



STUDENT SUSTAINABILITY COMMITTEE

Micro Grant Application (Under \$750)

Funding Criteria

A. General Rules

1. Undergraduate and graduate students are encouraged to submit requests for funding up to \$750. All projects require stakeholder support in order to have funds awarded.
2. Funding can only go to university-affiliated projects on university property submitted from students.
3. All SSC projects must make a substantial impact on students. This may be a direct impact or an indirect impact through education and engagement. All SSC funding is 100% from student green fees, so the projects funded by the students must benefit them.
4. SSC encourages innovation and new technologies – creative projects are encouraged to apply.
5. Unless a type of expense is specifically listed below as having restrictions, SSC can generally fund it. The items referenced below should not be taken as comprehensive.
6. SSC generally won't fund reimbursement requests.

B. Things SSC Can Fund, On A Case-By-Case Basis

1. SSC can fund feasibility studies and design work; however, it must work toward ultimately addressing a sustainability need on campus.
2. SSC can fund outreach events with a central theme of sustainability, provided their primary audience is the general campus community.
3. SSC can fund repairs and improvements to existing building systems as long as it works toward the goal of improving campus sustainability; however, a preference is shown to projects utilizing new or innovative ideas.

C. Things SSC Will Not Fund:

1. SSC will not fund projects with a primary end goal of generating revenue for non-University entities.
2. SSC will not fund personal lodging, food, beverage, and other travel expenses.
3. SSC will not fund tuition or other forms of personal financial assistance for students beyond standard student employee wages.
4. SSC will not fund micro grant proposals that solely request staff, faculty, or student stipends.
5. SSC will not fund capital projects using micro grant funding.
6. SSC will not fund staff or faculty projects using micro grant funding.

Your SSC funding application should include this application and a detailed itemized budget.

Please submit this completed application and any relevant supporting documentation to Sustainability-Committee@illinois.edu. The Working Group Chairs will be in contact with you regarding any questions about the application. If you have any questions about the application process, please contact the Student Sustainability Committee at sustainability-committee@illinois.edu.

General Information

Project Name: LED farming: Effect of Position of LED Lighting on Plant Growth

Total Amount Requested from SSC (\leq \$750): \$500

Project Topic Areas: Land & Water Education Energy
 Transportation Food & Waste

Contact Information

Applicant Name: YoungJoo (Jay) Yoon

Campus Affiliation (Unit/Department or RSO/Organization):

Email Address: yoon25@illinois.edu

Check one:

This project is solely my own **OR**

This project is proposed on behalf of (name of student org., campus dept., etc.):

(Optional)

Name of Faculty or Staff Project Advisor: Faculty: Professor Haran and Bevier café Staff: Phillips, Carter William

Advisor's Email Address: Professor Haran <kharan@illinois.edu> and Phillips, Carter William <cphllps@illinois.edu>

Project Information

Please review the proposal materials and online content carefully. It is highly recommended you visit a working group meeting to talk through your proposal before you submit it.

1) Provide a brief background of the project, its goals, and the desired outcomes.

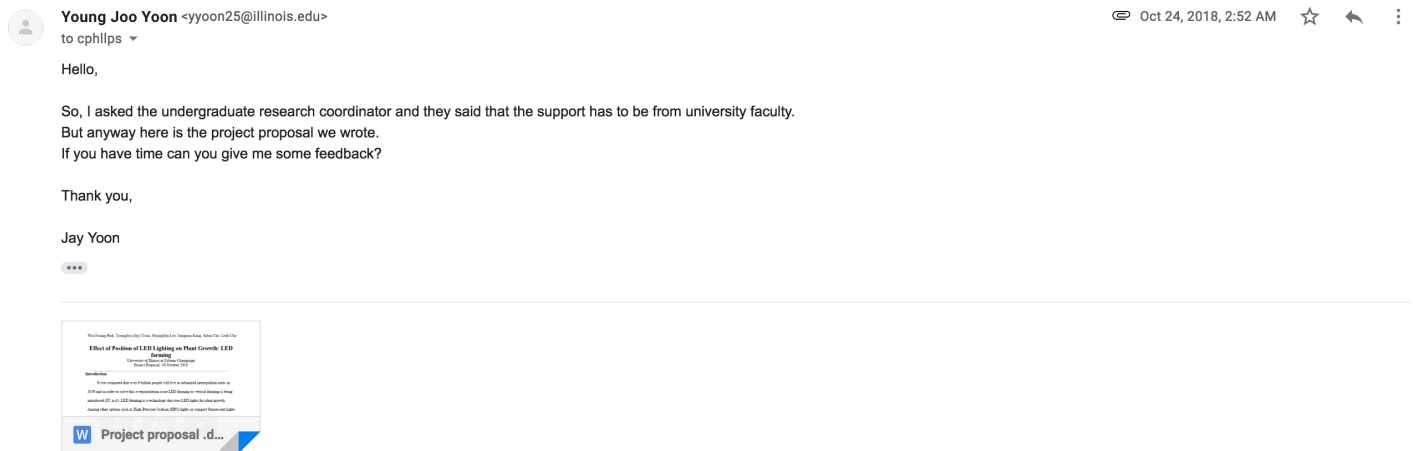
The objective of the research is to find out the relationship between the position of the LED lighting and plant growth. As a final product we will design and create an optimal LED plant pot that is aesthetically pleasing using 3D printing and from the information, we gather in the research and donate to Bevier Hall.

2) How will this project improve sustainability at UIUC?

The final product will be displayed in the Bevier Hall for education purpose. Also, we will make a small educational poster for the Bevier Hall next to LED plant pot to educate students about LED farming and the findings we found from the experiment. Students in UIUC will learn problems regarding the modern agricultural method and learn about an alternative technology, LED farming. Furthermore, the experiment result will promote interest in students who are interested in agriculture by introducing an unfamiliar topic like LED farming. Also, the products collected from the LED plant pot can actually be used in the Bevier Hall for sale.

3) Where will the project be located? Do you need special permissions to enact the project at this site? If so, please explain and attach a letter of support to your application.

The final product of this project will be located in Bevier Hall. I have already talked to one of the staff in Bevier Café and he have said yes to his support.



4) Other than the project team, who will have a stake in the project? Please list other individuals, groups, or departments indirectly or directly affiliated to this project. This includes any funding entities (immediate, future, ongoing, etc.) and any entities that will be benefiting from this project

Project Team Member List (student projects must include their faculty/staff advisor's information)

Name	RSO/Department	Email Address
WooYoung Park	Mechanical Engineering	
MyungGin Lee	Statistics	mlee147@illinois.edu
Sungmin Kang	Mechanical Engineering	sungmin6@illinois.edu
Subin Cho	Statistics	subin2@illinois.edu
Leah Cho	Statistics	yunjuc2@illinois.edu

Professor from Electrical Engineering Department: Professor. Haran
 Bevier café Staff: Phillips, Carter William

5) How will you ensure the sustained existence/maintenance of this project (including reporting requirements) once you are no longer involved? If the project will conclude while you are involved, what will happen to the materials purchased for the project and how will you return the project site to its original condition?

We are planning to conclude the project while I am involved and if the project does not end while I am not involved there are two freshman members in our team to finish what we started. Also, the final product of the project will be displayed in Bevier hall for educational purpose and other materials can be also used as an educational purpose.

6) Please indicate how this project will involve or impact students. What role will students play in the project?

For project team members we will learn more about our majors. For example:

- Statistics

In this project, we will be analyzing the raw data and optimizing the result. The data that are given in college usually have expected results or are from previous case studies. However, by collecting and analyzing the data independently we can be experienced in a more practical situation.

- Mechanical Engineering

Test equipment which is an application of various gear system for LED farming will be designed using a creative method such as Creo and Solidworks in mechanical aspect. Since this is a completely original creation we will learn to deal with an unexpected situation. Also, this is an opportunity to work with different majors and prepare us to collaborate with different people.

- Electrical Engineering

We will be designing a circuit for collecting data such as temperature, humidity, and light intensity. In college, most of the circuit schematic is given and there is a lot of help regarding the project. However, from this, we will learn to design our own circuit for this specific project and learn to decode on ourselves.

- Sustainability and Energy and Environment

We will be researching about the environmental impact of LED farming as this project itself is highly related to sustainability and the environment. Since LED farming is a rapidly rising field in sustainability, we will have a chance to have a hands-on experiment in such a field. From this experiment, we will learn more about energy efficient technology by collaborating with different major.

7) Have you applied for funding with SSC previously? If so, for what project?

No

Scope, Schedule, and Budget Verification

What is the plan for project implementation? Describe the key steps of the project including the start date, target completion date, target date for submitting a final report, and any significant tasks or milestones. Please be as detailed as possible.

Already started the project around September 2018 and I will attach the report on the things we did along with this application.

Task 1: Research

Type of plant, light, soil, watering techniques etc. Since flowers are harder to grow than herbs we can see a clear distinction in terms of plant growth, we decided to grow a pansy flower which is also edible. Also, there aren't a lot of research done in LED farming of flowers and since flowers are aesthetically pleasing it matches our goal.

Task 2: Design using SolidWorks, Creo 4.0 Parametric

Test equipment for LED farming will be designed in mechanical aspect. Basically, two different functional components will be designed by Solidworks. One is for the bed that allows the growth of the plants. It includes the space for soil, water pipes, and connecting rail. The other component is for LED panel that consists of connector and linkages. Each component will be printed by the 3D printer and assembled by raw materials provided by Innovation Studio in MEL. Forces and moments will be calculated for the stability and fluid calculation will be selectively added depending on the progress of the projects. Simulation for safety check will be done by Creo or Solidworks. Detailed design will be possibly changed.

Task 3: Collect data using Arduino UNO

All the data will be collected using Arduino UNO and other various sensors that we build in the breadboard. After building the circuit, we will place the sensor right next to the plant every certain period of days to observe the plant growth. We will adjust the position of the LED lighting and repeat the procedure again.

Task 4: Analyze the data collected

From the collected data, we will be using SAS or R software to analyze the data and find the relationship between the position of the LED light and the plant growth.

Task 5: Design the optimal LED plant pot

After we the research we will find the optimal position of LED lighting for the pansy flower. We will use this information to design our final product using CAD. Other materials could be used to make the product as aesthetically as possible.

Undergraduate Research Symposium: April 18, 2019

Target date for submitting the final report: May 10th 2019

Target completion date: May 3th 2019

List all budget items for which funding is being requested. Include cost and total amount for each item requested. Please be as detailed as possible. You are welcome to submit a separate budgeting document.

Budget cost:

Table for list of materials used in collecting data

10 Light Intensity Detection Photosensitive Sensor Module for Arduino UNO (\$11.99)	\$11.99
1 UNO R3 Board ATmega328P ATMEGA16U2	\$10.86
1 Resistor Kit Assortment	\$10.86
1 Breadboard Jumper Wires Ribbon Cables Kit for Arduino	\$6.98
5 DHT11 Temperature and Humidity Sensor Module for Arduino Transistor	\$10.49
A few Power General Purpose Transistors	\$3
Soil analyzer	\$8.99
Total	\$63.17

Table for list of materials used in creating plant pot

2 LMCO LED Grow Light	\$15.99
3D printing for LED test plant pots and the final product	~\$300
50 Pansy flower seeds (Walmart)	\$8
Gears used in adjusting the distance (ex. Worm gear and Spear Gear)	~\$25
Nutrient of pansy flower (pansy food)	\$11.49
Soil for planting (potting mix)	\$14.86
Acrylic plate for laser cutting in 3D printing	\$20
Total	\$395.34

Total cost of this project: $\$395.34 + \$63.17 = \$458.51$

So, around \$500 will be needed for this project.

If the project is implemented, will there be any ongoing funding required? What is the strategy for supporting the project in order to cover replacement, operation, or renewal costs? (Note: SSC provides funding on a case by case basis and should not be considered as an ongoing source of funding)

Bevier Café will have the final product and since they already are involved in LED farming they can plant whatever crops or plants they want to grow in our LED plant pot. So, No we will not need any ongoing funding.

Please include any other sources of funding that have been obtained or applied for, and please attach any relevant letters of support.

We have not received any funding.

What is the plan for publicizing the project on campus? In addition to SSC, where will information about this project get reported?

The final product will be displayed in the Bevier Hall for education purpose. Also, we will make a small educational poster for the Bevier Hall next to LED farming to educate students about LED farming and the findings we found from the experiment. We also plan to participate in the Undergraduate Research Symposium to share the findings to publicize the project.