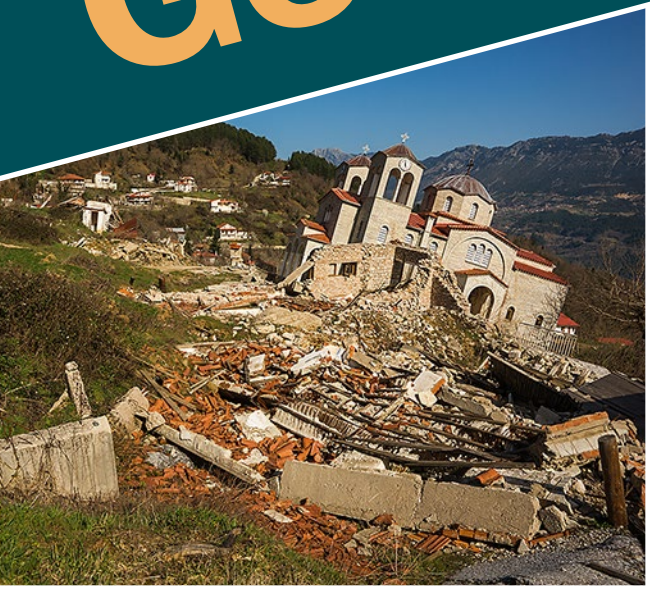


# Geo-Risk 2023

## Innovation in Data and Analysis Methods (GSP 345)

Selected Papers from Geo-Risk 2023
Arlington, Virginia ▪ July 23–26, 2023




**EDITED BY**

Jianye Ching, Ph.D.
Shadi Najjar, Ph.D.
Lei Wang, Ph.D.



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## *INNOVATION IN DATA AND ANALYSIS METHODS*

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GEO-RISK 2023

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Jianye Ching, Ph.D.
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# Preface

This is the second volume of four Geotechnical Special Publications (GSPs) containing papers from Geo-Risk 2023: Advances in Theory and Innovation in Practice, held in Arlington, Virginia on July 23–26, 2023. The Geo-Risk conference series is a one-of-a-kind event that attracts attendees from around the world to witness the major advancements in the growing fields of risk and reliability in geotechnical engineering. Geo-Risk 2023 is the third successful specialty conference offered by the Risk Assessment and Management Committee of the ASCE Geo-Institute. Geo-Risk 2011, held in Atlanta, covered risk assessment and management in all fields of geoengineering while Geo-Risk 2017, held in Denver, featured Geotechnical Risk: From Theory to Practice. Geo-Risk 2023 provided an international forum to discuss the giant strides made in the past decade by geotechnical practitioners and researchers in the fields of uncertainty modeling, geohazard mitigation, digitalization, data science, infrastructure resilience, and artificial intelligence. The conference was attended by a wide range of geo-professionals including engineers, contractors, academicians, numerical geo-technologists, researchers, and software developers.

This volume, which focuses on data-driven geotechnics and advances in computational methods for addressing geotechnical uncertainty, culminates two years of effort by the technical planning committee whose focus has been to continue the success of the previous meetings in the Geo-Risk conference series. Many individuals were responsible for the content of this volume, all of whom served in the efforts to maintain the standard set by previous proceedings. For Geo-Risk 2023, an international call for papers and a rigorous peer review process yielded 163 accepted technical papers, that were presented in 19 sessions. This volume includes 46 papers that were presented in 5 technical sessions and 1 panel-based session. Papers were reviewed in accordance with ASCE GSP standards. Accordingly, each paper was subjected to technical review by two or more independent peer reviewers. Publication requires concurrence by at least two peer reviewers.

The Editors would like to express their appreciation for having been provided the opportunity to be a part of Geo-Risk 2023 organization. We express our sincere thanks to the numerous session chairs and reviewers, and we hope that these proceedings will be of use to the geotechnical engineering community for many years to come.

**The Editors,**

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