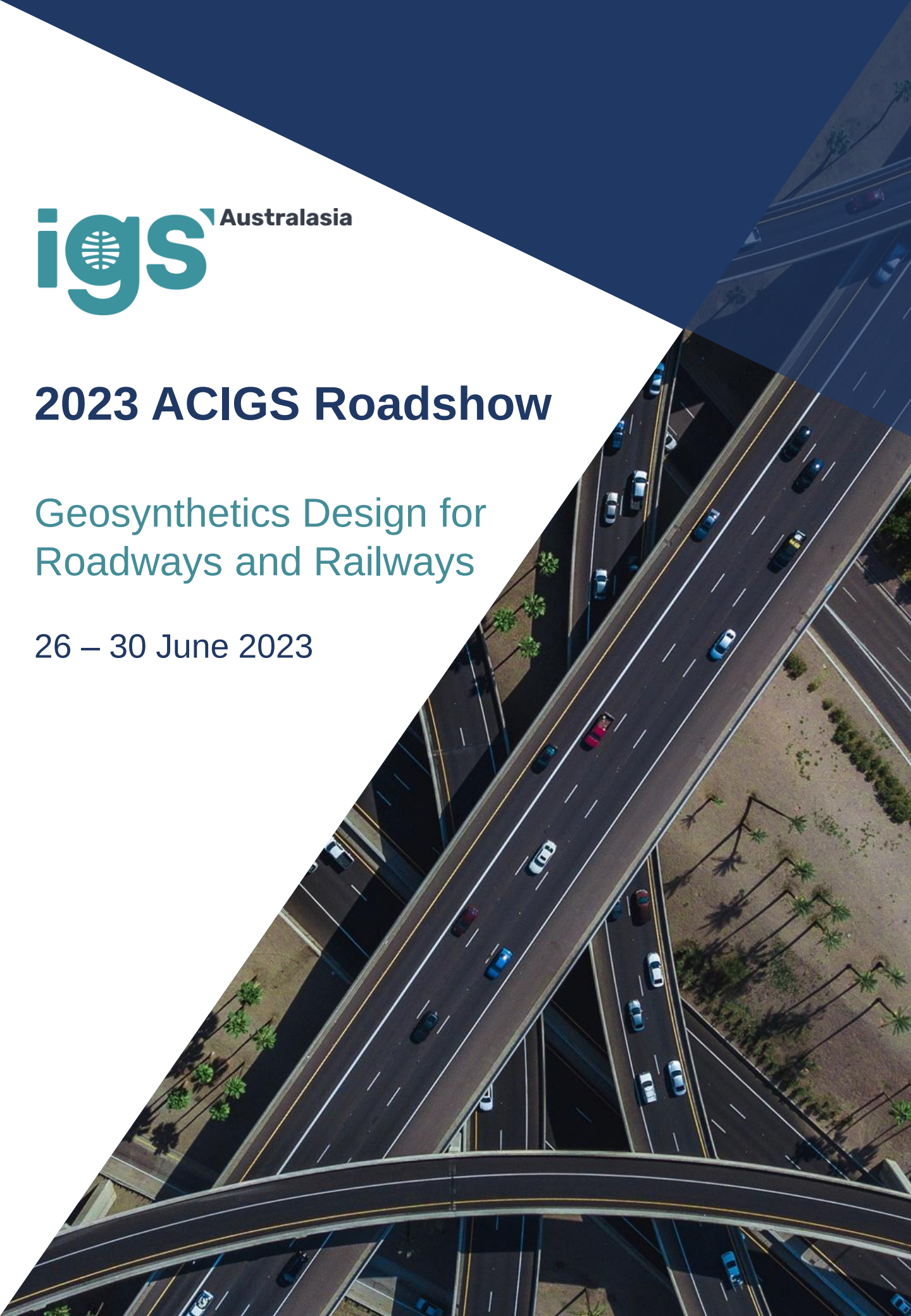
igs Australasia

2023 ACIGS Roadshow

Geosynthetics Design for Roadways and Railways

26 – 30 June 2023



Program

Program overview:

Geosynthetics provide sustainable alternatives for enhanced performance, durability and cost-effectiveness of roadways and railways. This short course provides an integrated view of the multiple applications of geosynthetics in these two transportation modes. This includes the mechanisms involved in the different applications, the identification of relevant geosynthetics properties, the available design methodologies, and case histories involving the use of geosynthetics in roadway and railway projects.

An outline of the main topics to be covered is as follows:

- Welcome & Objectives
- Geosynthetics: Types and Functions
- Structural Capacity of Pavements and Railways
- Overview of Geosynthetic applications in Roadways and Railways
- Geosynthetics for Mitigation of Asphalt Reflective Cracking
- Geosynthetics for Stabilization of Unbound Aggregate Layers
- Geosynthetics for Reduction of Layer Intermixing
- Geosynthetics for Reduction of Moisture in Structural Layers
- Geosynthetics for Stabilization of Soft Subgrades
- Geosynthetics for Mitigation of Distress Induced by Expansive Clays
- Path Forward & Closure

This is a full-day short course, organized on behalf of the Australasian Chapter of the International Geosynthetics Society (ACIGS). Course attendees will complete the short course with a working knowledge on the characteristics of different geosynthetics and their use to solve specific problems in the structural design of pavements and railways.

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Highlights

Geosynthetics applications in pavements:

The multiple applications of geosynthetics listed in the outline above many mechanisms that, in turn, require that geosynthetics make use of multiple functions (e.g., separation, reinforcements, stiffening). Understanding the different mechanisms is critical for selection of the proper design methods and geosynthetic properties. The course will discuss how to incorporate the benefits of geosynthetics within the framework of design approaches such as Mechanical-Empirical (M-E) design, AASHTO design method, limit state design & empirical design. The different applications involving the use of geosynthetics in roadways allow quantification of the performance, extended design life, and decreased carbon footprint.

Geosynthetics in Railways:

While the design criteria and typical methods used in railway design are different from those in roadways, the multiple applications of geosynthetics listed in the outline above will also apply. Accordingly, the mechanisms and geosynthetic functions that lead to improved railway performance are consistent with those geosynthetics used in roadways. This includes the use of geosynthetics for stabilization of the subgrade under the railway tracks, increased stiffness of the railway ballast, and control of ballast fouling. Overall, the short course material will focus on the use of geosynthetics to reduce settlements, improve load-bearing capacity, and improve the long-term performance of railway tracks. Other functions such as geosynthetics used for separation, drainage, erosion control in railway application will be presented.

Highlights

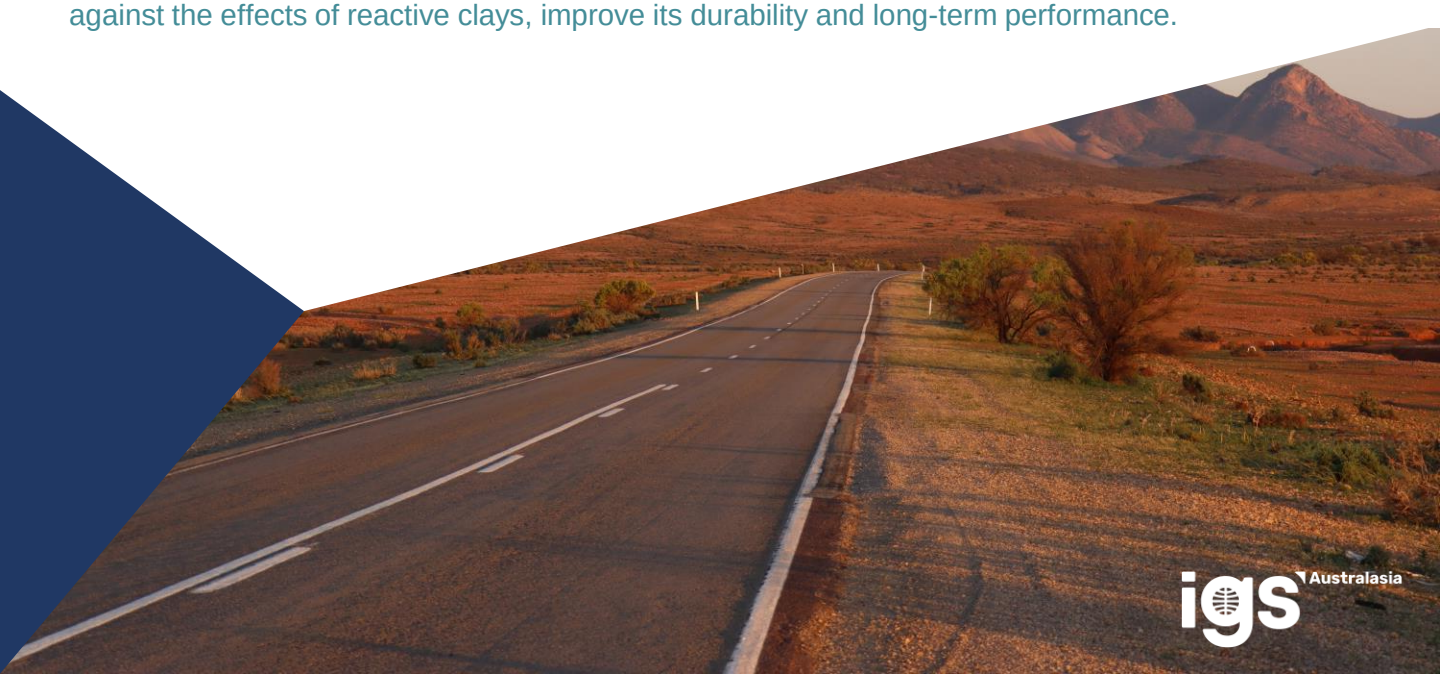
The short course will also cover applications that particularly relevant to conditions in Australia and New Zealand, including the following applications:

- Retardation of asphalt reflective cracking:

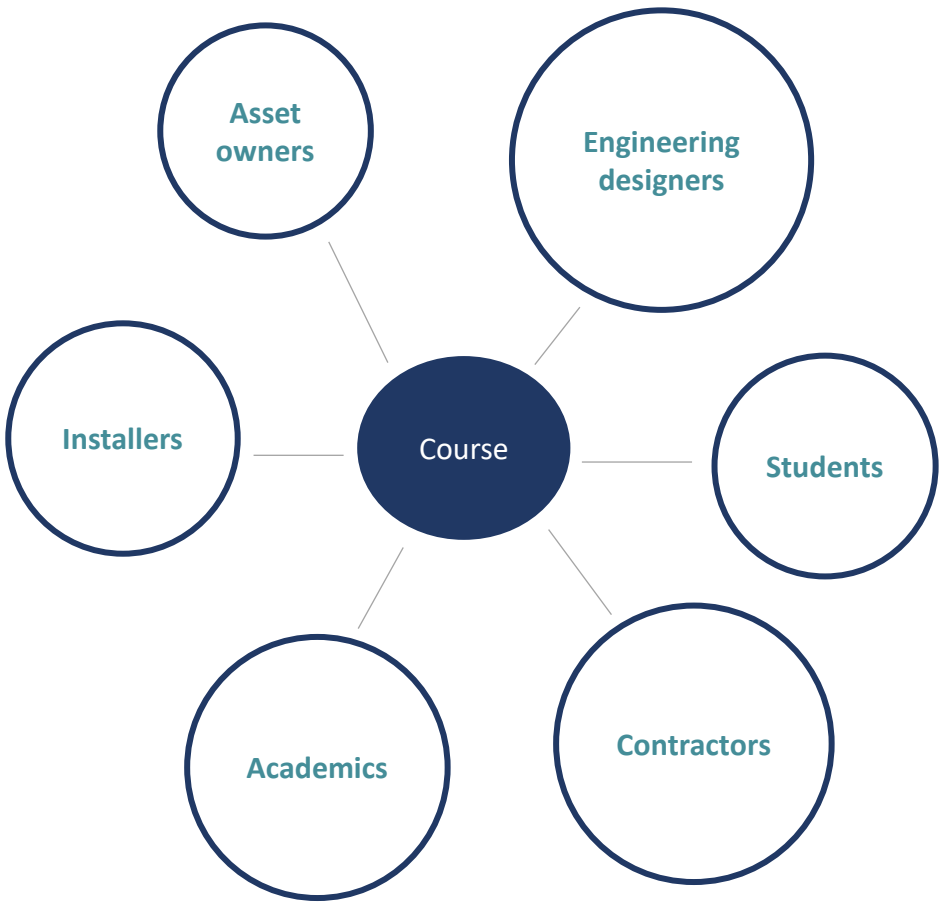
The use of geosynthetics as interlayers to prevent the propagation of cracks in the underlying pavement structure, as the geosynthetics provide either stress relief or allow distributing localized stresses and strains over a wider area will be examined. Such redistribution reduces the risk of reflective cracking in the overlay and extends the service life of the road. Geosynthetics interlayers can also improve the structural capacity of the existing pavement and the new overlay, further reducing the risk of reflective cracking. Overall, the short course will discuss the adoption of geosynthetics interlayers, as they may provide an effective and cost-efficient method to minimize reflective cracking in roadways.

- Reactive clays:

Reactive clays (i.e., expansive clays) can be damaging to infrastructure in several ways, including the development of bumps in the longitudinal direction of roadways and of significant longitudinal cracks in their transverse direction. These clays are characterized by their ability to change volume with changes in the soil moisture content, causing significant differential movements within the subgrade of roadways and railways. The damage caused by reactive clays can be significant and can result in costly repairs and maintenance. The problems associated with the presence of reactive clay subgrades can be significantly mitigated with the use of appropriate geosynthetic materials and techniques. This is an area of significant recent progress, and the short course attendees will benefit from the latest advances on the use of geosynthetics to protect infrastructure against the effects of reactive clays, improve its durability and long-term performance.



Who should attend?



Help asset owners make informed decisions about construction and rehabilitation projects. By incorporating geosynthetics into their infrastructure plans, asset owners can improve the performance, safety, and environmental sustainability of their roadway and railway assets, while also potentially reducing costs over the long term.

Provide designers, contractors and installers with a range of benefits, including improved design options and construction methods, cost savings, safety improvements, environmental sustainability, and opportunities for innovation. By incorporating geosynthetics into their designs, engineers can improve the performance, design life, and sustainability of infrastructure, while also meeting the needs of their clients and stakeholders.

Provide academics and student with new insights into the use of geosynthetics for enhanced learning, improved industry preparedness, sustainable infrastructure, and collaboration, all of which can lead to better and more efficient infrastructure construction practices.

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Registration

Duration:

Full day course (8.30am – 5.30pm)

Location:

26th June 2023
Auckland, New Zealand

Tonkin & Taylor
1 Fanshawe St,
Auckland Central

28th June 2023
Melbourne, Australia

Engineers Australia
Level 31/600, Bourke St.,
Melbourne

30th June 2023
Brisbane, Australia

Brisbane Covention & Exhibition Centre
Glenelg st.,
South Brisbane

Rate (in AUD/NZD):

- ACIGS member: **$250**
- Non-member: **$300**
- Public sector & academic: **$150**
- Student: **Free (limited space)**

The rate is valid for all locations inclusive of meals.

Registration link:

- Auckland: https://www.eventbrite.com.au/e/609114757637
- Melbourne:https://www.eventbrite.com.au/e/596420699367
- Brisbane: https://www.eventbrite.com.au/e/609120264107

All registration shall be done online, please follow the link to register.

For more information on the event, please contact info@acigs.org or visit www.acigs.org.

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Speakers

Professor Erol Tutumluer

University of Illinois

Dr. Erol Tutumluer at the University of Illinois at Urbana-Champaign (UIUC) is a Professor specializing in Transportation Geotechnics in the Department of Civil and Environmental Engineering (CEE). Professor Tutumluer holds Paul F. Kent Endowed Faculty Scholar and serves as the Director of International Programs. Dr. Tutumluer has been active in geosynthetics engineering research, education, and practice for more than 20 years. He has research interests and expertise in characterization of pavement and railroad track geomaterials, i.e., subgrade, soils and base/ballast unbound aggregates, soil/aggregate stabilization and geosynthetics.

Dr. Tutumluer has completed major research studies related to the subgrade restraint and granular base/ballast stabilization applications of geogrids and geotextiles. Dr. Tutumluer has served as an investigator on over 100 research projects and graduated 22 PhD and 44 MS students and authored/co-authored over 300 peer reviewed publications from his research projects.

Dr. Tutumluer is a member of the International Geosynthetics Society (IGS) and serves on the Technical Committee on Stabilization. He is the Editor-in-Chief of the Transportation Geotechnics Elsevier journal and the current Chair of the ISSMGE Technical Committee 202 on Transportation Geotechnics.

Dr. Tutumluer is a member of the ASCE T&DI and Geo-Institute and served as the Chair of the ASCE Geo-Institute's Pavements Committee in 2006-2012. He is a member of the AREMA Committee 1 on Ballast. Dr. Tutumluer is an active affiliate of the Transportation Research Board (TRB) and serves as the Chair of TRB's AFP00 Geological and Geoenvironmental Engineering Section. He is a member of the AFS70 Geosynthetics Committee and served as the Chair of TRB's AFP70 Aggregates Committee in 2011-2016.

Dr. Tutumluer was the 2000 recipient of the TRB's Fred Burgraff award for Excellence in Transportation Research; he also received TRB's Geology and Earth Materials Section Best Paper Awards in 2009, 2012 and 2019, and TRB's Soil Mechanics Section Best Paper Award in 2016. He was selected and honored with Yangtze River Scholar Award by China Ministry of Education in 2016 and Qiushi Distinguished Professor title by Zhejiang University in China in 2019. Dr. Tutumluer is the 2020 recipient of the ASCE T&DI James Laurie Prize in recognition of his career accomplishments for promoting Transportation Geotechnics field.

Speakers

Professor Jorge Zornberg

University of Texas

Dr. Zornberg, P.E., is the Brunswick-Abernathy Regents Professor at the University of Texas at Austin. He earned his B.S. (Hons.) from the National University of Cordoba (Argentina), his M.S. from the PUC of Rio de Janeiro (Brazil), and his Ph.D. from the University of California at Berkeley.

He has over 35 years' experience in research and practice in geotechnical, transportation and geoenvironmental engineering. Prof. Zornberg has been involved in the analysis, design, and forensic evaluation of retaining walls, reinforced soil structures, roadway systems, mining facilities, impoundment lining systems, as well as urban and hazardous waste containment facilities. He has served as an expert witness in litigation cases involving the collapse of earth retaining structures, damaged geosynthetic barrier systems, failure of roadways founded on expansive clays, and siting of waste containment facilities. His research focuses on geosynthetics for roadway stabilization, soil reinforcement interaction, earth retaining structures, unsaturated soils, liners for waste and mining containment systems, and numerical and physical (centrifuge) modeling of geotechnical systems. He teaches graduate courses at the University of Texas on Earth Retaining Structures and Geoenvironmental Engineering.

Prof. Zornberg served as president of the International Geosynthetics Society (IGS) during the period 2010-14. He currently serves as Trustee of the IGS Foundation and vice-chair of the IGS Stabilization TC. He served as chair of ASCE's 2017 Geo-Congress (Orlando, FL), of its International Activities Council, and of its Geosynthetics TC. Prof. Zornberg has authored over 500 technical publications, including several book chapters. Prof. Zornberg was awarded three patents. Prof. Zornberg has been invited to deliver keynote lectures in over 30 countries around the world.

In recognition of his contributions, Prof. Zornberg received the Presidential Early Career Award for Scientists and Engineers (PECASE) awarded by President George W. Bush in 2002. In addition, Dr. Zornberg was recognized with the IGS Service Award (2018), Mercer Lecture award (2015), J. James R. Croes Medal (ASCE, 2012), IGS Award (2004), Collingwood Prize (ASCE, 2000), and the Young IGS Member Award (1996). In 2019, the International Geosynthetics Society (IGS) recognized his "major contributions to the geosynthetics discipline" by establishing the "Zornberg Lecture," an honorary inaugural lecture for the Pan-American Conferences on Geosynthetics.

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CONTACT

For more information, please contact:

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https://www.acigs.org/