The 17th Annual George F. Sowers Symposium

A Continuing Tribute

2:45pm	*Arrival and Registration*
3:30pm	**State of the Art: Ellen Rathje, Ph.D.** Professor, The University of Texas at Austin **"Deformation Monitoring via Remote Sensing: Applications to Landslides and Liquefaction"**
4:15pm	**State of the Practice: Kyle Rollins, Ph.D.** Professor, Brigham Young University **"Deep Foundation Behavior in Liquefied Sands"**
5:00pm	*Reception & Poster Session* **Student Presentations by the Georgia Tech Geotechnical Engineering Society**
6:00pm	*Dinner*
7:00pm	*Introductions & Awards*
7:30pm	**Sowers Lecture: Richard Jardine, Ph.D.** Professor, Imperial College London **"Some recent developments in the design and analysis of large driven piles"**
8:30pm	*Adjourn*

May 6, 2014
Georgia Tech Student Center
350 Ferst Drive N.W., Atlanta, GA 30332-0458

For reservations and information, contact Sarah Fick at (PH) 423.385.2310 or (Email) sfick@geosyntec.com. Driving directions are available online at http://pts.gatech.edu/visitors/Pages/DirectionstoCampus.aspx (4-PDH Credits Available)

G-I GEO-INSTITUTE ASCE Georgia Chapter

Georgia Tech School of Civil and Environmental Engineering College of Engineering

Deformation Monitoring via Remote Sensing: Applications to Landslides and Liquefaction

Ellen M. Rathje, Ph.D., P.E.

Warren S. Bellows Centennial Professor

Department of Civil, Architectural, and Environmental Engineering

University of Texas at Austin

Landslides and liquefaction are two important geologic hazards that impact the built environment. The deformations associated with these phenomena can induce significant economic losses, which motivates research into accurately predicting these hazards. Our understanding of the complex interactions associated with landslide and liquefaction-induced deformations is hampered by the limited field data that are available and its low spatial and temporal resolution. However, advances in optical imagery correlation techniques and the availability of very high resolution optical satellite imagery now allows us to measure deformation patterns at high resolution and gain insights not available before. This presentation will describe our efforts to apply optical imagery correlation to active landslides and earthquake-induced liquefaction/lateral spreading. Analysis of the Portuguese Bend Landslide, located on the Palos Verdes Peninsula in Southern California, will be presented and the deformation rates from optical image correlation will be compared with those from field GPS. Optical image correlation also is applied to the 2011 Christchurch, New Zealand earthquake to measure the lateral spreading deformations associated with liquefaction. These analyses provide lateral spread deformations at a spatial resolution never obtained before. The potential use of these measurements to improve our understanding of the main drivers for liquefaction movements will be discussed.

BIO

Ellen M. Rathje, Ph.D., P.E. is the Warren S. Bellows Centennial Professor in the Department of Civil, Architectural, and Environmental Engineering at the University of Texas at Austin, USA. Her research encompasses the areas of seismic site response analysis, seismic slope stability, field reconnaissance after earthquakes, and remote sensing of geotechnical phenomena. She has published over 100 papers on these topics and has supervised the research of over 30 graduate students. Her research has been funded by the U.S. Geological Survey, the U.S. Nuclear Regulatory Commission, the U.S. National Science Foundation, and the United Nations Development Programme.

Dr. Rathje is a founding member and current Co-Chair of the Geotechnical Engineering Extreme Events Reconnaissance (GEER) Association, an organization that coordinates geotechnical investigations after extreme events such as earthquakes and floods. She was a member of the Board of Directors of the Earthquake Engineering Research Institute (EERI) from 2010-2013, and a member of the Scientific Earthquake Studies Advisory Committee of the U.S. Geological Survey from 2007-2013. She has been honored with various research awards, including the Huber Research Prize from the American Society of Civil Engineers in 2010, the Hogentogler Award for outstanding paper from ASTM Committee D18 in 2010, the Shamsher Prakash Research Award in 2007, the Shah Innovation Prize from EERI in 2006, and the Casagrande Award from ASCE in 2002.

Deep Foundation Behavior in Liquefied Sands

Kyle M. Rollins, Ph.D.

Department of Civil and Environmental Engineering

Brigham Young University

Deep foundations must be designed to deal with lateral loads and axial forces resulting from soil liquefaction. Prof. Rollins will survey approaches for considering lateral pile resistance in liquefied soils based on centrifuge, shaking table and full-scale blast liquefaction testing. Prof. Rollins first employed blast liquefaction for lateral load testing on piles and drilled shaft at Treasure Island in San Francisco. Later, static and dynamic lateral load tests, using a statnamic rocket sled, were conducted in Charleston, South Carolina for the Cooper River Bridge. Based on these tests, p-y curves were developed for liquefied sand which account for both pile diameter and sand density. These p-y curves provide reasonable estimates of pile performance observed in field, centrifuge and large shaking table tests. Dr. Rollins will also highlight blast liquefaction testing that has been used to determine negative skin friction and down drag on a steel pile in Vancouver, Canada and three CFA piles in Christchurch, New Zealand. In contrast to some theories, measured negative skin friction in the liquefied sand was not zero. As the liquefied sand reconsolidated, the sand exerted negative friction which was about 50% of the positive skin friction before liquefaction. Dr. Rollins will show videos of blast liquefaction, sand boil formation, and Statnamic load testing.

BIO

Kyle Rollins received his BS degree from Brigham Young University and his Ph.D. in Civil Engineering from the University of California at Berkeley. After working as a geotechnical consultant, he joined the Civil Engineering faculty at BYU in 1987 following after his father who was previously a geotechnical professor. His research has involved geotechnical earthquake engineering, deep foundation behavior, bridge abutments, collapsible soils and soil improvement techniques. He has published nearly 150 technical papers and supervised over 100 graduate students. He was recognized as the engineering educator of the year by the Utah State Engineers Council and received the Maeser Research Award at BYU. ASCE recognized his work with the Huber research award and the Wellington prize. In 2009, he was the Cross-Canada Geotechnical lecturer for the Canadian Geotechnical Society.