**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 funding application should include this application and any letters of support.**

*Please submit this completed application and any relevant supporting documentation by the deadline listed on the SSC website 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:** Myco-Cycling Spent Coffee Grounds into Food for Fungi

**Total Amount Requested from SSC:** $6552

**Project Topic Areas:** [ ]  Land & Water [ ]  Education [ ]  Energy

[ ]  Transportation [x]  Food & Waste

**Applicant Name:** Jasper Nord

**Campus Affiliation (Unit/Department or RSO/Organization):** School of Fine and Applied Arts

**Email Address:** jenord2@illinois.edu

**Check one:**

 [x]  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** |
| Jasper Nord | School of Fine and Applied Arts | Jenord2@illinois.edu |
| Max Keenan | School of Mechanical Science and Engineering, Grainger College | Keenan4@illinois.edu |
| Name | Department/Organization | Email Address |
| Name | Department/Organization | Email Address |

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

Name of Faculty or Staff Project Advisor: Dr. Andrew Miller
Advisor’s Email Address: amiller7@illinois.edu

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

Contact Name: Dr. Andrew Miller

Unit/Department: INHS

Email Address: amiller7@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:**

*We want to know: What is your project? What does it concretely produce, accomplish, or solve? Why is this project needed on campus?*

This project aims to investigate the possible use of Spent Coffee Grounds, a common urban waste by-product, as substrate in the production of novel mycelium based composite materials. In recent years, the advent of new ecologically friendly materials produced using fungi's natural growth systems have been shown to be incredibly promising. From Leather alternatives (MycoLeather) to Biodegradable burial systems (MagicalMushroom Company's edenn), mycelial materials are environmentally friendly and open the doors to revolutionize industries that have historically been incrediby harmful to the ecosystem such as leather. The goals of this are two-fold: 1) divert Spent Coffee Grounds from entering the waste pipeline and 2) to investigate a possible framework for environmentally friendly materials production in dense urban areas where fresh food may be hard to access. Through preliminary testing, we’ve found coffee grounds alone to be a viable substrate for Lions Mane (Hericium erinaceus) and Reishi (Ganoderma lucidum) species that are of high interest and value in consumer markets today as supplements and food products, and have been identified as viable species for bio-material fabrication. The produced mycelium and possible mushrooms produced will be analyzed for any contaminants, and if possible, may provide a new avenue for production of edible mushrooms from waste. If the mushrooms produced are deemed inedible, the project will still have produced usable mycelium materials and excess can be used as highly-valued mushroom compost.

What would this look like? Since coffee grounds are ideal breeding grounds for fungi, they are also extremely well-suited to growing mold. Because of this, they are known to mold quickly in open air, despite being sterilized in the brewing process. This presents a health hazard for businesses, complicating the issue of coffee ground collections. To combat this, we will provide businesses interested in a partnership with autoclavable biohazard collection bins which will be retrieved and emptied daily as they become full or before the end of the business day. To make these bins attractive to businesses, and prevent the impression of dangerous materials being collected, sleeves will be made out of unwanted clothing collected through clothing swaps and clothing drives, with denim material placed at a high priority for its durability and possible recyclable qualities. These cover bags will be made to fit snugly over the autoclavable bins and screenprinted with a specially designed logo meant to evoke the symbology of recycling and waste disposal bins, as well as instructions for use and contact information for when the bin is full. If funded, this will also include an SSC logo and mention of funding for public facing awareness. These coffee grounds collected at business sites will be transported to a 3rd site where they will be dried and processed. To ensure the cleanliness of this process, grounds will be dried out in a clean “room” constructed with plastic sheeting over a metal tubing frame, at one end will be a laminar flow hood outfitted with HEPA filter blowing an even flow of sterile air over the coffee grounds while the chamber is kept sterile through positive pressure. Following drying, these grounds will be stored in 5 gallon food safe bins until they can be rehydrated to 65% water by weight, mixed with different ratios of sawdust and/or cardboard amendments, sterilized, and inoculated with identified mushroom species. Meanwhile, collected coffee grounds will already be used to produce “coffee agar” plates to test viability of various mushroom species, including locally adapted varieties of Artists Conk (Ganoderma applanatum) and Hericium coralloides. Some grounds will also be used on their own in petri plates to test aptitude to coffee grounds as raw material and mycelial mat testing. The culmination of this will be a research paper on the efficacy of using spent coffee grounds as a substrate for mushrooms and the viability of the mycelial network produced as an opportunity for food production after sufficient edibility testing or bio-based material development through glycerol and propylene glycol processing. After the writing of the research paper though, we plan to continue fostering relationships with local businesses by providing them access to fresh gourmet mushrooms at a low cost, and using collected grounds as aid for teaching mushroom inoculation techniques to the interested public and showing the public how they can use the domestic waste they produce everyday to produce mushrooms for themselves, as well as producing mushroom fruiting blocks for consumers or researchers alike.

**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. SSC cannot fund projects without prior location approval.*

**Robert A. Evers Laboratory**

**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. Andrew N. Miller

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

*This includes both direct and indirect impact.*

**This project will involve students interested in learning more about mushroom cultivation and urban agriculture, as well as incorporating a public facing "myco-cycling" program that will serve to raise awareness of alternative methods of waste disposal.. These skills will be usable and transferable to everyday life as students will be able to carry these techniques into their day-to-day lives. Once the project reaches fruition as well, it could provide an economically efficient source of healthy food for students and people within the campus areas. The project will furnish willing businesses with specialized autoclavable biohazard containers to collect used coffee grounds with printed instructions for use. The bins will be autoclavable biohazard containers with a fabric covering to ensure sterility and longevity over the course of this research. These collection bags will be branded with a large logo reminiscent of recycling and waste symbology with a mycelial adaptation as well as an SSC logo for visibility. Ideally, this will spark curiosity among the public upon seeing these bags, and spark conversations between students and business owners addressing where the waste from our consumables ends up and how it can be used.**

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

**By the end of the year, I would like to have at least 5 businesses on board in a regular partnership with routine collection of waste materials. I would like to use these opportunities to foster conversations between students about how we can rethink waste as possibilities for growth. I would also like to foster community interactions between students via open workshops on how they can transform their waste into compost and/or food with little monetary investment. Ideally, this will inspire others to use their waste productively, and we plan on sharing some of the cultures developed through this project. Eventually, I would like to expand this recycling program to also include the recycling of paper/cardboard materials as well as even polyurethane plastic waste down the line, via the use of a novel species of polyurethane digesting fungi, Pestalopsis microspora. This project will also be entered into the Undergraduate research symposium for further visibility/discussion.**

**How will the project improve environmental sustainability at the Urbana-Champaign campus?**

By using waste products to grow and produce viable bio-based composite materials and possible food. This will also hopefully incentivize other groups and businesses to follow in the footsteps of partnered businesses in establishing their own partnerships/waste minimization programs. Additionally, although coffee grounds are a readily biodegradable waste product, they will still produce the incredibly harmful greenhouse gas if these materials end up in landfills where they degrade anaerobically. This research also poses the possibility of developing a bio-based material that can be produced from waste and returned to soil environments safely at the end of their life-cycle.

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

**By outlining an efficient and replicable method of using prevalent urban waste materials in the form of used coffee grounds, this reaseach would open the door for programs that could teach underserved urban populations and those living in food deserts methods of producing highly nutritious foods from waste they already produce regularly with minimal investment. Along with this would come ideas on how citizens can begin remediating their own environment with minimal effort, as a lot of people in unjust situations are already stretched very thin. By spreading the spores of fungi, we can effectively transform our waste back into it's essential raw components, closing the loop in our linear cycle of waste.**

**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.*

 -This timeline is not fully illustrative of the full process, as many stages may happen co-currently and many of the stages are already underway, such as production of fabric coverings

 -spawn will be

Now-Mar 15:( 5wks) Contact businesses and collect and dry coffee grounds, begin plate testing and grain spawn/liquid culture production, collect hardwood sawdust

 -largest time constraint is time for colonization of substrate, which takes around 4-5 weeks. In the meantime, collection and processing will continue

 March 1st: Host Clothing Swap

 March 8th: Sewing workshop for covering production

Mar 15-April30 (5Wks): Continue coffee ground collection, begin fruiting block production

May-June/July: Write and edit research paper on results, production continues, collections are refined and partnerships are improved

July 15: Submission of final report

**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.*

*Organic cotton thread: $11 2.00 $22*

*Seam Ripper $6 1.00 $6*

*Autoclavable Petri Dish $84.34/10ct 4.00 $337.36*

*p100 Half Mask Respirator $29.99 2.00 $60*

*Agar Agar $30.99 2.00 $62*

*Light Malt Extract $12.03 2 $24.06*

*Yeast $14.49 2 $30*

*Lion’s Mane/ Ganoderma Cultures (~$60) $60*

*Rye Grain $50 2 $100*

*12 ct 1 Qt wide Mouth Mason Jars $25 4 $100*

*Gypsum $10 2 $20*

*Wide-Mouth Injectable Airport Lids $32.99 2 $66*

*Parafilm $60 1 $60*

*Sterilization Indicator Strips $6 5 $30*

*Peptone $50 1 $50*

*1000ml Erlenmeyer Flask $50 1 $50*

*Electric tool Sterilizer $350 1 $350*

*Replacement pressure gauge $20 1 $20*

*Autoclavable Biohazard Disposal Cans $66.45/ea 10 $664.50*

*Fruiting Blocks*

*Filter Patch Polypropylene Bags $454 for 1000 3t bags 1 $454*

*Hardwood Sawdust Ideally Sourced on Campus*

*Fruiting Chamber $299 2 $598*

*Coffee Drying Set Up:*

*2”x4”x16’ wood $3.62 4 $14.48*

*Wire Screen $13.88 1 $13.88*

*Plastic sheeting $62.95 1 $62.95*

*Laminar Flow Cabinet $1,050 1 $1,050*

*Other Supplies:*

*Bike Cart 250 1 $250*

*5 gal Food Grade Buckets x 10 $8 10 $80*

*5 Gal Screw top Lids x 10 $9 10 $90*

*Lab Equipment Needed:*

*Scalpel $22 1 $22*

*Replacement Blades $20 2 $40*

*Magnetic stirrer $106 1 $106*

*Magnetic Stir Bars $9.70 10 $97.00*

*Glycerol $14.65/500ml 10 $146.50*

*Propylene glycol $20.70 1 $21*

*Research Assistant hours 10hrs/wk @$12/hr x 8 weeks $960*

*Graphic Design work $150 1 $150*

*Nitrile Gloves (L) $11.39/100ct 3 $34.17*

*Repairs for Bike/Cart $150*

*Extra Shipping Costs $100 $100*

*TOTAL $6,552*

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

*SSC provides funding on a case by case basis and should not be considered as an ongoing source of funding*

*Ideally this project will be self-funding after initial investment. As most of the success of this project involves waste donation and value addition, most costs after startup should be negligible. Additionally, this project boasts the benefit of producing direct value once the material made from the mycelial decomposition of waste is made usable. This material could be used to make degradeable planting pots, furniture items, and even possibly textiles, with different treatments used to impart necessary properties such as water repulsion, flexibility, and lifecyce prolongment. These will all be sellable products, with an additional appeal of being created while reducing waste. These products would not be sold for personal profit, as this company would operate as an employee owned non-profit service.*

**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. So far all of my work has been entirely self-funded with exceptions to materials graciously provided by Dr. A. Miller and doctoral candidate Jason Karakehian in the Robert A. Evers lab.

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

No

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

I run an instagram account where I document my efforts to explore possibe avenues for repurposing everyday waste using fungi called @contact.myc. I am also working on creating an organization, the SporeHouse to support and maintain this initiative, with a focus on community engagement and education on waste reuse and the value of growing one's own mushrooms.