

FRIEDMAN FAMILY VISITING PROFESIONALS PROGRAM

Visit to UCLA: Jan 31, 2017



This report summarizes the visit of **Dr. Farzad Naeim** from UC Irvine that took place at the UCLA on Jan 31, 2017.

ITINERARY

TIME:	ACTIVITY:
3:00 PM – 4:00 PM	Dr. Naeim arrives and meets student chapter leadership
4:00 PM – 5:30 PM	CEE 200 Seminar – “Performance-based design of tall buildings”
5:30 PM – 6:00 PM	Faculty advisor meets & welcomes Dr. Naeim to campus
6:00 PM – 7:30 PM	Infosession – “Anatomy of Three Award Winning Engineering Projects”

STUDENT CHAPTER VISIT PLANNING COMMITTEE

LEAD ORGANIZER(S):

- Yi Tyan Tsai President, tsaiyityan@gmail.com
- Bryan Hong Secretary, bryanyh@ucla.edu
- Jason Kim Treasurer, lukee3@g.ucla.edu
- Mandro Eslami Webmaster, mandro.es@gmail.com
- Saman Abdullah Structural Grad Students Liaison, eng.saman86@gmail.com
- Soheil Kashani Vice President, soheilka@g.ucla.edu

VISITING PROFESSIONAL LECTURES OVERVIEW

Professional Bio

Dr. Farzad Naeim is the President of Farzad Naeim, Inc. and CEO of Mehraim Naeim International Inc. both of Irvine California. Dr. Naeim is also an Adjunct Professor at UCI and a faculty member at the European School for Advanced Studies in Reduction of Seismic Risk (ROSE). He received his Ph.D. in Civil Engineering in 1982 and his J.D. with highest honors in 2002. In 2007, he received the Fazlur Khan Medal for lifetime achievements in seismic design of tall buildings from the Council on Tall Buildings and Urban Habitat. He has served two terms (1995 and 2011) as the President of the Los Angeles Tall Buildings Structural Design Council. Dr. Naeim is a Past-President and an



honorary member of the Earthquake Engineering Research Institute (EERI). He is currently Chair of California's Strong Motion Instrumentation Advisory Committee and serves on the Seismic Advisory Board of Caltrans, Board of Expert Consultants of the Los Angeles Department of Water and Power (LADWP), and Advisory Council of the Southern California Earthquake Center (SCEC). Farzad has published four textbooks, more than 160 peer-reviewed papers, and has developed 45 different software systems for earthquake engineering design and

education. Dr. Naeim has served as Technical Director for many landmark structures in California and across the United States and has collaborated with researchers from Stanford, UCB, UCLA, USC, UCSD, UCI and University of British Columbia on various research projects.

Summary of lectures

“Performance Based Seismic Design of Tall Buildings”

The main lecture was integrated into the seminar series for graduate students in the structural and geotechnical tracks to reach a larger audience and is pitched at a more technically advanced level. The presentation provides an overview of the current framework of Performance Based Earthquake Engineering (PBEE) – what are the underlying concepts, the rationale for moving towards such a design philosophy and its application for design of tall buildings in the United States.

Dr. Naeim briefly went over the history leading up to the conception of the PBEE approach, and explained why common prescriptive code provisions are incapable of addressing the needs of tall building design engineers. He identified the performance objectives associated with tall building design, and discussed the evolution of current component-based performance objectives to a more rigorous and fully probabilistic design approach. This included discussion of modeling and acceptance criteria associated with various performance based design guidelines, as well as special issues like the selection and scaling of ground motion records, soil-foundation-structure interaction issues, and seismic instrumentation and peer reviews.

“Anatomy of Three Award Winning Engineering Projects”

The second presentation focused on the structural challenges and concerns encountered during the design of three landmark projects – the Walt Disney Concert Hall, Staples Center, and the Eiffel Tower II and is aimed at a more general undergraduate audience. Dr. Naeim began the presentation with the Walt Disney Concert Hall project. The structural challenge he faced was dealing with complex and irregular three-dimensional geometry. The architect, Frank Gehry, is known for specifying curved surfaces for his buildings. Dr. Farzad Naeim, who was the Vice President and General Counsel of John A. Martin & Associates, and his colleagues oversaw the design of the structural aspect of this unique and challenging project. The major difficulty as they first began was the inability to convert the architectural file and drawings to SAP2000. The structural team spent few nights programming the conversion codes so that SAP2000 can extract all the data from the architectural file. With the SAP2000 file, he had to test the structural model with at least a thousand degree of freedoms because most structural members were curved and attached to a giant gusset plate. On the field, some gusset plates were at least 10 feet wide and tall, which are uncommon in normal structures. One of the questions attendee asked was: “Why didn’t you simplify the structural model?” Dr. Farzad Naeim’s response was “This is the most simplified version of the architectural design. Structural Engineers are constantly challenged by these designs. Only by facing these

challenges can we develop new ways of tackling various issues in the structural world." Structural engineers work intimately with architects to turn a vision into real life.



Figure 1: The Walt Disney Concert Hall



Figure 2: A fabricated curved beam

The second project Dr. Naeim talked about was the Staples Center Arena. The major difficulty was the roof of the structure. The roof truss system had to get built while hanging over the stadium. Dr. Naeim used SAP2000 to model the truss so that the contractor could follow his method. During the lecture, he also showed the students the bidding process of a project through videos and images. The architects were extremely detailed in visioning the Staples Center, including the interior and exterior.



Figure 3: MIT Stata Center



Figure 4: Original and replicated Eiffel Tower

The Eiffel Tower II, built in Las Vegas, was the last project Dr. Naeim covered. Dr. Naeim was assigned to construct a duplicate of Eiffel Tower in Las Vegas. He studied personally the drawings of the real Eiffel Tower. He adjusted the angles between the truss members and other parts of the tower. He also had to consider the wind load since the elevator goes to the restaurant, which operates daily. He explained the pre-fabrication process of the entire tower, relying heavily on welding the pieces together and shipping them in sections to the construction site.

RESULTS, FEEDBACK AND LESSONS LEARNED

Dr. Naeim's visit under the Friedman Family Visiting Professional program was well-received and the students enjoyed interacting with such an engineering superstar. The event we organized have provided opportunities for the chapter members, undergraduate and graduate students, and faculty members to interact with Dr. Naeim, and all parties benefited from this exchange. As we wanted to reach a large number of graduate students, we wanted to have the visit coincide with the weekly graduate seminar, but as Dr. Naeim taught a class at UC Irvine in the morning, the time we have with him is limited to the latter half of the day. Coordinating the visit was initially challenging as communication between the EERI student chapter officers, faculty members, department staff, students, and Dr. Naeim himself – was required. We learnt that it is not possible to maximize every parameter and to prioritize our goals when organizing an event.

Overall, the attendees, particularly for the second session were inspired by Dr. Naeim's work and the impact structural engineers make in the real world. Attendees enjoyed hearing the challenges he faced on the projects and his personal experience facing them. As the second session was targeted at a more general experience, we felt the topic was well suited and helped to encourage and inspire the attendees as they continue through their undergraduate studies.

ACKNOWLEDGEMENTS

The University of California, Los Angeles EERI Student Chapter acknowledges the generous support of the Friedman Family for sponsoring the travel of Farzad Naeim through their Friedman Family Visiting Professional Program endowment. In addition, the chapter would like to thank FEMA for the donation of \$10 per registered student member which helped to cover the expenses of hosting the visiting professional and other club events throughout the year.

LIST OF ATTACHMENTS

Included at the end of this report are the fliers used to advertise the event to the department.

UCLA ENGINEERING

UCLA EERI Student Chapter

Infosession with Dr. Farzad Naeim

31st Jan | 6pm - 7pm | 67-124 Engineering IV

Dinner will be provided. Please RSVP as space is limited.

The UCLA EERI student chapter will be hosting Dr. Farzad Naeim as part of the Friedman Family Visiting Professionals Program. He will present on several iconic projects he has worked on from 6 - 7 pm on 31st January (Tuesday) at 67-124 Engineering IV (Faraday Room). Come and learn from the very best!

Dr. Farzad Naeim is the President of Farzad Naeim, Inc. and CEO of Mehraim Naeim International Inc. both of Irvine, California. He is also an Adjunct Professor at UCI and a faculty member at the European School for Advanced Studies in Reduction of Seismic Risk (ROSE).

Dr. Naeim received his Ph.D. in Civil Engineering in 1982 and his J.D. with highest honors in 2002. In 2007, he received the Fazlur Khan Medal for lifetime achievements in seismic design of tall buildings from the Council on Tall Buildings and Urban Habitat. He has served two terms (1995 and 2011) as the President of the Los Angeles Tall Buildings Structural Design Council. Dr. Naeim is a Past-President and an honorary member of the Earthquake Engineering Research Institute (EERI). He is currently the Chair of California's Strong Motion Instrumentation Advisory Committee and serves on the Seismic Advisory Board of Caltrans, Board of Expert Consultants of the Los Angeles Department of Water and Power (LADWP), and Advisory Council of the Southern California Earthquake Center (SCEC).



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Performance Based Seismic Design of Tall Buildings

Farzad Naeim, PhD, SE, Esq
President, Farzad Naeim, Inc.
CEO, Mehrain Naeim International, Inc.
Adjunct Professor, University of California, Irvine



This presentation will provide an overview of current performance-based methodologies utilized for design of tall buildings in the United States.

The reasons why common prescriptive code provisions are incapable of addressing the needs of tall building design engineers are explained. The performance objectives commonly associated with tall building design are identified and the evolution of current component-based performance objectives to a more rigorous and fully probabilistic approach to performance based design is discussed.

Modeling and acceptance criteria associated with various performance based design guidelines are explained and special issues such as selection and scaling of ground motion records, soil-foundation-structure interaction issues, and seismic instrumentation and peer review needs are discussed.

Time: Jan 31st | 4 – 5:30 PM

Location: MS 5200

UNDERGRADS ARE WELCOMED TO COME



Anatomy of Three Award Winning Engineering Projects

Farzad Naeim, PhD, SE, Esq
President, Farzad Naeim, Inc.
CEO, Mehrain Naeim International, Inc.
Adjunct Professor, University of California, Irvine



This presentation will highlight the structural engineering challenges involved in design of three landmark projects:

1. The Walt Disney Concert Hall in Los Angeles, California;
2. Staples Center Arena in Los Angeles, California
3. The Eiffel Tower II in Las Vegas, Nevada

Each of these projects posed unique challenges to the engineering design team. From the very complex three-dimensional surfaces and geometry of the Disney Concert Hall, to the roof and support system of the Staples Center, to extreme weather engineering and construction methodology for the Eiffel Tower II. Despite the complexity of these projects, the competence of the design engineers and the team work spirit carried the day in each case resulting in internationally acclaimed projects.



Time: Jan 31st | 6 – 7 PM

Location: 67-124 Engineering IV

OPEN TO ALL STUDENTS