

Exponent®
Engineering & Scientific Consulting

Jose Lizarraga, Ph.D., P.E.

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Professional Profile

Dr. Lizárraga is a licensed professional engineer who specializes in the analysis and understanding of geotechnical engineering issues, particularly those involved in large, infrastructure projects and natural hazards. He has provided consulting and engineering support services for a variety of projects related to the design and construction of containment facilities for solid waste and coal combustion residuals (CCR), transportation, residential communities, industrial facilities, and dredged material management infrastructure for ports and marine terminals. His experience has led him to work with clients from a variety of industries including utilities, energy, industrial and manufacturing, and the public sector.

Dr. Lizárraga has also conducted research on the evaluation of soil-structure interaction effects for excavation support systems, constitutive modelling for unsaturated soils, development of spatially distributed models for shallow landslide hazard assessment in volcanic soils, and building Geographical Information Systems (GIS) based models for estimating land subsidence induced by depletion of natural gas reservoirs. His results have been presented at several peer-reviewed scientific and engineering journals, and national and international conferences.

Prior to joining Exponent, Dr. Lizárraga worked at engineering consulting firms where he was responsible for planning and execution of subsurface exploration programs, performing geotechnical analyses and design for the expansion and closure of landfills, ash monofills, dikes, stormwater management ponds, and surcharge embankments for roadways on soft compressible soils.

Academic Credentials & Professional Honors

Ph.D., Civil Engineering, Northwestern University, 2017

M.S., Civil Engineering, Northwestern University, 2014

B.S., Civil Engineering, Universidad Autonoma de Nuevo Leon, 2010

Licenses and Certifications

Professional Engineer Civil, Florida, #96605

Professional Engineer Civil, Georgia, #051247

Professional Engineer Civil, Louisiana, #PE.0049913

Professional Engineer, New York, #111555

Professional Engineer Civil, North Carolina, #060102

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Professional Engineer, South Carolina, #43740

Professional Engineer, Tennessee, #132381

Professional Engineer Civil, Texas, #156352

Professional Engineer, Virginia, #0402070328

Prior Experience

Senior Geotechnical Engineer, WSP, Jacksonville, FL, USA, 2023-2024

Engineer, Geosyntec Consultants, Jacksonville, FL, USA, 2019-2023

Post-Doctoral Researcher, Northwestern University, Evanston, IL, USA, 2017-2019

Engineer, COBISE, Reynosa, Tam, México, 2011-2012

Quality Assurance Engineer, Instituto de Ingeniería Civil, Monterrey, NL, México, 2010-2011

Professional Affiliations

American Society of Civil Engineers (Member)

Publications

Rundeddu, E., Lizárraga, J.J. and Buscarnera, G., 2022. Hybrid stochastic-mechanical modeling of precipitation thresholds of shallow landslide initiation. Natural Hazards, 113(2), pp.1083-1104.

Li, X., Lizárraga, J.J. and Buscarnera, G., 2021. Regional-scale simulation of flowslide triggering in stratified deposits. Engineering Geology, 292, p.106248.

Song, Z., Li, X., Lizárraga, J.J., Zhao, L. and Buscarnera, G., 2021. Shallow landslide triggering in unsaturated vegetated slopes: efficient computation of susceptibility maps. Computers & Geosciences, 154, p.104826.

Chen, Y., Lizárraga, J. and Buscarnera, G., 2021. Regional Subsidence Analysis Through a Multi□Scale Modeling Framework Based on Breakage Mechanics. Journal of Geophysical Research: Solid Earth, 126(5), p.e2020JB021335.

Song, Z., Li, X., Lizárraga, J.J., Zhao, L. and Buscarnera, G., 2020. Spatially distributed landslide triggering analyses accounting for coupled infiltration and volume change. Landslides, 17, pp.2811-2824.

Lizárraga, J.J. and Buscarnera, G., 2020. A geospatial model for the analysis of time-dependent land subsidence induced by reservoir depletion. International Journal of Rock Mechanics and Mining Sciences, 129, p.104272.

Lizárraga, J.J. and Buscarnera, G., 2020. Probabilistic modeling of shallow landslide initiation using regional scale random fields. Landslides, 17(8), pp.1979-1988.

Lizárraga, J.J. and Buscarnera, G., 2019. Spatially distributed modeling of rainfall-induced landslides in shallow layered slopes. Landslides, 16(2), pp.253-263.

Lizárraga, J.J. and Buscarnera, G., 2018. Safety factors to detect flowslides and slips in unsaturated

shallow slopes. Géotechnique, 68(5), pp.442-450.

Lizárraga, J.J., Frattini, P., Crosta, G.B. and Buscarnera, G., 2017. Regional-scale modelling of shallow landslides with different initiation mechanisms: sliding versus liquefaction. Engineering geology, 228, pp.346-356.

Presentations

Buscarnera, G., Chen, Y., Lizárraga, J. and Zhang, R. Multi□scale simulation of rock compaction through breakage models with microstructure evolution. Proceedings of the International Association of Hydrological Sciences, 382, pp.421-425. Netherlands. 2020

Lizárraga, J. J., K. Chandra, and G. Buscarnera. "Regional-scale implementation of poroelastic solutions for subsidence analyses." In ARMA US Rock Mechanics/Geomechanics Symposium, pp. ARMA-2019. ARMA, New York, 2019.

Lizárraga, J., Li, X., Cuomo, S., Buscarnera G.. Performance of advanced safety factor theories against field evidence of variable triggering mechanisms. Proceedings of the 7h International Conference on Unsaturated Soils (UNSAT 2018), Hong Kong, China. August 3rd – 5th, 2018.

Lizárraga, J. J., Buscarnera, G. (2018). Calibration of plasticity-based safety factors for rainfall-induced landslides. In PanAm Unsaturated Soils 2017 (pp. 370-379). Dallas, USA, 2017.

Lizarraga, J. J., Buscarnera G., Frattini P., Crosta G. B.. "Effect of suction-dependent soil deformability on landslide susceptibility maps." In EGU General Assembly Conference Abstracts, pp. EPSC2016-18405. Vienna, Austria 2016.

Lizárraga, J., Buscarnera, G., Frattini, P., Crosta, G. Spatially distributed modeling of landslide triggering: an approach based on principles of unsaturated soil plasticity. Landslides and Engineered Slopes. Experience, Theory and Practice: Proceedings of the 12th International Symposium of Landslides (ISL), Naples, Italy, 2016.

Project Experience

Design and Construction Disputes

Served as led investigator for disputes related to:

- Damage of historic masonry buildings caused by construction of adjacent structures.
- Evaluation of surface drainage and stormwater management systems of residential communities.
- Collapse of a seawall after hurricane events.
- Breach of an earthen dam impounding water.
- Sinkhole susceptibility.
- Excessive settlement in residential communities.
- Damage and settlement due to installation of sheet piles

Design Services: Transportation

Provided geotechnical engineering design services for a nearly $600M transportation project that included eight new bridges and 6.5 miles of roadway. Tasks included review and analyses of subsurface exploration data, evaluated pile capacity and settlement analyses of bridge piers, analyzed and designed

a surcharge settlement program to accelerate construction, and performed static slope stability analyses of embankments and retaining walls.

Retained as a consultant for the state transportation agency to evaluate the integrity of a retaining wall supporting the ramp of an existing bridge, identify the causes leading to its observed deterioration, and provide engineering recommendations to mitigate potential risks. Tasks included planning and coordinating the execution of an investigation program that included site visits and drilling of Standard Penetration Test (SPT) borings, review of existing plans, bridge inspection reports, and video recordings of stormwater management pipes, and preparation of final technical report.

Design Services: Ports and Marine Infrastructure

Performed engineering analyses and design services to increase the storage capacity of an inactive, 175-acre Dredged Material Containment Area (DMCA) for a State Ports Authority. Tasks included planning and execution of a geotechnical exploration program to evaluate subsurface conditions and characterize engineering properties of natural soils and dredged sediments, designed the new perimeter dike system and ancillary infrastructure, prepared life-cycle models of storage capacity, and coordinated the preparation of drawings, and technical specifications.

Provided field and engineering design services to support operations of Dredged Material Management Areas in a Liquefied Natural Gas (LNG) facility. Tasks included planning and execution of geotechnical exploration programs to evaluate the integrity of the existing dike system, designed dikes using dessicated dredged sediments, performed analyses to evaluate the stability of dike raising stages, monitored settlement and consolidation of dredged sediments, performed life-cycle analyses of storage capacity under different arrival/departure schedules of ship containers.

Design Services: Solid Waste and Coal Combustion Residuals Management

Performed engineering analyses, designed, and provided field services to support the preparation of permit applications for the expansion and closure of several solid waste and combustion ash disposal facilities in the southeast of the United States. Tasks included preparation of design and analyses packages (i.e., design of geosynthetic-based liner systems, analysis and design of leachate management systems, bearing capacity evaluation, hydrologic analyses), planning and overseeing of field investigations (i.e., Cone penetration Tests [CPT], Standard Penetration Tests [SPT]), and preparation of technical reports to evaluate geological hazards (sinkhole susceptibility, settlement, slope stability) to support compliance with the corresponding guidelines and state regulatory agencies.

Provided consulting, permitting and engineering support for the closure of a 7-acre, inactive, Class III Waste Disposal Facility, as part of a Brownfield redevelopment project. Tasks included analyses of subsurface exploration and waste characterization data, performing engineering analysis (e.g., analyses of final cover system, stability evaluations, settlement analyses), preparing conceptual closure design plans, and opinion of probable costs to support the preparation of permit application packages to the corresponding regulatory agencies.

Provided consulting support services for an approximate 30-acre Coal Combustion Residual (CCR) disposal facility in a power plant to comply with the newly adopted State CCR rule requirements. Responsibilities included inspection of site impoundments, review of facility documents, preparation of inspection training materials, and preparation of permit application support documents.

Provided engineering design services to prepare construction drawings and closure plan for an ash basin of a steam electric power plant. Tasks included performing engineering analysis to aid the closure design, including the evaluation of hydrologic performance of proposed geosynthetics of the final cover system, performing static slope stability evaluations of ash excavations and cuts, and reviewed project bid documents.

Miscellaneous Projects

Provided consulting support services as an external, third-party reviewer to oversee the foundation and pavement design for the development of more than twenty distribution and data centers across the United States for a confidential e-commerce client. Tasks included preparation of technical memorandums, evaluation of subsurface investigation data, analyses of bearing capacity and ground improvement options, review of pavement design, and provide recommendations for future geotechnical investigations.

Served as field engineer to oversee sampling of lagoon sediments using vibracore drilling techniques to support conceptual lagoon sediment remediation studies. Tasks included overseeing field operations on watercraft vessels, logging and visual classification of sediment cores, data analyses, and preparation of conceptual design alternatives for dredging/capping to remove/cap existing muck over an approximate 180-acre lagoon.

Provided engineering design services for the excavation of existing stormwater ponds to increase their storage capacity and provide flood mitigation during the hurricane season in Florida. Tasks included evaluation of subsurface conditions, performing bearing capacity analyses of new pump stations, analyses of groundwater seepage forces caused by rapid lake drawdown prior to intense storm events, performed slope stability analyses during operation and final conditions accounting for drawdown effects.

Peer Reviews

Journal of Geotechnical and Geoenvironmental Engineering

Geotéchnique Letters

Engineering Geology

Landslides

Environmental Geotechnics