

FRIEDMAN FAMILY VISITING PROFESIONAL PROGRAM

UC DAVIS



Visit to University of California, Davis: March 4, 2022

This report summarizes the visit of Dr. Christine Z. Beyzaei from NIST that took place at the University of California, Davis on March 4, 2022.

PROGRAM

TIME ¹	ACTIVITY
9:30 AM – 10:40 AM	Friedman lecture
11:00 AM – 11:45 AM	Informal meeting with a small group of students
12:00 PM – 1:00 PM	Lunch with students
1:15 PM – 1:45 PM	Laboratory tour
2:00 PM – 3:10 PM	Student presentation
3:30 PM – 3:45 PM	CGM tour with Prof. Ross W. Boulanger

¹ Break and commuting time slots not included.

STUDENT CHAPTER VISIT PLANNING COMMITTEE

LEAD ORGANIZER(S):

- Renmin Pretell (Co-President), rpretell@ucdavis.edu
- Irene Liou (Co-President), iyliou@ucdavis.edu
- Laura Luna, luna@ucdavis.edu
- Qiwei Zhang, qvzhang@ucdavis.edu
- Ryan Hochstatter, rmhochstatter@ucdavis.edu
- Dr. Sashi Kunnath (Faculty Advisor), skkunnath@ucdavis.edu

VISITING PROFESSIONAL LECTURE OVERVIEW

In his lecture, Dr. Beyzaei gave an overview of EERI's mission and explained how students and young professionals could get involved with the organization at various local and regional levels. Then, she talk about liquefaction effects of the Canterbury Earthquake Sequence (New Zealand). Dr. Beyzaei emphasize liquefaction effects observed after the earthquake and the differences in seismic performance observed at locations with sandy soils versus silty soils. Dr. Beyzaei also discussed field and laboratory investigation techniques and shared her experience conducting laboratory testing on silty soils as part of her doctoral research. Dr. Beyzaei concluded her presentation by discussing a resilience framework around communities.

After the talk, we had time for Q&A and discussion. Various students and faculty members asked questions and engaged with the speaker. All of our members are grateful for her time and shared knowledge.



Figure 1: Group picture following Dr. Beyzaei's lecture

Lecture Abstract

Liquefaction damage from the 2010-2011 Canterbury Earthquake Sequence devastated over 30% of the built environment in Christchurch, New Zealand. State of practice liquefaction assessment procedures have been shown to work generally well across much of Christchurch, when compared with post-earthquake damage observations. However, there are important case history sites where the state of practice liquefaction assessment procedures indicate that significant liquefaction induced ground failure would be expected to occur, but no surface manifestations of liquefaction were observed during post-earthquake reconnaissance. These sites are located predominantly in the southwest part of the city, an area known among local engineers for its silty soil conditions.

This presentation will explore investigations of the apparent discrepancy between state of practice liquefaction estimations and post-earthquake liquefaction observations at silty soil sites in southwest Christchurch. The issues highlighted in this presentation will demonstrate the need for a more holistic approach to liquefaction assessment and consideration of system response at silty soil sites, with a focus on liquefaction manifestations.

Professional Bio

Dr. Beyzaei earned her Ph.D. in 2017 from UC Berkeley. Her research focused on liquefaction of silty soils in Christchurch, New Zealand. Dr. Beyzaei has consulting experience on U.S. and international projects for critical infrastructure, new and existing buildings, high rise structures, bridges, and embankment dams.

Her experience includes site investigation, seismic testing, and advanced laboratory testing of geotechnical materials. Dr. Beyzaei is active in EERI, ASCE, and the Geotechnical Extreme Events Reconnaissance Association (GEER), and serves on committees for school earthquake safety, continuing education, and innovative technologies.

SUPPLEMENTAL ACTIVITIES

Informal meeting with students

Eight students welcomed Dr. Beyzaei, including some EERI Board members, to chat about career-related questions, industry practice, and research opportunities after graduate school. The students who participated in this session had diverse backgrounds (geotechnical and structural graduate and undergraduate students) and future career interests. The conversation was smooth and valuable.

Lunch with students

Dr. Beyzaei shared her lunchtime with six students and a professor. Dr. Beyzaei shared her experience as a graduate student and transition to industry. Dr. Beyzaei was happy to talk about her experience setting up laboratory equipment while staying in New Zealand as a doctoral researcher and participating in various EERI efforts.

Laboratory tour

Mr. Mandeep S. Basson welcomed Dr. Beyzaei to tour around the UC Davis Geotechnical Laboratory in Bainer Hall. The laboratory tour included a description of the different equipment, including a direct simple shear apparatus and a 3D printer. The tour also included a description of ongoing laboratory-based research efforts.

Student presentations

Dr. Beyzaei attended two one-on-one research presentations (listed below). The students had the chance to present their findings and discuss with Dr. Beyzaei.

- Patrick C. Bassal: System response of lateral spreading for an interlayered deposit in the Chi-Chi Earthquake
- Sumeet K. Sinha: Liquefaction-Induced Downdrag on Piles: Centrifuge and Numerical Modeling, and Simplified Procedure

Center for Geotechnical Modeling tour (45 min)

Prof. Ross W. Boulanger welcomed Dr. Beyzaei to tour around the UC Davis Center for Geotechnical Modeling (CGM), i.e., the centrifuge facility. The tour included a description of the history of the CGM, the different working areas in the facility, past projects and lessons learned, the large and small UC Davis centrifuge equipment, a description of technical and logistics-related aspects of conducting centrifuge experiments, amongst others.

RESULTS, FEEDBACK AND LESSONS LEARNED

- The various activities of the FRIEDMAN FAMILY VISITING PROFESSIONAL (FFVP) visit were welcomed by graduate and undergraduate students of the Civil and Environmental Department at UC Davis. Participation and engagement of students and faculty were satisfactory.
- The chapter Board made great efforts to widely advertise and distribute announcements for this event through faculty teaching classes relevant to the lecture topic, our and other departments' newsletters, and Twitter for the broader audience. We believe that an invitation e-mail from EERI might help broadening the audience to other disciplines (e.g., seismology and geology) in future FFVP events.

ACKNOWLEDGEMENTS

The University of California, Davis EERI Student Chapter gratefully acknowledges the support of the Friedman Family for sponsoring the virtual visit of Dr. Christine Beyzaei through their Friedman Family Visiting Professional Program endowment.

LIST OF ATTACHMENTS

Appendix A: Flier for Friedman Lecture (main)

APPENDIX A: EVENT FLIER

**Liquefaction of Silty Soils:
Investigations in Christchurch, New Zealand**

Christine Z. Beyzaei, Ph.D., P.E.

Research Engineer, NIST

This lecture is part of the EERI Friedman Family Visiting Professional Program.

MARCH 4th – 9:30 to 10:40 a.m.
Kemper Hall 1003

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Abstract

Liquefaction damage from the 2010-2011 Canterbury earthquake sequence devastated over 30% of the built environment in Christchurch, New Zealand. State-of-practice liquefaction assessment procedures have been shown to work generally well across much of Christchurch, when compared with post-earthquake damage observations. However, there are important case history sites where the state-of-practice liquefaction assessment procedures indicate that significant liquefaction-induced ground failure would be expected to occur, but no surface manifestations of liquefaction were observed during post-earthquake reconnaissance. These sites are located predominantly in the southwest part of the city, an area known among local engineers for its silty soil conditions. This presentation will explore investigations of the apparent discrepancy between state-of-practice liquefaction estimations and post-earthquake liquefaction observations at silty soil sites in southwest Christchurch. The issues highlighted in this presentation will demonstrate the need for a more holistic approach to liquefaction assessment and consideration of system response at silty soil sites, with a focus on liquefaction manifestations.