

**JFC Grant Proposal**  
Cal Seismic Design Team  
2021-2022 School Year

## **1. Executive Summary**

The Cal Seismic Design Team is a competition team whose goal is to become a more prominent fixture among UC Berkeley's engineering competition teams and to maintain the legacy that is UCB's prestigious engineering presence. To do this, we would like to focus on membership retention and recruitment as well as increasing exposure to the field of seismic engineering and innovation through community outreach events and events with outside organizations such as PEER and our EERI student chapter. Our mission throughout all of this is to excite more UCB students with the unique opportunities available in the field of earthquake engineering, which is otherwise lacking in the undergraduate curriculum, and to provide a future career path for those interested.

## **2. Statement of Agreement to Terms and Conditions**

The Cal Seismic Design Team has read and agrees to the terms and conditions associated with being a member of the CEE-JFC as stated in the Joint Fundraising Grant Program General Contract for 2021-2022. This includes the breach of contract agreement, in which the Seismic Team accepts the repercussions of not meeting the expectations and agreements laid out in the document. Verified by Co-Project Managers, Ethan Chen and Leah Mealey.

## **3. Organization Description and Management**

The purpose of the Cal Seismic Design Team is to provide civil engineering undergraduate students with an opportunity to engage in a hands--on project designing, analyzing, and constructing a cost -effective frame building that resists seismic loading. Participating in the team provides students with design, analysis, construction, and technical experience related to the field of earthquake engineering that they do not have access to in classes alone. While the main purposes of our team are academic and experience-driven, we also seek to socially engage our members and provide friendships, support, and a loving community within the Civil Engineering Department and at Cal in general. This social aspect also drives a more collaborative team dynamic and encourages membership retention.

### Organization Description

**Co--Project Managers: Ethan Chen & Leah Mealey** (ethanxchen@berkeley.edu, leahchristinem@berkeley.edu)

Ethan and Leah are the primary leadership of the team. They will perform administrative duties and communicate with the rest of the officer board to maintain the focus and agenda of the overall team. They will also manage issues that arise in any aspect of the team.\*

**Assistant Project Managers: Clara Rong and Sunny Ou** (clararong@berkeley.edu, shan.ou@berkeley.edu)

Clara and Sunny will be training, assisting, and practicing to be project managers. Their main role will be to absorb as much knowledge about the team and operations, and help out the PMs and officer board when needed. During the first semester, in particular, their focus will be assisting the other leads.\*

\*Leah and Sunny will also be responsible for managing the team's funds and functioning as a treasury unit. They will facilitate the reimbursement process and plan to execute a strict budget.

**Secretary: Jared Bautista** (jar-39baut@berkeley.edu)

Jared will assist in performing administrative duties for the team, including record keeping and website management.

**Social Chair: Ellie Matsuno** (ellie.matsuno@berkeley.edu)

Ellie will be ensuring team bonding and collaboration by planning and executing social events and activities, as well as being in charge of the end-of-the-year banquet.

**Architecture Leads: Justin Lin** (linjustin910@berkeley.edu)

Justin will be responsible for creating renderings of the tower to use for competition. He will also assist the design leads and may teach new members how to use design software like Rhino and Photoshop.

**Design Leads: Sydney Keeton & Aditya Bhaskar** (sydneykeeton19@berkeley.edu, adityabhaskar@gmail.com)

Sydney and Aditya will lead the process that develops the project's final design. They will also teach new members how to use SketchUp and other relevant design knowledge (like creating laser cutting files).

**Analysis Leads: Justin Chan & Tyler Rodrigues** (jchan711@berkeley.edu, txrodrigues@berkeley.edu)

Justin and Tyler are responsible for leading the process to choose a final tower design and predict the tower's seismic performance using SAP2000 and teaching new members how to use SAP2000.

**Technical Leads: Andrew Chen** (ahc1901@berkeley.edu)

Andrew is responsible for collecting data on the strengths and compositions of materials used for construction, including balsa wood and various glues, and also operating the shake table.

**Laser Cutting Leads: Anna Reck** (reck2023@berkeley.edu)

Anna is responsible for organizing and maintaining the laser-cutting schedule to ensure the project is on track. Anna will also be responsible for laser-cutting balsa wood and distributing relevant responsibilities.

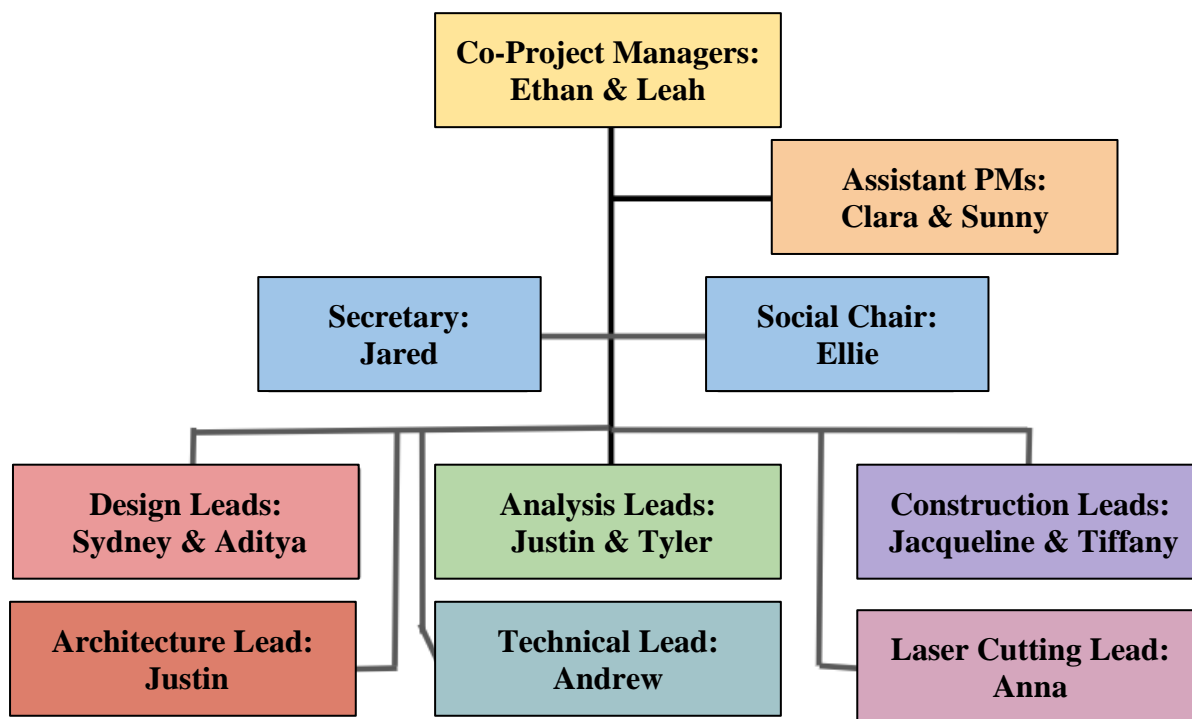
### Construction Leads & Safety Officers: Jacqueline Hurtado & Tiffany Luong

(jacquelineh1@berkeley.edu, tiffanyluong@berkeley.edu)

Jacky and Tiffany are responsible for creating and implementing construction procedures that result in the efficient and safe construction of the final product. They will oversee the progress of construction and train new members in balsa wood construction.

### Members

Approximately 25 other undergraduate students contribute to and assist with each phase of the project. They assist the officers with their respective tasks and provide the extra manpower needed to complete the project.



### Risk Management Processes

*Organization Safety Officer: Jacqueline Hurtado -*

1. As construction lead, Jacky will also serve as safety officer for the team, providing her knowledge and experience in safe construction practices.
2. The Cal Seismic Design Team is committed to the health and safety of all its members. All members of the team will receive proper training before being allowed to use the materials and tools. Members will be required to wear proper safety equipment, including safety glasses, while working on the project. Training will be obtained before using any new tools that the team obtains.
3. Specific hazards inherent with the construction of balsa wood towers include glue exposure, power tool misuses, and eye hazards from balsa wood members. Glue exposure will be mitigated through the use of gloves when working with caustic glues and proper ventilation when working around glue fumes. Power tool misuse will be mitigated through proper training before accessing power tools and supervision of power tool users. Power tool hazards will also be mitigated by wearing proper safety equipment when in

use including gloves and eye protection. Eye hazards from balsa wood members will be mitigated through the use of protective eye gear.

#### 4. Goals

The team focuses on the design, analysis, and construction of a 5 -foot tall, 19 -story balsa wood structure to be tested on a shake table at the annual EERI Undergraduate Seismic Design Competition, this year in Salt Lake City, June 27-July 1. The goal is for the structure to be able to withstand different ground motions, while considering factors such as simulated costs, predicted seismic performance, and aesthetics. Official rules will be announced in the fall semester, and more specific goals/deadlines will be made after such are released.

#### Organization Deliverables

1. Prepare a Design Proposal to submit to EERI in order to earn a spot in the annual competition. (Date TBD with Rules)
2. Prepare two or more designs as a backup for use in the competition if our first test model performs poorly. (By the end of Fall semester)
3. Design, analyze, build, and test a scale competition model balsa wood tower for entry in EERI's annual Undergraduate Seismic Design Competition. (June)
4. Prepare a poster to present at the competition. (June)

#### Organization Schedule (Tentative) for Fall 2021

<b>Week of</b>	<b>Scheduled Activities</b>
Aug 23	Introductory Info Session, Recruiting
Aug 30	Info sessions, Modules Rotations Begin
Sept 6	Review of 2020-2021 Year Findings Members Choose Module to join Introductory Module Lessons Begin
Sept 13	Module Lessons: Design Phase 1
Sept 20	Module Lessons

Sept 27	Module Lessons
Oct 4	Module Lessons: Design Phase 2 Begins
Oct 11	Module Lessons (Hopefully rules come out)
Oct 18	Module Lessons Beginning of Competition Preparation Members get competition tasks
Oct 25	Design: begin creating building design iterations for analysis module Analysis: learn advanced modeling techniques Construction: investigate novel construction techniques specific to design iterations
Nov 1	Design: continue creating building design iterations for analysis Analysis: model and analyze designs and provide feedback to design module Construction: investigate novel construction techniques specific to design iterations
Nov 8	Begin prototype construction of select tower design(s)
Nov 15	Continue construction of select tower design(s)
Nov 22	Thanksgiving
Nov 29	Continue construction of select tower design(s)

Dec 6	<p>RRR Week</p> <p>Hold optional work sessions as necessary</p> <p>Perform shake table testing on test model</p>
Dec 13	<p>Finals Week</p> <p>Hold optional work sessions as necessary</p> <p>Prepare for Winter Break Work on design(s)</p>

## 5. Long Term Investments

The team currently has a sliver of the remaining balance leftover from a donation from CSi three years ago that was intended to assist the team in any way and help cover more student travelers for the following year. As this donation will be used up completely after this year, one goal would be to communicate with CSi and try to get another donation as a backup for the following years and future leaders of the team. Extra funds not needed for explicit competition functionings would go into pursuing other long term improvements for the team like potentially purchasing our own shake table and new storage facility/organizers for old towers or basement materials like balsa wood to prevent impurities that would affect performance. To meet our yearly goals to stay on our timeline of buying this equipment, we will fundraise to make up for the dividend not covered by the extra funds. All of these would greatly help the team be successful and become more independent. We will look into pursuing them this year. See below table for plans/costs\*.

Our main expense each year is travel, which easily costs \$1000+ per traveling member with just accommodations, travel, and registration, not including smaller travel at the competition, meals, excursions, materials, etc. To fund competition every year, we heavily depend on JFC allocations, ESC allocations, donation money, and student copays. We will continue to do so and hopefully be able to send 25 members again next year. If we bought a large piece of equipment like a shake table, we would probably request more travel money to fund our whole travel budget and use our donation money for that equipment. We would also try outside fundraising like boba fundraisers and participating in the Big Give in the Spring semester.

We will limit our social budget and not spend money on unnecessary or too many materials. As always, our goal is to allocate the most money towards travel so that everyone who wants to attend competition can, and will cut down in other areas if possible to make that happen.

We are aiming to generate as much as possible, but hopefully, around \$1000 on our own to provide travel funds for one member of our team who cannot afford it. We will also try to seek another \$4,000-\$7,000 donation from CSi to prepare backup for the team in the coming years and supplement travel in the case of a far/costlier competition destination.

To afford both our long term investments and travelling, we intend to set aside the money allocated in the table below for each of our investments and essentially remove it from our

budget. We would then fundraise and apply for more funding to reach out travel needs without the set aside money.

<b>Item Desired</b>	<b>Cost</b>	<b>Ideal Purchase Date</b>	<b>Set Aside/Year</b>
Storage Items	\$300-500	This year	\$300/yr for this year goal
Shake Table	\$3-5,000	Within 5 years	\$700/yr for 5 year goal

## **6. Affiliations**

### Human Resources

The Cal Seismic Design Team is incredibly dependent on the momentous support of its members, officers, faculty advisor, and graduate student mentors. These are the people who not only contribute to the final project, but also create the conducive environment that allows for our team to be as competitive as possible. Our faculty advisor Professor Dimitrios Konstantinidis, Davis Hall lab technician Phil Wong, and numerous other professors and graduate student mentors offer their invaluable advice in design and analysis to aid us with the process.

### Organizations

We are affiliated with the Earthquake Engineering Research Institute and corresponding Student Leadership Council, as these two entities host our competition. We also work with the American Society of Civil Engineers chapter here at Berkeley to learn with other student teams and help the department. We also use a Pacific Earthquake Engineering Research Center loaned shake table, and are grateful for their support so we can test our designs. Computers and Structures, Inc. has been a former donor of ours, and grants us access to a few SAP2000 licenses for team use each year. Ashraf Habibullah, the CEO, also has a good relationship with our team and keeps in contact.

## **7. Contributions**

### Contributions to Fundraising

The Cal Seismic Design Team will attend EERI meetings, where officers and members will network with industry experts. This will open opportunities for financial support for all Cal CEE competition teams.

### Infosession/Career Fair Attendees -

Our team will commit the required number of attendees and actions for all infosessions, as stated by the Infosessions Manager and JFC Board, and will have sign-ups to ensure this minimum is met. Our team will commit the required number of members to help with volunteering or assisting for each career fair, as needed by the Career Fair Manager and JFC Board.

### Additional Fundraising Efforts

The Seismic Team will reach out to permitted companies to seek support for not only our team, but for all CEE competition teams. We will also collaborate with Engineering Student Services to implement fundraising programs. -The team will continue to present to FiComm about project costs to offset the contributions from JFC. The team will require members and officers to apply for the Academic Opportunity Fund (AOF) to bring in additional funds to offset the contributions from JFC.

#### New Student Outreach -

To reach out to new students, the Seismic Team will recruit members at the annual Pre-Engineering Program, Engineering New Student Orientation, and other recruiting opportunities at the beginning of the school year. There, we will exhibit our project's goals and missions along with the other competition teams, and incite motivation among new engineering and non-engineering freshmen and transfer in our team and project. We will also promote intensively through our social media accounts and email newsletters during the first few weeks of instruction and hold an informational meeting to recruit new members. A welcome event hosted by ASCE will also be a good place to present and recruit members/answer any questions the new civil students may have.

#### Prospective Student Outreach -

In order to reach out to prospective students, the Seismic Team participates in the CEE Department's activities on Cal Day. Since 2015, the team has displayed some of our balsa wood towers in the 2nd floor bay of Davis Hall, or this past year on Bechtel Terrace, and assisted elementary school students with shaking a building they had constructed for fun, while talking to prospective students and parents about the team and competition. We also presented the information about our team and CEE community at the PREP outreach event and SWE hosted prospective engineering women program. Some of our members hosted private tours for prospective students in the spring as well, and will continue to do so to expand our community.

#### ASCE Membership -

The Seismic Team will advise all civil engineering members to become members of Berkeley's chapter of ASCE to create a more collaborative CEE community. The Seismic Team will encourage all members to participate in some professional and social ASCE events within and outside of UC Berkeley.

#### **SMART Goals within CEE:**

1. Encourage at least 20 new students to attend our first info-session of the year (Aug. 31st) and potentially join the team.
  - a. Advertise Seismic to PREP, at GBO, and online before the semester begins
  - b. Have officers reach out to friends about joining before the first meeting
  - c. Make announcements at the first ASCE GM and in relevant courses to find new members
2. Meet bi-monthly with our advisor, Professor Dimitrios, and potentially 1-2 other structural engineering professors to better ourselves for competition and organization.
  - a. Reach out to Professor Dimitrios before the beginning of the semester (by August 16) to set up monthly meetings with at least our (A)PMs in attendance.
  - b. Get Dimitrios' advice on other potential contacts and reach out during the first weeks of classes.
  - c. Organize a social in October to introduce the team to our mentor(s).



3. Plan at least 2 small socials/semester within the Seismic team and 1 in conjunction with another CEE organization to strengthen the community.
  - a. Social dates will be picked out before the semester starts in coordination with out social chair (likely around Halloween and Christmas).
  - b. Begin reaching out to other CEE organizations in the first few weeks of classes.
4. Have at least 90% of all civil engineering students within Seismic also join ASCE.
  - a. Encourage new members to attend info-sessions and introduce to board.
  - b. Advertise GMs during announcements at the beginning of DeCal
5. Have at least 90% retention rate between Fall to Spring members.
  - a. Create mid and end of semester member surveys to ensure all members are comfortable and happy with Seismic
  - b. Establish mentorship program between existing and new members to engage them more with the team and make them feel welcome.
  - c. Offer more networking/professional development.

## 8. Performance Evaluation

### Evaluate Performance on Goals and Commitments in Previous Year

- A. Fundraising Goals and Requirements Met in 2020-2021
  1. Covered all material costs for members to participate in competition as well as learn skills in the virtual environment.
  2. Invested in long term equipment: additional tools like right angles, containers, and measuring devices, balsa wood, and scales.
  3. Covered portion of material costs for 2021-2022
  4. Participated and received some funding from Big Give
- B. Fundraising Goals and Requirements Not Met; explain lessons learned
  1. None. All goals and requirements were met.
- C. General Goals Met in 2020-2021
  1. Our team placed 2nd Overall in competition (Top 5 is always a goal)
  2. All members that wanted to join or try new things were able to
  3. Most members interested in attending the competition did so; We were able to compete virtually and everyone who was interested contributed to our final paper and submission.
- D. We will use improved tactics from last year and communicate more with professional and student resources to meet all of our goals and hopefully achieve better results.

## 9. Contingency Plan

In the case that the Cal Seismic Design Team is unable to fulfill its role in the CEE community, we intend to create a plan to meet as many of our goals and commitments as possible and then contact the appropriate members of the department to discuss this. We intend to attempt to fulfill as much as we can and take a monetary penalty, or go through the rehabilitation, suspension, or dismissal procedures as outlined below. Our self-assessments happen primarily in an end-of-semester decal evaluation. Each semester we ask for anonymous feedback from members and use this to improve as best as we can going forward. We additionally have open officer meetings once a month for any member, officer or not, to come with questions, comments, or concerns. Rehabilitation would be required if an assessment from a member is negative but constructive.

An example would be if someone had written that the communication in our construction module was poor and frustrated them. In an instance like this, we would sit down with the appropriate construction leads to determine the root cause of the communication errors, and work to resolve them. There would be periodic check-ins on a two-week basis to determine if the new methods are still being used. This method would also pertain to strikes from JFC regarding infossessions, career fairs, attendance at ASCE meetings, or participation in events.

Suspension would be required in the case that a member comes to us to report that a way that the team operates makes them uncomfortable personally, ethically, or physically. The team would be disbanded for a time and the department would be contacted to report the comment and discuss a plan for restructuring to ensure something like that never happened again. JFC would be contacted after to determine how this would affect the budget, how it would affect competition, and how long the suspension should last. This would also be the case in the wake of a tragedy on the team, unrelated to the operations of Cal Seismic.

Things that would warrant dismissal would be anything that goes against university policy including illegal activities, hazing, violations of RSO policy, etc. In this instance, we will contact the appropriate parties within the department and at the Lead Center to dismiss the team. After, we will meet with JFC to discuss the rest of our budget and our JFC obligations.