



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: Membrane-based Removal of Water from Oil

Total Amount Requested from SSC: \$9870.4

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

Applicant Name: BK (Brajendra K) Sharma

Campus Affiliation (Unit/Department or RSO/Organization): Prairie Research Institute-Illinois Sustainable Technology Center

Email Address: bksharma@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.):

Project Team Members

Name	Department	Email
Toma Solovey	ISTC	tamara2@illinois.edu
Rishi Ghorad	ISTC	rghora2@illinois.edu
Nikolai Kocherginsky	Chemistry	kocherg2@illinois.edu
Brajendra K. Sharma	ISTC	bksharma@illinois.edu

Student-Led Projects (Mandatory):

Name of Faculty or Staff Project Advisor: Nikolai Kocherginsky

Advisor's Email Address: kocherg2@illinois.edu

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

Contact Name: Margaret Morrison

Unit/Department: Prairie Research Institute-Illinois Sustainable Technology Center

Email Address: mmorrison@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.

Biodiesel often has emulsified water as a result of water washing. Our project involves vacuum filtration through a hydrophilic membrane to demulsify water-in-oil emulsions. In this process, tiny water droplets coalesce near the pore surface, while the aqueous phase penetrates through the membrane with oil. This leads to spontaneous formation of two separate phases, oil and water. Through this process, the water content in kerosene sharply decreases, increasing the electric resistance by almost 40 times. The purpose is to do the same with biodiesel.

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.

The project will be located at the Illinois Sustainable Technology Center, and no special permissions are required for the project site.

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.

Dr. Beth Conerty - Integrated Bioprocessing Research Laboratory (IBRL) - Business Development Manager

How will this project involve and/or benefit students?

This includes both direct and indirect impact.

There are several benefits of this project toward students. The use of biodiesel in university vehicles contributes to a more environmentally conscious community. Furthering the method of removing water based emulsifications in oils can also be used to aid additional oil based research or RSO's around the campus. The idea is to introduce our technology and collaborate with student groups. On that note, the involvement of students in our project is critical to its purposes. The demulsification process can be applied to other RSO's and other student based organizations that can utilize the procedure, particularly the biodiesel initiative-based groups. Additionally, undergraduate students are directly involved in the process of this project, from the demulsification to the water washing. The educational components to our research are in the technical information behind the procedure. The molecular interactions behind the process are crucial in the understanding of fluid dynamics and mass transfer. It is also possible to teach the use of technology in courses within Chemical Processes or Engineering. This could be vital in combining STEM with environmental consciousness. It is also valid to apply in laboratory courses and experiments to further the understanding of the topic.

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

The outcomes of the project will be published on the website of the Illinois Sustainable Technology Center, and info will also go out in ISTC newsletters as well as the annual ISTC report. We are also planning to present at the Engineering Open House. We will also present the research work on this project to the Biodiesel student group, IBRL, iSEE, and in conferences on campus, (such as Undergrad Research Conference organized

by ACS-ECI). Once all the experimental work is complete, we will submit final project report (as per SSC guidelines) after getting draft technical report reviewed and approved by SSC staff

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, we have not previously applied for funding.

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.

No ongoing funding is required. We have incorporated expected replacement, operational, and renewal costs into the overall funding scope and budget. This accounts for material that is expected to be replaced due to deterioration or by running out. Once we demonstrate the system's consistent operation, we will present our project to industries and funding agencies (USDA, USDA-NIFA, DOE-SBIR).

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.

No other funding has been obtained or applied for.

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?

With regards to on campus applications, this membrane-based demulsification could be used to aid in the purification of the biodiesel produced on campus in order to potentially increase the percentage of biodiesel used in the UI Fleet vehicles. In order to do so, the biodiesel must be purified through a related water-washing procedure with the membrane. The purified biodiesel is thus more efficient and produces less waste when consumed for energy. The relation of this to the iCAP initiative is through the capabilities of conserving energy, which accounts for a majority of the carbon emissions on the campus. The production of biodiesel through this method has the potential of reducing needs for fossil fuels in vehicles throughout the university. This has a significant impact in the reduction of our carbon footprint.

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.

The project's progress can be monitored by the efficiency of our system's demulsification process, which will be tracked with each test performed. This data can then be compiled into a comprehensive report for analysis. As for environmental outcomes, they are easily observable in the short term with the removal of the need for toxic chemicals for demulsification, as only a membrane and pump will be needed. Both of the latter are environmentally friendly, with the membrane consisting of cellulose triacetate, a completely natural and nontoxic material. As for long term environmental impacts, once we begin to work in collaboration with the IBRL, we will be able to track the percent increase in usable biodiesel and thus monitor the direct environmental impact as a result.

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

As previously stated, we plan to present our project at Engineering Open House in order to inform as many individuals both on and off campus as possible. As such, this project will inspire change at UIUC by increasing student awareness of both the iCAP initiative and the importance of biodiesel as a whole. This will encourage those on campus to become more involved in the mission to create in a more environmentally friendly campus while also educating themselves about renewable energy in the process.

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

n/a