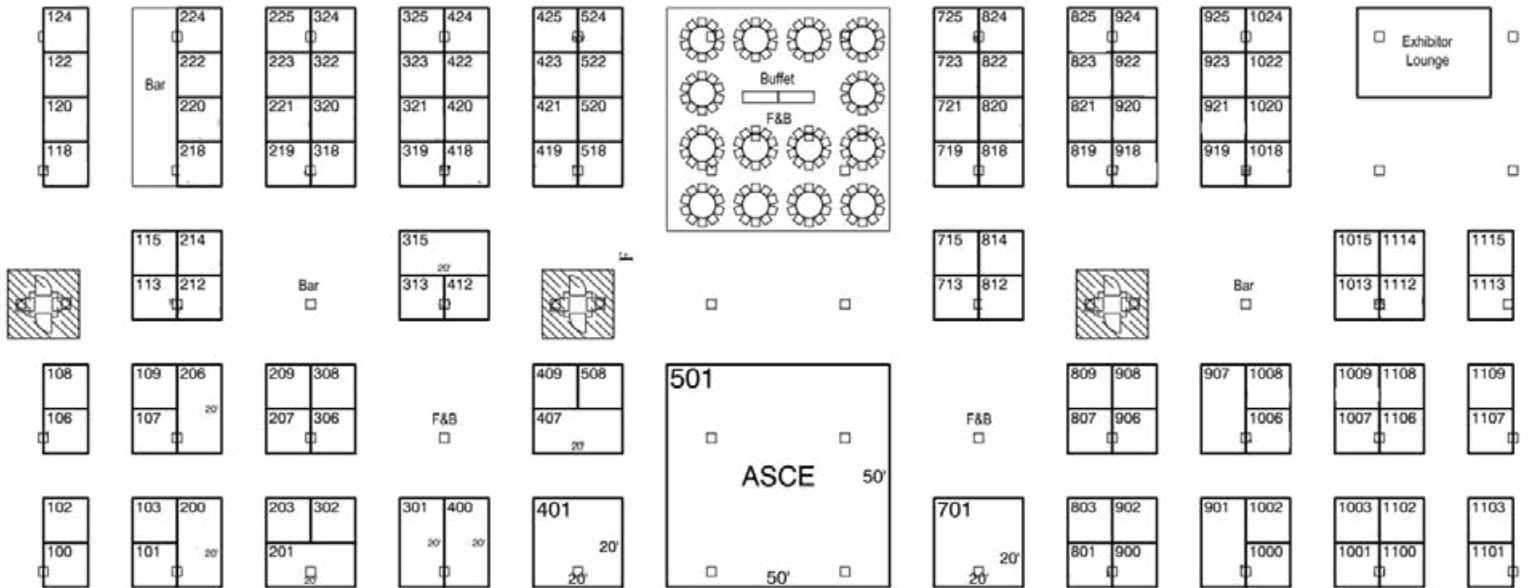
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10:00 – 11:30 a.m.	Technical Sessions						
Track A   Room 122A	Track B   Room 125	Track C   Room 123	Track D   Room 124	Track F   Room 122B			
<p><b>Deep Foundations: Special Topics</b>  <b>Moderators:</b> Joseph Thomas Coe, Jr., P.E., Matteo Montesi, P.E., M.ASCE</p>	<p><b>Underground Engineering and Construction</b>  <b>Moderators:</b> John S. McCartney, Ph.D., P.E., F.ASCE; Sotirios Vardakos, Ph.D., C.Eng, M.ASCE</p>	<p><b>Risk Assessment and Management</b>  <b>Moderators:</b> Haltham M. Dawood, Ph.D., P.E., M.ASCE; Kallol Sett, Ph.D., EIT, A.M.ASCE</p>	<p><b>Education for Geotechnical Engineering</b>  <b>Moderators:</b> Andrea L. Welker, P.E., M.ASCE; Patricia M. Gallagher, P.E.</p>	<p><b>Geoenvironmental Engineering</b>  <b>Moderators:</b> Kristin Sample-Lord, P.E., M.ASCE; Ehsan Ghazanfari, Ph.D., P.E. M.ASCE</p>			
<p><b>Visualization of Torpedo Pile Penetration and Pullout in Transparent Synthetic Soil Representative of Soft Marine Clays</b>, Abdelaziz Aads, M.Sc., <i>New York University</i>; Mehdi Omidvar, Ph.D., A.M.ASCE, <i>Manhattan College</i>; Stephan Bless, Ph.D., <i>New York University</i>; Magued Iskander, Ph.D., P.E., F.ASCE, <i>New York University</i></p> <p><b>Assessment of Helical Anchor Capacity in Marine Clays for Aquaculture Applications</b>, Leon D. Cortes-Garcia, S.M.ASCE, <i>University of Maine</i>; Melissa E. Landon, Ph.D., P.E., A.M.ASCE, <i>University of Maine</i>; Aaron P. Gallant, Ph.D., P.E., M.ASCE, <i>University of Maine</i>; Kimberly Huguenard, Ph.D., A.M.ASCE, <i>University of Maine</i></p> <p><b>500 Walnut Street: High-Capacity Auger Pressure-Grouted Piles Used to Support 26-Story Multi-Family Tower Behind Independence Hall</b>, Michael J. Kwiatkowski, P.E., M.ASCE, <i>Maser Consulting P.A.</i>; Daniel S. Stevenson, P.E., <i>Berkel and Company Contractors, Inc.</i>; Philip E. Gauffreau, P.E., M.ASCE, <i>Maser Consulting P.A.</i></p>	<p><b>Overcoming Challenges for the Parallel Thimble Shoal Tunnel Site Investigation</b>, Scott Kibby, P.E., M.ASCE, <i>Mott MacDonald</i>; Frank Perrone, P.E., M.ASCE, <i>Mott MacDonald</i>; Amanda Wachenfeld, EIT, A.M.ASCE, <i>Mott MacDonald</i>; Jose Ballesta, <i>Dragados USA</i></p> <p><b>Foundation Challenges for a Multi-Level Parking Structure in Boulder-Laden Fill: A Case Study</b>, Aditya Bhatt, Ph.D., A.M.ASCE, <i>Willmer Engineering, Inc.</i>; Daniel C. Pitts, P.E., M.ASCE, <i>Willmer Engineering, Inc.</i>; Sujit K. Bhowmik, Ph.D., P.E., M.ASCE, <i>Willmer Engineering, Inc.</i>; James L. Willmer, P.E., F.ASCE, <i>Willmer Engineering, Inc.</i></p> <p><b>Case Study: Geotechnical Instrumentation and Monitoring of Alaskan Way Viaduct Replacement Project</b>, Zhangwei Ning, Ph.D., M.ASCE, <i>Sixense Inc.</i>; Loic Galisson, <i>Sixense Inc.</i>; Philip Smith, <i>Sixense Inc.</i></p>	<p><b>Predicting Multiple Hazards Under Extreme Rainstorms</b>, Shengyang Zhou, <i>Hong Kong University of Science and Technology</i>; Limin Zhang, <i>Hong Kong University of Science and Technology</i>; Ping Shen, <i>Hong Kong University of Science and Technology</i></p> <p><b>Geotechnical Risk Assessment and Back Analysis of Ground Movements Induced by Tunnel and Open-Cut Excavations</b>, Mihail E. Popescu, Ph.D., P.E., D.GE, <i>HBK Engineering, LLC</i>; Andrew J. Schwarz, S.E., P.E., LEED, <i>HBK Engineering, LLC</i>; Naser Elsbih, P.E., <i>HBK Engineering, LLC</i></p> <p><b>Geohazards, Extreme Weather Events and Climate Conditions – The Development of FHWA Guidance</b>, Betsy Godfrey, P.E., M.ASCE, <i>WSP USA</i>; Khalid T. Mohamed, P.E., PMP, <i>U.S. Department of Transportation, Federal Highway Administration (FHWA)</i>; Brian H. Zelenko, P.E., M.ASCE, <i>WSP USA</i></p>	<p><b>Increasing Collaboration among Geotechnical Engineering Faculty: A Case Study from the “Geotechnical Engineering Women Faculty: Networked and Thriving” Project</b>, Patricia M Gallagher, Ph.D., P.E., <i>Drexel University</i>; Shobha K. Bhatia, Ph.D., <i>Syracuse University</i>; Sharon W. Alestalo, <i>Syracuse University</i>; Sucheta Soundarajan, Ph.D., <i>Syracuse University</i>; Adda Athanasopoulos-Zekkos, Ph.D., <i>University of Michigan</i></p> <p><b>Off-Site Implementation of GeoExplorer – A Game-Based Module for Geotechnical Engineering Education</b>, Victoria Bennett, <i>Rensselaer Polytechnic Institute</i>; Ifeanyi Mbah, <i>Rensselaer Polytechnic Institute</i>; Casper Harteveld, <i>Northeastern University</i>; Binod Tiwari, <i>California State University Fullerton</i>; Beena Ajmera, <i>California State University Fullerton</i>; Flora McMartin, <i>Broad-based Knowledge</i>; Tarek Abdoun, <i>Rensselaer Polytechnic Institute</i>; Usama El Shamy, <i>Southern Methodist University</i></p>	<p><b>In Situ Compaction Characterization of Dry Stacked Coal Combustion Residues</b>, David J. White, Ph.D., P.E., M.ASCE, <i>Ingios Geotechnics, Inc.</i>; Pavana Vennapusa, Ph.D., P.E., M.ASCE, <i>Ingios Geotechnics, Inc.</i>; Brendan FitzPatrick, P.E., M.ASCE, <i>Ingios Geotechnics, Inc.</i>; Eric Hageman, <i>HDR Engineering</i>; Jason F. Hill, <i>Tennessee Valley Authority</i>; Nick McClung, P.E., <i>Tennessee Valley Authority</i></p> <p><b>Shear Response of Interfaces in Liner System Under Accelerated Degradation of MSW in Bioreactor Landfill</b>, Girish Kumar, S.M.ASCE, <i>University of Illinois at Chicago</i>; Krishna R. Reddy, Ph.D., P.E., F.ASCE, <i>University of Illinois at Chicago</i></p> <p><b>Stresses in Soil-Bentonite Slurry Trench Cutoff Wall</b>, Daniel G. Ruffing, P.E., <i>Geo-Solutions, Inc.</i>; Jeffrey C. Evans, Ph.D., P.E., D.GE., F.ASCE, <i>Bucknell University</i></p>			
11:30 a.m. – 1:00 p.m.	<b>Lunch, Exhibit Hall E</b>						
1:00 – 2:00 p.m.	<b>Ralph B. Peck Award Lecture, Terrace Ballroom IV</b>						
2:00 – 2:30 p.m.	<b>Closing Ceremony, Terrace Ballroom IV</b>						

## Exhibit Hall Floor Plan



\* denotes Geo-Institute Organizational Member

### 1003 A.H. Beck Foundation Co [www.ahbeck.com](http://www.ahbeck.com)

A.H. Beck Foundation Co., Inc. is a proven innovator in the deep foundation industry. Providing cost effective earth retention and ground improvement solutions since 1932.

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Aerix Industries is the world leading manufacturer of foam concentrate for the use in low density cellular concrete providing projects with a fast schedule cost saving alternative backfill material for roadways sub-base, bridge approaches backfill, and other pavement system solutions. Cellular concrete reduces soil loading while maintaining structural integrity.

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Foamed glass aggregates are ultra-lightweight and used on highways, bridge abutments and retaining walls. In addition, they provide drainage and insulation properties. Unit weights 10-20pcf.

### 222 Arizona State University: Center for Bio-Mediated and Bio-inspired Geotechnics <https://cbbg.engineering.asu.edu>

CBBG, a consortium of ASU, UC Davis, Georgia Tech, and NMSU, develops nature-inspired solutions for hazard mitigation, infrastructure construction, environmental protection, and subsurface exploration.

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### 1112 Campbell Scientific, Inc [www.campbellsci.com](http://www.campbellsci.com)

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### 407 ChemGrout [www.chemgrout.com](http://www.chemgrout.com)

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### 809 CJGeo [www.cjgeo.com](http://www.cjgeo.com)

CJGeo is a specialty contractor performing pipe abandonment and annular space grouting with low density cellular concrete.

### 124 Compaction Grouting Services [www.cgsinc.net](http://www.cgsinc.net)

Compaction Grouting Services, Inc. is a geotechnical contracting firm that specializes in compaction grouting, micropiles (minipiles), sinkhole remediation, soil nail walls and shotcrete, and slabjacking.

### 219 ConeTec, Inc\* <https://www.conetec.com>

ConeTec is a full service geotechnical and environmental site investigation contractor. We safely solve problems by generating high quality subsurface information used in geotechnical, environmental, and mining geotechnique. Our team of experts are dedicated to safe, quality, and efficient site investigations using the best possible equipment.

### 102 CZM [www.czm-us.com](http://www.czm-us.com)

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### 209 Danbro Distributors [www.danbro.com](http://www.danbro.com)

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### 721 Deep Excavation [www.deepexcavation.com](http://www.deepexcavation.com)

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**823**  
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 DFI is an international association which brings together multi-disciplined individuals and organizations to find common ground and create a consensus voice for continual advancement in the deep foundations industry.

**1009**  
**Densification Inc\***  
[www.densification.com](http://www.densification.com)  
 Densification, Inc. is a nation-wide geotechnical contracting firm, specializing in dynamic compaction. Founded in 1994, our mission is to provide property owners and developers with an attractive construction alternative when poor soils or questionable fills are encountered. At the same time, we aim to provide geotechnical consultants with a personal and practical link to project owners.

**922**  
**DeWind One Pass Trenching**  
[www.dewindonepasstrenching.com](http://www.dewindonepasstrenching.com)  
 DeWind One Pass Trenching is the leader in trenching reaching depths to 125+ feet below grade, all across North America, installing environmental & civil trenching services.

**923**  
**DRW Associates**  
[www.drwalter.com](http://www.drwalter.com)  
 DRW Associates is an industry leader in the vibration and acoustical monitoring field. We are also a leading distributor of Instantel equipment for rental and sale.

**901**  
**Durham Geo Slope Indicator**  
<https://durhamgeo.com>  
 DGSI designs, manufactures, and supplies a wide range of geotechnical/structural instrumentation, materials testing equipment, and environmental sampling equipment.

**814**  
**Duro Terra**  
[www.duroterra.com](http://www.duroterra.com)  
 DuroTerra is the distributor of Ductile Iron Pile products in North America. Ductile Iron Piles are highly effective, fast and versatile driven pile systems.

**218**  
**Dywidag Systems International**  
[www.dsiamerica.com](http://www.dsiamerica.com)  
 DYWIDAG-Systems International USA Inc. (DSI), is part of the international DYWIDAG-Systems International Group. DSI's scope of business is the development and application of Post-Tensioning and Geotechnical Systems for the Construction industry. We are a leading global supplier of earth retaining and foundation support systems including DYWI Drill Hollow Bar, Multi-strand ground anchors, DYWIDAG Threadbar for ground anchors, soil nails, micropiles and tie-rods. DSI also provides anchor force monitoring services, during installation and throughout the anchor's service life, using the DYNA Force® load monitoring system.

**719**  
**ECA**  
[www.ecanef.com](http://www.ecanef.com)  
 For more than 100 years, Equipment Corporation of America has been a leading supplier of Foundation Construction Equipment in the Eastern United States.

**220**  
**Elastizell Corporation of America**  
[www.elastizell.com](http://www.elastizell.com)  
 Producing lightweight cellular concrete for quality Engineered Fill. Solving load issues for over 40 years with a national network of qualified and approved applicators.

**818**  
**ELE International**  
[www.ele.com](http://www.ele.com)  
 ELE International specializes in the design, manufacture, and supply of high-quality construction materials testing equipment.

**115**  
**Ensoft**  
[www.ensoftinc.com](http://www.ensoftinc.com)  
 Experts in soil-structure interaction, Ensoft has been developing and providing computer-based solutions to complex geotechnical and structural engineering problems since 1985.

**1021**  
**Enviroprobe**  
[www.enviroprobe.com](http://www.enviroprobe.com)  
 Enviroprobe Service, Inc. is a state of the art geophysical exploration and drilling company offering modern approaches to investigative needs in civil, geotechnical, and environmental applications.

**821**  
**Expanded Shale, Clay and Slate Institute**  
<https://www.escsi.org>  
 ESCSI is the international trade association for manufacturers of rotary kiln-produced expanded shale, expanded clay and expanded slate lightweight aggregate.

**423**  
**Exponent**  
[www.exponent.com](http://www.exponent.com)  
 Exponent is a multi-disciplinary engineering and scientific consulting firm that brings together more than 90 different disciplines to solve important engineering, science, regulatory, and business issues facing our clients.

**200**  
**Foothills Drilling Equipment**  
[www.foothillsequipment.com](http://www.foothillsequipment.com)  
 Our company is the East Coast distributor of TEI Rock Drills. We also provide sales of DTH Hammers and tooling, manufacturing of metal plates, sales of construction and mining materials, consumables and equipment. We now offer service and maintenance for TEI Rock Drills and DTH Hammers.

**1002**  
**Fugro Loadtest\***  
[www.loadtest.com](http://www.loadtest.com)  
 Fugro is the world's leading, independent provider of site characterization and deep foundations testing for large constructions, infrastructure and natural resources.

**812**  
**Gannett Fleming\***  
[www.gannettfleming.com](http://www.gannettfleming.com)  
 Gannett Fleming, an international planning, design, technology, and construction management firm, has been providing innovative engineering and consulting solutions for more than 100 years.

**520**  
**GCP Applied Technologies**  
[www.gcpat.com](http://www.gcpat.com)  
 GCP manufactures waterproofing solutions for construction projects. Over the past 50 years, our products have been used to waterproof virtually every type of building and structure. Commercial buildings. Infrastructure. If you build it, we'll protect it.

**803**  
**GCTS Testing Systems**  
[www.gcts.com](http://www.gcts.com)  
 GCTS Testing Systems designs and delivers productive and precise solutions for the advanced material characterization of soils, rocks, and pavements.

**713**  
**GDS Instruments\***  
[gdsinstruments.com](http://gdsinstruments.com)  
 GDS Instruments designs, develops and manufactures materials testing machines and software used for the computer-controlled testing of soils and rocks.

**701**  
**Geo-Instruments\***  
[www.geo-instruments.com](http://www.geo-instruments.com)  
 GEO-Instruments provides automated instrumentation for monitoring the safety and stability of buildings, excavations, bridges, railways, roads, tunnels, dams, embankments, and slopes. We help owners, infrastructure operators, and construction engineers identify and mitigate risk, optimize designs and methods, and document regulatory compliance.

**101**  
**Geo Products**  
[www.geoproducts.org](http://www.geoproducts.org)  
 For more than 70 years HDPE has been the plastic of choice for products manufactured for long-term use and critical applications. In addition to our EnviroGrid®, HDPE is used to manufacture geomembrane liner for subtitle D sanitary landfills, pit liners, and mining leachate ponds as well as pipe and other industrial products.

**302**  
**Geocomp Corporation**  
[www.geocomp.com](http://www.geocomp.com)  
 Geocomp identifies, quantifies, and manages risk associated with design, construction and operation of infrastructure with Active Risk Management™, geotechnical engineering, instrumentation/monitoring, testing and products.

**1000**  
**Geokon, Inc\***  
[www.geokon.com](http://www.geokon.com)  
 Geokon manufactures a full range of high quality geotechnical instrumentation suitable for monitoring the safety and stability of a variety of civil and mining structures.

**908**  
**Geopier Foundation Company\***  
[www.geopier.com](http://www.geopier.com)  
 Geopier provides an efficient and cost-effective Intermediate Foundation® solution for the support of structures. Specializing in Rammed Aggregate Pier®, Rigid Inclusions, and slope reinforcement systems.

**924**  
**Geoprofessional Business Association**  
<https://www.geoprofessional.org>  
 The Geoprofessional Business Association (GBA) helps members become more successful by creating unique business resources, programs, and services that help members and their clients confront risk and optimize business performance.

**1007**  
**Geosense**  
[www.geosense.co.uk](http://www.geosense.co.uk)  
 Geosense is one of Europe's leading manufacturers and suppliers of instruments to the geotechnical, civil engineering, structural health monitoring, mining and environmental industries.

**902**  
**GEO-SLOPE International**  
[www.geoslope.com](http://www.geoslope.com)  
 GEO-SLOPE develops, markets, and supports state-of-the-art software for geotechnical and geo-environmental modeling. Our customers include small engineering firms, large multi-nationals, government agencies, regulatory commissions, and leading universities throughout the world.

**907**  
**GeoStructures**  
[www.geostructures.com](http://www.geostructures.com)  
 GeoStructures provides design-build construction services for Foundation Support, Ground Improvement, and Engineered Earth Structures including, Diaphragm Walls and Tunnels. Design-Build delivery provides clients a seamless experience to estimate, design and build their projects.

**424**  
**Geosynthetics Magazine**  
<https://geosyntheticsmagazine.com>  
 The Industrial Fabrics Association International (IFA) is a not-for-profit trade association comprised of member companies representing the international specialty fabrics marketplace.

**522**  
**Giken**  
<https://www.giken.com/en>  
 Giken has been a pioneer in the Press-in Piling Technology, which enables driving of sheet and tube piles with very low noise and no vibration.

225

## **Gilson**

[www.globalgilson.com](http://www.globalgilson.com)

Gilson is a leading manufacturer and distributor of high-quality construction testing equipment and laboratory testing equipment suited to your unique applications. Experienced Customer Service and Technical Support staff work with you to select products that meet even the most rigorous ASTM and AASHTO standards. Our materials testing equipment spans across many industries including construction, laboratory, pharmaceuticals, food services and much more!

419

## **GRL Engineers, Inc\* / Pile Dynamics Inc**

[www.grlengineers.com](http://www.grlengineers.com)

[www.Pile.com](http://www.Pile.com)

GRL Engineers, Inc. provide deep foundation testing and analysis services nationwide. Pile Dynamics, Inc. is the world's leading developer and manufacturer of quality assurance testing systems for the deep foundations industry.

103

## **HUESKER, INC\***

[www.huesker.com](http://www.huesker.com)

HUESKER is the world's leading manufacturer of geosynthetics, agricultural, and industrial textiles. Providing solutions for Earthworks and Foundations, Roads and Pavements, Environmental Engineering, Hydraulic Engineering, Industry and Agriculture.

120

## **Humboldt Mfg Co**

[www.humboldtmfg.com](http://www.humboldtmfg.com)

Humboldt Mfg. Co., is a leading manufacturer and supplier of construction materials testing equipment for Soil, Concrete and Asphalt. Both Lab and Field Equipment.

401

## **IDEAL Manufacturing**

[www.idl-grp.com](http://www.idl-grp.com)

IDEAL manufactures the patented STELCOR Drilled-in Displacement Micropile (DDM), for new foundation support and foundation underpinning, as well as large capacity Helical Pipe Piles. IDEAL is ISO 9001-2015 certified and holds an ICC-ES report (ESR-3750) for our helical pipe piles.

106

## **IDS Geo Radar**

<https://idsgeoradar.com>

IDS GeoRadar provides products and solutions for geophysical, mining, civil engineering and security applications. Founded in 1980 as part of IDS Ingegneria dei Sistemi in Pisa, Italy, the company was recently acquired by Hexagon.

825

## **JAFEC USA**

[www.jafecusa.com](http://www.jafecusa.com)

JAFEC USA, Inc. is a geotechnical construction company that provides ground improvement services for liquefaction mitigation, dam and levee stabilization, excavation support and seepage control.

701

## **Keller**

[www.kellerfoundations.com](http://www.kellerfoundations.com)

Connected Companies: Anderson Drilling, Bencor, Case Foundation, Cyntech, GEO-Instruments, Hayward Baker, HJ Foundation, Keller in Canada, McKinney Drilling Company, Moretrench, Moretrench Industrial, and Suncoast Post-Tension.

318

## **Kessler Soils Engineering Products**

<https://www.kesslerdcp.com>

World's leading manufacturer of Dynamic Cone Penetrometers. Distributors of Zorn Light Weight Deflectometers for compaction control and MIT pavement thickness gauge & dowel bar scanners.

1008

## **Kordata**

[www.kordata.com](http://www.kordata.com)

Our vision is to be the industry leader in mobile data collection by developing and deploying the most innovative, flexible, scalable, mobile data collection and workflow software available by solving the challenging technical issues and putting simple and elegant solutions in the hands of our valued clients.

## **Maccaferri\***

[www.maccaferri.com/us](http://www.maccaferri.com/us)

Maccaferri is a global leader of civil and geotechnical engineering applications that helps consultants, agencies and contractors with "Engineering a Better Solution."

1019

## **Magnum Piering**

[www.magnumpiering.com](http://www.magnumpiering.com)

Magnum Piering is an industry leader in manufacturing high capacity, high quality steel piling products for deep foundations and foundation repair applications.

418

## **Malcolm Drilling Company\***

[www.malcomldrilling.com](http://www.malcomldrilling.com)

Malcolm has for 5 decades been an innovator and leader in the industry. Our services include deep foundations, retention systems, ground improvement and dewatering techniques

518

## **MARL Technologies**

[www.marltechnologies.com](http://www.marltechnologies.com)

MARL Technologies designs and manufactures technology and industry-leading drills for auger, rotary, geotechnical, environmental, sonic, geothermal, water well, CPT, mining and construction. We are also proud to supply the world's first digital electronic SPT system, the MARL eSPT®.

1020

## **Max Enterprises**

[www.maxenterprises.com](http://www.maxenterprises.com)

Max's New indoor hydraulic sampling units, crews can set up and continuously push 3-inch Shelby tube to a depth of 10 feet in less than one hour.

918

## **McCrossin Foundations**

[www.mccrossinfoundations.com](http://www.mccrossinfoundations.com)

Deep foundations and support of excavation contractor; capabilities include large diameter shafts, driven and drilled piling, and small diameter drilling and grouting.

308

## **Menard Group USA\***

[www.menardgroupusa.com](http://www.menardgroupusa.com)

Menard USA is one of the leading specialized ground improvement contractors in the U.S., with over 30 years of experience. We are the U.S. affiliate of Menard, a global leader among ground improvement contractors with offices in over 30 countries. Menard USA was formed as a merger between DGI (Drainage & Ground Improvement, Inc.), a leading Vertical Wick Drain installer in the US, and Menard.

421

## **Meter Group**

[www.metergroup.com](http://www.metergroup.com)

METER Group delivers real-time, high-resolution data with applications in hydrology and geotechnical engineering. METER instruments measure water and heat transfer in natural and engineered systems.

100

## **Morris Shea**

[www.morris-shea.com](http://www.morris-shea.com)

Morris Shea is a heavy civil contractor specializing in design/build of deep foundations. Services include DeVaal® Piles, CFA piles, drilled shafts and earth retention.

118

## **NHAZCA S.r.l.**

[www.nhazca.it](http://www.nhazca.it)

NHAZCA S.r.l., Spin-off Company of "Sapienza" University of Rome, is a services and consultancy company with great expertise in the following fields: natural hazards, geotechnics, hydrogeology, civil and environmental engineering, Oil & Gas and mining. Thanks to a constant effort in the innovation and optimization, NHAZCA provides cutting-edge solutions for the management of complex projects in complex environments making use of the most advanced remote sensing technologies, such as: Satellite SAR Interferometry; Terrestrial SAR Interferometry, PhotoMonitoring™ and UAV Surveys.

409

## **Nicholson Construction Company\***

[www.nicholsonconstruction.com](http://www.nicholsonconstruction.com)

Nicholson is a leader and an innovator in the geotechnical construction industry with expertise in deep foundations, earth retention systems and ground treatment solutions.

109

## **Nucor Skyline**

[www.nucorskyline.com](http://www.nucorskyline.com)

Skyline Steel supplies and manufactures an unparalleled assortment of Bearing Piles, Sheet Piles, Pipe, Accessories, Anchors, Micropiles, Tie Rods and Structurals. Visit [www.skylinesteel.com](http://www.skylinesteel.com).

224

## **Parratt-Wolff Inc.**

[www.pwinc.com](http://www.pwinc.com)

Parratt-Wolff Inc. is an employee-owned full-service drilling firm that ensures every site investigation meets or exceeds our clients' expectations

824

## **PDCA**

[www.piledrivers.org](http://www.piledrivers.org)

A pile driving contractors organization, including engineers and associates who advocate the significant benefits of using driven piles for deep foundations and earth retention systems.

113

## **Pennoni Associates**

[www.pennoni.com](http://www.pennoni.com)

Pennoni is a multi-disciplined engineering firm with 1,200 employees in the eastern United States headquartered in Philadelphia, PA. We provide geotechnical engineering and construction materials testing services to both private and public clients.

807

## **Plaxis Americas LLC**

[www.plaxis.com](http://www.plaxis.com)

PLAXIS is industry-leading finite element software for geotechnical design and analysis. PLAXIS is versatile, sophisticated and user-friendly. Plaxis is now part of Bentley Systems.

201

## **Propex GeoSolutions**

[www.propexglobal.com](http://www.propexglobal.com)

Propex GeoSolutions is one of the largest Geosynthetic and Erosion Control manufacturers in the world. The Propex portfolio of solutions helps build and rebuild key infrastructure across the globe.

820

## **Redi-Rock of SE Pa & JDM**

**Materials**

[www.jdm-inc.com](http://www.jdm-inc.com)

Redi-Rock of SE Pa and JDM are producers of PennDot approved retaining wall blocks for commercial industrial and landscaping installations. Visit us at Booth 820.

319

## **Reinforced Earth Company\***

[www.reinforcedearth.com](http://www.reinforcedearth.com)

Reinforced Earth® MSE walls are economical gravity structures having high strength, a limited footprint, flexibility to distribute loads evenly, and a variety of architectural finishes.

313

## **Rite Geosystems\***

<https://ritegeosystems.com>

Rite Geosystems is a supplier of geotechnical and structural instrumentation and monitoring products including vibrating wire and MEMS Sensors. With more than 50 years of experience in manufacturing geotechnical instrumentation, Rite Geosystems supplies high quality and durable devices for long-term safety and performance monitoring.

315

**Rocscience Inc\***

[www.rocscience.com](http://www.rocscience.com)

Rocscience is a world leader in developing geotechnical engineering software. For over 20 years, we've used leading-edge research to build tools used by 7,000+ engineers for slope stability, excavation design, and geotechnical analysis.

901

**Roctest**

<https://roctest.com/en>

Roctest is the leading developer, manufacturer and supplier of innovative sensing technologies based on vibrating wire and fiber optic sensors for geotechnical and structural instrumentation.

1100

**RST Instruments**

[www.rstinstruments.com](http://www.rstinstruments.com)

Founded in 1977, RST Instruments Ltd. is a world leader in providing innovative monitoring & measuring instruments for geotechnical, mining, environmental and structural projects.

122

**Saltus**

[www.saltusllc.com](http://www.saltusllc.com)

Saltus LLC is a Manhattan based provider of Documentation and Construction Monitoring Services, and more than twenty years of experience in the construction industry.

919

**Schnabel Engineering, LLC\***

<https://www.schnabel-eng.com>

An ENR Top 250 design firm, Schnabel provides specialized expertise and design for geotechnical, tunnel, and dam engineering projects across the U.S. and worldwide. We are an entrepreneurial, employee-owned company of over 300 diverse professionals in 18 locations with a passion for client service and tough technical challenges.

715

**Schnabel Foundation Company\***

[www.schnabel.com](http://www.schnabel.com)

Established in 1959, Schnabel Foundation Company is a geotechnical contractor that specializes in design-build earth retaining structures, jet grouting, cut-off walls, and specialty deep foundations.

725

**Seequent**

<https://www.seequent.com>

A global leader in the development of visual data science software. Our latest solution, Leapfrog Works, is a fast and dynamic 3D subsurface modelling solution for the civil engineering and environmental industries.

921

**Sensemetrics**

[www.sensemetrics.com](http://www.sensemetrics.com)

Technology firm providing business to business solutions and technologies for effective management of distributed sensor networks. Delivering smart solutions and descriptive analytics to sensing applications in the world's largest and most challenging industries - infrastructure, mining, oil & gas, construction, & utilities.

422

**Sigicom**

[www.sigicom.com](http://www.sigicom.com)

Sigicom develops, manufactures, and markets measurement systems for remote monitoring of vibration, noise, and other environmental variables affected by activities such as large-scale construction.

425

**Soilvision Systems**

[www.soilvision.com](http://www.soilvision.com)

SoilVision is considered a leader and innovator in 2D and 3D numerical analysis software for geotechnical, geoenvironmental, hydrogeological and soil science applications.

1015

**Spatial Networks**

<https://spatialnetworks.com>

Spatial Networks delivers data and technology products that enable organizations to identify opportunities, reduce uncertainty, and obtain valuable insights into their field operations.

322

**Stressbar Systems International**

[www.stressbarsystems.com](http://www.stressbarsystems.com)

Stressbar Systems International, LLC offers a full line of threaded bars and accessories in grade 80, 97, 100 & 150 ksi. We provide reliable and supportive services to fulfill your needs. Our innovative and superior products are guaranteed to meet the expanding demands of today's and tomorrow's engineering projects.

320

**Studio Prof Marchetti SRL**

[www.marchetti-dmt.it](http://www.marchetti-dmt.it)

Marchetti manufactures and distributes DMT/SDMT testing equipment (since 1980), for obtaining high accuracy geotechnical parameters including modulus, resistance, stress history and shear wave velocity.

723

**Subsurface Constructors\***

[www.subsurfaceconstructors.com](http://www.subsurfaceconstructors.com)

Geotechnical Contractors: ground improvement (aggregate piers/vibro stone columns, rigid inclusions/vibro concrete columns, compaction grouting, vibrocompaction), earth retention (soldier pile walls, augercast pile walls, soil nail walls...) and deep drilled foundations.

1001

**TenCate Geosynthetics\***

[www.tencategeo.us](http://www.tencategeo.us)

TenCate Geosynthetics is the global leader in geosynthetics. Our geogrids and geotextiles are engineered with advanced application knowledge to meet project specifications for transportation construction, mechanically stabilized earth, erosion control, and water and waste management.

325

**Terracon**

[www.terracon.com](http://www.terracon.com)

Since 1965, Terracon has evolved into a successful multi-discipline firm specializing in environmental, facilities, geotechnical, and materials services with presence in 40 US states served by 140 offices. The structural and materials diagnostics practice area within our Facilities service line is focused on diagnosing, remedial engineering, restoration, and monitoring the performance of structures with a goal to develop and implement solutions and strategies to enhance building performance.

420

**Terra Sonic International**

[www.terraconinternational.com](http://www.terraconinternational.com)

Terra Sonic International is the most experienced Sonic drill rig and tooling manufacturer with over a combined 250 years of field and design experience.

508

**Trautwein - GeoTAC**

[www.geotac.com](http://www.geotac.com)

GeoTAC provides equipment for automated geotechnical testing including: Sigma-1™ and Geojac™ load frames, DigiShear™ direct and simple shear, DigiFlow™ pumps, and TestNet™ data acquisition systems.

822

**TRC Engineers**

[www.trcsolutions.com](http://www.trcsolutions.com)

TRC is a national engineering, consulting and construction management firm providing integrated services to the power, oil and gas, environmental and infrastructure markets.

108

**University of California Davis**

<https://engineering.ucdavis.edu>

Building upon a long-standing tradition of public service, UC Davis Engineering has a visionary plan for the future in which innovative research and quality education will make life better for everyone.

203

**University of Illinois, Department of Civil Engineering**

<http://cee.illinois.edu>

CEE at Illinois offers graduate programs on-campus and online for full-time and part-time students in geotechnical engineering and all areas of civil engineering.

524

**Vibra-Tech Engineers**

[www.geosonicsvibratech.com](http://www.geosonicsvibratech.com)

Our Remote Monitoring Technology converts your site data into valuable engineering information available from your device – because you can't manage what you don't measure.

207

**Villanova University**

[www.villanova.edu](http://www.villanova.edu)

Villanova University's Department of Civil & Environmental Engineering offers M.S. degrees in Civil Engineering and Water Resources Engineering as well as a growing Ph.D. program. It has a graduate concentration in Geotechnical Engineering and is launching a NEW certificate in DAM Engineering this fall. Graduate students can take classes on a full or part-time basis. The College's award winning E-learning option provides the flexibility to stream classes live or view the archived lectures at their convenience (available 24/7).

819

**VJ Tech**

[www.vjtech.co.uk](http://www.vjtech.co.uk)

Since 1991, UK based VJ Tech Ltd. has supplied high-quality soil testing instruments to civil engineering companies & research institutions located in over 85 countries.

107

**Wagman**

[www.wagman.com](http://www.wagman.com)

Wagman is a multi-faceted construction firm with operations in heavy civil, general construction, and geotechnical construction services.

321

**White Industrial Seismology**

[www.whiteseis.com](http://www.whiteseis.com)

Mini-Seis III Seismographs, Mini-Seis III – Remote Portable Monitoring Systems and Mini-Seis Seismographs, Vibration Monitoring Services, Vibration Analysis Software, and Custom Assemblies.

412

**Williams Form Engineering Corp**

[www.williamsform.com](http://www.williamsform.com)

Williams Form Engineering Corporation has been offering Ground Anchors, Concrete Anchors, Post Tensioning Systems, and Concrete Forming Hardware to the construction industry for over 95 years.

920

**Worldsensing**

[www.worldsensing.com](http://www.worldsensing.com)

Loadsensing, the new standard in wireless monitoring with over 20,000 deployments in 40+ countries, is part of Worldsensing, a globally active IoT pioneer.

306

**WSP\***

[www.wsp.com](http://www.wsp.com)

WSP USA is a leader in tunneling and underground construction, from New York City to Istanbul. The firm has participated in the design and construction of some of the longest, largest, and most complicated bridges & tunnels in the world.

214

**Wurster Betterground**

[www.wursterinc.com](http://www.wursterinc.com)

Betterground enables construction companies to build up a sustainable business in the field of ground improvement utilizing the best equipment in the world, competent services and professional expertise, including equipment repairs, online spare part purchasing, site quality control, method optimization and geotechnical design and supervision.

# General Information

## Assumption of Risk

All ASCE events and activities are purely voluntary activities, and attendees are fully responsible for their own conduct and well-being, including, and without limitation, determining their level of fitness to take part in any such event or activity. In participating in any event or activity, attendees shall be deemed to understand and accept all risk of possible physical injury that might occur as a result of such participation. Children under the age of 18 are not allowed in the exhibit hall.

## Medical Emergencies – Loews Philadelphia Hotel

ASCE hopes that your visit to Geo-Congress 2019 will be free from illness or injury, but in case you or a family member needs medical attention during your time at the event, contact the front desk. The closest hospital is Thomas Jefferson University Hospital:

### Thomas Jefferson University Hospital

111 South 11th Street, Philadelphia, PA 19107, (215) 955-6000

## Medical Emergencies – Pennsylvania Convention Center

If there is an injured person or someone who needs medical attention, identify yourself to the individual if possible and obtain as much information as possible from him/her. Contact the Command Station, via the beige house phone at ext. 4911. Relay information to the Command Station. The Command Station will either contact the show EMS or the Philadelphia Fire Department Rescue Unit. It is important that you know where you are so medical attention may be rendered as quickly as possible. Do Not Call 911.

## No Smoking Policy

Smoking is not allowed at any ASCE event or in the Convention Center or hotel.

## Meeting Room Overcrowding

ASCE will make every effort to schedule popular events in rooms large enough to accommodate anticipated attendance. Since many events are extremely popular, it is wise to select alternative events as you plan your conference schedule. ASCE and the Pennsylvania Convention Center are REQUIRED to follow local fire regulations and may ask participants in rooms filled to capacity to choose another event.

## Program and Session Cancellation

ASCE reserves the right to cancel programs and/or sessions. In the unlikely event of a cancellation, all registrants will be notified. Programs and sessions are subject to change, and ASCE reserves the right to substitute a program, session, and/or speaker of equal caliber to fulfill the educational requirements.

## Pennsylvania Convention Center – Emergency Procedures

**Evacuation Plan |** Familiarize yourself with your surroundings. Note all emergency exits in your area. The key to a successful evacuation is for everyone to remain calm. In the event that evacuation is necessary, you will be informed via a voice-recorded message advising you to proceed to the nearest exit. If you are assisting in the evacuation of your show attendees and exhibitors, make sure they are instructed to leave by way of the nearest exit in a calm and orderly fashion. Physically challenged guests should be escorted to the nearest fire exit and the command station must be notified via house phone at ext. 4911 or nearest security personnel with the exact location of the individual so that the Fire Department is notified for retrieval of the individual.

**Fire – Code Red |** If a fire is suspected, contact the Command Station at 215-418-4911 or via the beige house phones at ext. 4911. Give the location and extent of the suspected fire. The Command Station will dispatch Security and Engineering and will call the Fire Department. The Command Station will also notify the Emergency Response Leaders, who will be in touch with Show Management. If evacuation is necessary, see evacuation plan above.

**Bomb Threat – Code Black |** When a call is received, try to keep the caller on the line as long as possible in order to obtain as much information as possible. Try to be calm when speaking to the caller. After a threat has been made and the call has been terminated, call the Command Station at 215-418-4911. Do Not Use your Radio at this point since the frequency of a two-way radio could trigger the device. Pagers as well as cell phones should also be turned off. Command Station will call the police and notify the Emergency Response Team. The Emergency Response Team will be in touch with Show Management. If evacuation is necessary, see the evacuation plan above.

**Civil Disturbances |** If you see protestors or witness a civil disturbance, notify the PCCA Command Station via the beige colored house phone at ext. 4911. The Command Station will notify security personnel and the appropriate management staff to report to your location. Command Station will also notify the Philadelphia Police Department, Security Services, and will meet with appropriate Show Management and advise them of the situation.

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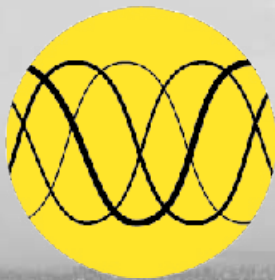
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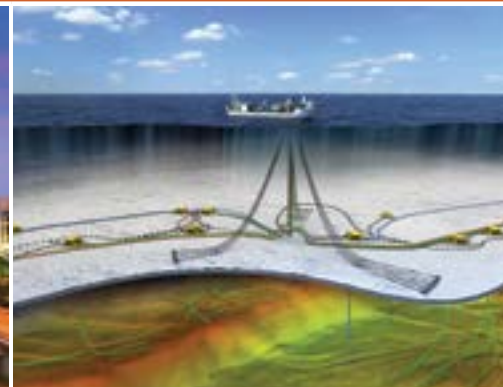
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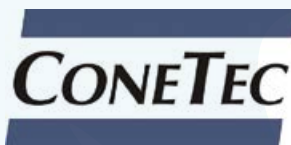


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