



STUDENT SUSTAINABILITY COMMITTEE

Funding Application – Step II

Funding Criteria

A. General Rules

1. Students, faculty, and staff are encouraged to submit requests for funding. Student-led projects require a faculty or staff sponsor in order to have funds awarded.
2. Funding can only go to university-affiliated projects from students, faculty, staff, and departments.
3. All SSC projects must make a substantial impact on students. This may be a direct impact or an 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 list.

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 staff positions that are related to improving campus sustainability. Strong preference will be given to proposals receiving matching funding from departments and/or plans for maintaining continuity of the position after the end of the initial grant.
3. SSC can fund outreach events with a central theme of sustainability, provided their primary audience is the general campus community.
4. SSC discourages funding requests for food and prizes but will consider proposals on a case by case basis that prove significant reasoning.
5. 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.
6. SSC can provide departments with loans for projects with a distinct payback on a case by case base. Loans will require a separate memorandum of understanding between SSC and departmental leadership pledging to repay the award in full and detailing the payback plan.

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 any travel expenses.
4. SSC will not fund tuition or other forms of personal financial assistance for students beyond standard student employee wages.

Your Step 2 funding application should include this application, the supplemental budget form, and any letters of support.

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 & Contact Information

Project Name: Waste to 3D Production

Total Amount Requested from SSC: \$9,250

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

Applicant Name: Colter Wehmeier

Campus Affiliation (Unit/Department or RSO/Organization): Illinois School of Architecture

Email Address: abstitial@gmail.com

Check one:

This project is solely my own **OR**

This project is proposed on behalf of (name of student org., campus dept., etc.): Illinois School of Architecture / Fab Lab / Professor Aaron Brakke

Project Team Members

| Name | Department | Email |
|-----------------|---------------------------------|----------------------|
| Aaron Brakke | Illinois School of Architecture | aaron@illinois.edu |
| Shaahin Davami | Illinois School of Architecture | Sdavam2@illinois.edu |
| Colter Wehmeier | Illinois School of Architecture | abstitial@gmail.com |
| Name | Department/Organization | Email Address |

Student-Led Projects (Mandatory):

Name of Faculty or Staff Project Advisor: Aaron Brakke

Advisor’s Email Address: aaron@illinois.edu

Financial Contact (Must be a full-time University of Illinois staff member)

Contact Name: Aaron Brakke

Unit/Department: Illinois School of Architecture

Email Address: aaron@illinois.edu

Project Information

Please review the proposal materials and online content carefully. It is highly recommended you visit a working group meeting sometime during the proposal submission process.

Please provide a brief background of the project, its goals, and the desired outcomes:

You may copy and paste your Step 1 application answer if nothing has changed.

My project is to introduce our campus to innovative forms of 3d Printing that use sustainable materials. A part of my plan is to 3D print clay, while another part of the plan is to create an extruder system capable of incorporating the use of sawdust into the filament. As you may know, we have a considerable amount of sawdust produced in our department's fabrication lab (about 40 pounds per semester for each fab-lab), and right now the saw-dust is useless, and it has been considered as a waste. So a significant amount of the wood timbers and lumbers and plywood sheetings which are being used in the fab-lab, is just turning into waste and no one uses them anymore. In our research, we have found alternative routes that have used wood flour for their experiments with 3D printer and this encouraged us to check the viability of our sawdust. We have also seen the use of powder bed and inkjet head 3D printing with organic non chemical binders.

Using sawdust as a material in 3D printers is seen as a way that will help us earn money out of them. We can hire people during the process and add to the jobs on-campus, and also a significant amount of waste is being terminated which helps us improve our campus's sustainability. We can also have a substantial impact on the students, providing them cheaper 3Dprinting facility which allows them to print their creative and innovative ideas just at the moment. Being a cutting-edge technology, using sawdust as a material in 3D printers will gain UIUC more reputation and honor through the US and the world as well.

There are a few other teams which are working on similar projects at our university, one is Filify which is looking for finding a way to recycle plastic water bottles for use in 3D prints and the other one is Zero Waste Woodshop which is working on gathering the different kinds of waste separately, like collecting all the sawdust in one place, but no one is going to be using this sawdust, They just dump the sawdust near the fab-lab somewhere and let it break down. This project aims to build on the knowledge produced by these teams and expand our scope to include adding important uses out of the saw dust which will be really great in terms of sustainability and impact on the students.

It may be enlightening to note that: each one of the 1 kg plastic filaments used in 3D printers can be replaced with approximate amount of 2 pounds of sawdust. We also have spoken with employees at the fabrication labs in Business school and Art and Design School, so that we can bring this alternative to these labs and we can impact more and more students. Another part of our plan which claims a significant importance is to get rid of all the waste being produced in the fabrication lab by using sawdust and reusing it again and again when students have failures with their models and they don't need them anymore.

Where will the project be located? Are special permissions required for this project site?

If special permission is required for this location, please explain and submit any relevant letters of support with the application.

This process will happen in Annex 1 and Annex 2 also known as Fab-Lab, located on 1208 W Peabody Dr, Urbana, IL 61801. A space has been allocated for this research in the room at the North West corner of the building.

Other than the project team, who will have a stake in the project? Please list other individuals, groups, or departments affiliated directly or indirectly by the project. This includes any entity providing funding (immediate, future, ongoing, matching, in-kind, etc.) and any entities that benefit from this project.

Please attach letters of commitment or support at the end of the application.

How will this project involve and/or benefit students?

This includes both direct and indirect impact.

How will you bring awareness and publicize the project on campus? In addition to SSC, where will information about this project be reported?

At the first point, architecture students will be notified through email and posters, the students will participate in design courses introducing them to the sustainable 3Dprinting. We will have our own desk at the orientation day for new incoming students to make them aware of our facilities. We are aiming to have an "Idea Birthday" competition for students all over the campus, so a substantial number of students will find out about us. Furthermore, students working in Annex 1 and 2 will spread the news about the new sustainable way of 3D printing which is so much cheaper than before, and then in our exhibition in which hundreds of people will attend, we can have a significant number of people to make them know about this sustainable new way of giving birth to their creative ideas. Negotiating with Business school and Art and Design fabrication labs, we anticipate impacting 500+ students monthly, which helps us to get spread all over the campus

Financial Information

In addition to the below questions, please submit the supplemental budget spreadsheet available on the Student Sustainability Committee [website](#). Submission of both documents by the submission deadline is required for consideration of your project.

Have you applied for funding from SSC before? If so, for what project?

No

If this project is implemented, will you require any ongoing funding required? What is the strategy for supporting the project in order to cover replacement, operation, or renewal costs?

Please note that SSC provides funding on a case by case basis annually and should not be considered as an ongoing source of funding.

This project aims to be able to start earning money after some time to cover all its costs.

Please include any other obtained sources of funding. Have you applied for funding elsewhere?

Please attach any relevant letters of support as needed in a separate document.

Environmental, Economic, and Awareness Impacts

How will the project improve environmental sustainability at the Urbana-Champaign campus? If applicable, how does this project fit within any of the [Illinois Climate Action Plan \(iCAP\)](#) goals?

_Purchasing, Waste, and Recycling objectives: 22. Reduce municipal solid waste (MSW) going to landfills. This involves reducing nondurable goods purchases, effectively reusing materials, and recycling. In the latter category, campus will increase the diversion rate of MSW to 45% by FY20, 60% by FY25, and 80% by FY35, while also increasing the total diversion rate to 90% by FY20 and 95% by FY25. MSW sent to landfills should decline to 2,000 tons annually by 2035: using the sawdust will decrease a considerable amount of plastic waste which was the result of plastic material used in the 3D printers before, and this directly impacts sustainability of our campus.

_Energy Conservation and Building Standards objectives: 1. Maintain or reduce the campus gross square footage relative to the FY10 baseline: Fabrication lab in Annex 1 is so much busy sometimes making increasing need for space and square footage there, due to the fact that students are more and more using laser cutters to build physical models, so we will satisfy student's needs with covering a significant part of manufacturing their physical models.

_Energy Generation, Purchasing, and Distribution objectives: Expand on-campus solar energy production. By FY20, produce at least 12,500 MWh/year, and by FY25 at least 25,000 MWh, from solar installations on campus property. These targets represent 5% and 10% of our expected 2050 electricity demand, respectively: Facilitating cheap and sustainable 3Dprinting option accessible by the students, helps them have easier experiments and trial and errors to define some way of solar energy producing which will be doable for our campus.

_Transportation objectives: 9. Reduce air travel emissions from a new FY14 baseline by 25% by FY20, 50% by FY25, and 100% by FY30. By using sawdust as the main material for 3D printing, students do not need anymore to refer to the material shops to buy material for their physical models, so all the traffic related to students driving to Blackline supply or other stores providing material, will be terminated.

_Water and Stormwater objectives: 17. Perform a water audit to establish water conservation targets — and determine upper limits for water demand by end-use — for incorporation into facilities standards by FY16: The wood flour dump near the fabrication lab may be taken to the ponds around Champaign-Urbana, and pollute the water.

How will you monitor and evaluate the project's progress and environmental outcomes? What short-term and long-term environmental impacts do you expect?

Some examples include carbon emissions, water conservation, green behavior, and reduced landfill waste.

We have talked to the fabrication lab's director, and asked him about the amounts of sawdust being produced there per semester, we have the related photos which show how much of waste we can get rid of, by reusing sawdust.

Furthermore, we have the approximate amount of plastics used in the 3D printer now, which we are aiming to decrease it to the minimum amount possible, right at the time we make our sawdust 3Dprinter able for students use.

We also have the statistics related to the number of students using Annex 1 fabrication lab to assess the changes in the number of students willing to use the sawdust 3Dprinter. So every one of the students which

we encourage using sawdust 3Dprinter will not need to refer to material shop driving a car to buy plastic material to 3Dprint their model.

What are your specific outreach goals? How will this project inspire change at UIUC?

Providing students with sustainable cheap 3D printing facility which enables them build physical model of their creative ideas right away.

The fact that 2D printing facilities on campus, are playing an important role in student's learning is obvious for everyone, just imagine the situation in which sustainable cheap 3D printing option is available for students to use for better understanding physical phenomenon.

If applicable, how does this project impact environmental injustice or social injustice?

As you can imagine, Being a big university, UIUC has a strong impact in the Champaign-Urbana region in terms of waste production. Gathering students from different cultures from all over the world, having number of buildings, increasing need for public transportation for students and experimenting and producing different innovations and prototypes, makes The university of Illinois a source of waste and pollution production for the people living in Champaign-Urbana. so this may be a kind of environmental injustice which we are aiming to participating in its decrease by reducing the plastic waste from 3D printers and air pollution due to the transportation for buying materials