

# Seventh Michael W. O'Neill Lecture – CIGMAT 2012

*Department of Civil and Environmental Engineering, University of Houston*

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## ***Unsaturated Soil Behavior for Practicing Engineers***

**Friday, March 2, 2012**

1:00 - 2:00 p.m., University Hilton, University of Houston

**ABSTRACT:** The lecture starts with a discussion of the fundamental concepts in unsaturated soils. It identifies the three zones in a soil deposit where the soil is saturated with water compression, saturated with water tension, and unsaturated with water tension. The phenomena associated with water tension and the magnitude of water tension are presented next including attraction between water and clay minerals, and attraction of water to higher salt concentrations. Then the influence of water stresses on the soil behavior is discussed including unsaturated soil strength and unsaturated soil deformability.

In a second part, applications of these fundamental concepts are covered including foundations on unsaturated soils (ultimate bearing capacity and movements), slabs on grade on shrink swell soils for smaller structures, elevated structural slabs on piles for taller structures, retaining wall pressures in unsaturated soils, slope stability in unsaturated soils. The goal of the lecture is to give an overview of some of the latest aspects of unsaturated soil mechanics and applications to every day practice in geotechnical engineering.



Professor Jean-Louis Briaud is Professor and Holder of the Spencer J. Buchanan Chair in the Zachry Department of Civil Engineering at Texas A&M University and the President of Briaud Engineers. He received his Bachelors degree from the Ecole Speciale des Travaux Publics in France in 1972 and his Ph.D. degree from the University of Ottawa in Canada in 1978. His expertise is in foundation engineering and more generally geotechnical engineering. He has served as President of the Association of Geotechnical Engineering Professors in the USA, President of the Geo-Institute of the American Society of Civil Engineers, and is the current President of the International Society for Soil Mechanics and Geotechnical Engineering. Among other awards, he has received the ASCE Ralph Peck Award, the CGS Geoffrey Meyerhof Foundation Engineering Award, the ASTM Hogentogler Award, the ASCE Huber Research Prize, and the ASCE Martin Kapp Award. Over the last 30 years, Dr. Briaud has conducted about 8.5 million dollars of research most of which was on foundations and retaining walls. He has supervised 37 PhD students and 81 Master students. He is the author of a book on the pressuremeter and has published about 300 articles and reports in geotechnical engineering.