

# FRIEDMAN FAMILY VISITING PROFESSIONALS PROGRAM



## Virtual visit to the University of California, Irvine: February 5, 2021

This report summarizes the visit of **Mr. John Hooper** from Magnusson Klemencic Associates that took place at the University of California, Irvine on February 5, 2021.

### ITINERARY

TIME:	ACTIVITY:
1:00 PM	Student Chapter meets & welcomes Visiting Professional virtually
1:30 PM – 3:00 PM	Guest lecture by Visiting Professional
3:00 PM – 4:00 PM	Open floor: Student Chapter meets to ask seismic-specific questions as well as general questions regarding structural engineering

### STUDENT CHAPTER VISIT PLANNING COMMITTEE

#### LEAD ORGANIZERS:

- Dr. Mo Li, Seminar Host, mo.li@uci.edu
- Dr. Farzin Zareian, Faculty Advisor, zareian@uci.edu
- Andres Lozano, President, arlozano@uci.edu
- Sarah Balaian, Vice President, sbalaian@uci.edu

### VISITING PROFESSIONAL LECTURE OVERVIEW

#### Lecture Abstract

Performance-Based Seismic Design (PBSD) has been used for decades for the seismic retrofit of existing buildings and the design of new structures. Today's PBSD approaches focus on providing a design that typically targets one of the following performance levels for a one of several ground shaking hazard levels:

- Immediate Occupancy
- Life Safety
- Collapse Prevention

The building code performance objective for new, ordinary (Risk Category II) buildings is to provide Life Safety for Design Earthquake (DE) ground shaking and Collapse Prevention for Maximum Considered

Earthquake (MCE) ground shaking. PBSD for new buildings are typically target performance equivalent to a code-prescriptive design. An example will be presented: used nonlinear response history analysis to fine-tune the seismic design and reduce construction costs.

The example evaluated whether the building meets in the intended performance objective of a low likelihood of collapse given MCE ground shaking. Moving beyond solely using collapse as the metric for whether a design is acceptable is the vision for the future. A FEMA-sponsored, Applied Technology Council-managed research effort has been underway for over 15 years developing the methodology. The results of this effort have been published in FEMA P-58 Seismic Performance Assessment of Buildings. The final portion of the presentation will focus on this new approach, which will allow engineers to estimate the following loss information for their buildings:

- Repair costs
- Repair time
- Unsafe placards
- Embodied energy and carbon
- Casualties

#### Professional Bio



John Hooper is a Senior Principal and the Director of Earthquake Engineering at Magnusson Klemencic Associates, a consulting structural and civil engineering firm in Seattle, Washington. He received his Bachelor of Civil Engineering from Seattle University and a Master of Science from the University of California at Berkeley.

John has over 30 years of engineering experience in the fields of renovation, earthquake engineering, and structural analysis and has been involved in the majority of MKA's Performance-Based Seismic high-rise designs over the past 20 years.

He is Chair of the American Society of Civil Engineer (ASCE 7's) Seismic Subcommittee and is a member of the Main Committee, and a member of the Building Seismic Safety Council (BSSC) NEHRP Provisions Update Committee. He also currently serves on AISC's TC-3, TC-5 and Committee on Specifications.

#### SUPPLEMENTAL ACTIVITIES

##### Welcoming the speaker virtually (1:00 PM – 1:30 PM)

The president (Andres Lozano), vice president (Sarah Balaian), and the cabinet of the UCI EERI Student Chapter met the speaker virtually to make introductions. They explained how the UC Irvine club has adjusted to the COVID-19 pandemic and how the implementation of workshops are necessary to keep students engaged and informed. In lieu of the Seismic Design Competition (SDC), Mr. Hooper provided his insight on how students can stay involved and participate in team building, keeping focus on quality of workshops over quantity.

## Lecture (1:30 PM – 3:00 PM)

Mr. Hooper's lecture was provided through the UC Irvine's Civil and Environmental Engineering department webinar series, hosted by Dr. Mo Li; those in attendance included the graduate class, undergraduates, professors, and engineering professionals. Before transitioning to the lecture, Dr. Farzin Zareian provided a brief introduction of EERI and the significance of Mr. Hooper's work in EERI and in the structural engineering field as a whole. Mr. Hooper then began his lecture, starting with the background of EERI, its mission statement, and the importance of joining the club. Moving into the main topic of the lecture, Mr. Hooper shared the basics for seismic design and introduced the code prescriptive seismic design procedure, as outlined by the International Building Code (IBC) and the ASCE 7-16 design code. From this basic design procedure, Mr. Hooper explained the significance of PBSD and the reasoning for utilizing such an approach for tall buildings, including both technical and client-related. PBSD was summarized into the following process: select performance objectives, perform preliminary design, assess performance capability (revised if results are unsatisfactory), and finally construction. Mr. Hooper explained each part of the process in great detail, providing the audience with a practical understanding by complimenting the theory with real-world application and utilizing images and figures of a case study, the Salesforce Tower in San Francisco, as supporting evidence. Lastly, Mr. Hooper touched on the future developments of PBSD and what current structural engineers should look to improve upon when considering PBSD, namely reoccupancy, functional recovery, and full function.

## Open Floor (3:00PM – 4:00 PM)

Following the lecture, the floor was opened to students and faculty alike to ask questions about Mr. Hooper's informative PBSD presentation. The meeting transitioned to more general structural engineering topics, such as time-history and site-specific ground motions, the implications of different structural systems with respect to damage and cost, and Mr. Hooper's valuable opinions on what the future of structural engineering will look like.

## ACKNOWLEDGEMENTS

The UCI EERI Student Chapter gratefully acknowledges the support of the Friedman Family for sponsoring the virtual visitation of Mr. John Hooper through their Friedman Family Visiting Professional Program endowment.

The UCI EERI Student Chapter would also like to give a special thanks to the Civil and Environmental Engineering department, specifically Jennifer Miller, for coordinating the lecture with our department webinars, Silvana Cobos for coordinating the visitation to our campus as well as her quick and helpful responses, Dr. Mo Li for hosting the webinar, and Dr. Farzin Zareian for his assistance in welcoming Mr. Hooper and providing an excellent introduction.

Lastly, a big thank you to Mr. John Hooper for such an insightful presentation and in-depth answers to all questions asked.

Flyer:



## CEE Seminar Series Winter 2021

**Performance-Based Seismic Design: Today's Approaches and a Vision for the Future**

Presented by: **John Hooper, P.E, S.E.**  
Senior Principal/Director of Earthquake Engineering  
Magnusson Klemencic Associates



**Friday - February 5, 2021, 1:30pm - 2:50pm PST**  
VIA Zoom:  
<https://uci.zoom.us/my/molilab>  
Meeting ID: 749 918 9692

Followed by EERI led discussion with John Hooper: <https://uci.zoom.us/my/eeriuci>

***This lecture is part of the EERI Friedman Family Visiting Professionals Program***  
***If you are interested in more from this program, register at: <https://eeri.swoogo.com/2021ffvp>***

**Speaker bio:** John Hooper is a Senior Principal and the Director of Earthquake Engineering at Magnusson Klemencic Associates, a consulting structural and civil engineering firm in Seattle, Washington. He received his Bachelor of Civil Engineering from Seattle University and a Master of Science from the University of California at Berkeley.

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