View results

Respondent

12 Raina Shrivastava

11:43
Time to complete

ACKNOWLEDGMENT

1

Please read and acknowledge the following:

- SSC funding can take ****1 MONTH OR LONGER**** to receive after the SSC has voted to approve a project because it includes several steps:
  - the authorization of an award letter by SSC, iSEE, Division of Student Affairs, the project's advisor *(student-led projects only)*, and the project lead;
  - the creation of the CFOP by the project team's departmental financial contact in conjunction with the project team;
  - the transfer of funds from SSC to the project's CFOP.
- If you are a project lead for a new project that is approved by the SSC, be sure to check your email regularly for the prompt to sign the award letter to help facilitate the efficiency of the process.
- Project teams for funded SSC projects do NOT receive funds directly. After a project's SSC funds have been transferred to the project's CFOP, the project team must work with the sponsoring department to purchase the approved budgeted items on behalf of the project team.
- If this project is funded, this application will be shared publicly on our SSC Illinois Climate Action Plan (iCAP) portal so that others can learn from your project.
- Funded projects have grant reporting requirements. See our website for more information.

*

◉ I acknowledge that I have read this information.

APPLICATION INSTRUCTIONS

Prior to starting your application, make sure you have the following information available:

- Project personnel including project lead, confirmed faculty/staff advisor, departmental financial contact, other team members
- Working Group attendance information
- Project title and abstract
- Project description including timelines, deliverables, detailed description about the project, project feasibility information
- Intended student impact(s)
- Intended sustainability impacts
- Optional supporting documentation (e.g., Working Group presentation, letters of support)
- Detailed project budget information

See our website for a sample application.

2

Today's Date

10/30/2025

3

Please tell us how you heard about the availability of SSC's funding for your sustainability project. *

- [x] I Have Received SSC Funding Previously.
- [ ] Instagram
- [ ] MassMail
- [ ] SSC's Newsletter
- [ ] Departmental Newsletter
- [ ] Digital Signage
- [ ] LinkedIn
- [ ] SSC Website
- [ ] SSC Board Member or Other Member of the Committee
- [ ] Other Project Teams that Received Funding
- [ ] Illinois Faculty or Staff
- [ ] At a Tabling Event
- [ ] General Word of Mouth
- [ ] Other

4

Is the Project Lead a currently enrolled Illinois student? *

NOTE: Only currently enrolled Illinois students are eligible to be a Project Lead.

- (●) YES (by selecting YES, you affirm that the Project Lead is a currently enrolled Illinois student)
- ( ) NO

5

Project Lead's Name *

Project Lead must be a currently enrolled Illinois student.

Raina Shrivastava

6

Project Lead's University Email Address *

rainas3@illinois.edu

7

Project Lead's Department *

Computer Science

8

Has someone from the project team presented their proposed project at a SSC Working Group meeting this semester? *

If not, please attend one and present your project. After presenting your proposed project (and attendance has been documented by the SSC), please return here to complete your application. The Working Group meeting schedule can be found on the SSC website.

- (●) YES
- ( ) NO

9

Select the Working Group meeting at which you presented. *

- ( ) Energy + Transportation & Infrastructure Working Group Meeting
- (●) Food & Waste + Land, Air, & Water Working Group Meeting
- ( ) Education & Justice Working Group Meeting

10

Enter the date of the Working Group meeting you attended. *

10/15/2025

11

What is the name of your project? *

WaggleNet

12

Total funding requested from the SSC for this project *

This application is restricted to students requesting $10,000 or less. The amount entered here must match the amount reflected in your detailed primary budget spreadsheet that you will submit with this application.

3250

Please enter a number less than or equal to 10000

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Project Category *

- ○ Education & Justice
- ○ Energy
- ○ Food & Waste
- ◉ Land, Air & Water
- ○ Transportation & Infrastructure

14

Project Abstract *

In 100 words or less, briefly describe the project.

WaggleNet is a student-run research group developing IoT devices and data science techniques to advance honeybee research. We aim to create a low-cost sensor package that amateur, commercial, and research beekeepers can use to monitor the health of their hives. Using data collected from a distributed network of honeybee hives, we aim to find general trends in honeybee hive data. These will be used to develop predictive algorithms that sense problems in hives before they happen, benefiting beekeepers using the device. We also develop tools for the university's Robinson Bee Lab to enable their research.

PROJECT DESCRIPTION

15

Describe your project in detail. Make sure you include sufficient details about your project so that the SSC can comprehensively evaluate the merits and feasibility of your project. *

Be sure to address the following:
-What are your project's goals and how do you intend to accomplish them?
-What are your project's deliverables?

WaggleNet is broken into two main focuses, each addressing different needs in the beekeeping community.

First, we are addressing the gap in data availability that exists in the beekeeping world. Despite the large amount of research in the area, relatively little data is publicly available. This limits the advancement of promising predictive algorithms that can help beekeepers save failing hives. We are developing an IoT sensor package that beekeepers can mount to a hive, which will collect data and send it back to our servers. We will send back a prediction of hive health to the beekeeper through a mobile app, and make data from the hive available to researchers.

Over the next two years, the major deliverables will be the development of a prototype sensor package and companion app, scaling production to create ~10 prototypes, and finally the deployment of that package on local hives in the Urbana-Champaign area.

Second, we are developing technology to help the university's Robinson Bee Lab to advance their research. Currently, we are creating a system that is capable of automatically attaching tags to bees. These tags are used to capture the motion of individuals for studies of social behavior among bees. The lab has been manually tagging thousands of bees for these studies, which takes lots of time and effort. We want to automate this process, which will enable the lab to perform more studies with less resources.

The major deliverables will be a proof of concept bee tagging system, followed by a full prototype of the system.

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List your proposed project's timeline and major milestones. *

NOTE: SSC funding agreements remain active for two years. Thus, your timeline should reflect your activities over a two year period or less.

December 2025
- Functional bee tagging prototype
- Completion of data collection prototype

August 2026
- Development of app interface for beekeepers
- Design of beekeeper-friendly data collection device

November 2026
- Deployment of data collection device at university's Robinson Bee Lab

October 2027
- Deployment of 10+ data collection devices

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Has the project team spoken with UIUC's Division of Facilities and Services (F&S) personnel about the feasibility of the proposed project? *

NOTE: While this step is optional for many projects, all projects involving infrastructure (e.g., internal or external physical infrastructure of university buildings) or grounds (e.g., plantings, installing structures on campus grounds) must have F&S approval prior to receiving SSC funding. If you need assistance evaluating the feasibility of your proposed project, please reach out to SSC-Advisor@illinois.edu PRIOR to submitting your application.

- ○ YES
- ○ NOT YET
- ◉ N/A

STUDENT IMPACTS

18

How many students will be directly impacted by this project? *

The members of WaggleNet are directly benefited by the project, and we currently have around 20 members.

19

How many students will be indirectly impacted by this project? *

WaggleNet has helped to raise general awareness of bee pollinator issues among the student body. Our biggest outreach event typically occurs at the Engineering Research Fair, where we present our work and discuss the problems we are addressing. These include colony collapse disorder, varroa mite infestations, and deformed wing virus.

20

What are the intended student impacts? *

At the minimum, be sure to address the following:
-How will this project benefit students?
-How will students be involved with this project?
-What educational components are there in this project?

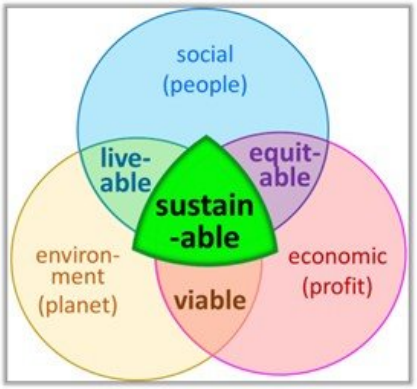
As a student-run research group, our group provides research opportunities for undergraduates. We are composed of several project teams, each with a different technical focus. The work that members do on their team allows them to develop their engineering skillset in an area of interest. However, the nature of our work is very interdisciplinary. Our group has the opportunity to collaborate with the university's bee lab, and we typically visit the lab several times in a semester. The connection to bee researchers enables our members to learn the importance of bee conservation and engage with the primary stakeholder in our project. We also deploy prototypes on hives, allowing students to learn how to design and carry out experiments.

SUSTAINABILITY IMPACTS

21

Authentic sustainability consists of the overlapping area of 3 spheres: Environment, Society, and Economy.

Describe how your project addresses sustainability. *



WaggleNet's overarching goal is to create a low-cost and amateur-friendly solution for beekeepers to monitor the health of their hives and protect their colonies, as well as collect honeybee hive data. This will improve the lack of publicly available data and continue to advance research for honeybees, one our most valuable pollinators. We directly support authentic sustainability by addressing all three dimensions: environment, society, and economy. Environmentally, our project helps protect the health of honeybee populations, which are integral pollinators that support ecosystems and global food systems. With our affordable, data-driven, hive monitoring solution, we aim to deliver early detection of colony stress and disease, reducing hive loss and improving honeybee populations as well as biodiversity. Socially, we will provide local and amateur beekeepers with accessible technology and visually clear insights to help their hives thrive. This also promotes community engagement and environmental awareness. Economically, our low-cost device will reduce the financial barriers to sustainable beekeeping and actions, helping maintain local food production systems that rely on pollination by honeybees. Our aim is to benefit the people and the planet through our sustainable work.

22

How does your project promote and increase environmental stewardship at UIUC? *

If applicable, also address what the carbon, water, waste, and/or energy savings is associated with your project.

WaggleNet promotes environmental stewardship on campus by combining technology, research, and community action to protect pollinators and support local ecosystems. Our team collaborates with research labs groups at UIUC to collect and share open-source hive data, which can be used for disease prevention, student research, and broader awareness about pollinator decline. We conduct outreach by promoting our lab and our mission and recruiting passionate students to contribute and make an impact. We also facilitate visits to the Bee Research Facility on campus for our members to directly experience and see the importance of honeybees.
While our system's direct carbon, water, waste, and energy savings are primarily indirect, they are significant in the long term. By reducing colony collapse and promoting healthy pollination, we help stabilize local food production systems. When these systems are unstable, crop yields decline and farmers can compensate with greater land, water, and chemical use, all of which increase carbon emissions. Supporting pollinator health therefore helps reduce the environmental footprint of agriculture. Additionally, our IoT devices are small and efficiently designed, minimizing the resources needed for construction and limiting e-waste.

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Does your project aim to advance one or more of the Illinois Climate Action Plan's (iCAP) objectives? If so, indicate which and describe how. If not, enter N/A. *

A full list can be found here: https://icap.sustainability.illinois.edu/objectives

Yes, WaggleNet directly supports several objectives outlined in the Illinois Climate Action Plan, particularly within the Land & Water, Education, and Resilience themes.
Theme: Land & Water, Objective 4.2.2: Increase Pollinator-Friendly Areas
While not directly increasing pollinator-friendly areas, WaggleNet promotes pollinator health by developing affordable hive-monitoring systems that help beekeepers reduce colony collapse. This will also enable beekeepers to have stronger hives, boosting the health of local ecosystems reliant on pollination.
Theme: Education,Objective 6.1: Broaden Sustainability Education
We provide hands-on opportunities for students to engage in real-world environmental research. Through data collection, open-access resources, and collaboration with campus sustainability and research organizations, WaggleNet contributes to the goal of broadening sustainability education across disciplines.
Theme: Resilience, Objective 8.4: Local Sustainability Issues
WaggleNet addresses the local issue of pollinator decline, which threatens agricultural stability and ecosystem resilience. By supporting healthy pollinator networks, the project enhances the resilience of local food systems. We especially aim to help colonies survive over the cold winters that they experience in Illinois by providing beekeepers with easily accessible insights and actions to take in winter.

FACULTY/STAFF ADVISOR

All student-led projects require a Faculty/Staff Advisor. NOTE: Project teams must obtain confirmation from faculty/staff PRIOR to listing them as an advisor.

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Faculty/Staff Advisor's Full Name *

Christopher Schmitz

25

Faculty/Staff Advisor's Department *

Electrical and Computer Engineering

26

Faculty/Staff Advisor's University Email Address *

cdschmit@illinois.edu

PROJECT'S FINANCIAL CONTACT

The project's Financial Contact must be a full-time Illinois employee who has the authority to request a CFOP, manage the project's expenditures, and generate financial reports on behalf of the project.

27

Financial Contact's Full Name *

Christopher Schmitz

28

Financial Contact's Department *

Electrical and Computer Engineering

29

Financial Contact's University Email Address *

cdschmit@illinois.edu

30

Are there additional members of your project team? *

- (●) YES
- ( ) NO

ADDITIONAL TEAM MEMBER

31

Team Member's Full Name *

Patrick Huang

32

Team Member's Campus Department *

Electrical and Computer Engineering

33

Team Member's University Email Address *

pphuang2@illinois.edu

34

Are there additional members of your project team? *

- (●) YES
- ( ) NO

ADDITIONAL TEAM MEMBER

35

Team Member's Full Name: *

Arya Das

36

Team Member's Campus Department: *

Electrical and Computer Engineering

37

Team Member's University Email Address: *

aryadas2@illinois.edu

SUPPORTING DOCUMENTATION

38

OPTIONAL: Please attach any letters of commitment or support here, along with any supplemental media that will support your application (Working Group presentations, photos, etc.).

SSC_WaggleNet_Letter_of_Support_Raina Shrivastava.pdf

We_are_WaggleNet_Raina Shrivastava.pptx

WN Onboarding_FA25_Raina Shrivastava.pptx

PROJECT FINANCES

39

Describe how SSC funds will be used in your project.

NOTE: Only address the use of SSC funds, specifically, even if the project will be funded by multiple sources.

SSC funds will be used primarily for hardware development, specifically for our bee-tagging device development as well as our IoT device development and deployment. We need motors, syringes, and other general items to build a function bee-tagging system that will be used by researchers for highly specific honeybee research. We also need parts to manufacture multiple IoT devices for deployment into hives. Finally, we also have website maintenance and cloud storage costs through AWS.

40

If additional funding is required to achieve your project's goals, do you have a plan in place to obtain additional funding from other sources? *

NOTE: SSC cannot guarantee financial support beyond that provided in an approved funding agreement.

- ○ YES
- ○ NOT YET
- ◉ N/A

41

Has your project team or department previously been awarded funding from the SSC for the same or a similar project? *

- ◉ YES
- ○ NO

42

What is the total amount of SSC funding received to date for the same or similar projects by the project team/department submitting this project? *

15000

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Download, complete, and submit the **SSC-Budget-Timeline_NEW APPLICATION_template** file linked below.

https://studentengagement.illinois.edu/sites/default/files/2024-09/SSC-Budget-Timeline-NEW-APPLICATION-template.xlsx

*

Please be very detailed so that the SSC can fully evaluate the merit of your funding request. Your proposed budget should total the amount you are requesting and should correlate well with the the description of how you will spend SSC funds on your project on this application. The budget template allows you to also submit alternative budgets in addition to your main budget.

SSC-Budget-Timeline-WaggleNet_Raina Shrivastava.xlsx