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SPF Application Form

Section A - Cover Page

Fill out this Cover Page and save it to your files for future reference before uploading it on the SPF website.

Project Title Autonomous Controlled-Environment Growth Chamber Display

In one to three sentence(s), explain what your project is about:

This project aims to create an autonomous controlled-environment food production system that will be displayed at the Macdonald Farm Community Engagement Centre. Featuring innovative technologies, it will provide educational benefit to the community with regards to controlled-environment agriculture and sustainable food production.

Indicate the McGill campus(es) where your project will be implemented:

◉ **Macdonald** ○ **Downtown** ○ **Gault Reserve** ○ **Bellairs Research Institute** ○ **Other (Specify):**

Approximate Budget Requested to the SPF ($):	33,826	**Approximate Total Project Budget** *(incl. other sources of funding if applicable)* ($):	33,826

List 1 to 3 main item(s)/expense(s) for your project that SPF money will be used for *(incl. approx.% of total budget)*: Sensors, Material & Fabrication Costs, Salaries for Students

Indicate which of the following team members...

... will be in charge of monitoring the project's budget *(maximum 1 person)*: Rachael Warner

... will be the Project Lead *(Project Lead will be the contact person for the SPF Staff)*: Pierce Dias Carlson

The Project Lead stays for the entire duration of the project: ☒ **Y** ☐ **N**

If no, explain in a few sentences your leadership transition plan for one or both of the Project Lead for sustainable continuation of the project:

PROJECT TEAM MEMBERS *(read details about SPF Evaluation Criteria #5 for more information)*

The SPF encourages your team to be inclusive of individuals who voluntarily self-identify as members of marginalized communities (e.g. women, Indigenous people, people of colour, LGBTTQI, student parents, members of ethnic minorities, immigrants, people with disabilities).

1. Project Team Member

First Name & Last Name	Pierce Dias Carlson	**Affiliation** *(select one)*	Undergraduate (UG)
Phone *(daytime; only put #)*	+1 (514) 267-2692	**Specify if Other**	
Email	pierce.diascarlson@mail.mcgill.ca	**Faculty/Unit/Organization**	FAES

2. Additional Project Team Member

First Name & Last Name	Rachael Warner	**Affiliation** *(select one)*	Undergraduate (UG)
Phone *(daytime; only put #s)*	+1 (514) 792-5940	**Specify if Other**	
Email	rachael.warner@mail.mcgill.ca	**Faculty/Unit/Organization**	FAES

3. Additional Project Team Member

First Name & Last Name	Mark Cool	**Affiliation** *(select one)*	Undergraduate (UG)
Phone *(daytime; only put #s)*		**Specify if Other**	
Email	mark.cool@mail.mcgill.ca	**Faculty/Unit/Organization**	FAES

4. Additional Project Team Member

First Name & Last Name	Mark Lefsrud	**Affiliation** *(select one)*	Academic Staff (AC)
Phone *(daytime; only put #s)*		**Specify if Other**	
Email	mark.lefsrud@mcgill.ca	**Faculty/Unit/Organization**	FAES

More mandatory information to be provided on next page.

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SPF Application Form
Section A - Cover Page

PROJECT TEAM MEMBERS (CONT'D)

5. Additional Project Team Member

First Name & Last Name Viacheslav Adamchuk | **Affiliation** *(select one)* Academic Staff (AC)
Phone *(daytime; only put #s)* | **Specify if Other**
Email viacheslav.adamchuk@mcgill.ca | **Faculty/Unit/Organization** FAES

6. Additional Project Team Member

First Name & Last Name Paul Meldrum | **Affiliation** *(select one)* Other (specify)
Phone *(daytime; only put #s)* | **Specify if Other** Farm Manager
Email paul.meldrum@mcgill.ca | **Faculty/Unit/Organization** FAES

7. Additional Project Team Member

First Name & Last Name | **Affiliation** *(select one)*
Phone *(daytime; only put #s)* | **Specify if Other**
Email | **Faculty/Unit/Organization**

8. Additional Project Team Member

First Name & Last Name | **Affiliation** *(select one)*
Phone *(daytime; only put #s)* | **Specify if Other**
Email | **Faculty/Unit/Organization**

To list more members, fill a 2nd Cover Page form and save it separately. You may then e-mail it to SPF Staff directly, also specifying your project title.

OPTIONAL:

If applicable, total number of team members voluntarily self-identifying as members of marginalized communities:

Represented marginalized communities:

Specify if Other(s) and/or add more:

Relevant link(s): *(to website(s) or social media)*

How did you learn about the SPF? *(select one)* MOOS/SPF website **Specify if Other**

Have you already been part of an SPF project in the past? ☒ **Y** ☐ **N** **If yes, specify project(s):** NVAC Barbados Greenhouse

Please check the boxes to confirm that you have read and agree to the following information:

☒ All of our project team members understand that the SPF is publicly funded and therefore, by default SPF projects are not confidential. We agree that if needed, the SPF Steward, the SPF Administrator and/or the SPF Working Group members read and/or share the application and/or communicate part of its content in the case where they would need to (e.g. to receive professional advice, connect our team to stakeholders, etc.).

☒ If our project is approved, all our project team members agree that their name, email, and phone number as well as their participation to the project be disclosed (e.g. for contact information or through our application and progress/final reports published on the SPF website).
If you do not check this box, the SPF staff will communicate with you to know whose information to remove before sharing your project online.

☒ All our project team members have read and understood the SPF Terms & Conditions, and we confirm that we agree to respect them.
If any aspect of the SPF Terms & Conditions are unclear to you, contact the SPF Staff before you submit your application so that you can check this box in confidence. Also note that, if your project is approved, the Project Lead and the person monitoring the project's budget will have to confirm in writing (through email or signing the document) that they agree to the SPF Terms & Conditions before officially starting the project.

Thank you! Save this form to your files for future reference and then fill Section B - 'Project Overview' of the SPF Application Form to complete the first stage of the SPF application process.

Date 9/7/17

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SPF Application Form

Section B - Project Overview

Answer the following questions and save this form to your files for future reference before uploading it on the SPF website with Section A - Cover Page.

Project Title Autonomous Controlled-Environment Growth Chamber Display

Project Lead First & Last Name Pierce Dias Carlson **Phone** *(daytime)* +1 (514) 267-2692 **Email** pierce.diascarlson@mail.mcgill.ca

*Before you fill out this Project Overview, make sure you have consulted all related application documents online, including the SPF Evaluation Criteria, the SPF Glossary, the SPF Project Flow Diagram, and the SPF Sustainability Brief. Read all questions first before starting answering them. Answer **exactly** what is being asked: go straight to the point and stay clear and succint. If need be, you will have a chance to include additional information in appendices at a later stage of the application process. The characters' limit (including spaces) is indicated for each question so that you can draft your answers in Word first if you want to (you will have to remove all formatting in Word before pasting here). Note that any skipped line will make you loose the line's characters (approx. 140 characters). Once you successfully pass this first stage of the application process, the SPF Staff will ask you to fill a Project Plan, in which you will specify your expected impacts, S.M.A.R.T. objectives and main activities, outputs, success indicators, stakeholders, main risks and mitigation measures, preliminary timeline, and costs. Although it is OK for you not to have all these details ready at this stage, having thought about them in advance will help you succeed in responding to the following questions.*

Project Vision A display of the technologies of autonomous controlled-environment growth for the Macdonald Farm CEC

A vision depicts the ideal future that someone is hoping for. Thus, a vision is a dreamed aspiration that someone intends to lead or contribute to, and it does not necessarily need to currently seem realistic. As such, tell us how you see McGill campuses in an ideal world once your project is completed successfully. The vision does not need to be completed within the timeline of the SPF funding.

Project Goal Create an autonomous controlled-environment food production system that will be displayed at the Macdonald Farm Community Engagement Centre.

A goal is the overarching desired tangible realization (and thus change) to be achieved within the project's lifespan. The goal contributes to the project's vision in a palpable and realistic manner. The project's goal may last longer than the SPF funding lifespan. In line with the SPF mandate, when achieved, your project's goal should result in a culture shift (e.g. change in ideas, habits, behavior).

1. What is the specific sustainability-related issue/challenge that you see on McGill campus(es) that you want to address? *(530 char. max. ~80 words)*

The Montreal climate prevents the production of fresh produce in winter months. Controlled-environment agriculture provides a method of sustainable vegetable production in winter months. Most vegetables in winter months are produced or transported in unsustainable ways. We want to educate the community about more sustainable agricultural technologies while showcasing the McGill research into these technologies.

2. What is your project idea and how will it help address the above issue/challenge? *(2000 char. max. ~300 words)*

This project encompasses the design and construction of a fully autonomous vegetable production system. An enclosed system, the display will contain a variety of cutting-edge agricultural technologies, allowing for the irrigation, lighting, and HVAC systems to operate independent of human interaction. The display will be as transparent as possible, to showcase the different stages of plant growth, and how the technology allows it to occur. Mature plants will be available for pickup from the machine on a regular basis, providing a steady supply of fresh produce to be used by clubs on campus, or by the McGill Farm Community Outreach Center for visitors. Our hope is that the system will educate visitors on the current advancements in urban agriculture technology and provide a moderate supply of fresh produce as an interactive feature. This technology can eventually be scaled up, for mass production, or brought into the home, to allow for fresh local produce production year round.

3. What impacts do you want your project to have on McGill structures, processes and/or systems? Also specify how this should positively transform peoples' behaviors/perspectives/habits on McGill campus(es). *(935 char. max. ~135 words)*

Currently, McGill's Macdonald campus lacks a showcase of the research being done on campus. Academic posters are the only display of the wonderful progress being done on sustainable development. The Macdonald Campus Community Engagement Centre will be an outstanding resource for the education of society about more conventional agricultural practices, but would not be complete without our system, showcasing the agriculture of the future. This will provide the McGill community with an window into our research of sustainable agricultural technologies and hopefully encourage the creation of more student-run sustainability initiatives.

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SPF Application Form

Section B - Project Overview

4. What institutional and financial arrangements will make these impacts continue after SPF funding? *(530 char.max.~80 words)*

As the system is autonomous, and thus does not need intensive management once it is installed. The Macdonald Farm Community Engagement Centre Employees will only need to collect the vegetables the system produces, and occasionally refill the unit with seed and fertilizer.

- ABOUT SUSTAINABILITY -

5. How do you intend to address social, environmental, and/or economic dimensions of sustainability in your project's objectives? *(1350 char. max. ~200 words)*

All three pillars of sustainability are tightly interwound with this project. We intend to carry out the development of our system under the FIDIC project sustainability management principles, to ensure we incorporate sustainable measures in each aspect of our project. Social aspects are addressed through installation in the Macdonald Farm Community Engagement Centre. The system will be professionally designed, with aesthetic material choices, and eye-catching electronics, to draw visitors in. This will encourage the success of the system in educating visitors of the centre and staying relevant for many years to come. The system will be designed with the intention to be as environmentally friendly as possible, with focus on using minimal water and fertilizers to nourish crops. All the features of the system highlight the progress that has been done in sustainable controlled-environment agriculture, from the irrigation to the material choices. From an economic standpoint, the project will be executed by a team of students to eliminate corporate costs, and keep the project McGill focused. Eventually, it will be producing crops and thus will be providing a commodity that can be used within McGill's community.

6. In addition to having sustainability-related objectives (Q5), how will you ensure that your project is also executed/ managed sustainably (e.g. material local sourcing; accessibility - see the SPF Sustainability Brief)? *(530 char.max. ~80 words)*

When sourcing material for the project, we will aim to recycle as much as possible, and consider the life cycle of any products which are being bought new. The FIDIC project sustainability management system acts as a checklist to ensure we are considering a wide variety of sustainability indicators from within all three pillar of sustainability (environmental, economic and social).

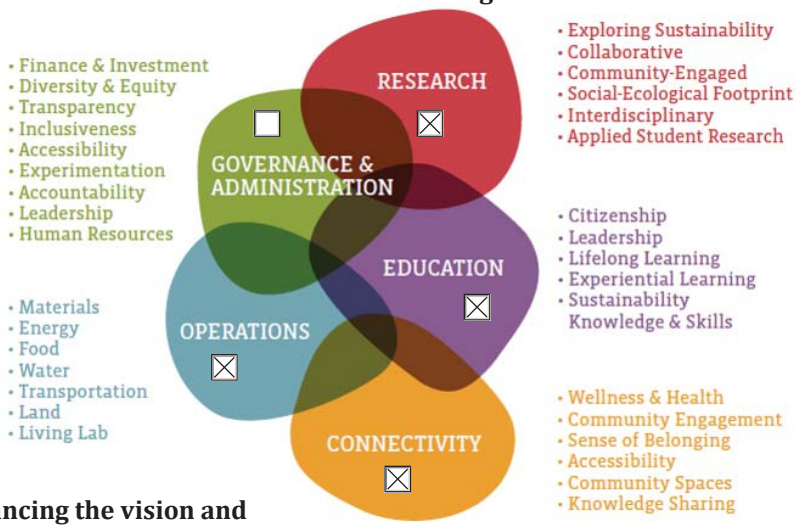
Beside appear the five categories in which the McGill students, faculty, and staff think the University can make a positive difference within society. The McGill Sustainability Strategy, Vision 2020, describes a specific vision and goals for each of these categories, as they were defined by the McGill direct stakeholders through a comprehensive consultation process.

7a. In the figure, check all the categories under which your project falls *(you can select only one if no others apply to your project).*

7b. Among the categories that you checked, select the one that you think is most relevant to your project:

Dominant Category: Education

Vision 2020 Categories



7c. How does your project concretely contribute to advancing the vision and goals described under the Vision 2020 category that is most relevant to your project? *(800 char. max. ~115 words)*

This project is looking to establish a new crop production system that when completed, will incorporate community engagement on Mac campus. This project continues education for McGill students by bringing the collective research of McGill students into a singular project, and then projecting this collective research to the greater Montreal community through an educational display. The project will serve as a source for education to all those involved in the production, and eventually the larger McGill and Montreal community visiting the the outreach center.

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SPF Application Form

Section B - Project Overview

8. How does your project relate to any current/past initiative(s) on McGill campus(es) (e.g. other SPF projects)? If applicable, also indicate: 1) how your project complements the initiative(s), and 2) how you will partner with them in implementing your project (e.g. working together on some activities, sharing material/resources/costs). *(2000 char. max. ~300 words)*

Our project will be placed in the Macdonald farm Community Engagement Centre, which is an initiative being put forth on Macdonald campus, to engage youth, and the community at large, on processes taken in their food production. This CEC (Community Engagement Center) will feature interactive works showcasing the broad field of agriculture, showcasing the past, present, and future of agriculture. Working closely with the farm manager, Paul Meldrum, will ensure our visions stay aligned as the project moves forward. The community engagement center will host workshops to educate the population on today's food system, and how to move towards a more sustainable system. In conjunction with the engagement center, we can show the population the future of agricultural technologies. The two professors associated with this project, Mark Lefsrud and Viacheslav Adamchuk, will work closely alongside us. With Professor Lefsrud's expertise in greenhouse design, lighting and botany, we aim to produce a growth system with minimal input and maximum crop yield. Experience from participating in the designing and building of the NVAC greenhouse hydroponic system allows us to have a familiarity with the products and design, and gives great confidence in designing and implementing the growth system. Professor Adamchuk's expert background in electronic instrumentation and control will allow us to see the realization of this system, incorporating fully automatic control and maintenance, allowing it to function long after the core team has graduated from McGill.

9. List the other stakeholders on/off of McGill campus(es) that you will partner with for your project. *(530 char. max. ~80 words)*

Note: *Under Stage 2 of the SPF application process, in the Project Plan, you will be asked to indicate your final key partners and specify how they will participate in your project. You will also be able to submit any documents that you want in appendices to demonstrate your communications and agreements with these key partners (e.g. support letters, emails).*

MacDonald Farm Community Engagement Centre
*Possible Sponsorships from Technology Companies

10. What key recommendations and/or lessons learned from current or past initiative(s) do you plan to build your project upon? *(800 char. max. ~115 words)*

Ensuring that the project is able to easily be passed on to another caretaker with minimal labour requirements, so that once completed, the project does not fizzle out and stays relevant for year to come. This must be considered when designing the system so that it is straightforward and easy to use.

- ABOUT SPF FUNDING -

11. Why do you think that your project should be funded by the SPF rather than by, or in addition to, another source of funding - i.e. what aspects of your project make it specifically relevant to the SPF mandate? *(530 char. max. ~80 words)*

This project has aspects within almost all categories of McGill's Vision 2020 sustainability goals. It brings together McGill and local communities with the common goal of education with regards to sustainable agriculture, while being an exciting and innovate project to bring to McGill. As the global climate changes, sustainable agriculture will become of increasing importance, and this project helps carry the McGill 2020 vision of sustainability, enforcing McGill's commitment to education and sustainability.

12. What other sources of funding have you approached for your project? If applicable, also provide the relevant details on these sources (e.g. responses given, amounts already committed, what these amounts will pay). *(530 char. max. ~80 words)*

At the present time, the SPF is the only funding source we have approached. We will be approaching companies that produce components useful to us for sponsorships in exchange for those components.

Thank you! After you save it to your files, you can now upload this form and Section A - Cover Page on the SPF website to complete this first stage of the application process. The SPF staff will contact your team within two weeks to provide feedback and accompany you towards next stage - Project Plan. Congratulations for applying to the SPF!

Date 9/7/17

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SPF Application Form
Section C - Project Plan

Answer the following questions and save this form to your files for future reference before uploading it on the SPF website.

Project Title Autonomous Controlled-Environment Growth Chamber Display

Project Lead First & Last Name Pierce Dias Carlson **Phone** *(daytime)* +1 (514) 267-2692 **Email** pierce.diascarlson@mail.mcgill.ca

Before you fill out this Project Plan, make sure you have consulted all related application documents online, including the SPF Evaluation Criteria and the Project Plan Flowchart. Also make sure to consult the SPF Glossary, as it clearly defines each term underlined in this form, as well as the Sample Project Plan, which gives some concrete examples for each term. Last, also do not forget to refer back to your 'Section B - Project Overview' to make sure that all the details you specify here align with it. For more support, consult the SPF website and the SPF staff.

Project Vision A display of the technologies of autonomous controlled-environment growth for the Macdonald Farm CEC

As indicated in your Section B - Project Overview.

Project Goal Create an autonomous controlled-environment food production system that will be displayed at the Macdonald Farm Community Engagement Centre.

As indicated in your Section B - Project Overview.

1. List 1 to 3 main impacts you expect/wish to have with your project - these must relate to the above Vision and Goal:

As per question #3 of your Project Overview. If you think of more than 3 impacts, only indicate the ones you think are the most relevant to sustainability at McGill.

	Expected/Desired Impact *(200 char. max. ~30 words)*
A	Education of the greater Montreal community about McGill advancements in sustainable Agri.
B	Collaboration between Different McGill programs to showcase McGill work
C	Create an precedent for student projects similar to this one at the Macdonald Campus

2. List 4 to 7 of your objectives to reach the above impacts with your project. Make your objectives as S.M.A.R.T. as possible. For each objective, indicate one key Success Indicator. *(see SPF Glossary, Sample Project Plan, and Sample Indicators)*

Of your 4-7 objectives, you should have a minimum of one "monitoring" objective, one "outreach" objective, and two "other" objectives. A monitoring objective ensures or verifies the progress and effectiveness of your project, thus allowing you to learn from it. An outreach objective ensures that your project is adequately communicated to the McGill community to increase stakeholders' awareness of and/or participation in your initiative. These two types of objectives might lead to project monitoring and outreach activities (next question). The nature of the 2-5 other objectives is for you to decide and tailor to your project. If you have more than 7 objectives, only indicate the ones that relate best to the above impacts and thus to sustainability at McGill. For each objective, specify the key success indicator(s) that you think should be used to assess the objective's degree of achievement/completion. Your indicators can be qualitative or quantitative (e.g. number of participants, participant testimonials, website analytics, quantity of energy saved, etc.). See the document Sample Indicators for inspiration.

#	Type of Objective	S.M.A.R.T. Objectives *(125 char. max. ~20 words)*	Related Impact(s) (A, B, C)	Related Key Success Indicator(s) - also indicate targeted numbers for each *(85 char. max. ~15 words) (ignore the circles for now)*	
1	Other	Design an Autonomous Controlled-Environment Growth Chamber display for the Community Engagement Center.	C, B	Establish design, build and test by growing crop	○
2	Monitoring	Outline a system to ensure proper maintanence of the living wall once installed.	B	Meet with community engagement center manager, outline necessary funds	◉
3	Outreach	Design a placard to be placed with the living wall, which will help educate the public during their visits to the center.	A	Survey visitors to the center after they observe the display	○
4	Outreach	Engage with many stakeholders throughout the project, and ensure all visions remain aligned as possible.	B, C	Schedule 3 group charettes to touch base throughout the desgn and build process	◉
5	Other	Harvest crops from the living wall and distribute within the engagement center and McGill community.	A, B	Communicate with at least two student groups on campus using food (OGP?)	◉
6	Outreach	Facilitate engagement between the agriculture and the wider McGill community.	B	Submit 2 articles to the McGill tribune. Table to offer crops to students to sample.	○
7	Other	Ensure the living wall minimizes inputs, during inception and operation.	A, C	Produce a mass balance of growth system.	○

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3. List the 4 to 7 most important activities that you need to conduct to reach the objectives you listed before. Make these as S.M.A.R.T. as possible. Also indicate at least one output and a key success indicator per activity. *(Sample Project Plan)*

Your main activities should relate to the objectives you listed. As such, if you consider this crucial to your project, you may end up having an activity that relates to your monitoring objective(s) (e.g. developing a survey, any other activity that will help you and other stakeholders learn through your project) or to your outreach objective(s) (e.g. producing and promoting a video about the project). For each activity, indicate the output(s) that will be created as a result, such as a deliverable (e.g. video, report), training, website, network, design plan, or any other output adding value to the project and helping reach objectives/impacts.

S.M.A.R.T. Main Activities *(125 char. max. ~20 words)*	**Related Objective #(s)**	**Resulting Output(s)**	**Related Key Success Indicator(s) - also indicate targeted numbers for each** *(85 char. max. ~15 words) (ignore the circles for now)*	
September 2017 host a meeting with all main stakeholders involved in the project	1, 4	Minutes from the meeting	Representatives from engagement center and design team discuss goals and ideas	◉
Design each indivisual system (hydroponic, climate control, robotics, frame) and produce a detailed materials list	1	Detailed project design	4 detailed material lists and system design	○
Survey those visiting the engagement center on their knowledge before and gained from their visit	3	Feedback survey	Collect 25 surveys	◉
Write a operations & maintenance manual for the living wall	1,2,4	Users manual	Prepare one draft manual pre-installation and final version upon completion	○
Outline FIDIC project management goals and indicators for this project	7	Report of fidic framework	Outline 5 goals for each pillar of sustainability	○
Outline important stakeholders and their participatory practices in the project.	4	List of stakeholder	Define goals, level and methods of involvement of each stakeholder.	○
Test sample lettuce crops in a hydroponic system to evaluate feasibility	5	Report on yields	Compare % yield of various varieties of lettuces.	◉

Provide any additional qualitative details that you would like to share with the SPF about your activities.*(800 char.max.~115 w.)*

The agricultural machinery shop at Macdonald campus will act as the hub for the construction. Upon completion, if the CEC is not completed, we hope to install the growth chamber in the lobby of the Macdonald-Stewart building at Mac Campus.

4. Now, about the circles...: Select a total of 3 success indicators that you wish to track more seriously and report on during your project out of all those you indicated for your objectives and activities. These 3 indicators should be the most relevant to your goal and to creating a culture of sustainability at McGill and they should be relatively easy to monitor.

When selecting your indicators, make sure that you will have/plan the time and resources you will need to allocate to monitor them throughout the course of your project. Before you start your project, the SPF may ask you to change a chosen indicator for another that seems more pertinent to the SPF or to the University sustainability reporting. Note that, in addition to these three indicators, you will be asked to track four other generic ones that will be specified in the Award Letter.

You will be required to indicate progress towards your final 7 indicators in your progress and final reports to the SPF. Because the SPF values the experiences and learning that occurs during your project (not only results), these reports will also gather related information through open-ended questions.

We have selected the 3 Success Indicators that we wish to monitor during the project: ☒

5. For all projects, there exist various risks, i.e. factors or preconditions whose probable presence or absence could negatively influence the successful achievement of the project's objectives. Please indicate 2 to 4 main risks for your project and the mitigation measures you intend to use/implement to reduce their likelihood. *(advise if you have more to list)*

It is particularly important that you list all risks to health and safety of the project's team members, direct and indirect stakeholders, and/or the environment.

Main Risks *(65 charac. max. ~9 words)*	**Preventative Measures** *(65 char. max. ~9 words)*
Slow Advancement in design & Fabrication	Weekly schedule and meetings to discuss progress and
Underestimation of costs	Ask for more funds than budgeted for
Core team overwhelmed with work	Incorporate more students into the project from Bioresource Dept.

If needed, list additional Main Risks in a separate appendix.

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6. List the 3 to 10 stakeholders/partners on/off McGill campus(es) that will be involved with and/or impacted by your project, and indicate their respective role in your project. *If your project team (as presented on Section A - Cover Page) does not include a student member or a faculty or administrative staff member, please make sure to have this group represented as part of your stakeholders/partners to better align with SPF Evaluation Criterion #5.*

Stakeholder's Name(s)	Affiliation	Role in the project	Confirmed support/ participation
Mark Lefsrud	Bioresource Eng. Professor	Project Manager	Yes
Paul Meldrum	Farm Manager	Assist in the project vision and placement	Yes
Nadia Wendowsky	Assoc. Director of Development	Community Engagement Centre planner	No
Valerie Orsat	Bioresource Department Head	Offer student resources to the project	Yes
Bioresource Students	McGill Students	Able to assist in the completion of the project	Yes
Vladislav Adamchuk	Bioresource Eng. Professor	Sensor expert and electronics consultant	Yes
MCSS (Macdonald Campus S. S.)	Student's Society	Showcase student project and progress	Yes

- PRELIMINARY TIMELINE ASSUMING THAT PROJECT STARTS IN 3 MONTHS -

Note: *If your project is approved, you will be asked by the SPF staff to fill out a more detailed timeline before any funding can be allocated.*

Key Tasks and/or sub-tasks	Related Output(s)	Responsible Team Member(s) and Time *(initials + if paid, estimated # of hours to do task)*	Start Date	End Date
Receive Funding	Build Plan	Core Team (1 week)	Aug 1, 2017	Jul 1, 2017
Complete Solidworks Render	Order Parts	Core Team (4 Months)	Aug 7, 2017	Nov 30, 2017
Begin Construction	Chassis Done	Core Team (4 Months) & other Students	Dec 4, 2017	Mar 30, 2018
Contract Coder from Computer Science	Electronics Ready	Computer Science Student (2 Months)	Feb 1, 2018	Mar 30, 2018
Install subcomponents	Ready for tests	Core Team (2 Months) & other Students	Mar 30, 2018	Jun 1, 2018
Test Growing cycles, fine tune sensors	Ready for	Core Team (2.5 Months) & other Students	May 1, 2018	Jul 14, 2018
Prepare Exhibit Documentation	Exterior Finished	Core Team (1 Week)	Jul 23, 2018	Jul 27, 2018
Prepare maintenance guide	Ensure Longevity	Core Team (2 Weeks)	Jul 14, 2018	Jul 25, 2018
Installation into Community Centre	Almost done	Core Team and Farm Manager (3 days)	Jul 28, 2018	Jul 31, 2018
Unveiling Ceremony	Project Success	All members (1 day)	Sep 4, 2018	Sep 4, 2018

Provide any additional details that you would like to share with the SPF about your timeline. *(530 charac. max. ~80 words)*

The project will advance quickly, but due to the relatively new nature of the combination of these technologies, parts of the project may take more or less time to complete. The time frame is still realistic, and coupled with help from fellow students in the Bioresource Dept. with the appropriate skills, the project should be ready for unveiling on June 1st. If the Community Engagement Centre is not yet open, it can be installed in other parts of the campus, such as the MCSS building or MS lobby, with support from the dean.

- ADDITIONAL INFORMATION -

Qualifications: If applicable, a List of Tasks for each position to be funded and the CVs of those to be employed in the project are attached: ☑

List of appendices, if any *(maximum 7 pages of appendices, excluding CVs, but including List(s) of Tasks for all positions to be funded)*:

If a McGill department/unit is to contribute financially to your project, make sure to include a support letter from its Financial/Budget Officer confirming contribution. Note that the SPF Working Group will evaluate your project based on your main application forms (i.e. Sections A, B, and C), not on appendices.

Appendix #	Title/Topic of Appendix	Total Qty of Pages
1	General Expenses	1
2	List of tasks for paid positions	1
3	Visual Aid	1
4	Farm Support Letter	1
5	CVs	4
6		
7		

- BUDGET -

When completing this form, please refer to the SPF Guide to Budgeting for additional information and explanations. If you would like to submit a more elaborated Financial Model/Business Case in addition to this SPF project budget (for instance, because of the nature of your project; e.g. you plan to generate some revenues through selling some items, revenues that will then allow your project to become financially self-viable), please develop it separately and join it as an appendix to this application. If you need guidance on how to elaborate a Financial Model/Business Case, see suggested resources on the SPF website.

REVENUES

Please indicate any funding you will receive or anticipate receiving to complete your project, including funds from McGill Departments and Units.

Reminder: For McGill department/unit's financial contributions, make sure to include a letter from its Financial/Budget Officer confirming contribution in appendix. Note that this contribution will also need to be confirmed at the end of the project.

	(A) **Funding Source(s)**	(B) **Amount** ($)	(C) **Status**
1.	Sustainability Projects Fund (SPF)	$33,826.00	Unconfirmed
2.			
3.			
4.			
	REVENUES GRAND TOTAL - add all (B)	**$33,826.00**	

EXPENSES

1. Salaries & Wages *(only if applicable)*

If applicable, indicate the job position(s) under your project and the associated costs. See the SPF Guide to Budgeting for further instructions.

(A) **Position Title**	(B) **~# of Hours per Week**	(C) **~# of Weeks**	(D) **Hourly Wage*** ($)	(E) **Subtotal** ($) (B x C x D)	(F) **20% Benefits**	(G) **Total Cost** ($) (E x F)	(H) **Funding Source(s)****
Solidworks Rendering and Design	20	15	$14.00	$4,200.00	1.2	$5,040.00	SPF
Main Body Fabrication	20	20	$14.00	$5,600.00	1.2	$6,720.00	SPF
Sensor+Pump setup and installatio	20	12	$14.00	$3,360.00	1.2	$4,032.00	SPF
Coding	10	8	$14.00	$1,120.00	1.2	$1,344.00	SPF
				Expenses Subtotal 1 - add all (G)		**$17,136.00**	

Do you already have a specific person in mind for filling the above position(s)? ☒ **Y** ☐ **N**

Do you have a personal and/or professional affiliation with the above position(s)? ☒ **Y** ☐ **N**

If you answered 'Y' to one or both of the above questions, please disclose:

Solidworks design and most of the setup will be done by the core team. Coding will be done in collaboration between the core team and several interested students from the McGill Computer Science program.

2. Other Expenses

Indicate all of the expenses associated with your project; think back to all of your project's activities and all of the items that you need to complete them. It may be beneficial to group by category (not required); if you do so, please use the following categories: Materials-Supplies, Equipment, Printing, Events, Transportation, One-time Profess. Fees, and Miscellaneous.

(A) **Item Description** (inputs)	(B) **# of Units**	(C) **Unit Cost** ($)	(D) **Total Cost** ($) (B x C)	(E) **Funding Sources****
Machined Frame	1	$4,000.00	$4,000.00	SPF
General Materials	1	$1,700.00	$1,700.00	SPF
Hydroponic plumbing	1	$700.00	$700.00	SPF
Water+Nutrient Pump	2	$200.00	$400.00	SPF
Solidworks License	2	$75.00	$150.00	SPF
Custom Plexiglass	1	$1,000.00	$1,000.00	SPF
HVAC Components	1	$1,000.00	$1,000.00	SPF
3D printing materials	1	$100.00	$100.00	SPF
Seeds	1	$50.00	$50.00	SPF
Nutrient Solutions	3	$30.00	$90.00	SPF
Expenses Subtotal 2 - add all (D)			**$9,190.00**	

(A) **Item Description** (inputs)	(B) **# of Units**	(C) **Unit Cost** ($)	(D) **Total Cost** ($) (B x C)	(E) **Funding Sources****
LEDs	15	$30.00	$450.00	SPF
Micro Computer	1	$700.00	$700.00	SPF
Sensor Interface	1	$400.00	$400.00	SPF
Information Printing	1	$50.00	$50.00	SPF
LCD Screen	1	$100.00	$100.00	SPF
Input Controller	1	$100.00	$100.00	SPF
Power Supply	1	$200.00	$200.00	SPF
Maintenance Fund	1	$3,000.00	$3,000.00	SPF
Sensor Array	1	$2,500.00	$2,500.00	SPF
Expenses Subtotal 3 - add all (D)			**$7,500.00**	

EXPENSES GRAND TOTAL (Subtotals 1 + 2 + 3)	**$33,826.00**

* *See the SPF Guide to Budgeting for the conditions and Hourly Wages applicable to hiring under the SPF.*

** *To indicate the one or many Funding Source(s) that will pay for the expenses, use their respective number as you listed under Revenues (SPF or other).*

Thank you! After you save it to your files, you can now upload this form and any appendices on the SPF website to complete the application process. The SPF staff will contact your team within two weeks to provide feedback. Congratulations for applying to the SPF!

Date 9/7/17

Appendix 1

General Expenses:

This cost is for smaller pieces not specific to the design but required for assembly such as fasteners and small tools.

Expense	**Cost $**
Stainless Steel Fasteners (Nuts, Bolts, washers)	100
Wires (Electrical & mechanical)	200
Tools- (Ratchet sets & drill bits)	500
Sealant	200
Dolly Wheels (For ease of movement)	100
Latex Gloves	20
Heat Gun	80
Voltmeter	100
Vinyl Wrap for Decal	100
Ventillation fans & flaps	200
Solder Tools (Wire & Wipes)	100
Total:	1700

Appendix 2

List of tasks for paid positions.

1. Solidworks Rendering and Design (Core Team CV)

    -Create full rendering of final design

    -Send renderings to machine company for fabrication

    -Draft expense reports and maintain budget of materials

2. Main Body Fabrication (Core Team CV)

    -Assemble the custom-built parts into the main body of the project.

    -Prep for sensor and pump installations

    -Draft expense reports and maintain budget of materials

3. Sensor + Pump setup and installation (Core Team CV)

    -Install all hydroponic pumps and electronic components.

    -Finish all physical work, leaving only coding left to be done.

4. Coding (Computer Science Student CV)

    -Program code for main computer controller.

    -Troubleshoot problems between controller and sensors.

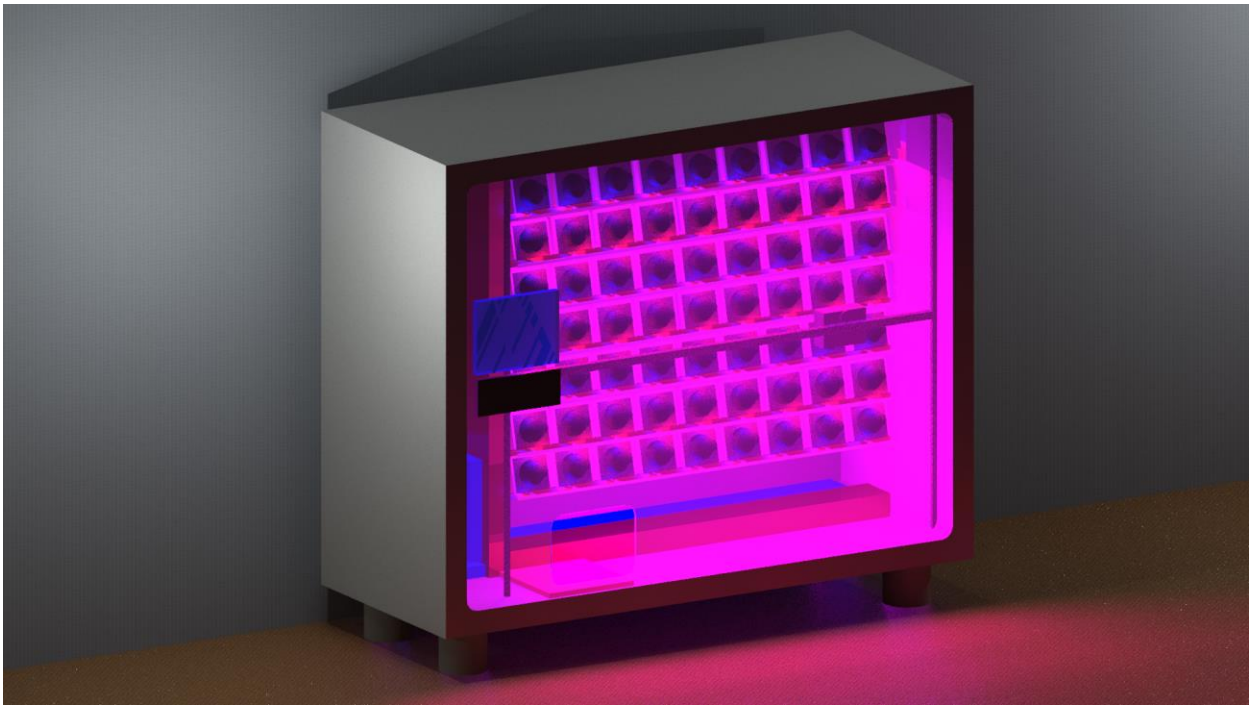
    -Design the graphical user interface.

    -Document programming for easy maintenance.

Autonomous Controlled-Environment Growth Chamber Display

Visual Aids of Design Goal

Initial Sketch



Early Render of Design

McGill

Faculty of Agricultural and Environmental Sciences

McGill University
Macdonald Campus

Tel.: (514) 398-7701

Office of the Farm

Faculté des sciences de l'agriculture et de l'environnement

Université McGill
Campus Macdonald

Fax: (514) 398-8134

Bureau de la ferme

21,111 Lakeshore
Ste-Anne-de-Bellevue
Québec, Canada
H9X 3V9

April 26, 2017.

Dear SPF Committee Members,

I am writing this letter to support the application of a group of Bioresource Engineering students for funding to build a "Living Wall" which will be used in the new Macdonald Farm Community Engagement Centre. This new centre will introduce elementary and secondary students, and members of the general public, to different forms of agriculture, and the Living Wall will be a wonderful visual example of the sustainability of hydroponics. An added feature is the use of robotics to grow crops such as lettuce. With the robot feeding the plants, moving them and eventually harvesting, it will no doubt pique the interest of those whose passion is not only in growing food, but also engineering and even computer programming. This broad spectrum of interest backs up our motto, "If you eat, you have an interest in agriculture"!

Another facet of this project that is truly inspiring is that it is student-driven. The students are designing, building and programming this wall, which will no doubt encourage the young people who come to the Macdonald Farm Community Engagement Centre, and bolster their courage to step out beyond the boundaries of accepted practices to try something new and innovative.

I believe the Living Wall will prove to be one of the more popular attractions in the Community Engagement Centre that will have people talking about it long after their visit. It is a worthwhile project that will have a wide-reaching impact, and will influence young minds for many years, and for these reasons, I encourage you to consider funding it through the SPF.

Please feel free to contact me if you have any questions about how this project will be used, and how it will promote sustainable, innovative agriculture.

Sincerely,

Paul Meldrum
General Manager
Macdonald Campus Farm

Core Team CV - Rendering, Fabrication & Installation

Rachael Warner

[redacted]

Languages: English (fluent), French (Advanced), Spanish (basic)

Education

Bachelor of Engineering, Bioresource Engineering 2015-Present

McGill University, Montreal, Qc

A sample of classes

- Agri-food buildings
- Hydrology
- Design Graphics
- Environmental Soil Physics
- Engineering for Land Development
- Post-Harvest Drying
- Engineering for Sustainability
- Introduction to Food Science

Diplome d'Etudes Collegial (DEC), Sciences

John Abbott College 2011-2013

Scholarships

Discover the Stars Bursary 2011

A Bursary given by the West Island of Montreal Chamber of Commerce for students excelling in the scientific field. Received after completing a literature review on genetically modified mouse models in Alzheimer's studies, and undergoing an interview process.

Work Experience

Summer student as an assistant technician in a forage seed production lab, for Agriculture and Agri-food Canada

Beaverlodge Research Institute 100038 Township rd 720, Beaverlodge, AB 2017

- Aiding in the seeding, growth and harvest of varying forage cropgrowth experiements
- Instructed in the operation of various farm equipment, including: tractors, seed drills, forage harvesters, lawn mowers.

Sales Associate and Key Holder

Sherwin Williams. 3001 Saint-Antoine Ouest, Montreal, QC 2014-2017

Sherwin Williams. 4698 boul. Saint-Jean, Pierrefonds, QC 2012-2014

- Serving clients, answering phones
- Stocking and cleaning store
- mixing paint
- Supervising store

Cherry Picker

Coral Beach Farm. 16351 Carrs Landing rd, Lake Country, BC Summer 2014

Working on an international team picking cherries and doing part time work in the processing plant.

Volunteer Experience

Volunteer Connection Ecuador/UBEICI

The market program February-April 2014

Working with under privileged children who spend their days with their parents in the market. This included teaching and playing with the children, all with aims to improve their basic knowledge, vocabulary and motor skills. Helping with homework with older students.

Member of the energy exchange program 2014-Present

Moksha Yoga Studio. 3669 boul. Des Sources, DDO, QC

Projects

The NVAC Greenhouse

McGill University, Bellairs Campus, Barbados

Completing the construction of the greenhouse, setting up systems and growing plants. Collecting and analyzing data from the completed greenhouse.

Certification and Skills

LEED Green Associate Certification, 2016

Canadian Safety Council UTV and Defensive Driving certified, 2017

WHIMIS, 2017

Class 5 Quebec Driver's license

Computer skills: AutoCAD, MATLAB, Microsoft Office: Excel, Word, PowerPoint

Associations and Clubs

Bioresource Engineering Association, *Vice President of Academic Affairs* 2017-2018

CERES McGill, *general member* 2016

Ordre des Ingénieurs du Québec, *student member* 2015

American Society of Agricultural and Biological Engineers, *student member* 2015

Hobbies and Interests

Outdoor activities: Skiing, rock climbing, hiking, camping, biking, yoga

Travel: Ecuador, France, Spain, Portugal, Cross Canada road trip

Hands on: Cooking, gardening, woodworking and refinishing furniture

CV for Coding (Computer Science Student)

Numa Karolinski

Internships & Jobs Montreal

[redacted]

Objective

Application of Software Languages and Mathematical studies to further broaden knowledge within the field of Computer Science.

Technical Skills & Software Languages

- Advanced Level: Java, C
- Intermediate Level: GIMP, Microsoft Office (Excel, Word, PowerPoint), Bash, Python, HTML, GNU

Languages

- Native English & Intermediate French

Education

Bachelor of Science, Major in Computer Science (Computer games) & Minor in Physics *2015-Present*
McGill University, Montréal, QC

United States High School Diploma
Catalina Foothills High School, Tucson, AZ *2012-2015*
- *AP Scholar, Blue Scholar, National Honor Society Member, and Varsity Athlete*

Falmouth Academy, Falmouth, MA *2011-2012*

Job Experience

Self-Employed Moving and Refurbishing Business *Summer 2016*
- Moved and refurbished household items together with my brother
- Organized hours of operation

Functionality Quality Assurance Tester *Summer 2016*
Babel Media a *Keywords Studio*, Montréal, QC
- Conducted quality assurance testing for games in development
- Collaborated with numerous FQA Testers to assure detailed inspection of all projects
- Adapted to project changes, flexible scheduling, and changing environments

High School Tutor *2013-2015*
Catalina Foothills High School, Tucson, AZ
- Worked under a school-supervised tutoring program
- Tutored in Geometry, Algebra 2, and Pre-Calculus in two hour sessions for multiple students

Volunteer Experience

National Honor Society Volunteer *2013-2015*
Catalina Foothills High School, Tucson, AZ
- Volunteered at numerous community events

[redacted]

    - Spent time moving and cleaning a local *Habitat for Humanity* store, cleaned Tucson washes (dry rivers), and organization of park events
- Served as a public instructor to further educate and enrich high school students

Activities and Interests

Music: Piano (8 years), and Violin (4 years)
Sports: Avid runner, soccer player, and weight lifter

- High School Varsity Track & Field Athlete
- High School Varsity Cross Country Athlete
    - Division 2 Arizona State Champion

Games: Various tabletop and video games

- Member of the *Smash Brothers at McGill E-Sports Students' Association*