

2015-2016 ANNUAL REPORT

Stanford University Student Chapter of the Earthquake Engineering Research Institute



Report Date: May, 2016

This report summarizes the membership and activities conducted by the Stanford University Student Chapter of the Earthquake Engineering Research Institute during the 2015-2016 academic year.

MISSION & GOALS

The purpose of the EERI Stanford Chapter is to advance Earthquake Engineering research, advance understanding of earthquakes and their consequences, and promote measures to mitigate their harmful effects.

We organize various academic and social events on campus. They include bringing speakers to campus to talk about interesting topics related to earthquakes, participating in outreach activities, or leading a hike along the San Andreas Fault.

MEMBERSHIP

The Stanford University Student Chapter had a total of 30 members in 2015-2016.

OFFICERS

The initial Board for the 2015-2016 Academic year was elected in April 2015. At the end of the Spring quarter the President stepped from the position and the new interim board was elected in June 2015 to lead the chapter during the summer. The interim Board was confirmed at elections in Autumn 2015 and led the chapter until Spring 2016. The Board consisted of the following members:

Spring 2015:

Role	Name	EERI Member Number	Email	Student Status
President	Eddie Vega	16646	eddie.j.vega@gmail.com	Graduate Student
Vice President	Nenad Bijelic	15714	nbijelic@stanford.edu	Graduate Student
Treasurer	Pablo Heresi	17437	pheresi@stanford.edu	Graduate Student
Secretary	Armando Gomez-Farias	17465	argofa@stanford.edu	Graduate Student
Activities Coordinator	Priscilla Nguyen	17449	priscil3@stanford.edu	Graduate Student
Geophysics Representative	Lucile Bruhat	17155	lbruhat@stanford.edu	Graduate Student
Career Fair Chair	Cristian Acevedo	15786	cacevedo@stanford.edu	Graduate Student

Summer 2015 – Spring 2016:

Role	Name	EERI Member Number	Email	Student Status
President	Nenad Bijelic	15714	nbijelic@stanford.edu	Graduate student
Vice President	Cristian Acevedo	15786	cacevedo@stanford.edu	Graduate student
Treasurer	Pablo Heresi	17437	pheresi@stanford.edu	Graduate student
Secretary	Armando Gomez-Farias	17465	argofa@stanford.edu	Graduate student
Activities coordinator	Priscilla Nguyen	17449	priscil3@stanford.edu	Graduate student
Geophysics representative	Lucile Bruhat	17155	lbruhat@stanford.edu	Graduate student
Career Fair Chair	Cristian Acevedo	15786	cacevedo@stanford.edu	Graduate student

Board meetings were held on a regular basis to support chapter activities and track their progress throughout the academic year.

FACULTY & INDUSTRY ADVISORS

The chapter advisors are:

	Name	Email	Affiliation
Faculty Advisor	Gregory Deierlein	ggd@stanford.edu	Stanford University
Industry Advisor	John Oстераas	osteras@exponent.com	Exponent

MEMBERS

A complete list of members is shown below.

	Name	EERI ID	Email	Student status
	Cristian Acevedo	15786	cacevedo@stanford.edu	Graduate Student
	Siddharth Awasthi	18271	sawasthi@stanford.edu	Graduate Student
	Mariano Balbi	18242	mbalbi@stanford.edu	Graduate Student
	Caroline Bambach	18774	cbambach@stanford.edu	Undergraduate Student
	Nenad Bijelic	15714	nbijelic@stanford.edu	Graduate Student
	Lucile Bruhat	17155	lbruhat@stanford.edu	Graduate Student
	Reagan Chandramohan	17334	reaganc@stanford.edu	Graduate Student
	Brandon Cortez	18761	bccortez@stanford.edu	Undergraduate Student
	Lala Dakessian	18261	lalad@stanford.edu	Graduate Student
	Hector Davalos	16641	hdavalos@stanford.edu	Graduate Student

Natalie	Ferrante	18773	natalie9@stanford.edu	Undergraduate Student
Curtis	Fong	16032	ckfong@stanford.edu	Undergraduate Student
Armando	Gomez-Farias	17465	argofa@stanford.edu	Graduate Student
Pablo	Heresi	17437	pheresi@stanford.edu	Graduate Student
Ezra	Jampole	15787	ejampole@stanford.edu	Graduate Student
David	Lallemant	12958	davidcbl@stanford.edu	Graduate Student
Cynthia	Lee	18248	clee19@stanford.edu	Graduate Student
Bo	Lindqvist	18268	blundqvi@stanford.edu	Graduate Student
Dudley	Mei	18240	dudley.mei.92@gmail.com	Graduate Student
Armando	Messina	18270	messina3@stanford.edu	Graduate Student
Andrea	Mosqueda	18772	andrea44@stanford.edu	Undergraduate Student
Priscilla	Nguyen	17449	priscil3@stanford.edu	Graduate Student
Viranchi	Patel	18258	viranchi@stanford.edu	Graduate Student
Ana	Perarnau	18267	perarnau@stanford.edu	Graduate Student
Samuel	Schreiber	17026	sschreib@stanford.edu	Undergraduate Student
Jose	Silos De Alba	18269	josilos@stanford.edu	Graduate Student
Miro	Vujicevic	17893	mirov1@stanford.edu	Undergraduate Student
Nate	Warner	18260	natebwarner@outlook.com	Graduate Student
Kevin	Yang	18247	keyyang@stanford.edu	Graduate Student
Kuanshi	Zhong	18166	kuanshi@stanford.edu	Graduate Student

BUDGET & FINANCIALS

The initial balance for this period was \$2,900.69, while the total withdrawals were \$983.19 and the total deposits were \$290.00. Therefore, the final balance of the period is \$2,207.50. The following table shows the events financed by the EERI Student Chapter. Note that for many events, the John A. Blume Earthquake Engineering Center also contributed with financial support, and this table only presents the amounts paid by the EERI Student Chapter.

Event	Amount paid by EERI	Observations
EERI Seminar Series	\$87.00	
Meet a PhD student	\$90.57	A PhD student is paired up with a couple of incoming Masters students; they talk about academic life at Stanford over lunch
ATC-20 Workshop	\$642.99	The main objective of this workshop is to provide insights on how to perform rapid evaluation of buildings for post-earthquake damage assessments, specifically, using the ATC-20 procedures. Lunch was provided, as well as a happy hour.
Seismic Design Team Meetings	\$149.82	Sum of all the meetings during the year.
EERI Info Session	\$12.81	Info session to motivate new students to join the EERI Student Chapter.
TOTAL	\$983.19	

The following table presents all the deposits received during this period.

Sponsor Name/Organization	Contact Person	Amount
Stanford Career Education (BEAM)	Kathy Campbell, Associate Dean of Career Education & Director of Career Communities.	\$290.00

CHAPTER ACTIVITIES

The EERI Stanford Student Chapter was involved in variety of activities over the year. Activities included organization of research forums, presentations and workshops as well as outreach events to other schools and industry professionals.

REGULAR CHAPTER MEETINGS

Board meetings were held on regular basis for a total of 11 meetings throughout the year. Meetings covered chapter logistics and planning of events. Following is the summary of the meetings:

Spring:

Meeting #1 Date: 04/22/2015 Duration: 1h Attendance: 5

First meeting of the new leadership. Discussed status of the chapter and plans for the quarter including: organization of student research forums, planning for info session with Exponent and a panel discussion with industry professionals, as well as organization of a bike/hike event and the BEERi competition.

Meeting #2 Date: 06/12/2015 Duration: 1h Attendance: 7

Meeting to elect interim leadership to lead the chapter during the summer quarter due to current president stepping down; new officers appointed. Decided to hold new elections at the start of the autumn quarter of the upcoming academic year (October 2016). Outlined the activities planned for the summer.

Summer:

Meeting #3 Date: 08/17/2015 Duration: 1h Attendance: 8

Discussed status of the chapter and plans for the Autumn quarter of 2015-2016 academic year. Set the date for election of new leadership to take over from interim leadership. Set the dates for Chapter info session/happy hour to recruit new members from the group of incoming masters students; coordinated and planned organization of the EERI-ATC Post earthquake evaluation workshop, participation in Stanford Splash and organization of Meet a PhD mentoring activity. Outlined the needs required to support the Seismic Design Team. Discussed the chapter's representation in the EERI SLC.

Autumn:

Meeting #4 Date: 10/02/2015 Duration: 1.5h Attendance: 8

Election of new membership and transfer of office; brief update on status of the chapter. Summary of the info session for incoming students; follow-up and additional planning for organization of upcoming activities (EERI-ATC workshop, Stanford Splash, Bike/Hike, Meet a PhD, Technical seminar with Arup).

Meeting #5 Date: 10/30/2015 Duration: 1 Attendance: 8

Meeting to discuss updates of ongoing and planned activities. Discussed longer-term ideas, including increasing interaction with other chapters and schools in the area.

Meeting #6 Date: 11/30/2015 Duration: 1h Attendance: 8

This was the last meeting of the autumn quarter; discussed topics include recap of the held events and activities; update on the progress of the seismic design team. Outlined plans for the winter quarter including kick-off happy hour and start of the student research forum.

Winter:

Meeting #7 Date: 01/08/2016 Duration: 1h Attendance: 7

First meeting of the winter quarter. Discussed topics included: helping the SDC team with shake table testing, kicking-off the bi-weekly student research forum covering winter and spring quarters, plans for upcoming events (Stanford Splash, happy hours), brainstorming ideas for future events.

Meeting #8 Date: 02/15/2016 Duration: 1h Attendance: 6

Meeting at the mid-quarter period. Status update on ongoing activities.

Meeting #9 Date: 03/15/2016 Duration: 1h Attendance: 7

Last meeting of winter quarter to outline plans for next quarter including: setting the tentative date for elections to be held in Spring quarter, planning of a professional panel with the industry representatives and info sessions; decision made to invite PhD students from other universities to present at the bi-weekly research forum.

Spring:

Meeting #10 Date: 04/01/2016 Duration: 1h Attendance: 5

First meeting of the quarter. Covered topics included the overview of the activities in the last year, status update of the SDC team for the upcoming competition; coordination for planned activities before the elections. The meeting was followed by the elections info session for the students.

Meeting #11 Date: 04/28/2016 Duration: 1.5h Attendance: 10

Board elections and meeting with the newly elected board. Focus of the meeting was to follow up on ongoing activities and ensure smooth transition to the new board.

PHD SEMINARS – SUMMER QUARTER ON THURSDAYS

PhD and masters' students presented their research every Thursday afternoon of the Summer Quarter. The seminar gave the opportunity to students to present their current projects in a non-pressured environment. In addition, presenters were exposed to constructive feedback from their peers. The seminars involved refreshments and gave students the chance to interact.

SPLASH – NOVEMBER 8TH, 2015 & April

The EERI Stanford Student Chapter taught Earthquake Engineering to students from 7th – 12th grade. The lecture broken down into four main sections: 1) What is engineering?, 2) Structural Engineering, 3) Earthquake Basics, & 4) Designing for Earthquakes. These topics were complimented with hands-on activities and interactive questions; these included ductile vs. brittle material, period of a structure based on mass and stiffness, and lots of questions! The classes were usually 50 – 60 kids.



POST-EARTHQUAKE BUILDING EVALUATION WORKSHOP – OCTOBER 10TH, 2015

The main objective of this workshop is to train students on how to perform rapid evaluation of buildings for post-earthquake damage assessments using the ATC-20 procedures. For this, we had the invaluable support of industry professionals John Osteraas and Patxi Uriz, who came to campus and presented the ATC-20 procedures for post-earthquake safety evaluation of buildings and presented interesting case studies. Each participating student received an ATC Manual donated by ATC. After the lectures, the students went out to assess post-earthquake “damage” on buildings around the campus. In this opportunity, Laura Whitehurst (SEAONC) and 5 students (from the Structural Engineering and Geomechanics program) volunteered to guide the participants. Then, each group presented one of their buildings, summarizing their findings. During the presentations, the students received comments not only from their fellow peers, but also from the professionals John and Patxi, along with the participation of Professor Eduardo Miranda, who closed the workshop giving a quick presentation with some examples of why is important to proceed with a rapid damage assessment after earthquakes. Finally, the students, faculty, and professionals enjoyed a happy hour.



Classroom training



Field Exercise



Final presentations

SPECIAL AUTUMN SEMINAR: 181 FREMONT TOWER BY ARUP – NOVEMBER 14TH, 2015

Arup engineers, Jason Krolicki and Abel Diaz, were invited to talk to our members about the 800-foot tall 181 Fremont Tower in San Francisco, which is currently under construction, and its design process for seismic resistance using innovative design technologies and topology optimization.



ARUP

Offices in Boston, Chicago, Houston, Los Angeles, Montreal, New Jersey, New York, Rio de Janeiro, San Francisco, Sao Paulo, Seattle, Toronto and Washington DC

Apply for graduate and intern opportunities at www.arup.com

Presentation on Arup's current tall buildings work in San Francisco, including the 800-foot-tall **181 Fremont tower**

4 pm, Wednesday November 14th, 2015
Hartley Conference Center, Mitchell Building



WINTER STRUCTURAL ENGINEERING, SUSTAINABLE DESIGN, & CONSTRUCTION – FEBRUARY 4TH, 2016

Stanford EERI Chapter and BEAM, Stanford Career Education teamed up to host a successful career fair in the Winter quarter. This collaboration was started last year and it is a way to fundraise for the chapter. Members volunteered for 4 hours (including setup) to help run the fair. The fair attracted a lot of students and companies. The amount of companies present was larger than last year's!

BEAM, Stanford Career Education presents:

**Structural Engineering,
Sustainable Design &
Construction
Career Fair**

Feb. 4

5:00-8:00 PM

RSVP & view participating
companies on Handshake

Stanford Career Education
BEAM: Bridging Education, Ambition & Meaningful Work

beam.stanford.edu



This boutique career fair is one of our most focused events, drawing employers rarely found at other fairs. If you are interested in construction management, civil engineering, architecture, and sustainability, this event is not to be missed.

STUDENT RESEARCH FORUMS – WINTER 2016 and SPRING 2016

The EERI Stanford Student Chapter, in collaboration with the Stanford Geosciences Department, hosts a bi-weekly student research forum during lunch. Students had the opportunity to present their latest research to fellow students in a non-pressure environment with constructive feedback. It also served as a platform to discuss new developments in the field and topics of common interest. In addition, the forum gave the opportunity to new students to present their undergraduate research related to earthquake engineering. Each forum featured two 20-minute presentations and lunch for all attendees. As a novelty this year, we also had PhD students from UC Berkeley and Virginia Tech as guest speakers.

SEISMIC DESIGN COMPETITION TEAM

The Stanford Seismic Design team is a student organized group dedicated to promoting interest in structural and earthquake engineering on campus. We are a small team that designs, builds and tests full scale balsa wood towers. Stanford students have been participating in the annual Seismic Design Competition for the past 6 years.

The team started out in early September with the recruitment of new members. Early recruiting was prioritized this school year to prevent lack of manpower experienced in previous years. The small size of the previous years teams created an additional challenge for team members attempting to balance rigorous coursework and the design and construction of a tower for the competition. Using rigorous recruiting efforts by last year's team members, the number of members in the team was more than doubled. These efforts consisted of aggressively promoting the team via emails to mailing lists, flyers, in-class pitches and most importantly the provision of free food to potential members at several events. A total of fourteen active and dedicated members who are motivated civil engineering majors were recruited. The team received invaluable guidance by faculty and graduate student advisers, especially with structural analysis.

This year, since some of the senior members were graduating and we had an unprecedented number of new members, we decided to start off the year with a focus on education. We wanted to create resources, such as ETABS and Sketch Up tutorials that would allow younger members to learn the skills required for the construction of our model. We wanted to make sure that they could also pass along what we have learnt over the past few years to future members. As a result we started off with a comprehensive ETABS tutorial. Following that we had everyone develop and test their own designs in ETABS. We then compared the performance predictions from ETABS and settled on constructing two models that we would test at the end of the fall quarter.

Since we had a large team, after the initial period of design development, three sub-teams were created with specific tasks: Structural Analysis, Construction, and Fabrication. This allowed new members to work directly with senior members of the team. As a result these members are now each individually proficient in their area and are capable of leading their respective team next year. We constructed two test models that we shake table tested at Stanford. Both towers survived all three ground motions so we settled on the structure that was lighter and rebuilt a nearly identical model for the competition. Based on votes from team members, the tower was named Exposure.

SDC Team Members

A complete list of members is shown below.

Name	EERI Member Number	Email	Role
Miro Vujicevic	17893	mirov1@stanford.edu	Captain
Sam Schreiber	17026	sschreib@stanford.edu	Captain
Brandon Cortez	18761	bccortez@stanford.edu	Captain
Curtis Fong	16032	ckfong@stanford.edu	Captain
Natalie Ferante	18773	natalie9@stanford.edu	Member
Andrea Mosqueda	18772	andrea44@stanford.edu	Member
Tim Ngo	N/A	ngotm@stanford.edu	Member

SDC Team Financial Sponsors

A list of financial sponsors for the SDC team:

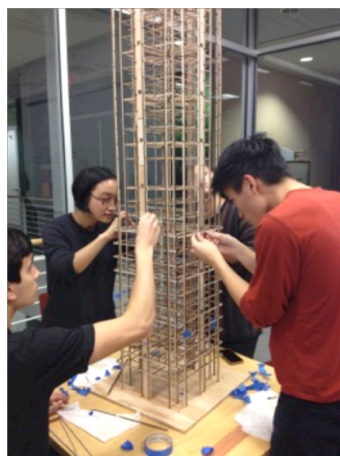
Name	Email	Amount	Note
John A. Blume Earthquake Engineering Center	ggd@stanford.edu	5000,00	

Team results and lessons learned

Following paragraphs are the account of the team's experience as described by the captain, Miro Vujicevic:

"This year we built a model that successfully withstood all 3 ground motions. While it survived all the ground motions, there were some major issues. The most predominant issues were our erroneous performance predictions and the separation of the diagrid from the moment frame during the final ground motion.

For our performance predictions, we calibrated parameters such as the Young's Modulus and the damping coefficient using previous year's results. Then those values were put into an ETABS model of this year's tower to compute the predictions we obtained. Unfortunately, it is difficult to know how exactly our predictions were so inaccurate. We believe that it is a combination of inadequate model parameter calibration and a lack of material testing efforts. For the following year, we would like to work on constructing a more accurate ETABS model and creating better material tests. We learned that this portion of the competition required more time than we originally dedicated.



SDC Team members hard at work building the model

When the diagrid separated from the moment frame, we thought our tower was doomed for failure, Surprisingly we did not fail. Unfortunately the tower had a key disqualifying rule violation: we placed the holders for the required weight rods on the wrong floor. We accidentally counted the double-heighted 15th floor as being both the 15th and 16th floor. However, that was not how the rules accounted for the double heighted story. From this we learned that we have to check every single rule, even the most basic ones. We decided to establish a team of students that will conduct a rule check prior to future competitions."

ELECTION & ELECTION RESULTS

An election for officers for the 2016-2017 academic year was held in April 2016. The table below shows the new officers appointed to the Chapter board who will take office in May 2016.

Role	Name	EERI Member Number	Email	Student Status
President	Cristian Acevedo	15786	cacevedo@stanford.edu	Graduate student
Vice-President	Hector Davalos	16641	hdavalos@stanford.edu	Graduate student
Treasurer	Pablo Heresi	17437	pheresi@stanford.edu	Graduate student
Secretary	Luis Ceferino	N/A	ceferino@stanford.edu	Graduate student
Activities Coordinator	Siddharth Awasthi	18271	sawasthi@stanford.edu	Graduate student
Geophysics Group Representative	Lucile Bruhat	17155	lbruhat@stanford.edu	Graduate student

ACKNOWLEDGMENTS

The EERI Stanford Student Chapter would like to thank its advisers, the John A. Blume Earthquake Engineering Center, Exponent, and its undergraduate and graduate members for their support and dedication to the chapter.