

FRIEDMAN FAMILY VISITING PROFESIONALS PROGRAM



Visit to University of Ecuador: February 16th, 2023

This report summarizes the visit of **Dr Ramin Golesorkhi** from Langan CA that took place at the Salesian Polytechnic University of Ecuador, 2023 on February.

ITINERARY OR AGENDA

Provide the itinerary of the visit. For example:

TIME:	ACTIVITY:
14:00 PM – 14:10 PM	Event Opening
14:10 AM – 14:30 AM	Video Presentation; Activities carried out in the student chapter EERI UPS UIO
14:30 PM – 16:00 PM	Conversation between Visiting Professional and Attendees
16:00 PM – 16:30 PM	Closing of the event

STUDENT CHAPTER VISIT PLANNING COMMITTEE

- Gabriela Soria, Faculty Advisor, Career Director of Civil Engineering, msoria@ups.edu.ec
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VISITING PROFESSIONAL LECTURE OVERVIEW

Lecture Abstract

Lecture topic: Development of Site-Specific times series,

The technical talk given by Dr. Ramin Golesorkhi was developed through the Microsoft Teams platform and dealt with the different methods to obtain compatible site-specific spectral records. Among which are spectral adjustment, spectral scaling and also a hybrid method that has elements of scale and matching which is called Mean Spectral Matching (Mazzoni et al.2012). In addition, "Spectral Matching" was discussed. Which focuses on matching the site motion spectrum with the time or frequency domain in many cases it is done in time domain to minimize the introduction of some artificial frequencies. As an example, two spectra were compared, which despite their remarkable similarity in acceleration for both a period of 5 seconds and 6 seconds, the difference that exists in the displacements and velocities generated at the time of making a spectral coincidence was noticeable.

The next method discussed was "Spectral Scaling" one of the most developed approaches was by Kirchner and associates have devised a relatively simple approach and does not change the spectrum as multiplying by a number can decrease or increase the spectrum. One detail to note is that if a different register is introduced to a set of spectra it will completely change the spectral scaling. This should be highly valued because it will be the requirements that will be interpreted at the time of performing the structural analysis. The advantages and benefits of performing these methods. It is consistent with the level of danger, it can be used in large movements because it is not very sensitive and you can use certain records and match them to a particular target. And the average results you get with relatively small variability because you are collapsing the variability. The advantages of spectral matching are relatively easy and they don't change the shape of the initial spectra, which is a naturally recorded spectral value, this provides a wider range or a wider spread where structural engineers because there they will be able to see what that variation does in terms of seismic response of a particular structure. Disadvantages of spectral matching; Computer code is required. This method changes the shape of the spectra and the time series traces, but you have to be careful. If you match it to the same target, it removes the natural variation between the two components and collapses the variability of the motion spectra so that they are all the same. Disadvantage of spectral scaling; you may get some spectra that are higher than the target. So one could argue that those records are incompatible with the hazard level at certain periods. You have to try to use ground motions with similar site conditions, and there are no fixed methods. Everyone does it differently.

Hybrid of Matching and Scaling

You calculate the ratios of that mean to that target spectrum for all the periods that you're considering from period zero through five, six, ten, eight, whatever range of periods your interested in. Then you divide each component of the set, like the first pair, the X component by this K value and the Y component by the K value, become the modified target spectra for those particular periods. So you go from R1X to R1MX as modified and MY, and then match the R1X record to its own version of a modified spectrum, MX, and repeat this process for the entire ensemble. An example of spectral acceleration is presented with 11 records in addition to the spectrum envelope, the hybrid scaling of the spectrum and an average of the records, once the procedure described can be seen a slight modification in the values despite it retains the natural variation of the records.

Professional Bio

Ramin Golesorkhi, Principal/Vice President and Director, Langan, San Francisco, CA.

He is a registered civil (California and New York) and geotechnical engineer (California) and a Fellow of ASCE. He is a principal/vice president and director of earthquake engineering services at Langan, an over 1,050-person geotechnical, environmental, and civil design engineering firm, with more than 30 years of experience in seismic analysis and foundation engineering. He received his Bachelor of Science and Master of Science degrees from Tufts University and his PhD from the University of California, Berkeley.



SUPPLEMENTAL ACTIVITIES

Audiovisual presentation of activities carried out in the Student Chapter EERI-UPS

The video-presentation issued by the organizers of the student chapter EERI UPS UIO was watched by the visiting professional, university faculty and undergraduate students, which showed the work done by the various

directives that seek at all times the development of knowledge about seismic resilience and seismic hazard through recreational activities, competitions, technical visits or technical conferences.

RESULTS, FEEDBACK AND LESSONS LEARNED

- About 50 people made up of undergraduate students and members of the university faculty participated in Ramin Golesorkhi's masterful speech, a challenge was the interaction between the participants and the speaker due to the virtual nature of the talk. It should also be noted that the speaker approached his subject in an orderly and concise manner.
- The virtual lecture reduces the interaction between the professional and the university community despite the knowledge imparted motivates to deepen various topics of study such as seismic resilience, soil-structure analysis and seismic hazard, fundamental axes in the mission and vision of the EERI organization and our chapter EERI UPS UIO. Therefore, we will remain attentive to the opportunity to receive a face-to-face visit from a professional of the Friedman Family Program.
 - Lessons learned
 - It is necessary to know the seismic-tectonics of our region in terms of ground motion selection and it must be compatible with the level of hazard we are analyzing.
 - It is necessary to choose records that have adequate pulses, durations and energy contents, i.e. to use one of the exposed methods; spectral matching, scaling, or to use this hybrid approach.
 - It is important and imperative to check the velocity and displacements; this is a fundamental piece at the moment of the analysis of structural stresses.

ACKNOWLEDGEMENTS

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LIST OF ATTACHMENTS

- Item 2, professional slide show or other handouts



