

October 2017



Joint GI and EERI

**Date: Thursday, October 26, 2017**

**Location:** Blue Prynt Restaurant  
815 11<sup>th</sup> St, Sacramento, CA.  
Street parking available! [Link to map](#)

**Speaker:** Dr. Jonathan D. Bray, PhD, PE, UC Berkeley

**Topic:** "Seismic Response of Silty Soil Sites"

**Agenda:**

6:00-7:00pm – Social hour  
7:00-7:30pm – Dinner  
7:30-9:00pm – Speaker and Questions

Meeting Cost: \$40 (with RSVP by October 20th) and \$45 for walk-ins  
\$10 for students

RSVP at [this hyperlink](#)  
or send questions to Kartik Atyam: [Kartik.Atyam@aecom.com](mailto:Kartik.Atyam@aecom.com)

# "Seismic Response of Silty Soil Sites"

October 26, 2017

presented by: Dr. Jonathan D. Bray  
UC Berkeley

Liquefaction from the 2010-2011 Canterbury earthquake sequence damaged much of the built environment in Christchurch, New Zealand. State-of-practice liquefaction triggering procedures provided results consistent with observations of liquefaction across much of Christchurch. However, there are cases where liquefaction assessment methods indicate that there should have been severe liquefaction-induced ground failure, yet none was observed. The overestimation of liquefaction-induced ground failure by current procedures is troublesome, because engineers often require expensive ground improvement or building foundations where these procedures indicate that liquefaction is likely. The over-prediction of liquefaction triggering by current procedures appears to be due to their inability to capture the seismic performance of stratified silty soil deposits. The empirical database used to develop these procedures consists primarily of liquefaction triggering data from sand sites. Stratified silty soil swamp deposits in Christchurch are shown through regional CPT-based analyses to have mitigating effects on the manifestation of liquefaction beyond what can be captured by simplified liquefaction triggering procedures. Differing surficial geology and depositional environments were found through examining historical documents to explain in part the limitations of current liquefaction evaluation procedures in the silty soil sites in southwest Christchurch. Consideration of depositional environment distinguishes between liquefaction performances that could not be differentiated through the CPT-based assessment alone. CPT resolution is not sufficient to capture the thin layering at these stratified sites, and the simplified liquefaction triggering procedures do not take into account the effects of the stratification on pore water pressure movement within a soil profile. Continuous sampling and careful logging of high-quality samples provides important insights on in-situ stratification at these silty soil swamp sites, discerning differences in stratigraphy resulting from differences in depositional environment.

**Presenter:** Jonathan Bray is the Faculty Chair in Earthquake Engineering Excellence at the University of California, Berkeley. He earned engineering degrees from West Point, Stanford, and Berkeley. Dr. Bray is a registered professional civil engineer and has served as a consultant on several important engineering projects and peer review panels. He has authored more than 300 research publications. His expertise includes the seismic performance of earth structures, seismic site response, liquefaction and ground failure and its effects on structures, earthquake fault rupture propagation, and post-event reconnaissance. Dr. Bray was elected into the National Academy of Engineering and is a Fellow in ASCE. He has received several other honors, including the Peck Award, Joyner Lecture, Prakash Award, Huber Research Prize, Packard Foundation Fellowship, and NSF Presidential Young Investigator Award.