

**Cal Environmental Team
JFC Grant Proposal 2021-2022**

1. Executive Summary

- a. Our mission as the Cal Environmental Team is to impart the fundamentals of water treatment, filter design, and to promote a collaborative spirit among team members. In doing so, we aim to take first place at the annual ASCE Mid-Pacific conference against northern California state schools, UC Davis, and international schools from China and Canada.
- b. The funds we hope to procure through JFC will go primarily towards travel costs for the team to participate at MidPac in the spring and the cost of materials for use during the year.

2. Statement of Agreement

- a. Cal Environmental Team agrees to all the terms and conditions outlined in the JFC grant program document.

3. Organization management

- a. The Cal Environmental Team is a sustainable water filtration competition team. We provide hands-on training for students, and wet lab experience.
- b. Roles:

<i>Position</i>	<i>Student</i>	<i>Responsibilities</i>
Project Manager	Aneeshi Desai, Hailey Rowbatham, Amita Muralidharan	Oversees operation and well-being of the Environmental Team - this includes facilitating the DeCal, conveying technical knowledge, and handling the logistics and finances of the team.
Assistant Project Manager	TBD*	Assists the Project Manager(s), shadows PMs to take over for the upcoming year
Social Media Chair	TBD*	Oversees social media for Enviro including Facebook and Instagram to promote awareness and bring in future members
Treasurer	TBD* (with the assistance of Aneeshi Desai and Amita Muralidharan, who were previously treasurers)	Works with project manager(s) to apply for grants, submit reimbursement requests for the team, and track spending. To be more organized for the upcoming year, the treasurer will also be in charge of developing a budget and allocating funds to professional development, lab equipment, construction materials, and other expenses.

We are currently collecting applications for the APM, social media, and treasurer roles. Positions will be assigned based on related course material/interests and previous engagement with the team. We hope to assign all positions by the first week of August.

- c. Before being allowed into labs, each member of the team must complete EHS safety training. Negassi Hagdu (our lab safety manager) will train PMs and APMs, who will then be in charge of providing the same training to the rest of the team. In terms of COVID-19, students who wish to will be mailed home lab testing kits with no hard chemicals with no risks.
- d. Social support will be offered to all students through socials planned out throughout the school year and ESS advising.

4. Goals

- a. Our main goal is to design a water treatment system that relies on both physical and chemical methods of treatment.
- b. Below are our team's SMART goals to achieve the main goal listed above:
 - i. Record lab data and measurements in a professional, uniform way across labs.
 - ii. Develop a standard lab procedure for each week's weekly lab so that testing and procedures are the same throughout the week, regardless of the officer running the lab.
 - iii. Ensure the safety of each student at all times both in the classroom and lab.
 - iv. Hold one lecture specifically about environmental justice, and one about a water event happening in the area or that recently happened in the area.
- c. Final deliverables
 - i. A treatment system consisting of household items to physically filter and chemically treat wastewater
 - ii. Final treated effluent with the following parameters
 - 1. Dissolved oxygen levels at maximum saturation (~8 mg/L, 100% saturation)
 - 2. Neutral pH (~6.65 - 7.25)
 - 3. Low turbidity (~0 NTU)
 - 4. Low electrical conductivity (~0 μ S/cm)
 - 5. Target chlorine residual as designated by the year's rules
 - 6. Maximum volume retention (~9 gallons)
 - iii. A technical design report outlining the engineering design, process, cost analyses, life-cycle assessment, and final results, and a summarizing poster presentation
 - iv. An oral presentation that follows the technical design report
- d. General Schedule (Entire Organization)
 - i. During the fall semester, our organization meets Monday nights from 6-7:30 pm in 212 O'Brien (if permissible considering COVID-related room regulations for the fall semester). We host lab testing sessions throughout the week and materials preparation sessions on the weekends. For the spring semester, we follow the same schedule as the fall but with additional class meetings Wednesday nights from 6-7:30 pm. As we

approach competition, we host report drafting sessions and presentation practices throughout the week as well, specific times and dates to be determined by the team. **In the event that in-person classes are allowed as expected, we will proceed with the above plan. If not, we will move to online meetings and send members individual testing kits and will still meet weekly.**

- e. Officer Schedule (to ensure that the SMART goals are reached)
 - i. In order to ensure that the SMART goals are reached, we will take the following steps:
 - 1. During the second lecture, we will teach each student how to record measurements in a lab notebook. Throughout the semester, we will require each student to record their lab session's measurements in the notebook to ensure a uniform way of recording data.
 - 2. At the beginning of each week, the officers will meet to develop a lab for the upcoming week with steps on how to perform the lab and what to test/record.
 - 3. Each student will be required at the beginning of the semester to complete EHS safety training. We can observe the safety of students by the number of accidents (past years have had zero accidents) and can work to keep this record by ensuring that each student wears the proper PPE in the lab (eye goggles, gloves, etc.). Bi-weekly, the PMs will take inventory of PPE equipment, such as gloves, to make sure that we have enough for the upcoming two weeks to ensure a safe environment.
 - 4. PMs will develop lectures about environmental justice topics and a water-related issue as it fits in with the curriculum/current discussion of the team.
 - f. Resources
 - i. We have materials from previous MidPac competitions and lab equipment to test our water filtration designs.
 - ii. We have access to the technical reports, oral presentations, and posters from the past three years
 - iii. We consult with our lab supervisor Negassi Hadgu for technical knowledge and advice.
- 5. Long Term Investments
 - a. We plan to hold a sticker fundraiser in October with a goal of raising \$1737 (\$595 + \$1142) to buy new DO and pH probes if we don't receive funding to cover them. These probes are vital to our competition because they are two of the most important water quality parameters in terms of the competition and wastewater treatment education in general. We plan to hold this fundraiser, during which we will design Earth and water related stickers, in October so that new members

have been introduced to our team and are excited to fundraise for the organization.

- b. We currently have necessary equipment in O'Brien and hope to continue to take care of and use the equipment.

6. Affiliations

- a. ESC - expected \$2,125 allocation

7. Contributions

- a. We provide an environmental option for CEE students. We provide hands-on lab experience, and an introduction to environmental engineering at Berkeley!
- b. We are in the second year of piloting a mentorship program within Enviro, which matches a new student with a returning member. This will help get new students more involved in the civil engineering community! Since it was hard to do this during COVID, we are looking forward to doing a full-fledged version this fall!

8. Objectives

- a. Safety Officer(s)
 - i. Project manager(s) and assistant project manager(s) are responsible for knowing and enforcing safety protocol for every aspect of the team (i.e. gloves, safety goggles, basic lab and construction safety, enforcing EHS training).
 - ii. Our technical advisor, Negassi Hadgu, ensures that we are trained in person in addition to the required EHS training.
- b. Contributions to JFC
 - i. We will participate enthusiastically in JFC events such as company calling, career fairs, and info sessions. We will provide volunteers from our team when asked.
 - ii. For the upcoming year, we are planning on participating in outreach activities organized by the team to reach out to new prospective members. The Cal Environmental Team is also active on social media (mainly, Instagram), and we are planning on using our online presence to increase membership as we have in the past through reposting relevant posts and materials on our stories.

9. Budget

- a. Expected income:
 - i. ESC: \$2,125
- b. Total LEAD center balance: \$0
- c. See attached budget request (We are requesting \$10,967.00 for Cal Environmental Team)

**indicates travel items - see next section

*** indicates nonessential items - see attached request for actual amount requested

<i>Event</i>	<i>Items needed</i>	<i>Description</i>	<i>Amount</i>
MidPac Conference	Gas, rental vans, team	In the event that MidPac does happen (which we are anticipating will	\$3,180.00

	dinner, conference fees, hotel costs.	happen), and assuming each hotel room is \$140/night, 25 students attending from Enviro, 3 cars, and the registration fee.	
Weekly DeCal	Wastewater constituents, filter components, chemicals	We will try to send each team member the wastewater constituents to their homes and perform at home testing and lab sessions. We will also send chemicals and physical filter media to each student as well.	\$9,912.00
		Total projected expenses	\$13,092

d. Travel expenses:

- i. Essential team members to travel: 25 total
 1. Executive board (project managers (2), assistant project managers (2))
 2. Two filter builders
 3. Two presenters
 4. Three alternates
- ii. Nonessential team members:
 1. Eleven additional team members if funds are available to maximize the number of students who benefit from this experience.

10. Performance Evaluation

- a. Due to COVID-19, we haven't had the ability to test new wastewater due to space and cost restraints. Instead, we did online classes with students receiving at home pH strips, lab lessons over Zoom, and lecture presentations. Given the online nature of the school year, we think that we did the best we could to teach incoming students about water quality parameters and prepare them for MidPac in upcoming years. Therefore, in order to evaluate our performance in a way that will help in the upcoming school year while we prepare for MidPac, we will discuss our final effluent right before MidPac 2019, which had the following parameters:
 - i. pH: 7.06
 - ii. Turbidity: 14.2 NTU
 - iii. Electrical conductivity: 24.9 mS
 - iv. Dissolved Oxygen: 6.55 ppm
 - v. Volume 10 L
 - vi. Looking at these results, we are proud of our work and what we have accomplished, however, we see definite room for improvement. We feel that we excelled in our technical writing skills, oral presentation, and construction. We see room for improvement in water quality as well as in certain aspects of the other components of competition. This can be improved through more accurate measuring of wastewater constituents

and contaminants, as well as more lab organized time and discussion of lab results as a group.

- vii. To improve for the upcoming school year:
 - 1. We will standardize lab testing procedures to ensure accuracy in our results.
 - 2. We will spend more time on our technical report.
 - 3. We will work with our new advisors, who specialize in water treatment, for advising.
 - 4. We will analyze the scores from 2019 to pinpoint exactly where improvements can be made - e.g. professional quality of design report and poster, technical content of oral presentation, and orderliness of construction site.
 - 5. We will work to improve the O'Brien basement as a neat and orderly workspace to foster productivity.
 - 6. We will encourage interaction and collaboration with other competition teams in the pursuit of knowledge.
 - 7. We will reach out to new freshmen, as well as rising sophomores who did not have the opportunity to participate in-person last year.

11. Contingency Plan

- a. We will hold elections to elect new leadership to reshape our team, namely for the assistant project manager positions, social media manager, and treasurer positions.
- b. Throughout the academic year, we plan to hold short surveys at the end of each month to evaluate how we are doing as PMs, mentors, and colleagues with small incentives (such as getting out of lab cleaning half an hour early) to encourage participation. We will ask questions related to content, difficulty, support, and professional development and work to make necessary changes, if necessary, based on feedback. At the end of each semester, we hope to do a larger survey to evaluate the same parameters listed above and will change our teaching approach for the spring semester based on the feedback.
- c. If a student becomes seriously injured during the lab, that could be grounds for suspension of the team.
- d. If an incident occurred within the team, we would reach out to Julia and have an investigation done. If someone(s) were found guilty of some sort of crime, they would be dismissed from the team.

12. COVID-19 Response

- a. If in-person classes are offered as planned, we will have in-person sessions in O'Brien. However, we will be prepared to offer online meetings if deemed necessary again.
 - i. If a team member wishes to join virtually if they are not on-campus, we will broadcast our meetings over Zoom every Monday from 6-7:30, taking extra steps to ensure their learning is supported.

- ii. We will continue to recruit through our social media such as Facebook and Instagram. We plan to increase awareness and engage current followers to join Enviro by posting more on our social media pages.