

# FRIEDMAN FAMILY VISITING PROFESIONALS PROGRAM



## Visit to University of Notre Dame: March 8, 2017

This report summarizes the visit of **Dr. Annie Kammerer** from Annie Kammerer Consulting Firm that took place at the University of Notre Dame on March 8, 2017.

### ITINERARY

TIME:	ACTIVITY:
8:30 AM – 10:00 AM	Breakfast with faculty member Dr. George Mavroeidis
10:00 AM – 10:30 AM	Meeting with EERI chapter faculty advisor Dr. Alex Taflanidis
10:45 AM – 11:15 AM	Meeting with managing director of ND Energy Frontier Research Center Dr. Ginger Sigmon
11:30 AM – 12:30 AM	Meeting with faculty member Dr. Yahya Kurama and his group members
12:30 AM – 2:30 PM	Lunch with EERI graduate students
2:30 PM – 3:00 PM	Campus tour
3:00 PM – 3:30 PM	Seminar preparation time
3:30 PM – 4:30 PM	Seminar given by Visiting Professional – “ <i>Seismic Design and Risk Evaluation of Nuclear Plants: Past, Present and Future</i> ”

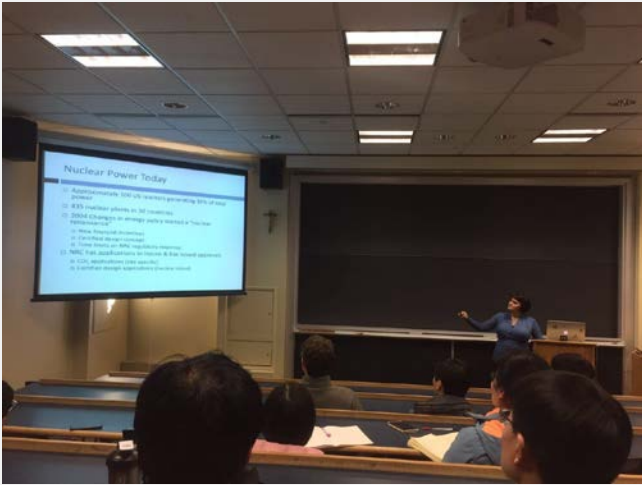
### STUDENT CHAPTER VISIT PLANNING COMMITTEE

**LEAD ORGANIZERS:** Yenan Cao, Chapter President, ycao2@nd.edu

- Robert Devine, Chapter Vice-President, rdevine@nd.edu
- Alex Taflanidis, Chapter Faculty Advisor, a.taflanidis@nd.edu
- George Mavroeidis, Faculty Member, g.mavroeidis@nd.edu

### VISITING PROFESSIONAL LECTURE OVERVIEW

Dr. Kammerer gave a seminar on “*Seismic Design and Risk Evaluation of Nuclear Plants: Past, Present and Future*”. Approximately 30 faculty members, undergraduates, graduates, and staff members attended the seminar. In the seminar, Dr. Kammerer first talked about the basic nuclear plant design concepts and why the engineering of nuclear power plants is unique and challenging. Then Dr. Kammerer gave an overview of the history of seismic regulations, design approaches, and reevaluation efforts. She further discussed about the performance-based and risk-informed methods used in nuclear industry today. Finally, Dr. Kammerer talked about the impact of the Fukushima Daiichi accident on the current and future Nuclear Regulation Committee efforts. The seminar was well received by the attendances, and many graduate students found the seminar informative and interesting.



**Figure 1.** Seminar given by Dr. Annie Kammerer on “Seismic Design and Risk Evaluation of Nuclear Plants: Past, Present and Future”

### Lecture Abstract

Since the beginning of the nuclear power industry, the framework and methods used in the seismic design and risk evaluation of the fleet of nuclear power plants in the US has gone through significant change and advancement. This presentation—targeted to the technically-inclined layperson—will cover a wide variety of topics including:

- Basic nuclear plant design concepts (how they work and what can go wrong)
- Why the engineering of nuclear plants is unique and challenging
- Brief history of seismic regulations, design approaches, and reevaluation efforts
- The performance-based and risk-informed methods used in the industry today
- The impact of the Fukushima Daiichi accident, including current and future NRC efforts
- The NRC, IAEA, and the new global nuclear picture

### Professional Bio

Dr. Annie Kammerer is a private seismic hazard and risk consultant and a visiting scholar at the Pacific Earthquake Engineering Research Center at UC Berkeley. Her work is focused on analysis and regulatory processes associated with probabilistic seismic and tsunami hazard and risk assessments for nuclear plants and other critical facilities.

Prior to starting her own firm, she was Principal Seismologist for the Bechtel Corporation in San Francisco. Prior to that, she spent 7 years at the US Nuclear Regulatory Commission, where she coordinated the NRC Seismic Research Program. At the NRC, she developed the current US guidance on performing seismic hazard assessments and seismic margin analysis for nuclear facilities. Starting in 2011, Dr. Kammerer was a member of the NRC’s seismic technical team developing post-Fukushima response and re-evaluation guidance. From 2012 to 2013, she was also the NRC’s technical lead for a special program conducting Seismic Walkdowns of all 104 operating US nuclear plants in response to the Fukushima Daiichi accident. Dr. Kammerer is active internationally and has chaired IAEA Working Groups on seismic re-evaluation of operating reactors, tsunami, and seismic isolation.

Prior to joining the NRC in 2006, she was a consultant in the Risk and Advanced Technology groups in the international design firm, Arup. As seismic hazard lead for the Americas, her consulting work encompassed a wide variety of technical areas including geotechnical earthquake engineering, structural dynamics, seismology

and risk assessment. She holds three degrees from UC Berkeley, including a Ph.D. in geotechnical engineering with minors in strong motion seismology and structural engineering.

## SUPPLEMENTAL ACTIVITIES

### Meeting with Faculty member Dr. Yahya Kurama and his group members

Dr. Annie Kammerer had a one-hour meeting with Dr. Yahya Kurama and his group members. Graduate students Robert Devine and Steven Barbachyn presented their research results on the use of high-strength reinforcement and high-strength concrete as well as prefabricated rebar assemblies to accelerate the construction of next-generation reinforced concrete nuclear structures. The meeting covered topics about nuclear structure regulations, risk assessment and design based loads for nuclear structures, and the future of nuclear structures in the U.S.

### Lunch with EERI graduate students

Dr. Annie Kammerer had an informal luncheon meeting with a group of approximately ten EERI graduate students from 12:30 pm to 2:30 pm. During the lunch meeting, Dr. Kammerer shared her industrial experience at different companies and organizations. Dr. Kammerer also shared her inspiring life stories about her career development and deep connection with EERI. Lunch also provided a great opportunity for students to seek for career advice. Dr. Kammerer talked about the general picture of the Civil Engineering professional, and she further elaborated on the challenges and opportunities for different areas (e.g., Structural Engineering, Geotechnical Engineering). The career guidance provided valuable information for senior Ph.D. students.



**Figure 2.** luncheon meeting with approximately ten EERI graduate students

## RESULTS, FEEDBACK AND LESSONS LEARNED

It was a great and terrific experience for EERI student chapter at Notre Dame to have Dr. Annie Kammerer as a Friedman Family Visiting Professional. First, we were grateful for Dr. Kammerer's willingness to visit our campus. The planning and execution of her visit went smoothly. Second, her work on seismic design of nuclear power plants was closely related to the research areas of several research groups here at Notre Dame. The experience and knowledge brought by Dr. Kammerer were extremely well-received. In particular, we would like to thank Dr. Kammerer for sharing her unique and inspiring life stories during the luncheon meeting.

For future visits, we would like to further include:

- Getting more undergraduate students involved in the Friedman Family Visiting Professional Program
- Setting up meetings/lab tours with different research groups

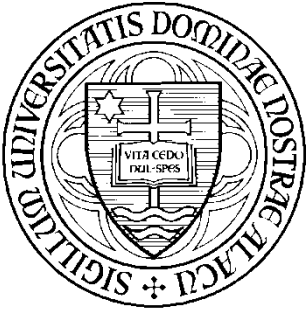
## ACKNOWLEDGEMENTS

The University of Notre Dame EERI Student Chapter gratefully acknowledges the support of the Friedman Family for sponsoring the travel of Dr. Annie Kammerer through their Friedman Family Visiting Professional Program endowment.

## LIST OF ATTACHMENTS

Included at the end of this report are various attachments to supplement the information included above. A list of the attachments is included below:

- Item 1, Event flier
- Item 2, Event Itinerary



# Department of Civil & Environmental Engineering & Earth Sciences

*Earthquake Engineering Research Institute (EERI)  
Friedman Family Visiting Professionals Seminar*

March 8, 2017

216 DeBartolo Hall, 3:30-4:30 p.m.

Annie Kammerer, Ph.D.

*Annie Kammerer Consulting, Rye, NH*

## ***Seismic Design and Risk Evaluation of Nuclear Plants: Past, Present and Future***

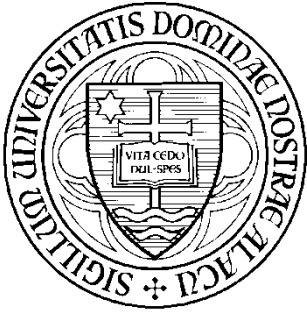
### **Abstract**

Since the beginning of the nuclear power industry, the framework and methods used in the seismic design and risk evaluation of the fleet of nuclear power plants in the US has gone through significant change and advancement. This presentation—targeted to the technically-inclined layperson—will cover a wide variety of topics including:

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### **Bio**

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# Department of Civil & Environmental Engineering & Earth Sciences

## Itinerary: Dr. Annie Kammerer

### **Tuesday, March 7, 2017**

8:08 p.m. - Arrive SBN, UA5200 (Yenan Cao to pick up; Tel: 412-551-3390)  
Accommodations at Morris Inn, Confirmation Number: 69438416

### **Wednesday, March 8, 2017**

8:30 a.m.-10:00 a.m. - Breakfast at Morris Inn with Dr. George Mavroeidis (meet at lobby)  
10:00 a.m.-10:30 a.m. - Meeting with Dr. Alex Taflanidis (158 Fitzpatrick Hall)  
Walk to Stinson-Remick Hall with Dr. Alex Taflanidis  
10:45 a.m.-11:15 a.m. - Meeting with Dr. Ginger Sigmon (301 Stinson-Remick Hall)  
Walk back to Fitzpatrick Hall, graduate student Robert Devine to pick up from  
301 Stinson-Remick Hall  
11:30 a.m.-12:30 p.m. - Meeting with Dr. Yahya Kurama and Dr. Ashley Thrall (156D Fitzpatrick Hall)  
12:30 p.m.-2:30 p.m. - Lunch with EERI Graduate Students (156D Fitzpatrick Hall)  
2:30 p.m.-3:00 p.m. - Campus tour with graduate student Robert Devine  
3:00 p.m.-3:30 p.m. - Seminar preparation time  
3:30 p.m.-4:30 p.m. - Seminar, *Seismic Design and Risk Evaluation of Nuclear Plants: Past, Present  
and Future*, 216 Debartolo Hall  
5:00 p.m. - Drive to SBN airport (graduate student Robert Devine)  
6:21 p.m. - Depart SBN, UA5670