



## 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](mailto: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](mailto:sustainability-committee@illinois.edu).

## General & Contact Information

**Project Name:** Improving the energy efficiency of an ultra-low freezer used to store biological materials

**Total Amount Requested from SSC:** \$10,000

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

**Applicant Name:** Alison Bell

**Campus Affiliation (Unit/Department or RSO/Organization):** Department of Evolution, Ecology and Behavior

**Email Address:** alisonmb@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
Alison Bell (PI)	Evolution, Ecology and Behavior	alisonmb@illinois.edu
Katie Julkowski (lab manager)	Evolution, Ecology and Behavior	Julkows2@illinois.edu
Name	Department/Organization	Email Address
Name	Department/Organization	Email Address

**Student-Led Projects (Mandatory):**

Name of Faculty or Staff Project Advisor:

Advisor's Email Address:

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

Contact Name: Penny Broga

Unit/Department: School of Integrative Biology

Email Address: broga@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.*

The overall goal of research in the Bell lab is to understand why individual animals behave differently from one another, using threespined stickleback fish as a model organism. To that end, we measure the behavior of individual sticklebacks in behavioral assays in both field and laboratory settings and collect biological material samples for genetic, molecular, neural and hormonal analyses. We also use the ultra-low freezer for long term storage of critical biological materials for future studies. For example, we have been tracking individual differences in behavior within certain stickleback populations over the last 20+ years and long term, reliable storage of those samples facilitates the analysis of long-term changes in the population. These sorts of longitudinal data are extremely rare and valuable and it is critical that samples are well-preserved.

### **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 ultra-low freezer will be kept in the Bell lab on the 4<sup>th</sup> floor of Morrill Hall. No special permissions are required.

### **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.*

The Bell lab has been continuously supported by grants from the NIH and NSF since 2007, and the ultra-low freezer holds samples that are used in federally-funded research. Colleagues in the Department of Evolution, Ecology and Behavior and the School of Integrative Biology also occasionally store samples in the Bell lab ultra low freezer and will therefore benefit from this project. ICR funds to the Department of Evolution, Ecology and Behavior will contribute to the purchase of the freezer. Other stakeholders include the large number of undergraduate and graduate students who carry out research projects in the Bell lab.

### **How will this project involve and/or benefit students?**

*This includes both direct and indirect impact.*

The Bell lab has trained over 100 undergraduate researchers, most of whom have gone on to pursue careers in science and graduate school. Many of the undergraduate researchers in the Bell lab have come from groups under-represented in science, and/or are first generation college students. The Bell lab has trained 11 PhD students and 11 postdocs, all of whom have remained in science and several of whom are now leading labs of their own at peer institutions. Undergraduates play a critical role in the lab and often earn research credit for their projects, and often complete honors theses that ultimately result in peer-reviewed publications. An ultra-low freezer is critical for the success of research in the lab, including research projects led by students.

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

Support from the SSC will be advertised in the Bell lab on the 4<sup>th</sup> floor of Morrill Hall. Support from the SSC will be acknowledged during scientific talks and posters that lab members present at venues/conferences all over the world. Presentations and publications by members of the Bell lab will include the SSC name and/or

logo in the acknowledgements section. The SSC name and logo will be featured prominently directly on the ultra-low freezer. Information about this project will be reported to the Department of Evolution, Ecology and Behavior and the School of Integrative Biology.

## 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.*

Additional funding for the project will not be needed. The goal is to replace the current freezer with a more energy efficient option that will reduce cost of utilities for our building. The utility costs for Morrill Hall are paid by the College of LAS.

### **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.*

ICR funds will be used to contribute to the cost of the ultra-low freezer; see Letter of Support from Andy Suarez (Department Head). The total cost of the freezer is \$13,200. We are asking for \$10,000 from SSC; the difference will be paid with departmental (ICR) funds.

## 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?**

The latest sustainable -80 ultra-low freezers offer considerable improvements in energy efficiency compared to their predecessors. For example, the model we propose to purchase (Thermo Scientific TSX Series Ultra-Low freezer TSX50086) offers the following advantages:

- Reduced energy usage up to 70% compared to our older ultra-low freezer
- Uses less than 8 kWh/day
- Produces less environmental heat emissions and lowers HVAC costs
- SNAP compliant, natural hydrocarbon refrigerants
- SNAP compliant, environmentally- friendly, water-blown foam insulation

The unit is EPA ENERGY STAR® certified. While conventional refrigerant, ultra-low freezers can run at very high kWh/day in energy usage, the TSX Series by comparison has been designed to reduce energy usage without compromising performance.

Another important feature of the new model is the SNAP Compliant Hydrocarbon Coolant, which is much safer for the environment. The viscosity of hydrocarbon refrigerant is much less so doesn't take as much force to drive through compressor or refrigerant lines resulting in (1) Lower Operating Temperature; (2) Lower Operating Pressures; (3) Less Friction. The overall effect is a lower heat and noise producing ultralow freezer.

This project will therefore contribute to meeting energy goals as part of the Illinois Climate Action Plan, specifically by building energy conservation. A brochure about the ultra-low freezer is included in this application.

**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 expect that the primary impact of this project will be to conserve energy over both short- and long-term scales. Below is a comparison of our 15 year old ultra-cold freezer (ULT2586A) to the ultra-cold freezer we propose to purchase (TSX50086). Our current freezer uses 9819 kWh/year, while the new freezer will consume 3176 kWh/year, with associated energy cost savings of over \$1000 per year.

What products currently you are using? Enter below details										
Add row		Delete active row								
Size*	Age*	Enter quantity*	Annual maintenance cost per unit* \$	Volume (cu.ft)	Published energy (kWh/day)	Energy per year all units (kWh/year)	Electricity cost per year \$	HVAC electricity cost per year \$	CO2 impact per year (kg)	Total maintenance cost per year \$
Medium(19.0 To 27.0 cu.ft)	>5Years	1	\$0	24.1	26.9	9,819	\$1,178	\$335	4,450	\$0
<b>Total Sum</b>		<b>1</b>	<b>\$0</b>	<b>24.1</b>	<b>26.9</b>	<b>9,819</b>	<b>\$1,178</b>	<b>\$335</b>	<b>4,450</b>	<b>\$0</b>

TSX/Advanced/STP: Energy Efficient Ultra-Low Temperature Freezers										
Add row		Delete active row								
Size*	Age	Enter quantity*	Annual maintenance cost per unit* \$	Volume (cu.ft)	Published energy (kWh/day)	Energy per year all units (kWh/year)	Electricity cost per year \$	HVAC electricity cost per year \$	CO2 impact per year (kg)	Total maintenance cost per year \$
TSX50086A, 500 Boxes	New	1	\$0	24.1	8.7	3176	\$381	\$108	1439	\$0
TSX50086D, 500 Boxes	New	1	\$0	24.1	8.3	3030	\$364	\$103	1373	\$0
TSX60086A, 600 Boxes	New	1	\$0	28.8	9.4	3431	\$412	\$117	1555	\$0
TSX60086D, 600 Boxes	New	1	\$0	28.8	8.7	3176	\$381	\$108	1439	\$0
TSX70086A, 700 Boxes	New	1	\$0	33.5	10.4	3796	\$456	\$130	1720	\$0
TSX70086D, 700 Boxes	New	1	\$0	33.5	9.5	3468	\$416	\$118	1572	\$0
<b>Total Sum</b>		<b>6</b>	<b>\$0</b>	<b>172.8</b>	<b>55.0</b>	<b>20,075</b>	<b>\$2,409</b>	<b>\$685</b>	<b>9,098</b>	<b>\$0</b>

<b>Current</b>	Current Model #	ULT2586-9-A (48.1"W)
	Serial #	X18R-234893-XR
	Capacity	400 - 2" Boxes (24.4 cf)
	Year manufactured	2007 - 15+ years old
	Electricity cost per year + HVAC electricity cost per year	\$1,513.00
	<b>Energy per Year (kWh/year)</b>	<b>9819</b>
<b>Proposed</b>	Proposed Model #	TSX50086A - (38.2"W)
	Energy Savings/year = C5 minus electricity cost per year of new model minus HVAC electricity per of proposed model	\$1,024.00
	<b>Energy per Year (kWh/year)</b>	<b>3176</b>
	Capacity	500 - 2" boxes
	Energy Savings/year calculation	Greater than 5 years old - energy savings = (Current Units Electricity + HVAC electricity) - (energy efficient replacement unit electricity cost + HVAC electricity cost) North America Europe ULT Energy Calculator (EXTERNAL USE)_rev11.xlsm (Electric Rate \$0.12/kWh)
		Product Comparison Generator 1.2.7.xlsm (Electric Rate \$0.12/kWh)

The old freezer will be removed by F&S Refrigeration, who will take it to the reclamation site where all of the refrigerants that are in the unit will be reclaimed. The oil that is inside the compressors will be removed. The unit will then be sent out for scrapping and metal recycling.

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

Our goal is to help reach the benchmarks set by the Illinois Climate Action Plan. This project will contribute to ongoing sustainability work on energy conservation in our lab and the entire Morrill Hall building. A project to install sustainable (variable -air-volume VAV) fume hoods as well as an HVAC upgrade is already ongoing in Morrill Hall.

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

The Bell lab is committed to broadening participation in science and has trained over 100 undergrads, many of whom are from underrepresented groups and/or first-generation college students. Our work on how genes influence behavior has important societal implications and our lab is committed to education and research to promote socially-informed understanding and awareness of how mistaken ideas about how genes influence behavior are used to fuel inequalities.