



Green Labs Pilot Project Proposal

Project Requirements

- Only Caltech students, post-docs, staff, or faculty may submit a project application.
- Projects must directly address sustainability on the Caltech campus. Preference will be given to projects that:
 - o Demonstrate a reduction in Caltech's environmental impact.
 - o Are cost-effective.
 - o Include applications to lab spaces, or spaces utilized by lab spaces.
 - o Are collaborative.
 - o Are less than \$5000. Projects over \$5000 will be considered after smaller awards have been dispersed.
- Budgets must include links to all items being purchased, with details of vendor.
- Projects must have received written approval of support from the Green Labs Committee and appropriate campus officials prior to consideration.
- Projects must have education, publicity, and outreach considerations.
- Projects must be able to be evaluated and followed up on after funding is dispersed. If the project may have ongoing benefits such as annual cost savings, the project submission must include information regarding recording and reporting these benefits to the Green Labs Committee.

Application Submission Instructions

1. Please type your responses in each section.
2. Save your application as a pdf with the following format: **YYMMDD_PROJECTNAME**
3. Send your application to the Green Labs Committee (greenlabsinfo@caltech.edu) with the subject title in the following format: **GREEN LABS PILOT APPLICATION: PROJECTNAME**
4. If you would like to schedule a meeting to discuss your application, please email greenlabsinfo@caltech.edu.



Application Submission

Contact information:

To add additional lines to the table, please click into the appropriate row, then click the “+” button on the right-hand side.

Role	Name	Title and/or Department	Lab Group	Email
Primary Contact	Tasha Cammidge	Lab Manager BBE	Prober Lab	greenlabsinfo@caltech.edu
Secondary Contact (if applicable)	Sarah Torres	Lab Manager BBE	Sternberg Lab	greenlabsinfo@caltech.edu

Project Team:

Please list project managers and any other members responsible for reporting status and success, and list any partnering entities such as organizations, individuals, stakeholders, or departments and please explain their involvement and contact information. Other team members and their titles should be listed here as well. To add additional lines to the table, please click into the appropriate row, then click the “+” button on the right-hand side.

Name	Title and/or Department	Lab Group	Email	Involvement
BBE Department	BBE	N/A	N/A	Will be reported to and will provide funding, are stakeholders in the project
Tasha Cammidge	Lab Manager BBE	Prober Lab	greenlabsinfo@caltech.edu	Volunteer helper
Sarah Torres	Lab Manager BBE	Sternberg Lab	greenlabsinfo@caltech.edu	Volunteer helper
Yvette Garcia-Flores	Lab Manager BBE	Mazmanian Lab	greenlabsinfo@caltech.edu	Volunteer helper
Gerard Coughlin	Graduate Student BBE	Gradinaru Lab	greenlabsinfo@caltech.edu	Volunteer helper
Marina Lecoche	Graduate Student BBE	Prober Lab	greenlabsinfo@caltech.edu	Volunteer helper and presenter

Additional notes can be added below.

Green Labs members, including students, will all help monitor the machines and will let the project team, outlined above, know of any issues with the Lomi composters.



1. How much of your project will students be involved in and what roles will they fulfil? Does your project target involvement of a particular section of the student body?

Students will also be consulted as to interest in composting programs at Caltech, and were involved in determining the composting program that would be easiest to implement. Initial student involvement also includes presenting about the Lomi composting project at the Green Labs Lightning Talks held in April 2023. Furthermore, students will help volunteers set up and monitor the Lomi machines to ensure they are not being overfilled and are running as expected, and will contribute food waste to the Lomi composters.

2. Will your project involve others who are not currently part of the project team (for example interns or volunteers)? How will you recruit them?

No additional interns or volunteers will be involved.

Proposed Project Title:

Green Labs Lomi Tabletop Composter Pilot Project

Proposed Project Summary:

We hope to install Lomi tabletop composters in the three Chen kitchen areas in an effort to tackle food waste at Caltech. We will collect data from April to December on the usage of these devices to encourage adoption of sustainable lunchtime practices for labs in BBE. These Lomi composters transform our food waste into usable compost that our gardeners will then use to fertilize the lovely gardens here at Caltech.

Project Objectives:

1. What type of project are you proposing?

Composting pilot project.

2. What is the purpose of this project?

We would like to investigate the volume of food waste developed during the pilot timeline in Chen, and general interest in composting programs. We also want to determine the useability and benefits of the Lomi machines in the proposed settings and see if other labs or buildings are interested in using them. Our group also wants to understand how the reduced food waste being diverted into the landfill may improve working conditions for custodians, and how the food waste can contribute to the beautification of Caltech grounds. In doing so, we will work with Caltech Grounds to incorporate our compost into current Grounds projects. If the pilot is successful, we would like to propose purchasing additional Lomi composters for other lab spaces in BBE, and incorporating the compost developed in those spaces into the established workflows determined during the pilot.

3. Why are the items in the proposed budget essential for this project or program to succeed?

The Lomi composters are the cornerstone of this project, as composting will be very difficult to incorporate into current waste streams without the ability to turn the food waste into compost dirt with the Lomi machines first. Traditional composting programs are not practical currently, and would require a lot of work from custodial services as well as the users in the Chen kitchens to establish. Thus, a traditional compost program would require months to incorporate and



implement. The Lomi composters are easy to set up and will immediately be producing compost, and will not require any work at all for custodial services. In fact, it may even reduce custodial workload as they will not be dealing with as much food waste and will thus need to remove the waste less often, will have less of a mess to deal with, and will not have to clean the garbage bins as often. During our pilot, we would also like to test the usability and effectiveness of the Lomi composters to see if it is worthwhile to expand composting efforts on campus utilizing these composters.

4. How will you implement your project?

We propose installing three Lomi tabletop composters into each of the three Chen kitchen areas. We will develop signage indicating what can and cannot go into the Lomi composters and email the Chen inhabitants to disseminate the information. We hope inhabitants in Chen will begin to contribute their food waste to the composters. Green Labs group members will run the Lomi composters when they are full, transforming food waste into compost dirt. This compost dirt will be collected in clear 15 liter plastic bins, and when the bins are full we will coordinate with Caltech Grounds to drop off this compost dirt so that it can be incorporated into Grounds projects. We will be collecting data to show just how much food waste we are producing, and how valuable this food waste can be if diverted correctly. We hope to use this data to encourage Caltech to adopt more sustainable practices and invest more heavily in composting programs on campus. After the pilot is finished, we will determine the success or failure of the program as outlined below.

5. What aspects of sustainability will your project address, and why is it important?

This project addresses food waste on campus. Composting our food waste on campus means that valuable nutrients are added to our local soils and will contribute to the beautification and development of native gardening on campus, rather than contributing to the waste problems and greenhouse gas emissions issues currently facing our country. Native gardening programs increase biodiversity and provide sanctuaries to local flora. Furthermore, compost retains large volumes of water, helping prevent erosion and reduce runoff, thus protecting downstream water quality. Composting will also significantly reduce the amount of trash we are diverting to our landfill, thus reducing the carbon emissions not only from transporting this waste, but also reducing the amount of emissions the waste itself will produce while decomposing in a landfill. Pasadena is now able to collect compost from most family homes, and is hoping to expand their programs to businesses, schools, and apartment buildings soon.

6. How will your project benefit the Caltech Community?

We hope that composting food waste will reduce the amount of waste diverted to landfills, and also reduce the amount of food waste custodians need to deal with. Composting will also prevent smelly garbage cans. Furthermore, by keeping the valuable food waste resources on campus we will contribute to the beautification and maintenance of biodiverse sanctuaries on campus by providing extra nutrients to our local gardens. Compost also retains large volumes of water, which will contribute to reducing the water lost during watering (an ever-important endeavour during a drought!).

7. Are there examples of similar project that were successful at Caltech or elsewhere?

Yes. There are many successful programs in K-12 classrooms across the USA. As far as we know, no other universities have incorporated Lomi composters into their composting initiatives, making us the first university to adopt this method of composting!



Metrics and Measurability:

1. How will you measure the impact of this project after it is implemented? How will you collect and analyze data before, during, and after the project to show you have met your goals?

We will measure the impact of this project by keeping track of the volume and kinds of food waste we are diverting. We will determine how many runs are required per day for each kitchen when the Lomi capacity is reached (each Lomi has a capacity of 3L). Once the runs are complete, the food waste is typically reduced to 20% of the initial input volume. The compost dirt will be collected in 15L clear plastic bins, and when these bins are full, the compost will be dropped off for Caltech Gardens to use. The frequency of drop-offs will be monitored so we can determine how much compost is being developed, and how often future drop-offs will need to occur.

To determine if the project is successful, we will analyze the data collected and see if the machines are being utilized as expected and if usage increases over time. Furthermore, we will ask our Green Labs group and other users if they have comments on the program, and if the Lomi composters are easy to use. If other groups are interested in the composters, this will also be a measure of success.

If the project is unsuccessful, the Lomi composters will be raffled off during Green Labs events. If the project is successful, we hope to encourage other labs to incorporate the Lomi program into their lunchtime routines. We are hopeful that BBE will provide some benefit for participating in the program (continuing costs of the Lomis, funding for volunteers to help deal with the compost waste, or funding for initial purchase of the Lomi machines), but these incentives will be determined at a later date.

2. Will you report the project outcomes to any other groups besides the Green Labs Committee?

Yes, we will report the project outcomes to the BBE division in addition to the Green Labs Committee.

3. How does your project achieve higher sustainability than those already mandated by Caltech?

Currently, no composting projects are ongoing at Caltech that are available to BBE scientists. This project allows members of BBE to easily participate in composting practices. Further, this program will contribute nutrients and conserve water in the Caltech Gardens

Outreach and Publicity:

1. What is your target audience?

BBE scientists are our target audience. Specifically, those who work or study in the Chen building.

2. Is there a plan for publicizing your project on campus?

Yes, we are advertising our program on the Green Labs website, in the BBE quarterly newsletter, and will email out to the Chen building occupants. Furthermore, we have developed signage that we will post alongside the Lomi composters, so even those who are not privy to the above means of communication will be able to learn about the program.

3. Do you have any outreach or attendance goals? Do you have a way to measure these factors?

We would like to encourage people to join the Green Labs group and to get their labs Green Lab Certified. To that end, we have signage that will include a QR code link to the Green Labs



website throughout BBE buildings, and also located near the Lomi composters. We can measure the effectiveness of our outreach by asking newly Certified labs where they learned of our Certification program. We can also measure outreach by increasing attendance at monthly Green Labs meetings, or increasing the number of users on the Green Labs listserv email address.

4. What you would like students to achieve or learn during the project? Are they specifically related to sustainability?

We would like students to participate in the program and learn more about composting practices and the utility of composting in general. We hope that by making the composters easily available and easy to use, that these users will also be more willing to investigate and participate in other sustainable practices for their daily lives (including in their labs).

5. How will you demonstrate the achievement of these outreach goals?

We will demonstrate the achievement of these outreach goals by increasing the amount of compost developed over time (thus showing more people are willing to use the composters). Further, we hope the Lomi composting program will allow us to do outreach for the Green Labs group, increasing the number of members in our group and members on our listserv email address. After the program is complete, we will also see if BBE will provide incentives to other groups who would like to get Lomi composters for their lab lunch spaces. Interest in purchasing tabletop composters for other spaces will also demonstrate achievement of both our sustainability and outreach goals.

Project Approvals:

1. Do any aspects of your project require approval from either on or off-campus entities? Projects must have written confirmation of approval by appropriate officials prior to consideration. For each entity, please explain the approval and submit evidence of this authorization.

BBE must approve our project as we are purchasing these machines on their behalf and will allow us to put the machines in public spaces. We have received both email (attached to application) and verbal confirmation from the BBE department for this.

Location (if applicable):

Chen kitchen areas on B1, L1, and L3.

Timeline:

Please list milestones chronologically, and provide estimates for duration of time each task will take). To add additional lines to the table, please click into the appropriate row, then click the “+” button on the right-hand side.

- 1. Proposed project start date:**
2023-04-07
- 2. Proposed project end date (if known):**
2023-12-31
- 3. Date by which you will need the first installment of funds:**
2023-03-01



4. **Date by which you expect to have spent all Green Labs funds:**
2023-04-01
5. **Target date for submitting final report and photos to the Green Labs Committee:**
2024-01-12
6. **Schedule/Task completion goals (any significant tasks or milestones): (if additional space is required, please add additional lines to the table, by clicking into the appropriate row, then click the “+” button on the right-hand side).**

Task	Date
Purchase of 3 Lomi composters	2023-03-01
Development of signage	2023-04-07
Setup and installation of Lomi composters, including compost dirt storage bins. Email will be sent out to BBE about this program and it will be advertised in the BBE newsletter coming out around this date.	2023-04-14
Lomi composters will be monitored from April to December by Green Labs volunteers.	2023-12-31
Writeup will be completed, and pictures or other relevant documentation will be submitted to the Green Labs committee to track our progress and the success of the program. We will send our recommendations to the BBE department and to the Green Labs group about continuation of the program.	2024-01-12

History with Green Labs Committee Funding Applications:

1. **Have you applied for Green Labs funding previously?**
No
2. **If so, when?**
N/A
3. **How did you hear about the Green Labs funding application?**
Green Labs website.

Budgetary Limitations:

Any item valued over \$5000 is considered Caltech property and must be registered with the inventory management team. It will need to be tracked as it is moved between entities of Caltech. Any item less than \$5000 will be expensed but not capitalized. If the item is deemed theft-sensitive, they will be considered Caltech property, and need to be registered and tracked by the inventory management team.

Budget Requirements:

1. **Please provide amend the table below. To add additional lines to the table, please click into the appropriate row, then click the “+” button on the right-hand side.**
2. **List all items separately and do not group items together if they are distinguishable.**
 - a. **For example: “Flyers and Posters” should be instead input as two separate line items “50 Flyers” and “3 Posters”.**
3. **Organize the budget within the categories (if applicable).**
 - a. **Equipment and implementation costs.**



- b. Publicity and communication.
- c. General supplies/other.
- 4. Include shipping, tax, installation, and other miscellaneous charges to the total cost calculation (if these costs are not accounted for, you will be responsible for these costs).
- 5. Include total cost for each item requested, and be as detailed as possible.
- 6. Include quotes, links and/or receipts for all items and vendors if available.
- 7. If this is a previously funded project, please include additional historical budget information if available.
- 8. Include images if applicable.

Equipment and Implementation Line Item	Link (or explanation)	Quantity	Cost Per Item	Totals
Lomi composters	Link is here	3	499.00 CA	1497.00 CA
Lomi Skylight	Skylight lid (optional but we wanted to show off the Lomi capabilities)	3	99.99 CA	299.97 CA
Lomi Pods – 180 cycles	Lomi Pods Refills for 1 year	3	54.95 CA	164.85 CA
Lomi Filter Refills – 180 cycles	Lomi filter refills for 1 year	3	99.95 CA	299.85 CA
Pela Labs Shopify Discount	Pela offered us a 42% discount	1	(-956.67) CA	(-965.67) CA
Plastic bins	Bins for storing composting materials while Lomi is running – scrounged from volunteer labs so free!	3	0.00	0.00
Plastic compost storage bins	Bins for storing composted materials before dropping off at Caltech Gardens – scrounged form volunteer labs so free!	3	0.00	0.00
Taxes	Taxes	1	133.76 CA	133.76 CA
Publicity and Communication	Link (or explanation)	Quantity	Cost Per Item	Totals
10 Signs	10 signs for advertising the Lomis, with information on what can and cannot be composted	10	0.02	0.2
6 Signs for Lomis	10 signs for how to use the Lomi, to be placed on the lid of the machine and the lid of the plastic bins being used while the bins are running	6	0.02	0.12



General Supplies / Other	Link (or explanation)	Quantity	Cost Per Item	Totals
None	None	0	0	0
			Total (include tax if possible)	1438.76 CA (1074.42 USD) 0.32 USD
			Total (include tax if possible)	1074.74 USD

Additional notes can be added below.

Green Labs members, including students, will all help monitor the machines and will let the project team, outlined above, know of any issues with the Lomi composters.

Budget Management:

- 1. If your project is accepted, will it require on-going funding after completion? Do you have a strategy for continued costs?**

After the first year the filter refills and Lomi pods will need to be replaced. We are hoping that, if the pilot is successful, BBE may be able to provide these continuing costs as part of the project expansion.

- 2. Will your project generate cost-savings for Caltech? If so, please estimate them here. Will your project be able to repay the funds received?**

We hope that this project will reduce the amount of waste produced in the kitchen areas, thus reducing the cost of custodial services, and waste disposal services. We also anticipate it will reduce the “mess” of food waste and reduce the amount of water being put into the bins, further reducing the burden on custodial services as bins will not need new liners as often and will not need to be cleaned as frequently, providing cost savings in that they can spend their time more efficiently. This project will not make funds for Caltech (ie. we are not selling anything back to a company), so we will not be able to repay the funds received.

- 3. Demonstrate how you have attempted to minimize the cost while maintaining the integrity of the project.**

We contacted the vendor who was able to offer us a 42% discount on these products. If the program is successful, we hope they will extend this offer to other purchases of these machines. Furthermore, we went with the cheapest plans for these machines to further reduce costs. Items such as plastic bins were sourced from labs who no longer needed them, making them free for the pilot.

Additional Comments:

No additional comments.



Application Checklist:

- Typed responses are in every section.
- Include comprehensive itemized budget, including all item costs, miscellaneous charges, taxes, and an accurate total budget cost.
- Include links and images for items if applicable.
- Provide necessary project approval forms.
- Save application as a pdf with the following format: **YMMDD_PROJECTNAME**
- Send your application to (greenlabsinfo@caltech.edu) with the subject title in the following format:
GREEN LABS PILOT APPLICATION: PROJECTNAME