

President's Advisory Committee on the Environment, Climate Change, and Sustainability

ANNUAL REPORT 2018



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A Message from the President

I am pleased to see the 2018 Annual Report of the President's Advisory Committee on the Environment, Climate Change and Sustainability. Established just 16 months ago, the CECCS has made remarkable progress in this short time, laying the foundation for ambitious and innovative ideas to become concrete actions and solutions.

In adopting three spheres of activity, *campus as living lab*, *University as agent of change in the community*, and *curriculum innovation*, the committee has developed an effective framework to achieve a series of imperative sustainability goals. The report also outlines a thoughtful approach to fostering student engagement and community partnerships while bringing academic and operational aspects of the University together to better address the pressing challenge of climate change. In fact, the committee has already begun to make connections between disparate sustainability initiatives across our campuses, amplifying our efforts in meeting this challenge.

The University of Toronto is home to tremendously innovative and dedicated students, faculty, and staff, and the CECCS is leveraging that strength and the passion of our entire community to make a lasting impact on sustainability at U of T and around the world. On behalf of our University, I offer congratulations on the 2018 Annual Report and the impressive activity underway thanks to the leadership of the committee.

Sincerely,

Meric S. Gertler
President

INTRODUCTION

The President's Advisory Committee on the Environment, Climate Change and Sustainability (CECCS) has been in existence for 16 months. In that time, we have developed an ambitious agenda for sustainability at the University of Toronto. The goal throughout has been to identify, explore and begin to implement ways that U of T could act on the view that sustainability is a core component of the University's identity, with concomitant changes in teaching, research, partnerships and operations. In this context, we have identified three areas of activity: Campus as Living Lab, University as Agent of Change in the Community, and Curriculum Innovation. This framework provides a basis for integrating operational and academic sustainability activities and for connecting disparate sustainability activities across our campuses in a fruitful way.

Mandate and Purpose. The mandate of the CECCS is to identify ways to advance the University's contributions to meeting the challenges of climate change and sustainability, with a particular focus on research and innovation, teaching, and University operations. In its activities, the committee will, among other things, support the implementation of the seven other sustainability commitments made by President Gertler in [Beyond Divestment](#).

Above all, the CECCS sees itself as a means to identify, facilitate, support, enable and promote sustainability efforts and initiatives, and to foster a sense of common identity and purpose—a common enterprise—by bringing together existing sustainability networks and connections at U of T and in the community, developing strategic priorities for future sustainability-related activities, and supporting their implementation. Key approaches are to promote the integration of operational and academic sustainability, develop partnerships on sustainability issues with the various communities inside and outside U of T, and make sustainability curriculum opportunities available to students. The ultimate goal is to help U of T build on its strong record of success in research, teaching and operations in the areas of environment, climate change and sustainability, and to help make sustainability part of the core identity of the University.

The CECCS has adopted two operating principles to guide its activities. The first is a focus on regenerative sustainability approaches that look for net positive ways to increase both human and environmental wellbeing (instead of simply focusing on reducing environmental damage). The second is a goal of integrating operational and academic sustainability at U of T, looking for ways to combine research, teaching, partnerships and operations to improve sustainability both on and off campus.

CECCS Composition. The CECCS has 16 members: eight faculty members, five staff, two students, and one alumna. There are also four members of the subcommittees who are not members of the CECCS. The three subcommittees are:

- Campus as Living Lab
- University as Agent of Change
- Curriculum Innovation

The membership of the CECCS and its subcommittees is shown in Appendix A. To date there have been 26 meetings of the CECCS and its three subcommittees (Appendix B). In addition, five undergraduate students have pursued research assistantships in support of the CECCS. The activities of the CECCS are supported by two staff members from the Office of the President. The outcomes of these activities are described in the Activity Report below.

PROGRESS SINCE LAST REPORT

The 2017 Report of the CECCS outlined the activities that were undertaken in the first four months of CECCS' existence. That report outlined a series of action items and priorities for each of the CECCS subcommittees and for CECCS as a whole. This report outlines progress in each of these areas.

With regard to the campus as living lab subcommittee, in consultation with operational staff, we have developed a preliminary list of six living lab projects (one retrofit project and one new build project for each of the three campuses), and a template for student involvement that will allow us to develop student projects for each. We are working on a Charter of Principles for these projects.

With respect to the agent of change agenda, we have prepared a preliminary typology of forms of engagement with partners on sustainability projects, and developed inventories of sustainability-oriented community-engaged learning courses at U of T, and of student clubs with a sustainability focus.

On the curriculum innovation front, we have completed an inventory of all sustainability-oriented undergraduate courses at U of T, and started work on sustainability curriculum pathways in four divisions: UTM; Arts and Science; Daniel's Faculty of Architecture, Landscape and Design; and UTSC.

At the overall CECCS level, we have begun a mandate review of commitments in *Beyond Divestment*; provided input (most of which was accepted) on sustainability content in the U of T Institutional Strategic Research Plan; developed a proposed Tri-Campus Sustainability Communications Strategy; agreed to work with the Office of the Vice-President, Research & Innovation on developing a Clean Tech Challenge event for the University; and coordinated interactions among five otherwise separate sustainability initiatives on campus. All of these accomplishments will be described in more detail in the Activity Report.

ACTIVITY REPORT

Campus as Living Lab (CLL) Subcommittee

The campus as living lab subcommittee aims to bring together faculty members, students, staff, and, where appropriate, external partners to collaborate on developing sustainability projects that combine operational and academic activities. Such projects contribute to the operational sustainability goals of the University while providing an opportunity for research and experiential learning, where students are directly involved in addressing real world sustainability problems of interest to the University. A significant priority of the CLL subcommittee is to find ways to involve students in analysing the sustainability dimensions and implications of operational policies, guidelines, and plans, and to propose improvements in line with good practices elsewhere.

While living lab projects can be developed with regard to any operational activities at the University, in order to provide a starting point, and set of pilots for such projects, the CLL subcommittee has identified six projects to act as living labs—one new project and one retrofit project per campus (see below).

Location	New Project	Retrofit Project
UTSC	Passive house residence	Geo-thermal field
St. George	Academic Tower	Physical Geography building
UTM	Science building	Recreation, Athletics, and Wellness Centre

Subcommittee members have been selected to serve as project leads for the six identified projects and the CLL as a whole is currently undertaking the process of attaining formal permission for CLL activities.

A crucial attribute of successful living lab projects is to provide opportunities for students and faculty to engage with operational sustainability activities in ways that do not hamper the ability of operational staff to meet the budgetary and scheduling obligations of the projects. To this end, under the lead of committee member Tim Lang, the subcommittee has constructed a typology of non-disruptive student involvement in living lab projects: Shadow Design, Monitoring and Research, Design Charrettes, and Study of Process (Meta-process).

Shadow Design. This approach would entail sharing technical documents and project information for use in parallel design exercises that do not affect the critical path of the project. While it will not be feasible to give these exercises a prerogative to guide the design, they could meaningfully exist alongside the critical path, and would work to incorporate outcomes of the exercises into the projects where possible.

Monitoring and Performance Assessment. Logistically, it is not difficult to incorporate monitoring and research into a given project. This is best done by integrating such systems into the project design from the beginning, though portable monitoring equipment can also be used. The most significant constraint is budget for the cost of required equipment, though such costs have been dropping rapidly. In a CLL context, there exists the opportunity to obtain academic research funds to support monitoring and performance assessment. U of T's new Sustainable Built Environment Performance Assessment (SBEPa) research network provides a powerful conceptual framework for building more extensive monitoring and assessment into U of T's built environment.

Design Charrettes. For projects that are at early stages of development, there is an opportunity for living lab exercises that are more ambitious and aspirational. Faculty and students could be involved in developing design charrettes—intense periods of planning activity—intended to add sustainable design ideas at the outset of the project planning process.

Study of Process. Using participant-observation techniques, faculty and students can study U of T's design, planning and implementation processes. Such studies can be expected to lead to conclusions that may inform future projects. In the process, students learn how actual design, planning and implementation decisions are made and constraints navigated.

A supplementary CLL idea would be to have key operational staff give seminars, with Q&A, on completed designs or projects. This form of student engagement is more passive in nature, but would impact a greater number of students.

Having selected six project sites and identified potential methods of student engagement, the CLL is currently writing up proposals. These proposals will outline the specific research questions and method of student engagement that will form the basis of potential living lab projects. Research questions will be identified through collaboration with project teams and through committee member attendance at planning and design meetings. The proposals will be used both to secure formal permission from project managers and University administration and to approach departments and individual faculty members to invite their involvement.

In the process of developing the CLL projects above, the subcommittee identified the need for a charter of principles to frame student engagement and partner involvement for the living lab initiatives. In this task the CLL overlapped heavily with the work of the agent of change subcommittee, and details regarding this charter will be found in the Agent of Change section below.

In addition to identifying the six projects and engagement strategies listed above, members of the CLL subcommittee also undertook several specific living lab activities.

Engineering Strategies and Practice. Last year's report noted that one promising avenue for campus as living lab projects is Engineering Strategies and Practice [ESP APS111/112], the first-

year engineering course where a core assignment has students proposing solutions to real world problems. Each year upwards of 1000 students take this course; divided into groups of five, this represents 200 projects annually.

Under the leadership of Aimy Bazylak, the CLL subcommittee collaborated with course instructors this past academic year to introduce the new Sustainability Scholars Projects initiative. Of the 47 Sustainability Scholars Projects designed and submitted by the students, 46 were selected to move forward. The topics of these projects ran a wide range, and the clients were most commonly alumni. The students devoted two months to refining their designs before presenting them at the Final Client Presentations on April 13. The initiative was widely considered to be a success and was met with great enthusiasm by students, faculty members and clients alike.

Campus as Living Lab Course. John Robinson teaches ENV461/1103 *The U of T Campus as a Living Lab of Sustainability*. Each year the course engages groups of undergraduate and graduate students on applied sustainability projects designed by operational staff at the University. In the fall of 2017, students undertook six projects:

- A study of the effect of changed signage on recycling behaviour – for the Sustainability Office
- A pre-occupancy evaluation of the learning commons in Sid Smith – for the Faculty of Arts and Science
- An evaluation of comfort in selected U of T classrooms – for the Sustainability Office
- The potential for roof gardens at Trinity College – for Trinity College
- Development of sustainability language for U of T's procurement policies – for Procurement Services
- A study to map the water refill stations and fountains on the downtown campus and advise on a marketing strategy for the bottled water ban from 2011 – for the Sustainability Office

This was the second year this course has been offered. As in the previous year, the projects were welcomed by operational staff.

Agent of Change (AOC) Subcommittee

The agent of change subcommittee is an enabler, convener or agent of empowerment with the objective of supporting the University community to work more actively with private, public and civil society sector partners on sustainability issues, with a particular focus on student engagement. The subcommittee is also looking to scale up broad outreach on sustainability to find new partners and determine how best to leverage current research partners into a broader approach with a strong degree of student engagement.

This past year, the AOC subcommittee has examined how best it can support the University of Toronto as an agent of change in society, in the service of sustainability. Questions framing this consideration include: How should we as a University interpret this role? How can we do more with community partners? How can we identify the demand that currently exists and create further demand by helping our partners see opportunity and need when it comes to regenerative sustainability?

Inventory and Typology. As a first step, the subcommittee developed a better understanding of the University's approach to working with external partners by examining how projects and collaborations have been structured in the past. Recognizing that various divisions within the University have differing degrees of engagement and different difficulties achieving engagement, a variety of structures and approaches were found. University groups operate fairly independently, and there is currently no easy way to capture the range of existing projects, and catalogue the impact and/or report on that. Connections between projects, partners or students rely on unofficial networks, and the work that individual staff and faculty undertake in their own portfolios. The subcommittee has begun to map out these forms of engagement, identify which divisions are actively involved, and determine how best to scale up this activity.

As noted in last year's annual report, external engagement at the University consists largely of three models of partnership:

1. Private sector partnerships, where the University works with industry partners on the development of products or services—examples would include tech development or incubators
2. Policy partnerships, where the University works with government agencies and other policy-making bodies in overseeing policy development
3. Civil society partnerships, where the University works with NGOs, funding councils, Indigenous communities, and other civil society bodies for the purpose of fostering social change

Such partnerships usually involve faculty members or graduate students. A priority of the AOC subcommittee is to scale up the involvement of undergraduate students in sustainability projects or 'work'—in its many forms—with external partners. This sort of student engagement with external stakeholders on sustainability-focused work represents a largely untapped resource; one that could have a major impact on the surrounding community.

Given the large number of ways that the University community currently engages with society, the AOC subcommittee has an opportunity to create a framework that will make engagement on sustainability issues more accessible and meaningful to both students and current and potential external partners. The subcommittee aims to create a clearer pathway for external partners seeking sustainability expertise, and for internal partners—primarily students in this case—to identify and obtain experience in this area. Working within existing capacity to set up a

process to make opportunities more accessible—a ‘one stop shop’—the subcommittee is soliciting help in design from those staff who are already working day-to-day on such engagement initiatives. An important part of this process is generating a network that links staff and faculty already involved.

Subcommittee member Claire Westgate has taken the lead on this initiative and created an initial inventory of what already exists with regard to sustainability placements. She has compiled a list of the many existing programs, staff, faculty, offices and departments that have embedded impact projects.

In addition to this menu of opportunity, the AOC is constructing a typology of engagement; an account of what is meant by ‘engagement’ and of the forms engagement may take across the University (see Appendix C). This involves compiling an inventory of what already exists with regard to sustainability placements and developing a simplified menu of types of engagement as the current list is unmanageable. This streamlined list would be a means to harness the vast number of options and opportunities and to improve accessibility. Both the initial inventory of engagement activities, and the preliminary proposed typology are attached as Appendix C.

We believe that the AOC has significant potential to drive robust, measurable impact for the University as an agent of sustainability-oriented change in the community at large. And there is no doubt that interest is there. The University is regularly approached by potential corporate community partners who would like to use U of T as a test bed to evaluate the use and impact of their technologies or solutions. As an example, we have been separately approached by several potential private sector partners to apply energy-saving software and technology across the St. George campus. Such partnerships not only offer excellent opportunities for student engagement but also represent potential sources of funding for students from the companies that will benefit from collaborating with U of T.

As more opportunities for student engagement are identified, it is important to examine the question of how best to integrate curricular and non-curricular approaches. The curricular approach, whereby students receive credit for work with external partners, works well when there are faculty members interested in the project or if compatible courses already exist. Otherwise, non-curricular approaches (internships, volunteer activities, etc.), which can be captured in the Co-Curricular Record, may be most appropriate.

Charter of Principles. Much like the campus as living lab subcommittee, the AOC soon recognized the need for a charter of principles to frame student engagement and partner involvement. As a first step, the AOC surveyed relevant centres and staff to discover what general policies were in place regarding student placement to learn more about the parameters and restraints of these partnerships on a policy or legal level. It was discovered that, in general, there is a lack of formal overarching policies with regards to the full range of student-industry partnerships at the University. It would seem that each department/division/unit has their own mechanisms in place. Typically, these mechanisms entail a course outline and some sort of

'agreement' paperwork, often a form in which the student agrees to a certain behaviour, and an agreement in which the host organization agrees to supervise. Significant interest in having a more general charter was expressed from frontline staff.

The CECCS charter would address both on-campus (CLL) and off-campus (AOC) living lab project possibilities. We anticipate that such projects would involve graduate and/or undergraduate students as well as academic sponsors (professors) to facilitate strategic partnerships. The charter would consist of a set of principles to inform prospective partners about what a sustainability living lab project is and how it works. It would outline general rules and criteria to codify our approach and would address such concerns as IP, public tendering requirements, and rights to publication. In developing the charter, the AOL subcommittee will draw on the CECCS 2017 report which clearly outlines the principles underlying our approach.

Community-Engaged Learning Workshop, Oct 2018. The AOC is also supporting the Community- Engaged Learning workshop to be held in the spring of 2019. The Activism and Civic Engagement Lab (ACELab) of the Munk School of Global Affairs and the Centre for Community Partnerships are co-hosting this workshop to inform the development and growth of community-engaged learning for sustainability at the University. Faculty involved in experiential learning have been invited to advise on how best to increase sustainability-related CEL activity across the University. Topics include: CEL and sustainability as institutional priorities; mapping the CEL for sustainability landscape; collaborative identification of the assets, opportunities, gaps and resources required to advance CEL for sustainability; and student perspectives regarding CEL and sustainability. Discussions will also consider how the University might expand and enhance CEL for sustainability.

This event is designed for faculty who teach one or more courses that incorporate community-engaged learning and address issues of sustainability, a list that includes faculty from a wide range of disciplines such as Engineering, Pharmacology and Toxicology, Chemistry, Human Biology, School of the Environment, Economics, Criminology, Anthropology, Historical and Cultural Studies, Urban Studies, Language Studies and more.

Tri-Campus Clean Tech Challenge. The AOC is also supporting the Tri-Campus Clean Tech Challenge first introduced in *Beyond Divestment*.

During the course of AOC discussions, several aspects of the challenge were discussed:

- a more general Sustainability Challenge would invite participation from the natural sciences, engineering, health sciences, social sciences and the humanities
- the University could invite companies to present their challenge so that (teams of) students would compete for the opportunity to work with clients by presenting plausible solutions;
- each year the challenge could be linked to specific objectives (net-positive) and themes (e.g. Paris agreement); and

- the prize could offer the opportunity for students to work with the client to implement their solution supported by a grant, bursary or work/study position.

A proposal is being prepared and will be shared with the committee for input and comments in early 2019.

Curriculum Innovation (CI) Subcommittee

In last year's inaugural report, the curriculum innovation subcommittee established that supporting the development of sustainability pathways would be its central priority. Such curricular pathways would provide each undergraduate student at the University the opportunity to add sustainability learning to their program, no matter what program they are enrolled in, and to be given community-engaged learning opportunities, and develop cross-cutting interdisciplinary skills, in so doing.

Crucial to the development of the sustainability pathways approach is an inventory of available courses which contain sustainability content and community-engaged learning opportunities. This past year the CI subcommittee has overseen the development of such an inventory (see Extended Student Engagement section below) and is collaborating with the Provost's office, and staff in several divisions, on the curriculum innovation required to develop these pathways.

While the course inventory is being developed and refined, the subcommittee has been considering how best to embed this data in the process by which students choose courses, and to develop the sustainability pathways approach. To this end, the committee has hosted a presentation from Susan McCahan, Vice Provost Innovations in Undergraduate Education and has reviewed the vice-provost's white paper (*Rethinking Higher Education Curricula: Increasing Impact through Experiential, Work-Integrated and Community-Engaged Learning*, June 2017), and the office's strategic plan.

The white paper lays out a vision for re-thinking higher education curricula and describes how the University might grow its experiential, work-integrated, and community-engaged learning offerings in line with provincial requirements and institutional priorities, and establishes quality criteria to inform the ways in which this growth might occur. In line with the CECCS priorities, the paper recognizes that this growth would collectively enhance both the student learning experience and the University's ability to support broader community and societal needs.

During the past year, the CI subcommittee has worked on the three sustainability curriculum pathways initiatives proposed in last year's report—UTM, FAS, and FALD— and added a fourth: UTSC.

University of Toronto Mississauga. The initiative to integrate sustainability into undergraduate programming at UTM has made great progress this past year under the leadership of committee member Shashi Kant. With the approval of the Dean, a Sustainability Pathways Working Group was formed in Dec 2017, with 17 members (11 faculty, five staff and one student). The Working Group has reviewed pathways-like programming at other universities, identified UTM courses with sustainability content, and proposed the development of a 'sustainability culture' at UTM based on five pillars:

- Academic programs and curriculum
- Research
- Campus engagement
- Civic engagement
- Human resources and infrastructure

A draft report describing these ideas in more detail and outlining a short- and long-term implementation plan can be found in Appendix D.

Daniels Faculty of Architecture and Landscape Design. Significant progress has also been made at FALD with the assistance of committee member Liat Margolis. A working group is being formed and an inventory of courses with sustainability content is currently underway. This inventory will identify thematic areas and categories for courses and will determine what courses could have sustainability content added. Key challenges are to modify the pathways approach to recognize the design-oriented nature of the FALD undergraduate program, and to make connections apparent between sustainability and the current foci of FALD teaching and research. The new joint faculty position on Sustainable Built Environments between FALD and the School of the Environment, and the growing activities of the Sustainable Built Environment Performance Assessment (SBEPA) research network, will provide useful impetus for the pathways initiative.

Faculty of Arts and Sciences. Kimberly Strong is overseeing the pathways initiative at the FAS where the focus has been on building sustainability into big first year courses. An initial review indicated that 13 of 62 such courses already have sustainability content. The subcommittee is in the process of developing supporting materials by outlining four models of how sustainability can be incorporated into these courses. Over the summer, student RAs identified 100-level courses that will be good candidates for the pathways approach, refine the sustainability course inventory, and prepare background information on pathways programming at other universities. The subcommittee will also be exploring the organizational requirements of pathways programming, and how information on sustainability opportunities can best be made available to students, and reflected in their program. Discussions have begun with relevant academic staff in the Provost's office, and Office of the Dean to explore how these ideas can be pursued.

University of Toronto Scarborough. The sustainability pathways approach has strong decanal support, and is moving forward, at the University of Toronto Scarborough. William Gough, the

Vice-Principal Academic and Dean and two members of ECCS—Tim Lang and Conor Anderson—are in the process of establishing a core of interested faculty and staff to act as a working group for the proposal. Dr. Gough is targeting the implementation of sustainability pathways as a type two certificate program. The group hopes to have a draft implementation plan for the 2019–2020 calendar year.

In addition to the divisional activities noted above, the subcommittee has been debating the best means to support sustainability pathways in the long term. It has concluded that the most feasible approach would be to establish a category two certificate program in sustainability. Such sustainability certificates would be offered in conjunction with an undergraduate degree program (for-credit). The subcommittee is currently exploring the lessons to be learned from the Global U program, which has proposed an approach that might be readily applied in the sustainability context.

Extended Student Engagement (ESE) activities

The CECCS has no core budget and only limited staff support. It was necessary to obtain funding, initially from the Faculty of Arts and Science, and more recently from the Provost’s LEAF program, to hire undergraduate student RAs through the Extended Student Engagement Project (ESE) to support the activities of CECCS.

The focus of this work has been on developing an inventory of all sustainability-oriented undergraduate courses at U of T; a separate inventory of all community-engaged learning courses with sustainability content; inventories of co-curricular sustainability clubs and opportunities; and research support for the pathways concept. During the summer of 2017, one student was hired. This grew to five students during the fall 2017 and winter 2018 terms, and three students continued this work during the summer of 2018. The students who have been involved in the ESE are Rashad Brugmann, Nicolas Côté, Danielle Pal, Nathan Postma, and Emily Shaw. CECCS committee member and undergraduate student Shamaila Bajwah also contributed to the effort this past summer, with support from the School of the Environment.

Undergraduate Sustainability Course Inventory. The ESE project created a comprehensive draft inventory of undergraduate sustainability courses that can be used to support four central goals of CECCS:

- Create a tool for students to add sustainability content to their academic curricula
- Create a list of professors involved in sustainability teaching
- Contribute to the progress of sustainability-oriented curriculum pathways, and
- Create more opportunities for student engagement in sustainability in the community

The inventory, which was refined over the summer of 2018, is based on keywords derived from 16 of the 17 United Nations Sustainable Development Goals (SDGs); it contains 2028

sustainability-oriented courses, corresponding to about 20% of all undergraduate courses at the University. This inventory, updated in July 2018, can be found in Appendix E.

Co-curricular Sustainability Activities. The ESE has developed additional inventories for all sustainability-focused co-curricular and extracurricular opportunities for students at U of T.

The first inventory is a list of sustainability-focused student groups, which identifies a total of 67 such groups. This list was developed and maintained in a partnership between the ESE research group and the University of Toronto Students' Union Sustainability Commissioner (UTSUSC). The groups were identified through student group networks, searches of the [ULife](#) website, and other University websites and networks.

The second inventory is a list of the sustainability-focused co-curricular activities with U of T Co-Curricular Record (CCR) recognition. This inventory was developed using the same keyword-search methodology as the sustainability course inventory, based on the United Nations Sustainable Development Goals (see Appendix E for details). The keywords were searched in the University's [CCR Opportunity Directory](#), and 263 sustainability CCR opportunities were identified.

Both of these inventories can be found in Appendix G.

Community-Engaged Learning. A separate inventory of community-engaged learning (CEL) courses was created using course descriptions to identify those CEL courses with sustainability content. 298 such courses were found, taught by 122 faculty, and involving 3749 students (see Appendix F).

Pathways Work. A key purpose of the inventory work described above was to support the development of the sustainability curriculum pathways described in the Curriculum Innovation discussion above. To that end, the ESE group has been working on a report to provide the President's Advisory Committee on the Environment, Climate Change, and Sustainability an overview of good practices and recommendations on developing sustainability pathways. This report is similar to the Sustainability Pathways Working Group July 2018 Report for UTM (see Appendix D), but is intended to provide a more detailed and targeted overview, towards a proposal of good practices. The main objectives of the report are to:

- Create a literature review of sustainability pathways programs – describe the different sustainability pathways and pathways-like programs at other post-secondary institutions
- Recommend several different sustainability pathways certificate programs and implementation approaches, based on the certificate idea above – describe the elements,

advantages and disadvantages, and tasks for implementations of each option that range in difficulty for implementation and features, and

- Make general comments about the resources required to maintain and develop a sustainability pathways certificate program

During June and July, Professor Robinson and members of the ESE group met with academic administrative staff in the Provost's office and the Faculty of Arts and Science, to obtain their views on how sustainability pathways may parallel other similar initiatives at U of T and how they may be implemented. The results of those discussions will be incorporated in the pathways report, which was released in the summer of 2018 and presented to the CI subcommittee in their Nov. 2018 meeting. See Appendix H.

ISCN Conference. As part of the mentoring process, ESE students were encouraged to write an abstract describing their course inventory work in hopes of attending a conference, and perhaps even producing a journal article. Undergraduates don't often have these sorts of opportunities. The students' abstract, "Expanded Student Engagement Project", was accepted at a major international university sustainability conference (International Sustainability Campus Network (ISCN), *Sustainable Development: Acting with Purpose*, KTH Royal Institute of Technology, Stockholm, June 11-13, 2018). The CECCS was able to secure funding from U of T sources for all five students (Rashad Brugmann, Nicolas Côté, Danielle Pal, Nathan Postma, and Emily Shaw) to attend the conference and present their paper. The students are currently working with Professor Robinson on a journal article version of their work to submit for publication in the conference proceedings.

ECCS Committee

While much of the committee's work occurs in the three subcommittees, the overall committee does retain a number of important roles:

Coordinating Role. In adopting three areas of activity—campus as living lab, University as agent of change in the community and curriculum innovation—as a framework, the CECCS has developed the basis for integrating disparate sustainability activities across U of T campuses in a fruitful way. As an example, the committee is making connections among five sustainability-related activities at the University, which represent a mixture of research, operational and partnership activities:

- GRASFI – in January of 2018, the University joined the Global Research Alliance on Sustainable Finance and Investment founded by the University of Oxford
- UC3 – in February of 2018, the University joined the University Climate Change Coalition founded by the University of California
- GGRP – the Province of Ontario's Campus Greenhouse Gas Reduction Program. U of T has been awarded \$26.7 million for GHG reduction activities

- EFAC – the School of the Environment’s Environmental Finance Advisory Committee was founded in 2002; members are finance professionals in the private and NGO sectors
- SBEPA – the Sustainable Built Environment Performance Assessment research network was established in fall 2017 and includes faculty from Architecture, Engineering, Computer Science, Environment and Public Health

The CECCS is overseeing the emerging connection between these initiatives and, in June, organized a high profile conference at the intersection of those areas.

Inaugural UC3 Forum. UC3 is a new coalition of 13 leading North American research universities that will prototype a collaborative model designed to help local communities achieve their climate goals and accelerate the transition to a low-carbon future. These universities are mobilizing their resources and expertise to accelerate local and regional climate action in partnership with businesses, cities and states.

As part of this commitment, each UC3 institution will convene a climate change forum in 2018 to bring together community and business leaders, elected officials and other local stakeholders. These meetings are tailored to meet local and regional objectives shared across sectors and aims to speed the implementation of research-driven climate policies and solutions. This is in addition to their pledge to reduce their institutional carbon footprints, with commitments ranging from making more climate-friendly investments to becoming operationally carbon neutral.

To fulfill the former commitment, the University of Toronto and the School of the Environment’s Environmental Finance Advisory Committee (EFAC) hosted: *Carbon Markets and Climate Finance: Alternative-Financing Paths to a Low-Carbon Future; The University of Toronto’s Path Forward* on June 19, 2018. Using U of T as an example of a cap and trade “covered emitter” with a public commitment to meet aggressive emissions reduction targets, the conference focused on identifying the various financing options and market mechanisms currently and prospectively available to organizations such as the U of T. The program is included as Appendix I.

Emphasis was placed on identifying alternative paths that represent potential future sources of climate finance for leading market participants such as the university sector. From Green Bonds to structured finance options to innovative leverage strategies, the goal was to identify a broad array of ways by which to finance GHG emission reduction commitments, making use of both public and private market funding sources.

The EFAC/UC3 conference allowed connections to be made among the five activities described above, which would likely have been pursued individually without the coordinating role of CECCS. Pursuance of such coordination can help create a stronger institution-wide identity in sustainability, and more opportunities for collaboration.

Communications Role. As a function of its communications role, CECCS proposed that representatives from the sustainability offices of the three campuses meet to discuss alignment around a coordinated communications strategy. As a result of this meeting, the CECCS Communications Working Group—a tri-campus sustainability communications working group has converged. Tim Lang is the committee representative on this group.

The mandate of the group is to coordinate communications pertaining to sustainability at the St. George, Mississauga, and Scarborough campuses of the University of Toronto, so that they align to broadly support the vision of sustainability endorsed by the CECCS, as well as the specific initiatives and strategic directives it promotes.

Among other initiatives, the group is considering the potential adoption and administration of a coherent tri-campus sustainability brand or identity and is working on a ‘statement’ of sustainability. It will also collectively administer sustainability.utoronto.ca as a pan-institutional portal for U of T’s sustainability achievements and contributions.

The group is working with U of T Communications to develop a communications strategy related to the University’s sustainability efforts and activities.

Advisory Role. In its advisory role, the CECCS responded to a call by the Office of the Vice-President Research & Innovation to review the draft Institutional Strategic Research Plan (ISRP). The committee made a series of suggestions that aimed to better situate the plan in the context of regenerative sustainability. The committee was gratified to see that most of these suggestions were included in the final version of the ISRP.

Mandate Review. The CECCS has initiated a mandate review to ensure we are addressing the commitments in the *Beyond Divestment* report. The result of that review will inform the activities of CECCS in 2018-19.

Other Activities. Members of the CECCS are engaged in a number of other sustainability-related activities. These include:

- Work by John Robinson with Trinity College on living lab opportunities at the College. These include work on sustainable food options, a roof garden, a new Trinity One program in Environment and Sustainability (starting in Sept 2018), and discussion about sustainable design with regard to the new building that is being considered at Trinity
- Professor Robinson has also been working with Engineering Professors Bryan Karney and Marianne Touchie, Engineering students Rashad Brugmann and Ziad Ashqar, and Engineering grad student Wen Jie Li on developing a proposal for campus as living lab building retrofit projects in the Multi-Disciplinary and Mechanical and Industrial Engineering fourth year capstone courses in Engineering. The focus would be on examining the technical and economic potential for sustainability retrofits for the 120 buildings on the St. George campus.

CONCLUSION

As illustrated in the preceding section of this report, CECCS has been very active in developing an approach to sustainability at U of T, and a set of activities, which are both intended to further the goals of making sustainability a core component of the identity of the University of Toronto, with associated changes in teaching, research, partnerships and operations. In particular, we have adopted a regenerative approach to sustainability, which focusses on looking for improvements in both human and environmental wellbeing, and on ways of integrating academic and operational sustainability, and connecting disparate sustainability activities across campus in a fruitful way. To those ends, we look to identify specific living lab projects, develop partnerships on sustainability issues with the various communities inside and outside U of T, and make sustainability curriculum opportunities available to students. The ultimate goal is to help make sustainability part of the core identity of the University.

Goals. In support of these ambitious plans, CECCS has identified the following goals that align with the three Presidential Priorities (Leverage our urban location, Strengthen and deepen international partnerships, Re-imagine and reinvent undergraduate education).

Campus as Living Lab Subcommittee



- engage 1000 students per year on CLL projects on campus³
- Global leadership in sustainability standards²
- Signature sustainability projects

Agent of Change Subcommittee



- Engage 5000 students per year on AOC projects in the community^{1,3}
- Develop sustainability-oriented CEL principles¹
- Sustainability a priority in CEL courses^{1,3}

Curriculum Innovation Subcommittee



- Sustainability curriculum pathways for every undergraduate student³
- Sustainability community of practice for U of T faculty³

General



- Sustainability as key component of U of T identity
- International leadership in operational and academic sustainability²
- Coordination of disparate sustainability activities

Legend: Three Presidential Priorities

1. Leverage our urban location
2. Strengthen and deepen international partnerships
3. Re-imagine and reinvent undergraduate education

Appendices

Appendix A – Membership of the President’s Advisory Committee on the Environment, Climate Change, and Sustainability

Appendix B – Meetings of the President’s Advisory Committee on the Environment, Climate Change, and Sustainability and its subcommittees

Appendix C – Typology of forms of student engagement (Agent of Change Subcommittee)

Appendix D – Report of the UTM Sustainability Pathways Working Group

Appendix E – Inventory of Undergraduate Courses with Sustainability Content

Appendix F – Inventory of Undergraduate Community-Engaged Learning Courses with Sustainability Content

Appendix G – Inventory of Sustainability-Oriented Student Clubs

Appendix H – ESE Pathways Report, Oct 1, 2018

Appendix I – Program for the Inaugural UC3 Forum

Appendix A - Membership of the President's Advisory Committee on the Environment, Climate Change, and Sustainability (as of Jul 2018)

CECCS MEMBERS			
Type of Member	Name	Title	Department
Alumni	Maria Banda	Graham Fellow	Faculty of Law
Faculty (Chair)	John Robinson	Presidential Advisor on the Environment, Climate Change, and Sustainability and Professor	Munk School of Global Affairs and Public Policy and School of the Environment
Faculty	Aimy Bazylak	Associate Professor / Director, Institute for Sustainable Energy	Department of Mechanical Engineering
Faculty	Kenneth Corts	Professor of Business Economics and Vice-Dean, Faculty & Research	Rotman School of Management
Faculty	Shashi Kant	Professor / Director, Master of Science in Sustainability Management Program	Forest Resource Economics and Management, Faculty of Forestry, UTM
Faculty	Liat Margolis	Associate Professor / Director, Green Roof Innovation Testing Laboratory	John H. Daniels Faculty of Architecture, Landscape, and Design
Faculty	Fiona Miller	Professor / Chair in Health Management Strategies	Health Policy, Institute of Health Policy, Management and Evaluation
Faculty	Jennifer Murphy	Associate Professor and Associate Chair, Graduate Studies	Department of Chemistry
Faculty	Kimberly Strong	Professor, Department of Physics and Director, School of the Environment	Department of Physics / School of the Environment
Staff	Tim Lang	Manager	Sustainability Office, University of Toronto Scarborough
Staff	Andy Macdonald	Director of Facilities	Faculty of Kinesiology and Physical Education

Student	Shamaila Bajwah	Undergraduate	
Student	Conor Anderson	PhD candidate	William A. Gough Climate Lab, University of Toronto Scarborough
VP Liaison	Derek Newton	Assistant Vice-President, Innovation, Partnerships and Entrepreneurship	Innovations and Partnerships Office (Designate of the Office of the Vice-President, Research & Innovation)
VP Liaison	Daniella Mallinick	Director, Academic Programs, Planning & Quality Assurance	Vice-Provost, Academic Programs (Designate of the Office of the Provost)
VP Liaison	Paul Leitch	Director of Sustainability, Facilities and Services	(Designate of the Office of the Vice-President, University Operations)
Administrative support	Susanne Miskimmin	Manager, Correspondence Unit	Office of the President
Administrative support	Daniela Trapani	Executive Assistant to the Assistant Vice-President, Strategic Initiatives	Office of the President
ADDITIONAL SUBCOMMITTEE MEMBERS			
Faculty	Susannah Bunce	Associate Professor	Human Geography, UTSC
Staff	Ahmed Azhari	Director	Utilities, Sustainability & Grounds, UTM
Staff	Jeff Miller	Director	Facilities Management, UTSC
Staff	Claire Westgate	Placement and Employer Relations Officer	Master of Science in Sustainability Management Program, UTM

AGENT OF CHANGE IN THE COMMUNITY subcommittee
Susannah Bunce
Tim Lang
Fiona Miller
Jennifer Murphy
Derek Newton
Claire Westgate
John Robinson
Susanne Miskimmin

CAMPUS AS LIVING LAB subcommittee
Ahmed Azhari
Maria Banda
Aimy Bazylak
Ken Corts
Tim Lang
Andy Macdonald
Jeff Miller
Paul Leitch
John Robinson
Susanne Miskimmin

CURRICULUM INNOVATION subcommittee
Conor Anderson
Shashi Kant
Shamaila Bajwah
Liat Margolis
Daniella Mallinick
Kimberly Strong
John Robinson
Susanne Miskimmin

EXTENDED STUDENT ENGAGEMENT
Rashad Brugmann
Nicolas Côté
Danielle Pal
Nathan Postma
Emily Shaw
John Robinson

Appendix B – Meetings of the President’s Advisory Committee on the Environment, Climate Change, and Sustainability and its subcommittees

Committee on the Environment, Climate Change, and Sustainability (CECCS)

- Feb 27, 2017
- Mar 29, 2017
- May 8, 2017
- Jun 19, 2017
- Oct 3, 2017
- Mar 2, 2018
- Oct 1, 2018

Campus as Living Lab (CLL) Subcommittee

- May 8, 2017
- Jul 5, 2017
- Sept 18, 2017
- Jan 31, 2018
- Apr 11, 2018
- Nov 26, 2018

Agent of Change (AOC) Subcommittee

- May 10, 2017
- Jun 14, 2017
- Sept 18, 2017
- Jan 18, 2018
- Apr 10, 2018
- Nov 21, 2018

Curriculum Innovation (CI) Subcommittee

- May 10, 2017
- Jun 14, 2017
- Sept 18, 2017
- Jan 18, 2018
- Apr 10, 2018
- Nov 28, 2018

Appendix C – Typology of forms of student engagement (Agent of Change Subcommittee)

What follows are:

1. A menu of different kinds of student engagement, prepared by CECCS Agent of Change subcommittee member Claire Westgate on Sept 25, 2017
2. Based on this menu, a template for a typology of community-engaged learning experiences, prepared for the AOC subcommittee on Apr 10, 2018 by Susanne Miskimmin. The goal is to fill in this template in order to identify areas of strength and gaps which can in turn be used to develop priorities for enhancing sustainability-oriented community-engaged learning opportunities for students.

1. “Menu” of Partnership/Engagement Options for External Organizations & Internal Groups

Methods (Menu) for Partnerships / Engagement between External and Internal Groups

Each of these is outlined in the chart below – but each provides a method for “internal” U of T stakeholders (students, faculty, staff, researchers, etc.) to engage with “external” U of T partners – and thereby to have impact (which can, of course, take many forms – whether it’s working together for innovation, or simple transfer of information from one party to the other). Through each mechanism, the potential exists for the University to have impact, or make change, outside the scope of the University itself.

1. **Guest Lectures**
2. **Industry-taught courses**
3. **Industry Advisory Boards**
4. **Job Shadowing**
5. **Field Trips/Company Tours**
6. **Informational Interviews**
7. **Mentorship Programs**
8. **Day-Of-Service**
9. **For-Credit Placements:**
 - a. Internship
 - b. co-op
 - c. service learning
10. **Projects**
 - a. For-credit (embedded in a course)
 - b. Independent (like a volunteer role)
11. **Not-For-Credit:**
 - a. independent jobs (summer, part-time, full time jobs)
 - b. volunteer roles
12. **Research Partnerships**
 - a. Students (for thesis work, or course work)
 - b. Faculty
13. **Conferences**
 - a. Students (attend, present)
 - b. Faculty (attend, present)
 - c. Staff (attend, present)
14. **Special Events**
15. **Alternative Reading Weeks**
16. **Centre for Student Engagement Programming**

Definitions

(Possibly important to have some clarifying definitions as terms are often used inconsistently across groups. This is simply a starting point – can be further modified).

- **External Organization:** any group outside U of T, including companies (both large and small/medium enterprises), start-ups, nonprofits, NGOs, government divisions at all levels, boards, etc.)
- **Internal Group:** any internal group to U of T, including students, staff, faculty, researchers, or any other group under the U of T banner
- **Partnership/Engagement:** any opportunity for the campus to play a role in the “outside” world (example: sharing of information, provision of resources) or for the “outside” world to contribute to the campus (example: advisory boards, course content, provision of student experiential opportunities)
- **Co-Op:** co-op refers to a for-credit, paid role for which an external organization can claim the Ontario Co-Operative Education Tax Credit. Student MUST be enrolled in an approved co-op Program (note: co-op program approval is issued by the Provost’s Office and is updated annually by each campus’ Experiential Education Officers). Minimum of 10 weeks, full-time.
- **Internship:** internship is a term used incorrectly by many internal and external groups. The Province does not have formal regulations on “internships” – however in theory, the critical point is that unpaid internships must not replace the work of an employee, must not be critical to a company’s operations, and requires adequate learning opportunities and mentorship. If a student undertakes a for-credit internship at U of T that is unpaid, the University covers insurance. They can be for-credit, or NOT for-credit, can be sanctioned by the University, or done independently by the student (e.g.: a summer job)
- **“Industry expert”:** in this context, refers to any Professional working in any sector (corporate, non-profit, government, etc.) – not to be confused with “private companies only”.

Method of Partnership/Engagement	Definition	Example	Rationale for Inclusion	Currently Offered Through
Guest Lectures	Bringing an expert on cap and trade to deliver a lecture in a class	Frances Edmonds from HP Canada provides an annual guest lecture to MScSM on the subject of EPR (Extended Producer Responsibility)	Provides real-world context for students; enables the speaker to connect with faculty and students with a view to future partnership (e.g.: for research, hiring, etc.)	Many courses – arranged usually by Faculty or Program Administrators
Industry Taught Courses	Industry experts teach full courses, or full modules, on specific subject matter	MScSM has a module-based course that covers carbon accounting, water and energy, taught by professionals from TRCA, Metrolinx and the Carbon Accounting Company	Provides real-world context for students; enables the speaker to connect with faculty and students with a view to future partnership (e.g.: for research, hiring, etc.)	Many courses – arranged usually by Faculty or Program Administrators
Advisory Boards	Industry experts sit on boards advising Programs or campus groups on content, structure, etc.	The MBIotech Program has an employer advisory board that meets once a year to provide input to the courses and for student development	Provides an open line of communication to keep course content, or activity content, relevant to changing industry trends; gives the campus concrete links to sectors and/or organizations	MBiotech, Career Centres (?)
Job Shadowing	Students spend a day following an industry professional to learn about the sector/career	A student interested in city planning spends a day with a Planner at the City of Toronto, “shadowing” them to learn more about what they do	A very easy, non-committal link between industry and the University; builds options for longer-term and more robust programming at a later date	Career Centre
Field Trips / Tours	Students in a class, or from a group, visit an offsite place to learn about their operations.	The MScSM Students go offsite and visit places like the GTAA (Airport), LUSH Cosmetics, and Waste Facilities	An effective way to bring students and faculty and staff out into the community – a physical presence of U of T, and also serves as a mechanism to solidify relationships with those industry partners hosting the tour with a view to future partnerships	MScSM; MMI; other programs?

Method of Partnership/Engagement	Definition	Example	Rationale for Inclusion	Currently Offered Through
Informational Interviews	Students meet with industry professional's 1:1 or in small groups to learn more about their sector or career areas	All MScSM students are required to do these as part of their professional development	Informational interviews lead to job creation, and the creation of projects that students can engage in. Serves a major role in student development and in helping students to understand the nature of a given workspace. Provides the industry partner with a warm connection into U of T.	MScSM; MMI other programs?
Mentorship Program	A formal pairing program between students and industry professionals in which they meet regularly	Unknown	Similar to informational interviews as above – an easy way to build a connection with an outside origination and share information (both internal-external and external-internal)	Unsure?
Day Of Service	Stand-alone days in which groups go to the community to perform a task / be helpful	The basketball team spending a day working in a soup kitchen serving meals	A tangible way for U of T to provide hands-on service to the community	CCP and Centres for Student Engagement / Student Life divisions; perhaps some student clubs and possibly some courses
For Credit: Internship	Students undertake a placement with an outside organization for-credit. Could be paid, could be unpaid. Sanctioned or required by the University.	Undergraduate environment students at UTM can take a 1-day-a week internship course, unpaid, for credit, in which they are placed in outside organizations.	A great way for students to both bring their expertise to organizations as well as learn. Also a very strong formal partnership between organizations and the University that is measurable.	Many – UTM has many undergrad courses that allow for this; MScSM and MMI allow for internships, Engineering, Forestry – many others.

Method of Partnership/Engagement	Definition	Example	Rationale for Inclusion	Currently Offered Through
For Credit: Co-Op	A 10-16 week for-credit, paid work-term in which an industry partner hires a student from a co-op approved Program, and can subsequently claim tax credit for doing so.	UTSC Co-Op Program; MScSM, MMI, MMPA Co-Op Programs	Has a long history; industry partners are familiar with the model. Allows for information/expertise and innovation to flow both direction (to/from the University to/from Industry). Excellent strength of partnership due to length and strength of outcomes.	Many – UTSC undergraduate, various graduate-level programs (e.g.: MMI, MScSM, MMPA, others)
For Credit: Service Learning	As part of a course, students go into the community to perform a task or project. Equal balance on the education of the student and needs of the community.	Woodsworth’s Roots of Criminal Justice Policy Course has lecture hours plus a service learning component, coordinated by the CCP.	Due to equal balance on student education and needs of community, is a good example of a “two-way street” and even partnership	Breadth of courses unknown; CCP will have a list
Course Projects	As part of a course, a student or group of students works with an outside organization for a task of some kind, approved by the Faculty member	MScSM Students in the Marketing elective work in a group of 4 on a real-world project for 25% of their grade; example would be a team working on promotional materials and media for Ch2MHill for a water treatment plant	Good way to bring university innovation and ideas to outside organizations; good exposure to industry for the students	Breadth of courses unknown but likely significant
Independent Jobs, Volunteer Roles	In which students undertake volunteer or part-time or summer roles, not sanctioned by the university, but on their own time	An MScSM student working part time for an environmental non-profit (Ecosource) while completing his studies.	Very difficult to quantify – but a collectively massive impact on the labour force through these roles –in which their knowledge and expertise is used at outside organizations	Career Center facilitates postings; some professional-stream programs will support; otherwise it’s difficult to fully capture. Centre for Student Engagement/Student Life may have some capture on volunteer hours facilitated through the University.

Method of Partnership/Engagement	Definition	Example	Rationale for Inclusion	Currently Offered Through
Volunteer Projects	The idea that an organization can approach the University with a project that requires assistance, and students (groups?) can participate on that project. IUPUI used to have a centre that focused on this (unsure if still exists). Not necessarily for credit, but more structured than a 1-off volunteer role.	Partners in Project Green approached MSCSM to bring together three students to undertake some data work with some partner industry organizations; students gained good experience for their resumes, and the firm was able to capitalize on their expertise.	Good experience for students – but also a good way to share information back and forth between the organization and the University. Industry benefits from the University’s students, and students benefit from the experience.	Unknown if this exists in any formal capacity. Centre for Student Engagement Programming at a minimum.
Research Partnerships	In which Faculty members / researchers at U of T are engaged with outside organizations for the purposes of furthering research; may also apply to students as well.	An MScSM student partnered with LoyaltyOne to explore the feasibility of a philanthropic program at the firm as part of his thesis.	Good way to bring U of T’s research strengths to industry/community; also outside organizations have an opportunity to contribute to research as well	Ask Devin – is there a way to capture fully?
Conferences	Students, Faculty and Staff attending conferences outside the University; the University hosting conferences that outside partners can attend	MSCSM students regularly attend sustainability conferences, both as presenters, and as delegates. Broadens the Program’s reputation, and gives students access to all sorts of cutting-edge information. Presenters have the opportunity to share their own work with industry which showcases U of T’s research expertise.	Less of a “partnership” – but a good way to bring U of T’s engagement in sustainability to the community at large, and to industry at large – may lead to job creation, research partnerships, or other methods of engagement via connections made	Happens within individual departments/units

Method of Partnership/Engagement	Definition	Example	Rationale for Inclusion	Currently Offered Through
Special Events	Industry professionals are often invited to attend special events at U of T – serves as a means to strength existing partnerships, but also bring people to campus, where potential future partnerships may begin	MScSM brings a range of industry partners to campus for our “Sustainability Leaders’ Series”. Students display posters, and attendees listen to a keynote lecture and participate in networking. Panels and networking events are also good examples.	Provides a chance for industry to see what the students and faculty are doing, but also to hear a keynote lecture on a sustainability topic each year. Fosters a sense of community, and good B2B connections can be made.	Diverse – many departments would be hosting this sort of event.
Alternative Reading Weeks	Students take part in projects in the local community (or sometimes elsewhere) during reading week	A student from MScSM went to Guatemala to work with the local community on coffee plantations	Students contribute significant time, knowledge and resources to community projects – and conversely gain excellent experience.	Facilitated through the CCP and possibly through other Student Life or Student Engagement Offices
Alumni Mentorship Programs	Like mentorship described above, but restricted to alumni	1:1 or small group pairings between alumni and students	Serves as a good way to get alumni involved in a very small way (which often is practical if they are early in their companies or careers) – which can forge a strong connection for future partnership.	Centre for Student Engagement; individual programs and colleges?

“Brokers” or “Catalysts” at U of T – 3 Campuses

The following groups are already engaged in brokering or connection work – in which they connect students, faculty or staff with external partners, including non-profits, NGOs, private corporations, start-ups, government agencies, and any other “external” group to the University. Purpose of these connections could be research, employment, skill-provision, funding, alumni services, or other areas. In some cases, the external partner comes TO the University seeking an engagement opportunity (i.e.: to choose from the “menu”, if you will), and in other cases the University reaches OUT to the external partner for an opportunity to partner or engage.

Tri-Campus Offices

- Career Centres (three locations – UTSC, UTM and St. George – in regular communication)
- Centre for Student Engagement Offices / Student Life Offices (separate offices, but in communication)

UTM

- Work Terms / Placements
 - MScSM – co-op term, in-course projects, field trips, mentorship, informational interviews)
 - MMI - co-op term, in-course projects, field trips, mentorship, informational interviews
 - MMPA – co-op terms
 - MBiotech – co-op terms
 - Undergraduate Internship Courses – Biology, CCIT, Economics, Education, Geography, Forensic Science, History, Language Studies, Psychology, Professional Writing & Communication, Sociology, Visual Studies, Women & Gender Studies, Management & Commerce – Faculty Leads & Office of the Dean – Experiential Education Office
- Service Learning
 - Undergrad Service Learning Courses – Computer Science, Environmental Sustainability, Equity and Diversity in Education, Human Anatomy, Inclusive Education, Restoration Ecology, World Religions & Ecology)
- Volunteerism
 - Career Centre
 - Centre for Student Engagement – Community Day Events, Innovation Projects, Action Projects, Alternative Reading Week
- Research Partnerships
- Alumni Office
- Additional note: Courses with EXP designation in course calendar have an experiential learning component, which may include partnership with external organizations
- Incubators
 - ICUBE

St. George

- Work Terms / Placements
 - Undergraduate Engineering – PEY and eSIP (Engineering)
 - Master of Forest Conservation (Forestry)
 - Master of Mathematical Finance
 - Master of Public Policy
 - MBA (Rotman)
 - Master of Information (iSchool)
 - Master of Global Affairs (Munk School)
 - Master of Science in Planning (Geography & Planning)
 - Master of Science in Applied Computing
- Service Learning
 - Centre for Community Partnerships
- Volunteerism
 - Career Centre
 - Centre for Community Partnerships
- Research Partnerships (need detail here)
- Alumni Office
- Incubators
 - Creative Destruction Lab
 - Department of Computer Science Innovation Lab
 - Hatchery
 - Health Innovation Hub
 - Impact Centre
 - Start@UTIAS
 - UTEST
- Exchange Offices (for academic exchange)

UTSC

- Work Terms / Placements
 - Undergraduate Co-Op: Biochemistry, Biological Chemistry, Chemistry, Computer Science, Environmental Biology, Environmental Chemistry, Environmental Geoscience, Environmental Physics, Environmental Science, Health Studies, International Development, Mathematics, Mental Health Studies, Molecular Biology & Biotechnology, Neuroscience, Psychology, Statistics, City Studies, English, French, Health Science (Policy), History, Linguistics, Philosophy, Psycholinguistics, Public Policy, Women & Gender Studies, Economics for Management Studies, Management, Management & Accounting, Management & Finance, Management & HR, Management & IT, Management & International Business, Management & Marketing, Strategic Management

- Master of Environmental Science (Physical and Environmental Sciences)
- Service Learning
 - Centre for Teaching and Learning - 4 courses offered
- Volunteerism
 - Academic Advising & Career Centre
- Research Partnerships (need detail here)
- Alumni Office
- Incubators
 - The Hub

2. Typology of Integrated Learning Experiences with External Partners

Approach	Classification		Focus			Outcome			Intensity		Location			Determination		
	Academic/ For credit	Co-curricular	Competency development	Research	Community engagement	Learning	Balanced	Service	Duration	Frequency	Field	University	Classroom	University	Student	Partner
Internship																
Professional experience year																
Placement																
Practicum																
Co-op																
Job shadow																
Tour																
Informational interview																
Mentorship																
Study abroad																
International exchange																
Capstone course																
'Partner' taught course																
Guest lecture																
Independent research project																
Course research project																
Research-based consulting																
Community action project																
Community based/engaged research																
Conference paper																
Conference attendance																
Alternate reading week																
Day of service																
Field trip																
Community event																
Community outreach																

Appendix D - Report of the UTM Sustainability Pathways Working Group

SUSTAINABILITY PATHWAYS WORKING GROUP REPORT

Revised Version July 6, 2018

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1.0 Context

The Vision Statement within UTM's Academic Plan (2017) includes the following phrase: *“UTM strives to educate highly accomplished individuals who are capable of leadership in the global knowledge economy, and who are thoughtful and empathetic global citizens able to reflect critically on the world and are committed to the values of integrity, democracy, and academic freedom.”*

The Plan has identified five attributes – Community, Creativity, Communication, Innovation and Sustainability – that make up UTM's identity. The Plan has also set five goals: 1) inspire student success by supporting a rigorous and innovative academic environment, 2) demonstrate that UTM is a home for world-class research, 3) enrich the student experience by embracing opportunities for community involvement, 4) educate future leaders to be global citizens meeting complex challenges, and 5) focus on transformation and innovation to create a sustainable and cohesive community. Sustainability, directly or indirectly, is embedded in all five goals. In addition, Goal 1 puts special emphasis on engaged learning through multi-disciplinary collaborations:

“UTM will continue to create imaginative new undergraduate educational experiences designed to challenge student thinking, performance and growth to new levels. This will include sponsoring opportunities for engaged learning in multi-disciplinary collaborations at UTM that link across departments in the humanities, social sciences, and sciences. For example, providing students with the option to include a ‘Sustainability Pathway’ in their degree will allow our students to leave UTM with a deeper appreciation and understanding of the complexity surrounding sustainability in all that it encompasses.”

As part of the Academic Implementation Process, Professor Amrita Daniere, Vice-Principal Academic and Dean, constituted the Sustainability Pathways Working Group (SPWG) (membership list is provided in **Appendix 1**) in December 2017. The SPWG has met four times. In the first meeting, held in early January 2018, the group discussed the many aspects that make up sustainability on campus – academic programs, research, outreach, and sustainability initiatives - and it was decided that the group will report on all aspects. In the second meeting, held in late January 2018, the group was divided into two further sub-groups – one charged with providing a working definition of sustainability and the other to report on the good practices of sustainability at universities (membership of the sub-groups is also provided in **Appendix 1**). These two sub-groups met twice independently, and once together. The two sub-groups drafted separate reports, and then worked together to produce a joint report. The joint report was discussed in a facilitated session on April 23, 2018. In this session, first different parts of the report were discussed in smaller groups, and later the whole group discussed the observations/suggestions of different groups. The observations/suggestions from the meeting on April 23, 2018 have been incorporated in this version.

2.0 Review of Sustainability Material

Sustainability Plans, Support Structures, Sustainability Tools, Courses and Programs

The SPWG decided to review relevant material. A brief summary of the elements included in the review is provided below.

2.1 Sustainability Plans

The group reviewed sustainability plans from leading universities who have placed a high importance on sustainability including Yale, Columbia, Harvard and University of British Columbia. Details of these plans are available at the links provided.

1) Yale Sustainability Plan 2025

https://sustainability.yale.edu/sites/default/files/sustainability_plan_2025.pdf

2) Columbia University Sustainability Plan 2017-2020

[https://sustainable.columbia.edu/sites/default/files/content/Columbia%20University%20Sustainability%20Plan\(1\).pdf](https://sustainable.columbia.edu/sites/default/files/content/Columbia%20University%20Sustainability%20Plan(1).pdf)

3) Harvard Sustainability Plan 2015-2020

<http://www.syntao.com/Uploads/files/Harvard%20Sustainability%20Plan.pdf>

4) University of British Columbia – 20-Year Sustainability Strategy

https://sustain.ubc.ca/sites/sustain.ubc.ca/files/uploads/CampusSustainability/CS_PDFs/PlansReports/Plans/20-Year-Sustainability-Strategy-UBC.pdf

2.2 Support Structures

Different universities have used different structures to promote sustainability. Some examples of different structures include:

a) University of British Columbia - The UBC Sustainability Initiative (USI) Office under the direct supervision of the Provost: UBC has made a commitment to integrate academics and operations in sustainability and the USI, established in 2010, is the main agent/structure for implementation of this commitment. The USI directly reports to the Provost. The USI is responsible for fostering partnerships and collaborations beyond traditional boundaries of disciplines, sectors and geographies. The USI's work is carried out under two themes - campus as a living laboratory and the University as an agent of change. The USI has four groups to implement different programs: the Regional and International Engagement Group; the Teaching, Learning, and Student Engagement Group; the Urban Innovation Research Group, and the Pacific Institute for Climate Solutions.

b) Arizona State University - Julie Ann Wrigley Global Institute of Sustainability: The Institute is the hub of ASU's sustainability initiatives, and its mandate includes advancing education, research, and business practices. The School of Sustainability, in the Institute, offers transdisciplinary degree programs focused on finding practical solutions to social, economic and environmental challenges. The school offers the following degrees: a BA in Sustainability, a BS in Sustainability, an MA in Sustainability, an MS in Sustainability, an MS in Global Sustainability Science, a Master of Sustainability Solutions, a Master of Sustainability Leadership, a 4+1 Accelerated Master of Sustainability Solutions, a Ph.D. in Sustainability, a Ph.D. in Sustainable Energy, and a Ph.D. in Complex Adaptive Systems Science. The Institute

has 18 Sustainability Programs and Solutions, such as the Centre for Biodiversity Outcomes and Sustainable Cities Network. In our terminology, it may be a Faculty (given the size of the unit and support staff of the Director), but this is not entirely clear from the materials available publicly.

c) Columbia University - The Earth Institute: The Earth Institute is hub of inter-disciplinary research and programs at Columbia. It blends research in the physical and social sciences, education and practical solutions to help guide the world onto a path toward sustainability. It has 24 Columbia-based research units and programs which are home to over 850 scientists, students, postdoctoral fellows and staff working to advance understanding in engineering, biology, and earth, health, and social science. It offers many undergraduate programs, Master and Ph.D. programs related to sustainability either by itself or in collaboration with other academic units. The status (in terms of an EDU) is not clear, but its operations are quite large.

2.3 Sustainability Tracking Tools

The group reviewed a Sustainability Tracking, Assessment & Rating System to identify what metrics are typically reported on by institutions of higher learning. The most common Sustainability Metric used by many universities is the Sustainable Campus Index developed by the Association for the Advancement of Sustainability in Higher Education (AASHE). AASHE publishes an annual report on sustainability performance of universities. University of Toronto does not currently participate in the AASHE report. Examples of components or elements that make up the Sustainable Campus Index are included as ***Appendix 2***.

2.4 Undergraduate Courses with Sustainability Content at UTM

Amy Geisberger, Master of Science in Sustainability Management (MScSM) student and SPWG Member, identified a large number of UTM courses that have sustainability content. The main filter used for identification of courses was the text that makes up the Sustainable Development Goals (SDG) since they encompass a breadth of topics within sustainability. After carefully analyzing the course calendar, she went online to peruse the syllabus of every course that seemed to have some content related to the SDGs. She assessed the detailed descriptions in each course syllabus and made a judgment as to whether or not it had aspects of sustainability as defined by the SDGs. If the syllabus included an outline of the individual lectures, she also made note of the topic and numbers of lectures with sustainability content to further help her gauge if a significant portion (about 25% or more) of the course was focused on sustainability.

She also recorded the contact information available for the professors teaching each course. Next steps should include directly approaching each professor as well as every department chair/director to get a better understanding of the available courses and decide how much of the course content actually focuses on sustainability.

This list of courses, which contain sustainability content (***Appendix 3***), is a starting point for further creation or modification of UTM's sustainability-oriented courses. The list of sustainability courses in each department will be finalized in consultation with concerned academic units.

2.5 Sustainability-Related Undergraduate Programs in Canada

The committee also prepared a list of all sustainability-related undergraduate programs in Canada. The list is provided in *Appendix 4*. There are many Major and Minor options related to sustainability, such as Environmental Science, Environmental Management, Resource Management etc. However, a Sustainability Pathway is only available at the University of British Columbia.

After reviewing and debating the content of this material, the SPWG created the other elements of its report (which are presented next).

3. Sustainability at UTM

3.1 Sustainability Vision

UTM strives to become a global leader in sustainability by fostering a culture of sustainability.

3.2 Definition of Sustainability

The World Commission on Environment and Development (WCED), commonly known as Brundtland Commission, introduced the concept of sustainable development (SD) and defined it as:

“development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

In its most cited definition of SD, the WCED draws upon several notions but the key element is non-separation of environment and development. The commission states:

“...the "environment" is where we live; and "development" is what we all do in attempting to improve our lot within that abode. The two are inseparable.”

In 2015, to operationalize the goal of a sustainable world, more than 190 world leaders committed to 17 Sustainable Development Goals (SDGs) to help us all address the challenge of climate change, end extreme poverty, and fight inequality & injustice. The 17 goals are: (1) no poverty; (2) no hunger; (3) good health; (4) quality education; (5) gender equity; (6) clean water and sanitation; (7) renewable energy; (8) good jobs and economic growth; (9) industry, innovation and infrastructure; (10) reduced inequalities; (11) sustainable cities and communities; (12) responsible consumption; (13) climate action; (14) life below water; (15) life on land; (16) peace and justice; and (17) partnerships for the goals.

Taking the fundamental aspects of our existence and our wellbeing into perspective, the SPWG group defines sustainability as:

“Sustainability rests on the principle that the biosphere is the foundation for all human activities: the well-being of present and future generations depends on the health of our shared ecosystems. The University of Toronto Mississauga has a unique role to play in fostering a culture of sustainability that respects the Earth and all of its inhabitants.”

3.3 Role of Academic Disciplines – Natural Sciences, Social Sciences, Humanities and Beyond

Sustainability, as defined above, is about human beings’ relations with the Earth and its other inhabitants. A culture of sustainability promotes the wellbeing of all generations, maintains healthy ecosystems, and fosters regenerative relations between natural, social, and technological systems.

Fostering such a culture requires an emphasis on holistic, integrative, and critical thinking that draws upon but also moves across traditional academic fields and disciplines. The natural sciences provide foundations for knowledge about the Earth’s systems and processes, gained through research and scholarly engagements in biology, chemistry, geology, physical geography, physics, psychology and others. The social sciences provide foundations for knowledge about social systems and processes, gained through research and scholarly engagements in anthropology, economics, human geography, political science, sociology and others. The humanities provide foundations for knowledge about meaning of systems and processes, gained through research and scholarly engagements in the arts, history, languages, philosophy and others.

In addition to these traditional fields and disciplines, transdisciplinary and newly emerging fields also play a fundamental role by synthesizing insights, revealing critical gaps in knowledge and developing new approaches. This includes, but is not limited to, bioinformatics, digital humanities, environmental studies, ethnic and indigenous studies, communications, transnational studies and women and gender studies. In short, a culture of sustainability hinges on the generation, integration, and application of holistic knowledge that draws from traditional, transdisciplinary and emerging academic fields, disciplines and areas of specialization.

3.4 Five Pillars of Sustainability Culture at UTM

A culture of sustainability can be fostered only by incorporating sustainability in all aspects of UTM, e.g. academic programs, research, human resources and infrastructure and by engaging the whole campus and society-at-large. Hence, Sustainability at UTM rests on the following five pillars.

- 1) Academic Programs and Curriculum
- 2) Research
- 3) Campus Engagement
- 4) Civic Engagement
- 5) Human Resources and Infrastructure

3.5 Sustainability Planning at UTM

Pillars 1 to 4 are related to academics and research while Pillar 5 is related to infrastructure and human resources, and these two categories of pillars require different time-horizons and the involvement of different stakeholders in planning and implementation. Given these differences, sustainability planning should be adopted in at least two distinct phases:

- a. **Short-term Plan:** This part of the plan should focus on Pillars 1 to 4, and the first plan may be based on a 3-year planning period.
- b. **Long-term Plan:** This part of the plan should be a more comprehensive plan incorporating all five pillars; the short-term plan (or its updated version) should become a part of the long-term plan. The first long-term plan may have a planning period of five years. The plan should also include Key Performance Indicators (KPIs) for each pillar, measurement frequency and should identify the administrative/academic units responsible for reporting on the different KPIs.

The next section provides more details regarding the five pillars and affiliated recommendations related to both plans.

4.0 Five Pillars and Plans

Main Point of Agreement

Sustainability initiatives and strategic plans at higher education institutions in Canada and around the world have gained momentum at an accelerated rate. For UTM to truly embrace sustainability, there is a clear demand for better integration between theory and practice; UTM needs to walk the talk as well as conduct the research and teach sustainability throughout the curriculum.

To lead the sustainability effort at UTM that bridges and supports academic research, student education and campus administration and physical logistics/operations, a new position of Vice-Principal Sustainability should be created (or the existing Vice-Principal Special Projects can be converted into Vice-Principal Sustainability). The mandate of this office should be lead and collectively inform an overarching divisional sustainability strategy that crosses boundaries yet simultaneously aligns progress towards an integrated sustainability practice. The VP Sustainability should be supported to become the command centre for Sustainability initiatives on campus.

A standing Sustainability Advisory Group (SAG) should be formed immediately. The group should have representation from a wide range of stakeholders. The SAG will advise and work with the VP Sustainability to develop a Long-Term Sustainability Strategic Plan for UTM that should include metrics for all pillars and activities. The SAG should also develop an implementation, monitoring (tracking progress), and reporting mechanisms for the strategic plan.

The VP Sustainability will report directly to the Principal and be given primary responsibility for implementing efforts around Pillars 3, 4, and 5, will work with VP Academic on Pillar 1 and with VP Research on Pillar 2, each elaborated in much more detail below. This new position and

office can serve as the bridge that connects our campus community, integrating the vast number of sustainability practices underway and planned initiatives, including academic, research and operational approaches, with an added goal of linking our campus to local and global communities engaged in sustainability efforts more broadly.

4.1 Short-Term Plan and Its Pillars

The Short-term Plan, as stated earlier, will incorporate the first four pillars. Details of each pillar and related recommendations are discussed next.

Pillar 1: Academic Programs & Curriculum

Based on our myriad and profound teaching experiences as well as lessons learned from existing programs, UTM will develop sustainability-specific academic opportunities for undergraduate and graduate students. These opportunities will be in the form of courses, experiential learning options, pathways and programs focused on sustainability.

Objectives: The learning opportunities should provide students with the space to explore creative approaches to current systems, use critical thinking skills and take calculated risks.

Undergraduate and graduate learning pathways should be interdisciplinary and freely accessible to all students, regardless of their degree program.

- A. Undergraduate Programs:** Each undergraduate student, regardless of their degree program, should have access to sustainability education.

Recommendations: In the short-term, UTM should introduce a Sustainability Pathway. In the long-term, UTM should also consider incorporating at least one “Sustainability Course” as part of UTM’s distribution requirements.

Sustainability Pathway: UTM should introduce a Sustainability Pathway as a Certificate option. The SPWG felt that a Certificate option will complement existing programs, such as the recently approved Sustainability Minor in the Geography Department. A certificate can provide options for students who already have focused their studies towards formal Subject POSTs (programs) such as a specialist, two majors or one major and two minors. The design of the Certificate option should address three important aspects. First, the credit requirements of a certificate should be less than the credit requirements of a minor program (1.5 to 3.5 credits because a minor requires 4.0 credits). Second, the certificate should be clearly distinguishable from other programs/opportunities (such as the new Sustainability Minor in the Geography Department). Third, all courses that comprise the certificate should be regular for-credit courses that can also count towards a student’s other program(s) or degree requirements.

Key recommendations for the educational attributes and structure of the Sustainability Pathway include:

Educational Attributes: Four key educational attributes are:

- i. **Sustainability Thinking** – systems and critical thinking as well as global citizenship
- ii. **Sustainability Knowledge** – from different perspectives: scientific, social and humanities
- iii. **Sustainability Integration:** integration of knowledge from different perspectives

iv. **Sustainability in Practice** – experiential learning and change agents

Certificate Program Structure (3.0 credits)

First and Second Years: 1.5 (0.5 credit in the first year and 1.0 credit in the second year) credits from required courses taken in the first and second Years

First Year: No new course need be created. Rather, sustainability should be embedded in foundational courses of the departments that support the Sustainability Pathway. The first year courses that include sustainability content should be identified, and ideally comprise pre-requisites for taking future steps along the Sustainability Pathway, which will be open to students in their second year.

Second Year: Two new courses (ideally called SUS200H5 and SUS201H5) focused on Sustainability should be created and made available to all students who have taken one or more of the first year courses identified above. These courses should include contents from natural science, social science and humanities. These courses will resemble the “Big Ideas” courses in the Faculty of Arts and Science (FAS) at the St. George campus. They will normally be taught by multiple instructors and also include elements of systems and critical thinking. It is very likely that these courses will have more than one (SCI, SSC, and HUM or some other such as UTM/IMI) designation. These courses will be required courses.

Third and Fourth Years: 1.5 credits from a list of electives, including a minimum of 0.5 credits having an EXP designation

Third Year: Two electives, which would include existing courses with significant sustainability content within departments (no new course need be created). These courses will be identified in consultation with departments. The departments should be allowed to co-designate the courses.

Experiential Learning Course – Experiential education opportunity including Co-op/Internship, community-based projects, ROPs and other modes of experiential learning. The existing departmental courses, which include a Co-op/Internship component (such as BIO400H, and JEG400/401Y and similar courses in other departments which have sustainability projects), should be included here even if they are offered in Third Year or Fourth Year. Ideally, all of these courses should be regular for-credit courses that can also count towards a student’s other program(s) and/or degree requirements. In addition, UTM should create a new SUS experiential course (SUS3XXH5 (EXP)) with an internship component. Other possible courses to consider as meeting this requirement of the proposed Certificate include popular study abroad courses with a strong sustainability component. All these details should be sorted out during formal program approval process.

Fourth Year: A new Capstone course (SUS4XXH) should be created as an elective option for Certificate students.

Finally, to further enrich the exposure to sustainability research, values and experiences for undergraduate students, UTM should initiate a monthly sustainability lecture series.

Guidelines for Academic Next Steps

1. Create a brief document that includes existing UTM courses that are eligible for Certificate purposes and which may be eligible if more sustainability content is added.
2. Identify one faculty member in each department to:
 - Recruit/select courses
 - Coordinate with academic advisors/committees
 - Propose courses for inclusion in the Certificate program
3. Request that the Dean compose and send a letter to all Chairs and Directors that includes information about possible:
 - Support/funding/complement
 - Benefits in terms of attracting students to UTM and to their departments, which include:
 - i. Market research
 - ii. Employability
 - iii. Facilitation of civic engagement
4. An SPWG website should be created that helps to increase awareness about the new academic options for faculty and students and should include:
 - A brief summary of this report (1-2 pages)
 - A current list of identified sustainability courses (.xlsx)
 - An explanation of the purpose and structure of the proposed Certificate
5. Create a timeline grid/graphics for pillar one (e.g. Yale)
6. Use sustainability content to build critical thinking, reading, writing, literacy, numeracy
 - Connect to UTM's Academic Plan working groups

Resource Complements

- (i) To facilitate administration and to streamline access for students, only one academic unit (department/institute) should be responsible for administering the Sustainability Pathway Certificate, as well as student advising. The unit should be provided with sufficient human and financial resources.

- (ii) Faculty Complement: Additional faculty complement (research and/or teaching steam) may be considered for the departments that plan to participate in the Sustainability Pathway Certificate. In such instances, a firm commitment to offer and promote the Pathway certificate will be required from any academic unit who seeks additional complement for this purpose.
- (iii) Resources for First Year Courses: Additional resources in terms of Teaching Assistant(s) and/or Research Assistant hours should be provided to incorporate sustainability content.
- (iv) Resources for Second Year Courses: These courses will be challenging to design and deliver. Additional resources – that may be similar to the FAS “Big Ideas” course - should be allocated for these courses.
- (v) A new Sustainability Pathways Grant should be started to support the development of sustainability courses/opportunities within a department that may include the revision of existing undergraduate courses.
- (vi) Similar to UBC, Faculty Sustainability Fellowships should be created to support Sustainability Champions in departments who will lead various sustainability initiatives including implementation of the Sustainability Pathway Certificate.
- (vii) To promote a better understanding of different disciplines in Sustainability, a Workshop/ Conference on the Role of Different Disciplines in Sustainability should be organized in 2018-19. At this event, experts from different disciplines who are working on sustainability issues should be invited as guest speakers.

B. Graduate Programs: Similar to undergraduate students, all graduate students, regardless of their degree program, should have access to sustainability education.

Recommendations: UTM should explore the possibility of starting the following two programs.

- (i) Sustainability Summer School for Ph.D. students; and
- (ii) Collaborative Program in Sustainability for all graduate students.

Both programs should be inter-disciplinary and open to all students. Programs should be supported with required human and financial resources.

Pillar 2: Research

Building upon UTM’s excellence and diversity in terms of research, the campus should develop sustainability-specific inter-disciplinary (theoretical and applied) research opportunities for professors, graduate students, and undergraduate students. These opportunities should be in the form of research projects and research grants.

Objectives: UTM should become the pioneer for inter-disciplinary research related to sustainability within the University of Toronto. Research opportunities should provide a unique

academic space/environment to work in multi-disciplinary teams on various sustainability-related issues/problems and their solutions. The space should accommodate theoretical as well as applied research, and researchers (including graduate and undergraduate students) from natural science, social science, and humanities.

Recommendations

UTM should fund sustainability research at levels that create powerful incentives for faculty to embrace and engage in this area. These funding support levels below are *suggested targets* that UTM should aspire to reach.

- (i) **Research Grants for Professors:** UTM should allocate at least \$500,000/year for research projects proposed and led by faculty. The grants should be tiered in terms of size and duration. Suggested amounts range from \$60,000 for larger grants and as little as \$10,000 for smaller grants. It is also suggested that larger projects allow for implementation over a two to three-year period. All grants should be limited to interdisciplinary research projects, and the research teams should include faculty from at least two or more disciplines/departments. SPWG members urged that research proposals include the active involvement of students and that projects include scholarships/salaries of Post-Doctoral Fellows and Research Associates.
- (ii) **Research Grants for Graduate and Undergraduate Students:** UTM should allocate at least \$50,000/year for student-driven research projects related to sustainability. The suggested grant amount is from \$2,000 to \$5,000. These grants could potentially fund summer schools, research travel, publication fees, independent research projects on sustainability, small equipment, field travel and other participation in research activities, It is suggested that these grants also be available to ROP students engaged in sustainability research.
- (iii) **Research areas:** The research grants should not be limited to any specific discipline and/or research topic. The description of research areas and topics should be flexible and open-ended to encourage member of every department and academic unit at UTM to participate.
- (iv) **Sustainability Grants Committee (SGC):** A Sustainability Grants Committee should be formed to review and recommend grants. As with other research funding committees at UTM, the SGC should be made up of members from multiple disciplines that, ideally, roughly reflects the disciplinary diversity of the applicant pool. The committee should be chaired by the Vice-Principal Research and include input from the Vice-Principal Academic, and Vice-Principal Sustainability (proposed in this document).
- (v) **Promotion of Sustainability Research and Scholars:** UTM should develop a research website to promote scholarly research on sustainability being conducted by

UTM researchers. Promotion of this kind can help to develop sustainability-related partnerships and attract research funds to UTM.

In addition, UTM should support faculty attending conferences that feature research addressing themes on environmental sustainability, sustainability in economic, social, and cultural context, sustainability policy and practice, as well as sustainability education. One such example is the [International Conference on Environmental, Cultural, Economic & Social Sustainability](#) whose 2019 Special Focus is: From Pedagogies for Sustainability to Transformative Social Change.

All recipients of any sustainability research funding should also promote sustainability efforts on the campus; these activities may include participation and contributions to Sustainability Seminar/Colloquia Series (Pillar 3) and activities related to civic engagement (Pillar 4) such as Let us Talk Sustainability, Sustainability Summer Camp, Peel Region Science Fair.

- (vi) **Sustainability-Friendly Labs Program:** UTM should develop a well-funded and implemented program to reduce the environmental impacts of research-related activities and to support a healthy work environment in UTM labs. A Sustainability Revolving Fund should be created to promote this program. The funds can be used to reduce consumption of gas, electricity, water, chemicals, and to improve the work environment in labs. The SPWG proposes that UTM allocate at least \$100,000/per year for this program.

- (vii) **Global Conference on Sustainability:** UTM should consider organizing a global conference on sustainability every other year.

Resource Complements

- (i) A sub-unit, supported by adequate financial and human resources, within the VP Research portfolio and/or VP Sustainability portfolio will be necessary to implement the Sustainability research program.
- (ii) The unit should have an advisory committee with representation from sustainability scholars from different disciplines.
- (iii) The staff in the unit should also possess an educational background in the environmental, social and/or economic aspects of sustainability.

Pillar 3: Campus Engagement

UTM will support campus-based student, staff and faculty-driven initiatives surrounding issues of importance, including, but not limited to well-being, food and dining services, waste

management, water quality, transportation, infrastructure, energy utilization and grounds maintenance.

Objectives: Widespread campus engagement will contribute towards fostering a culture of sustainability through student, staff and faculty-driven activities in the areas that will directly contribute to making this campus a more sustainable community.

Recommendations:

- (i) **Sustainability Seminar/Colloquia Series:** UTM should start a seminar/colloquia/workshop series (also recommended in Section 4.1) with sustainability topics to edify campus members. The series may invite speakers from the areas identified above, such as water quality.
- (ii) **Sustainability Orientation:** Add material related to sustainability and/or Sustainable UTM to the website of the UTM/Sustainability Office as well as to campus recruitment and orientation events
- (iii) **Sustainability Poster Competition:** UTM should start an annual Sustainability Poster Competition. The competition may have different awards for undergraduate and graduate students. The poster competitions can also focus on different themes related to the topics identified above.
- (iv) **Campus Life and Sustainability:** UTM should consider incorporating Sustainability into the Campus Life menu on the UTM website and as part of opportunities offered through the Centre for Student Engagement.
- (iv) **Peace Garden:** UTM should consider developing a joint peace/indigenous garden and public space on campus as a symbol of the importance of international peace and its benefits to humanity. This is a fundamental tenant of social sustainability. The garden should be developed at a prominent location. The process of garden development should be inclusive and Indigenous leaders should be actively involved.
- (v) **Engagement of Student Clubs:** UTM should consider programs to promote sustainability through student clubs. Small grants, specifically for student clubs, for sustainability initiatives could be used to incentivize these efforts.
- (vi) **Professional Development (PD) for Staff Members:** UTM should consider creating professional development activities focused on sustainability. PD can include grants to attend workshops/courses, time release for staff to take courses related to sustainability, and organization of staff-oriented sustainability educational opportunities.

- (vii) **Recognition and Awards:** UTM should provide awards for students, student groups, staff and/or faculty who show leadership in sustainable practices on campus including co-curricular activities and other new ideas.
- (viii) **Sustainability Engagement Grants/ Loan Program:** UTM should create incentives for students, staff and faculty who wish to promote a sustainability culture on campus. UBC's Sustainability Coordinator (SC) program may be used as a model to develop details of this program.
- (ix) **Food and Dining Services and Waste Management:** UTM should immediately start reviewing and improving campus food and dining services and waste management practices with an eye to improving sustainable food practices.

Resource Complements

- (i) The Vice-President Sustainability portfolio should be responsible for all campus engagement and civic engagement activities. This administrative unit will also ensure that other opportunities/activities that are marketed as having sustainability themes are aligned with UTM's sustainability vision and plan.
- (ii) As indicated under previous pillar(s), consider where already-existing staff and faculty can support campus engagement opportunities.
- (iii) The unit/sub-unit should be supported with required financial and human resources.

Pillar 4: Civic Engagement

In recognition of our position in the broader ecosystem, UTM will support partnerships with schools, conservation authorities, local and broader government and community/neighborhood organizations that promote sustainable practices. This would include promoting authentic interactions between campus and community members leveraging the full range of human communications, which encourages development of verbal, analytical, and written skills.

Objectives: Such civic engagement will contribute towards fostering a culture of sustainability through engagement with a wider community. Supporting this pillar will also help position UTM as part of a broader natural, social, political and organizational ecosystem, embedded within Peel or the GTA.

Recommendations

- (i) UTM should explore all possibilities through the Centre for Student Engagement and Experiential Education Unit for existing opportunities or to create new ones for civic

engagement (to develop and strengthen connections with Mississauga, Peel Region, Ontario, and Canada).

- (ii) **Partnership with Let's Talk Science:** UTM should develop a partnership with this group to promote sustainability among elementary and high school students. UTM should also explore the possibilities of organizing a separate event on Let's Talk Sustainability, with or without partnership of Let's Talk Science.
- (iii) **Peel Region Science Fair:** UTM should also develop a sustainability component (competition on sustainability-focused projects) in this science fair.
- (iv) **Summer Camps Focused on Sustainability:** UTM should explore possibilities of organizing sustainability-focused summer camps for elementary school students either as a part of its existing summer camps or an independent stream of summer camps.
- (v) **Team-building Events:** UTM managers and/or leaders should be encouraged to coordinate team-building events whereby entire teams/units volunteer with a program or organization (such as an NGO, Habitat for Humanity, a food bank), which encourages learning and sharing of experiences and cultures. A Sustainability leadership course should be organized for city councilors to be offered on-campus on an annual basis if it proves successful.
- (vi) **Partnerships and Support of Community Organizations:** UTM should introduce a program for staff to contribute a fixed number of paid days per year (for example, seven) to provide professional support to community organizations that have mandates consistent with UTM's Sustainability Plan. Examples include: The United Way campaign and where it should be possible for UTM to support community organizations through individual or coordinated donations and by allowing embedding of UTM staff and faculty and librarians. This could mean, for example, allowing the Mississauga Food Bank to partner with UTM on yearly events such as the Principal's Holiday reception. Other possible organizations to partner with are Toronto and Region Conservation Authority (TRCA), EcoSource, and Credit Valley Conservation.

Resource Complements

- (i) VP Sustainability will be responsible for campus engagement activities.

- (ii) Consider where already-existing staff (such as Environment & Sustainability Coordinator) can support managers and leaders who have ideas on how to become more involved or active with the community.
- (iii) Consider having Sustainability Ambassadors (much like Health & Safety representatives) representing collective units on campus, who meet regularly with a central administrative unit, a coordinator and/or Faculty so that ideas and knowledge can be shared and disseminated.
- (iv) Human Resources and management at UTM has to be supportive of the financial implications of staff being away from the office for a day or days, understanding the ultimate way it gives back to the community.

4.2 Long-Term Plan and Its Pillars

To foster a culture of sustainability in the long-term, it is essential that we ‘walk the talk’. Hence, the integration of sustainability principles and incorporation of the best possible standards of sustainability practices in our human resource and infrastructure management will be critical for building our reputation as a global leader in sustainability.

The long-term plan, as stated earlier, will include all pillars. Other pillars have been discussed in the short-term plan, and here we discuss only Pillar 5.

Pillar 5: Human Resources & Infrastructure

The main focus of this pillar is to build sustainability into human resource infrastructure management practices. Some of the aspects that need to be addressed in this pillar are air quality, buildings, energy use, food and dining, greenhouse gas (GHG) emissions, grounds, purchasing, transportation, waste, water use, employee engagement and well-being.

The scope of this pillar is very broad, and the UTM stakeholders related to human resources and infrastructure are not represented on the SPWG. The SPWG does not have enough understanding, data, time, and other resources to offer informed input into the long-term plan in this area.

Recommendations:

- (i) As mentioned above in section 4.0, create a new position of Vice-Principal Sustainability. The Office of the VP Sustainability will oversee all other sustainability-related activities and initiatives at UTM. The Office of the VP Sustainability should have three units – (i) Campus and Civic Engagement; (ii) Human Resources, Infrastructure, and Reporting; and (iii) Coordination of Sustainability related Academic and Research Initiatives and Outreach. The VP Sustainability should be added to the membership of the UTM Executive Committee. The appropriate level of resourcing for this new office is to be

determined, but should be supported to take a leadership role in Sustainability at UTM, Mississauga, Ontario, Canada, and globally.

- (ii) A standing Sustainability Advisory Group (SAG) should be formed immediately. The group should have representation from all stakeholders. The SAG will advise the VP Sustainability.
- (iii) The SAG should work with the VP Sustainability to develop a Long-Term Sustainability Strategic Plan for UTM. The SAG should be able to request the services as needed of expert consultants to support the development of the Sustainability Strategic Plan. The Plan should include metrics for all pillars and activities. Examples of metrics related to five pillars are detailed in Appendix 2.
- (iv) Given the importance of Sustainability overall to UTM, the VP Sustainability should be supported by an appropriate structure and resources to implement, monitor, and report on all of the short-term and long-term sustainability plans.
- (v) UTM should become a member of AASHE STARS as soon as possible; AASHE reporting could become part of the coursework in 3rd year experiential learning courses and/or capstone courses.

Appendix 1

Sustainability Pathways Working Group (SPWG) University of Toronto Mississauga

A. Membership of the group

1. Prof. Amrita Daniere (VP Academic and Dean, UTM)
2. Prof. Ingo Ensminger (Department of Biology)
3. Prof. Jumi Shin (Department of Chemical and Physical Sciences)
4. Prof. Teresa Lobalsamo (Department of Language Studies)
5. Prof. Barbara Murck (Department of Geography)
6. Prof. Joan Simalchik (Department of Historical Studies)
7. Prof. Soo Min Toh (Department of Management)
8. Prof. Steven Hoffman (Department of Sociology)
9. Prof. Amy Mullin (Department of Philosophy)
10. Prof. Jeffrey Graham (Department of Psychology)
11. Christopher Lengyell (Student Housing & Residence Life)
12. Laura Ferlito (Academic Advisor, Office of the Registrar)
13. Lorretta Neebar (Registrar & Director of Enrolment Management, Office of the Registrar)
14. Amy Geisberger (MScSM Student)
15. Julia Morton-Marr (International Holistic Tourism Education Centre)
16. Anuar Rodrigues (Director, Academic Planning, Policy, and Research, Office of the Dean)
17. Prof. Shashi Kant (Director, MScSM)

B. Membership of Two Sub-groups

Sub-group on Sustainability Definition

1. Prof. Jumi Shin (Department of Chemical and Physical Sciences)
2. Prof. Barbara Murck (Department of Geography)
3. Prof. Steven Hoffman (Department of Sociology)
4. Laura Ferlito (Academic Advisor, Office of the Registrar)
5. Prof. Shashi Kant (Program Director, MScSM)

Sub-group on Best Practices of Sustainability

1. Prof. Joan Simalchik (Department of Historical Studies)
2. Prof. Soo Min Toh (Department of Management)
3. Lorretta Neebar (Registrar & Director of Enrolment Management, Office of the Registrar)
4. Amy Geisberger (MScSM Student)
5. Prof. Shashi Kant (Director, MScSM)

Appendix 2

Metrics (based on AASHE Technical Manual)

Pillar 1: Academic Programs & Curriculum

- Academic courses
 - An inventory of courses that have been identified as “sustainability courses” and “courses that include sustainability” using the definitions provided by AASHE
- Learning Outcomes
 - Number of students that graduate from programs that have adopted at least one sustainability learning outcome
- Undergraduate Programs
 - Number of sustainability-focused programs and sustainability-focused minors of concentration
- Graduate Programs
 - Number of sustainability-focused programs and sustainability focused minors of concentration
- Immersive Experience
 - Immersive, sustainability-focused educational programs that are one week or more in length and may take place off-campus, abroad, or on-campus
- Sustainability Literacy Assessment
 - Conduct an assessment of the sustainability literacy of students
- Incentives for Developing Courses
 - An ongoing program that offers incentives for faculty in multiple disciplines to develop new sustainability courses and/or incorporate sustainability into existing courses
- Campus as a Living Laboratory
 - utilizing its infrastructure and operations for multidisciplinary student learning and applied research that contributes to understanding campus sustainability

Pillar 2: Research

- Research and Scholarship

- An inventory of Faculty and staff engaged in sustainability research and Departments that conduct sustainability research
- Support for Research
 - Encourage and support sustainability research
- Open Access to Research
 - Published open access policy that ensures that versions of future scholarly articles by faculty and staff are deposited in designated open access repository

Pillar 3: Campus Engagement

- Student Educators Program
 - Total number of students served by a peer-to-peer outreach and education program
- Student orientation
 - Percentage of entering students provided orientation activities and programming that include sustainability
- Student life
 - Number of co-curricular sustainability programs and initiatives
- Outreach Materials and Publications
 - Production of outreach materials and/or publications that foster sustainability learning and knowledge
- Outreach Campaigns
 - Hold at least one sustainability-related outreach campaign directed at students
 - Hold at least one sustainability-related outreach campaign directed at employees
- Assessing Sustainability Culture
 - Conduct an assessment of campus sustainability culture

Pillar 4: Civic Engagement

- Community Partnership
 - At least one formal community partnership that is either transformative, collaborative or supportive
- Inter-Campus Collaboration

- Collaboration with other colleges and universities to support and help build the campus sustainability community
- Continuing Education
 - Conduct an inventory during the previous three years to identify continuing education courses that address sustainability
 - Have at least one sustainability-themed certificate program through continuing education or extension department
- Community Service
 - Engage student body in community service, as measured by the percentage of students who participate in community service
 - Engage students in community service, as measured by the average hours contributed per student per year
- Participation in Public Policy
 - Advocate for public policies that support campus sustainability or that otherwise advance sustainability
- Trademark Licensing
 - Become a member of the Fair Labor Association (FLA) and/or the Worker Rights Consortium (WRC)

Pillar 5: Human Resources & Infrastructure

Air Quality

- Greenhouse Gas Emissions
 - Conduct a publicly available greenhouse gas (GHG) emissions inventory that includes, at minimum, Scope 1 and Scope 2 GHG emissions and may also include Scope 3 GHG emissions
 - Reduce its adjusted net Scope 1 and Scope 2 GHG emissions per weighted campus user compared to a baseline
 - Annual adjusted net Scope 1 and Scope 2 GHG emissions are less than the minimum performance threshold of 0.02 metric tons of carbon dioxide equivalent (MtCO₂e) per gross square foot (0.215 MtCO₂e per gross square meter) of floor area
- Outdoor Air Quality
 - Written policies or guidelines to improve outdoor air quality and minimize air pollutant emissions from mobile sources on campus
 - Complete an inventory of significant air emissions from stationary sources on campus or else verified that no such emissions are produced. Significant emissions include nitrogen oxides (NO_x), sulfur oxides (SO_x), and other standard

categories of air emissions identified in environmental permits held by the institution, international conventions, and/or national laws or regulations

Buildings

- Building Operations and Maintenance
 - Certified under a green building rating system focused on the operations and maintenance of existing buildings, e.g., LEED®: Building Operations + Maintenance (O+M) and/or Operate and maintain in accordance with published sustainable operations and maintenance guidelines and policies that include one or more of the following:
- Building Design and Construction
 - Buildings that were constructed or underwent major renovations in the previous five years are: 1) Certified under a green building rating system for new construction and major renovations, e.g., LEED®: Building Design & Construction (BD+C) 2) Certified Living under the Living Building Challenge and/or 3) Designed and built in accordance with published green building codes, guidelines and/or policies

Energy

- Building Energy Consumption
 - Reduced total building energy consumption per gross square foot/meter of floor area compared to a baseline
 - Annual building energy consumption is less than the minimum performance threshold of 65 BTU per gross square foot per Fahrenheit degree day (389 BTU per gross square meter per Celsius degree day).
- Clean and Renewable Energy
 - Supports the development and use of clean and renewable energy sources

Food & Dining

- Food and Beverage Purchasing
 - Primary dining services contractor conducts an inventory to identify food and beverage purchases that have the following attributes: 1) Third Party Verified. The product is sustainably and/or ethically -produced as determined by one or more recognized food and beverage sustainability standards. 2) Local & Community Based. The product does not qualify as Third Party Verified, but meets the criteria outlined in the table below. This category provides a path for campus farms and gardens and small and mid-sized producers to be recognized in the absence of third party certification.
- Sustainable Dining
 - Dining services support sustainable food systems in one or more ways

Grounds

- Landscape Management
 - Grounds include areas that are managed in accordance with: 1) an Integrated Pest Management (IPM) program; and/or 2) an organic land care standard or landscape management program that has eliminated the use of inorganic fertilizers and chemical pesticides, fungicides and herbicides in favor of ecologically preferable materials.
- Biodiversity
 - Conduct one or both of the following: 1) an assessment to identify endangered and vulnerable species (including migratory species) with habitats on institution-owned or -managed land; and/or 2) an assessment to identify environmentally sensitive areas on institution-owned or -managed land.

Purchasing

- Sustainable Procurement
 - Written policies, guidelines or directives that seek to support sustainable purchasing across commodity categories institution-wide
 - Employ Life Cycle Cost Analysis (LCCA) as a matter of policy and practice when evaluating energy- and water-using products, systems and building components
- Electronics Purchasing
 - Purchase EPEAT registered products for desktop and notebook/laptop computers, displays, thin clients, tablets/slates, televisions and imaging equipment (copiers, digital duplicators, facsimile machines, mailing machines, multifunction devices, printers and scanners)
- Cleaning and Janitorial Purchasing
 - Main cleaning or housekeeping department(s) and/or contractor(s) purchase cleaning and janitorial paper products which are environmentally-conscious
- Office Paper Purchasing
 - Purchase office paper with post-consumer recycled, agricultural residue, and/or Forest Stewardship Council (FSC) certified content.

Transportation

- Campus Fleet
 - Supports alternative fuel and power technology by including appropriate components in its motorized vehicle fleet vehicles
- Student Commute Modal Split
 - Students commute to and from campus using more sustainable commuting options such as walking, bicycling, vanpooling or carpooling, taking public transportation, riding motorcycles or scooters, riding a campus shuttle, or a combination of these options
- Employee Commute Modal Split

- Employees (faculty, staff, and administrators) get to and from campus using more sustainable commuting options such as walking, bicycling, vanpooling or carpooling, taking public transportation, riding motorcycles or scooters, riding a campus shuttle, telecommuting, or a combination of these options
- Support for Sustainable Transportation
 - Implement one or more strategies to encourage more sustainable modes of transportation and reduce the impact of student and employee commuting

Waste

- Waste Minimization and Diversion
 - Implement source reduction strategies to reduce the total amount of waste generated (materials diverted + materials disposed) per weighted campus user compared to a baseline
 - Total annual waste generation (materials diverted and disposed) is less than the minimum performance threshold of 0.50 tons (0.45 tonnes) per weighted campus user.
 - Divert materials from the landfill or incinerator by recycling, composting, donating or re-selling
- Construction and Demolition Waste Diversion
 - Divert non-hazardous construction and demolition waste from the landfill and/or incinerator. Soil and organic debris from excavating or clearing the site do not count for this credit.
- Hazardous Waste Management
 - Strategies in place to safely dispose of all hazardous, special (e.g., coal ash), universal, and non-regulated chemical waste and seeks to minimize the presence of these materials on campus.
 - Program in place to recycle, reuse, and/or refurbish electronic waste generated by the institution and/or its students. Institution ensures that the electronic waste is recycled responsibly by using a recycler certified under the e-Stewards® and/or Responsible Recycling (R2) standards.

Water

- Water Use
 - Reduce its potable water use per weighted campus user compared to a baseline
 - Reduce its potable water use per gross square foot/meter of floor area compared to a baseline
 - Reduce its total water use (potable + non-potable) per acre/hectare of vegetated grounds compared to a baseline
- Rainwater Management

- Use green infrastructure and low impact development (LID) practices to help mitigate stormwater run-off impacts and treat rainwater as a resource rather than as a waste product

Sustainability Coordination

- Sustainability Planning
 - Publish one or more written plans that include measurable sustainability objectives

Diversity & Affordability

- Diversity and Equity Coordination
 - Institution has a diversity and equity committee, office and/or officer (or the equivalent) tasked by the administration or governing body to advise on and implement policies, programs, and training related to diversity, equity, inclusion and human rights on campus. The committee, office and/or officer may focus on students and/or employees.
 - Institution makes cultural competence training and activities available to students, staff, and/or faculty.
- Assessing Diversity and Equity
 - Institution has engaged in a structured assessment process during the previous three years to improve diversity, equity, and inclusion on campus
- Support for Underrepresented Groups
 - Institution has one or more policies, programs or initiatives to support underrepresented groups and foster a more diverse and inclusive campus community
- Affordability and Access
 - Institution has policies and programs in place to make it accessible and affordable to low-income students and/or to support non-traditional students

Investment & Finance

- Committee on Investor Responsibility
 - Institution has a formally established and active committee on investor responsibility (CIR) or equivalent body that makes recommendations to fund decision-makers on socially and environmentally responsible investment opportunities across asset classes, including proxy voting (if the institution engages in proxy voting)
- Sustainable Investment
 - There are two possible approaches to this credit; institutions may pursue one or both. Institutions for which investments are handled by the university system, a separate foundation of the institution and/or a management company contracted by the institution should report on the combined activities of those entities.
 - Option 1: Positive Sustainability Investment or Option 2: Investor Engagement

- Investment Disclosure
 - Institution makes a snapshot of its investment holdings available to the public, including the amount invested in each fund and/or company and proxy voting records. The snapshot of holdings is updated at least once per year.

Wellbeing & Work

- Employee Compensation
 - More than 75 percent of the institution’s employees receive a living wage (benefits excluded)
 - Institution is able to verify that more than 75 percent of the employees as contractors that work on-site as part of regular and ongoing campus operations receive a living wage (benefits excluded)
 - Total compensation provided to the institution’s lowest paid regular (i.e., permanent) employee or pay grade meets or exceeds the local living wage
- Wellness Program
 - Institution has a wellness and/or employee assistance program that makes available counseling, referral, and well-being services to all students, staff, and/or faculty members
- Workplace Health and Safety
 - Institution has reduced its total number of recordable workplace injuries and occupational disease cases per full-time equivalent (FTE) employee compared to a baseline
 - Institution has fewer than 6 recordable workplace injuries and occupational disease cases annually per 100 full- time equivalent (FTE) employees

Employee Engagement

- Employee Educators Program
 - Number of employees served by a peer-to- peer outreach program
- Employee Orientation
 - Percentage of new employees offered orientation and/or outreach and guidance materials that cover sustainability
- Staff Professional Development
 - Estimated percentage of regular staff that participates annually in sustainability professional development and training

Innovation & Leadership

- Innovation

- Innovation credits are open-ended and reserved for new, extraordinary, unique, groundbreaking, or uncommon outcomes, policies, and practices that address sustainability challenges and are not covered by an existing credit or exemplary practice option

Appendix 3

Undergraduate Courses with Sustainability Content at UTM

(Not included here)

Appendix 4

Sustainability-Related Undergraduate Programs in Canada

(not included here)

Appendix E – Inventory of Undergraduate Courses with Sustainability Content

















University of Toronto’s Sustainability Course Inventory

by the Expanded Student Engagement (ESE) in Sustainability Education Research Group
July 2018

The ESE Project is intended to support the goals of the President’s Advisory Committee on the Environment, Climate Change, and Sustainability (PACECCS)’s Subcommittee on Curriculum Innovation. Under the direction of the Committee in 2018-2019, the ESE created a comprehensive inventory of all undergraduate sustainability courses at the University of Toronto. The inventory includes 2028 sustainability-oriented courses, representing approximately one-fifth of all undergraduate courses at U of T. The purpose of the sustainability course inventory is increase the visibility of such courses, making it more accessible for students to add sustainability content to their educational experience. Thereby, the ESE hopes to encourage deeper understanding of the societal shift towards sustainability, to contribute to the creation of a culture of sustainability at the university. The inventory is based on keywords derived from the [United Nations Sustainable Development Goals \(SDGs\)](#). The SDGs were chosen as a basis for the inventory due to their comprehensiveness and widespread usage in the sustainability field. The ESE team collaborated with the PACECCS to select which keywords would be used to represent each of the first 16 SDGs. (SDG 17, “Strengthen the means of implementation and revitalize the goal partnership for sustainable development,” was excluded from the methodology, as it encompasses the act of achieving the other goals rather than bringing a new perspective to sustainability). See Table 1.

Table 1. The UN Sustainable Development Goals and inventory keywords

Using these keywords, titles and descriptions of undergraduate courses were searched through U of T’s [Course Finder](#) website. The search results were quality assured by the ESE team to remove any courses which were deemed not to have sustainability content. When the ESE found a course that they weren’t certain fit the scope of a particular SDG, they looked up its

SDGs	Keywords:	SDGs	Keywords:	SDGs	Keywords:	SDGs	Keywords:
	Poverty; income distribution; wealth distribution; socio economic		gender; women; equality; girl		infrastructure; innovation; industr*; buildings		climate; greenhouse gas; environment; global warming; weather
	agriculture; food; nutrition		water; sanitation		trade; inequality; financial market; taxation		ocean; marine; water; pollut*; conserv*; fish
	health; well being		energy; renewable; wind; solar; geothermal; hydro electric		cities*; urban; resilien*; rural		forest; biodiversity; ecology; pollut*; conserv*; land use
	educat*; inclusive; equitable		employment; economic growth; sustainable development; labour, worker; wage		consum*; production; waste; natural resources; recycl*; industrial ecology; sustainable design		institution; justice; governance; peace; rights

description in the Course Finder, and from the course description determined whether they believed it was centrally relevant to the SDG or not. In the Sustainability Course Inventory, the following information was documented: course code (with hyperlink to course description on Course Finder), course title, credits, campus, department, term, relevant keywords, year level, and the SDG(s) to which the course is related.

Shown below is a sample page of the sustainability course inventory. The complete inventory can be accessed online through the following link:

https://docs.google.com/spreadsheets/d/1FIFYiLG4Tf1g52hmBOLzE_AfedcZf8_B8jQFH0otbls/edit?usp=sharing. If you are a professor at the University of Toronto and think that a course should be deleted from or added to the inventory, please [contact us](#).

Sample page from inventory of sustainability-oriented undergraduate courses

Course Code	Course Title	Campus	Department	Term	SDGs Covered
ANT200Y1	Introduction to Archaeology	St. George	Anthropology	2018 Fall +	SDG 2, SDG 5, SDG 10, SDG 11
ANT204H1	Anthropology of the Contemporary World	St. George	Anthropology	2019 Winter	SDG 3, SDG 5, SDG 10, SDG 16
ANT208H1	Medical Anthropology: an Evolutionary Perspective on Human Health	St. George	Anthropology	2019 Winter	SDG 3, SDG 5
ANT329H1	Language & Power Structure	St. George	Anthropology	2018 Fall	SDG 5
ANT336H1	Evolutionary Anthropology Theory	St. George	Anthropology	2019 Winter	SDG 15
ANT347H1	Metropolis: Global Cities	St. George	Anthropology	2018 Fall	SDG 11, SDG 16
ANT348H1	Medical Anthropology: Social- Cultural Perspectives (formerly ANT348Y1)	St. George	Anthropology	2018 Fall	SDG 3
ANT358H1	Medical Anthropology and Social Justice	St. George	Anthropology	2018 Fall	SDG 3, SDG 5, SDG 16
ANT362H1	Sports and Play	St. George	Anthropology	2019 Winter	SDG 5
ANT370H1	Introduction to Social Anthropological Theory	St. George	Anthropology	2019 Winter	SDG 5
ANT378H1	Gift, Money, and Finance	St. George	Anthropology	2019 Winter	SDG 1
ANT386H1	Global Catholicism: Anthropological Approaches	St. George	Anthropology	2019 Winter	SDG 5
ANT412H1	Historical Archaeology	St. George	Anthropology	2019 Winter	SDG 9
ANT420H1	Archaeology of Inequality	St. George	Anthropology	2019 Winter	SDG 5, SDG 10
ANT434H1	Health, Diet & Disease in the Past	St. George	Anthropology	2019 Winter	SDG 3
ANT435H1	Anthropology of Childhood and Childcare	St. George	Anthropology	2018 Fall	SDG 2
ANT455H1	Ethnographic Approaches to the Middle East and North Africa	St. George	Anthropology	2018 Fall	SDG 5
ANT458H1	Settler-Colonialism and Indigenous Health in Canada	St. George	Anthropology	2018 Fall	SDG 3
ANT472H1	Japan in Global Context: Anthropological Perspectives (formerly ANT354Y1 and ANT354H1)	St. George	Anthropology	2019 Winter	SDG 5

Appendix F – Inventory of Undergraduate Community-Engaged Learning Courses with Sustainability Content

The ESE research group has developed an inventory of sustainability-focused community-engaged learning (CEL) courses at U of T. The inventory seeks to identify opportunities for students to contribute to for-credit projects working on sustainability in a community, locally or internationally. The definition of CEL from the U of T White Paper: *Rethinking Higher Education Curricula: Increasing Impact Through Experiential, Work-integrated, and Community-engaged Learning* (July 2017) is used for the purposes of the inventory. Broadly, CEL describes an experiential learning activity where students partner with a community to address a challenge which is identified by community members, to the mutual benefit and growth of both the community and the student.

The CEL sustainability inventory was developed through a keyword search of the university's [Course Finder](#) system. The keywords searched were: **placement, *community, *experiential, *internship, *partner, *client, and *service*. The ESE team then rigorously assessed the search results using course descriptions to determine whether the identified courses included both CEL activities and would address challenges related to sustainability. A level of subjectivity was inevitable in this screening process, as projects for CEL courses may change annually and therefore the project topics are not listed explicitly in course descriptions. The ESE sought to make this screening process more transparent by retaining a list of all search results removed from the inventory.

The CEL sustainability inventory includes course code, course title, credits, campus, department, term, division, associated keywords, and a link to the course description. Further, in an effort to foster a community of sustainability educators and partners at the university, the instructor name(s) (where available), email(s), and max course enrolment are currently being added to the inventory.

Shown below is a sample page of the CEL sustainability inventory. The complete inventory can be accessed online at:

<https://docs.google.com/spreadsheets/d/144hEdgcrBE0r13mGjsdkSSYWEufxR8IEqWdRfe69tLQ/edit?usp=sharing>. *If you are an instructor or community member at U of T and you think a course should be added or removed from the inventory, please [contact us](#).*

Sample page from inventory of undergraduate community-engaged learning sources with sustainability content

Course Code	Course Title	Department	Term	Division	Instructor Name(s)
ACMD01H3	ACMEE Applied Practice II	Dept. of Arts, Culture & Media (UTSC)	2018 Fall	University of Toronto Scarborough	FACULTY
ACMD01H3	ACMEE Applied Practice II	Dept. of Arts, Culture & Media (UTSC)	2019 Winter	University of Toronto Scarborough	FACULTY
ACMD02H3	ACMEE Applied Practice III	Dept. of Arts, Culture & Media (UTSC)	2018 Fall	University of Toronto Scarborough	FACULTY
ACMD02H3	ACMEE Applied Practice III	Dept. of Arts, Culture & Media (UTSC)	2019 Winter	University of Toronto Scarborough	FACULTY
AFSA03H3	Experiencing Development in Africa	Dept. of Historical & Cultural Studies (UTSC)	2019 Winter	University of Toronto Scarborough	N/A
ANT399Y5	Research Opportunity Program	Anthropology	2018 Fall +	University of Toronto Mississauga	N/A
ANTD20H3	Culture and Community	Anthropology (UTSC)	2019 Winter	University of Toronto Scarborough	Lena Mortensen
APS490Y1	Multi-Disciplinary Capstone Design	Mechanical & Industrial Engineering	2018 Fall +	Faculty of Applied Science & Engineering	N/A
BME489H1	Biomedical Systems Engineering Design	Division of Engineering Science	2018 Fall	Faculty of Applied Science & Engineering	N/A
CCT409H5	Special Topics in Work-Based Learning	Institute of Communication and Culture	2018 Fall	University of Toronto Mississauga	TBD
CCT410H5	CCIT Internship I	Institute of Communication and Culture	2018 Fall	University of Toronto Mississauga	TBD
CCT410H5	CCIT Internship I	Institute of Communication and Culture	2019 Winter	University of Toronto Mississauga	TBD
CCT411H5	CCIT Internship II	Institute of Communication and Culture	2019 Winter	University of Toronto Mississauga	TBD
CCT433H5	Sustainable Design (SH)	Institute of Communication and Culture	2018 Fall	University of Toronto Mississauga	TBD
CCT460H5	Advanced Web Design (SH)	Institute of Communication and Culture	2019 Winter	University of Toronto Mississauga	TBD

Appendix G – Inventories of Sustainability-oriented Student Clubs and CCR Opportunities

The ESE has developed additional inventories for all sustainability-focused co-curricular and extracurricular opportunities for students at U of T.

The first inventory is a list of sustainability-focused student groups. The list is organized by affiliation or topic, including subject-focused groups, college-based groups, and student unions. The list includes the group name, student contact and email, how the group was identified for the inventory, and the school year that the contact was last updated. A total of 67 sustainability-focused student groups are identified in the inventory. This list has been developed and maintained in a partnership between the ESE research group and the University of Toronto Students' Union Sustainability Commissioner (UTSUSC). The groups were identified through student group networks, searches of the U of T [ULife](#) website, and other university websites and networks.

The second inventory is a list of the sustainability-focused co-curricular activities with U of T Co-Curricular Record (CCR) recognition. This inventory was developed using the same keyword-search methodology as the sustainability course inventory (Appendix E), based on the United Nations Sustainable Development Goals (see Appendix E for details). The keywords were searched in the university's [CCR Opportunity Directory](#), and 263 sustainability CCR opportunities were identified. The CCR inventory includes the opportunity name, number of positions available to students, keywords, related SDGs, and a hyperlink to the position description.

The inventories are too long to include in this appendix, so what is shown here is a one page sample of each. The full inventories can be accessed online at: https://docs.google.com/spreadsheets/d/1CMQm_hFKtVU3LuL3TxNjIPWAnV3E9KOTHimwIHZAIXY/edit?usp=sharing. *If you are a member of the U of T community and you believe an extracurricular activity should be added to or removed from the inventory, please [contact us](#).*

Sample page from inventory of sustainability-oriented student clubs

Group	Student Contact	Email	Contact Last Updated (academic year)
General Sustainability			
UTERN	Katelyn Tantakis	k.tantakis@mail.utoronto.ca	2017-2018
UTSU Sustainability Commission	Zhenglin Liu	sustainability@utsu.ca	2017-2018
Environmental Justice Collective	Joanna Dowdell	ejc.toronto@gmail.com leapuoft@gmail.com,	2016-2017
Leap Chapter UofT	Julia DaSilva	Jeremiah.cashore@mail.utoronto.ca	2017-2018
Regenesis UofT	Jessica Viau Zoha Faheem, Kaushar Kagzi, Heerea Rikhranj, and Levetha Thani	uoft@regenesi.eco	2016-2017
Greenpeace Student Network	Levetha Thani	utgpsn@utoronto.ca utea.utoronto@gmail.com,	2016-2017
UofT Environmental Action	Zahireen Tarefdar	zahireen.tarefdar@mail.utoronto.ca	2016-2017
Specific Topics			
U of T Bees	Naomi Alon	bees.utoronto@gmail.com	2016-2017
Future-Living Lab	Andrej Grgic	andrej.grgic@mail.utoronto.ca hhsocialjustice@gmail.com;	2017-2018
Hart House Social Justice Committee University of Toronto Biology Environmental Action Team (UTBEAT)	Danielle Dinunzio (Staff)	danielle.dinunzio@utoronto.ca	2016-2017
Bug Bites	Adam Kramer Claire Shenestone Harris Caroline Nguyen & Olivier Smith	utbeat@utoronto.ca claire.shenestone.harris@mail.utoronto.ca	2016-2017
CAFFIENDS Current Affairs Exchange (CAFEX) Forum	Cecilia Woodard	caffiends@gmail.com cafex.forum@utoronto.ca	2016-2017
Dig In! Campus Agriculture Network/Food Policy Council	Danielle Thibodeau	uoft.fpc@gmail.com enactus@utoronto.ca	2016-2017
Enactus UofT Green Chemistry Initiative	Nuha Siddiqui Ian Mallov	647-213-2128 green@chem.utoronto.ca	2017-2018 2016-2017

Sample page from inventory of sustainability-focused co-curricular activities

Activity	Positions	Keyword	SDGs Covered
Accessibility Student Advisory Committee	1	Education	SDG 4
Anthropology Experiential Learning, STEP Forward	1	Education	SDG 4
Anthropology Peer Mentoring, STEP Forward	1	Education	SDG 4
Aquatics, Faculty of Kinesiology & Physical Education	3	Education; Inclusive; Environment	SDG 4, SDG 13
Armenian Students' Association, Student Organization	6	Education; Environment	SDG 4, SDG 13
Arts & Science Committee on Teaching and Learning		innovation	SDG 9
Arts & Science STEP Forward Committee	1	Education	SDG 4
Arts & Science Students' Union (ASSU)	2	Education	SDG 4
Arts & Science Teaching and Learning Initiatives Committee	1	innovation	SDG 9
Aspire to Inspire Club, Student Organization	8	Education	SDG 4
Association of Accountancy (AoA), Student Organization	10	industry	SDG 9
Association of Chinese Engineers (UTACE), Student Organization	6	Inclusive	SDG 4
Association of Mathematical and Computer Sciences Students (AMACSS), Student Organization	12	Education	SDG 4
Association of Philosophy Students (APS)	6	Education	SDG 4
Athletics & Recreation Department, Fit-Break Program	1	Education	SDG 4
Athletics & Recreation Department, Student Staff	3	Environment	SDG 13
Bangladeshi Students' Association (BSA), Student Organization	7	Education	SDG 4
Biology Students' Association (BioSA)	20	Health	SDG 3
Biology Students' Association (BioSA)	20	Education; infrastructure	SDG 4, SDG 9

Appendix H – ESE Pathways Report, Oct 1, 2018

EXPANDING SUSTAINABILITY EDUCATION: SUSTAINABILITY PATHWAYS REPORT

September 2018

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1

1. Objectives of this Report on Sustainability Pathways

The purpose of this report on sustainability pathways is to provide the Presidential Advisory Committee on the Environment, Climate Change, and Sustainability (CECCS) an overview, best practices and information on developing sustainability learning pathways. This report was specifically written for the Faculty of Arts and Science (FAS) and the John H. Daniels Faculty of Architecture, Landscape and Design (Daniels) to assist them develop and implement a sustainability pathways program, but we believe that its information could be useful for any academic division at the University of Toronto (U of T). This report is similar to the Sustainability Pathways Working Group (SPWG) April 2018 Report for the University of Toronto Mississauga (UTM). However, it aims to provide a more detailed overview for the implementation of ‘sustainability pathways.’ The main objectives of this report are:

1. Describing the three levels of a proposed Sustainability Pathways program based on the approach outlined in Joseph Wong’s Global U Framework at the Munk School of Global Affairs. Accordingly, we framed this program as the Sustainable U Framework
2. Make general comments about resources required to maintain and develop a sustainability pathways program.
3. Create an appendix of information of sustainability pathways programs - describe the different sustainability pathways programs and similar sustainability curriculum programs at Higher Education Institutions (HEI)s across North America and Europe, useful additional inventories of information from U of T, and analysis of information from the Sustainability Course Inventory.¹

2. Context of Sustainability Pathways

a. What are Sustainability Pathways?

Beginning in 2010, the University of British Columbia (UBC) initiated a sustainability curriculum initiative called Sustainability Learning Pathways (SLP) at the UBC Sustainability Initiative (USI). This initiative was developed as a part of a series of goals by UBC to improve the sustainability knowledge and skills of their students. These goals were established with the understanding that HEIs have an essential role in transforming society. They describe the pathways as the following:

A Sustainability Learning Pathway is a collection of sustainability-oriented courses and experiences that students pursue alongside their disciplinary major that provides them with a firm grounding in the four attributes: 1) holistic systems thinking, 2) sustainability knowledge, 3) awareness and integration, and 4) acting for positive change.

The main goal of the SLPs is: any student regardless of their degree program will have access to an education in sustainability through a learning “pathway,” to compliment their disciplinary education. The SLPs are flexible in structure and should be a thoughtful progression of learning over student’s university experience via well-connected courses and activities. Furthermore, the USI argues that the SLP should encourage students to gain experience outside of the traditional classroom, as they believe that these experiences are essential to learning about sustainability. These co-curricular experiences should involve

¹ These HEIs were chosen for research using three different models; 1) Canadian Universities that are research institutions of similar size; 2) recommendation from Daniel’s Administration from a meeting in May 2018; 3) HEIs that were prominent or leading institutions at the ISCN 12th Annual conference that the ESE attended.

students collaborating with local communities to work on projects that address real world sustainability challenges. But currently, the SLPs do not include co-curricular activities as there is no mechanism for accrediting these extracurricular activities.

UBC has devoted considerable resources to developing a series of different approaches for implementing SLPs: disciplinary separations, themed-based SLPs, and “beyond-classroom” pathways. Currently, they have mainly been developed by individual departments or faculties through the “disciplinary separation” approach and are only for undergraduate students. The USI also defined four sustainability attributes, which define important elements of student learning and skill development for the SLP program. The Appendix includes more important information on development of the SLPs and the four sustainability attributes at UBC.

Few other universities have pathways programs similar to UBC’s SLP, but many other HEIs are working to improve sustainability curriculum through other programs somewhat similar to the SLPs. We understand that U of T’s sustainability pathway will be different from UBC’s SLPs. But considering that UBC has devoted significant resources to developing a comprehensive conception of sustainability pathways, we argue that their conception of the SLP is an useful starting point to develop the a pathway program at U of T and that U of T can learn from their process and progress. Therefore, according to the SLP program and the UBC sustainability attributes, the following is a list of useful features for a for-credit sustainability course program for U of T potential pathways program:

1. Accessible to many or all undergraduate students; regardless of degree program;
2. Interdisciplinary;
3. Not another minor program- something students can take with their degree program, not an additional program;
4. Involves research, co-curricular projects and/or community engaged learning (CEL) courses ;
5. Have some form of sustainability integrity or encompass sustainability attributes as a program

b. Context of Sustainability Pathways at U of T

Since 2016, U of T has begun taking more tangible actions to develop sustainability initiatives on campus to combat climate change. After significant pressure from students for action, the university outlined their goals and commitments for sustainability action in the 2016 *Beyond Divestment Action on Climate Change Report*, as a part of the university’s decision not to divest from fossil fuels. The report established CECCS to ensure that the goals of the report were implemented. As well, in February 2018, U of T joined twelve other leading research universities in North America as a member of the University Climate Change Coalition. This coalition’s goal is for member universities to reduce their greenhouse gas emissions on their campus and in their communities.

The development of sustainability pathways aligns with the *Beyond Divestment Action on Climate Change* goals and commitments on developing sustainability curriculum. In the CECCS 2017 Annual Report, the Curriculum Innovation subcommittee made a commitment to develop sustainability pathways. The focus of the program would be to enable any undergraduate student the opportunity to add sustainability learning to their degree program. The committee also stated that they wanted students to have access to CEL opportunities in order to develop students cross-cutting interdisciplinary skills. In the report, UTM, FAS, and Daniels all outlined their initial plans for developing pathways.

To assist with the development of pathways, the ESE has created and maintained a Sustainability Course Inventory of all undergraduate courses across all three campuses at U of T starting in 2017. The inventory is based on keywords derived from 16 of the 17 United Nations Sustainable Development Goals (SDGs) - the 17th being procedural. It was created by searching for courses using these keywords in the CourseFinder and then the ESE sorted the courses to ensure they have sustainability content. The 2018-2019 inventory includes 2022 unique sustainability-oriented courses, corresponding to about one-

fifth of all unique undergraduate courses at the university.² The ESE also identified “Big First Year” courses offered at U of T, which were any 100-level courses that had a large number of spots open for students, relative to the academic division that the course was offered. Lastly, the ESE created an inventory of sustainability-related CEL courses based on a different keyword search and additional sorting of courses for sustainability content. The 2018-2019 CEL inventory includes 153 undergraduate courses.

There are a series of important contextual factors about U of T that could pose a challenge to development of pathways. Unlike UBC, U of T currently has less financial and labour resources devoted to developing sustainability pathways. Specifically, U of T does not have an interdisciplinary academic division devoted to developing sustainability curriculum across the different academic disciplines like UBC. As well, U of T has less of a pre-existing culture and research interest in sustainability compared to UBC. Further, U of T is also a decentralized and large institution, with over 88,000 students and three distinct campuses.

Yet, there are also many other contextual factors about U of T that make the university uniquely well suited for pathways. U of T has Sustainability Offices at each of its three campuses, working with Facilities and Services to improve operational sustainability at the University. At UTM, the Sustainability Pathways Working Group (SPWG) is developing their own sustainability certificate program for undergraduate students in addition to their pre-existing minor in Sustainability. Furthermore, we argue that FAS is also uniquely suited for developing sustainability pathways as there are many students within the same faculty and the faculty itself is already interdisciplinary as the faculty requires students to have two majors or one major and two minors. Further, U of T has particularly large and few first year courses that almost every student takes. For example, there are often big first year courses with more than one thousand students in a single lecture section.

c. The Global U Framework

The Global U Framework is a three-tiered co-curricular and curricular program, including a language citation, focused on international/global issues for undergraduate and graduate students to compliment their degree program. The framework was designed by Professor Joseph Wong and Vanessa Laufer at the Munk School of Global Affairs as a part of their Global U Initiative. It is currently only a proposal and may take several forms across the different academic divisions. The three tiers (plus the language citation) are the following:

- 1) **GLOBAL CITIZEN**: a co-curricular level where acknowledgement of extracurricular activities would be on the CCR
- 2) **GLOBAL SCHOLAR**: a curricular level where completion of (existing) for-credit courses would lead to a certificate
- 3) **GLOBAL LEADER**: co-curricular activities, curricular courses, international experience, and a capstone course (#3 was previously referred to as the Global Scholars Program)
- 4) **LANGUAGE CITATION**: Reinvigorated language citation as part of the suite of options

In this report we propose a sustainability pathways program, the Sustainable U Framework, which is similar to the Global U Framework. The Global U Framework is the preferred framework for

² Note: “unique course” is defined in the inventory as a course that has a unique course code when including the session code (F, S, or Y). I.e. ECO102H1F and ECO102H1S are unique courses, but ECO102H1F lectures 0101 and 0102 are not unique.

such a program. It starts with few formal constraints, making it easy for students to be the program, and becomes more structured as it develops. This tiered approach allows students to choose their level of commitment to the program and provides opportunities for interest to grow. The lower levels of certification helps democratize sustainability education by providing such opportunities for undergraduates regardless of their program of study. At the same time, the highest level of certification encourages the development of highly accomplished sustainability leaders at U of T. This approach is also similar to UBC's Sustainability Learning Pathways program.

Like the Global U Framework, the Sustainable U Framework has three levels: 1) Sustainability Citizen, 2) Sustainability Scholar, and 3) Sustainability Leader, however the levels will contain different requirements and will focus on ensuring that the program is accessible and interdisciplinary. Unlike the Global U Framework, the Sustainable U Framework would attempt to engage as many students as possible in the program, regardless of their degree program. Below is a description of each level for the Sustainable U Framework. The description will include information for the implementation of each level and research from similar programs at other universities that might be useful for implementation at U of T.

3. Sustainable U Framework

a. Sustainability Citizen

The Sustainability Citizen will be a Tri-Campus initiative in which students will choose from existing co-curricular offerings across the university to get a "Sustainability Citizen" notation on their Co-Curricular Record (CCR). Students will be required to participate in a set number of activities or a particular quality of activity within a certain timeline to receive the notation. The activities must be already recognized by the CCR systems/ competencies framework. The goal of this level is to engage thousands of students in sustainability through their co-curricular activities.

The CCR provides a centralized database of activities to let students easily search for co-curricular activities. Each activity is linked to competencies, which are designed to help students make the connection between their involvement and learning. The **Appendix** includes the CCR competencies framework. The activities include student clubs/societies/groups, work study positions, and sports teams. For an activity to be included in the CCR database, the activity must include the following:

- 1) the activity must have a clear attachment to a recognized faculty or staff member;
- 2) the activity must have validation requirements, (for example, criteria that students must complete in order to have their position validated;
- 3) the activity's positions must be connected to the competencies, as described in U of T's competencies framework; and
- 4) the activity must provide an opportunity for active engagement for the students involved in it (for example, not activities that merely symbolize a student holding a title but not actually following through with duties).

Students will be able to print an official validated record of their CCR to prove their involvement. In order for a pre-existing student club/group to be included on the CCR, representatives from the club must attend a CCR training session in order to begin the process of getting their club/group on the CCR. Representative(s) who attend the training session will be the one(s) required to fill out the application

form and complete the CCR process throughout the year. Every Academic division has a committee that decides what activities qualifies for the CCR.

The Sustainability Citizen program would be fairly simple to implement and has the potential to engage a large number of students. Due to the nature of the CCR accreditation as each academic division decides what activities qualifies for the CCR, a strong collaboration with academic divisions would be required in order to support it. As well, to ensure the integrity of the CCR opportunities included in the Sustainability Citizen, the CCR could offer workshops with resources for activities on incorporating the SDGs, similar to the CCR training session.

As well, many universities recognise co-curricular activities as a part of their sustainability scholars/pathways programs, as these activities sustainability compliment courses and some have sustainability opportunities that just include co-curricular activities. Dalhousie University has a similar program offered to students at their College of Sustainability, called the RBC Sustainability Leadership Certificate, in which students are recognised for their engagement in specific co-curricular activities in sustainability.

The ESE has developed two inventories with relevant information for this tier of the Sustainability Pathways; the student group inventory and an inventory of ‘sustainability’ CCR activities, both are included in the appendix. The student group inventory highlights 66 student clubs, 55 of which are registered at the UTSG campus with the remaining spread between UTM (7) and UTSC (4), that focus on sustainability or environmental issues. To make this inventory, the ESE searched the ULife Student Groups directory with the following keywords: **green*, **environment*, and **sustainability*. Further, the U of T Environmental Resource Network (UTERN) had a list of sustainability student groups from 2014 & 2015 that were searched and consolidated. Additional groups were added from the personal networks of ESE members. Finally, the University of Toronto Student Union Sustainability Commissioner (UTSUSC) added numerous groups from their network. Yet most of these student groups are not recognised as CCR activities. The CCR inventory is a preliminary list of CCR opportunities that focus on the SDGs. It was created using the same SDG-centered keyword method as for the ESE Sustainability Course Inventory and opportunities were searched on the CCR website. This inventory is currently only a preliminary version, as the current needs to be more thoroughly edited to ensure each opportunity actually addresses the SDGs. Currently, there are 263 activities in the CCR inventory that engage at least 1213 students (some opportunities do not list the number of students that can be involved in the activity). Both these inventories are quick to create and maintain.

Through meeting with Daniella Mallinick, the Director of Academic Programs, Planning & Quality Assurance, a challenge that was identified is that CCR has not proven to be a strong incentive for students to get engaged in activities. Further, there is little incentive for groups to become recognized by the CCR. To address these challenges for students who are already engaging thoughtfully in sustainability issues, we would recommend granting them Sustainability Citizen accreditation regardless of their CCR accreditation. Moving forward, the Sustainability Citizen program should act as additional incentive for future students and activities to become recognized by CCR, bolstering the CCR program.

This first tier of the sustainability pathways program is an important foundation for the overall integrity of the Sustainable U framework at U of T. It will act as an incentive for more students to become engaged in sustainability issues through co-curricular and extracurricular activities at the university, providing an accessible avenue for students to focus on sustainability in their education.

b. Sustainability Scholar

i. Global Scholar and Sustainability Scholar pathways

In the Global U Framework defined in the Munk School of Global Affairs and Public Policy, the Global Scholar program is designed for students to earn a certificate upon completing a certain number of already-existing for-credit courses. This curriculum-level recognition would provide students a next level of recognition for their efforts in the Global U program. However details about the number of courses which students must complete and the ‘buckets’ of courses from which they could chose have not yet been defined.

ii. Sustainability Scholar pathways

Like the Global Scholar program, we believe that a Sustainability Scholar program could similarly be developed and take the form of a Certificate Program in the FAS. Secondly, for the purpose of guidance of the students as well as integrity of the certificate, we believe it should be built for students as trajectories from first year to graduation. Hence, we imagine the Sustainability Scholar program as Sustainability Scholar pathways granting a FAS Certificate.

The Sustainability Scholar program targets the democratisation of sustainability learning for students from all disciplinary backgrounds. The two principal subtexts to this sustainability vision are: to encourage an interdisciplinary approach to sustainability, and to form pathways that provide a consistent, in-depth and trustworthy training in the field of sustainability. The introduction of Sustainability Scholar pathways would therefore provide an interdisciplinary trajectory of courses in the disciplinary undergraduate curriculum linked through a focus on sustainability.

iii. Context: The FAS Breadth Requirement

The FAS currently has a multidisciplinary requirement for undergraduate programs called the Breadth Requirement (BR). The BR ensures all students graduating with an Honours degree from the FAS have chosen courses across a broad range of subject areas in the Faculty as part of their undergraduate education. Each student enrolled in the FAS must take at least 4.0 credits that have been designated as satisfying the BR. These must be either (a) at least 1.0 credit in each of 4 of the 5 categories below, or (b) at least 1.0 credit in each of any 3 of the 5 categories, and at least 0.5 credits in each of the other 2 categories. The FAS integrated the BR into its curriculum in September 2010³. Every student starting their degree in the FAS at or past this date is required to satisfy the BR in order to graduate. The FAS Breadth Requirement is made of five Breadth Categories:

1. Creative and Cultural Representations
2. Thought, Belief, and Behaviour
3. Society and Its Institutions
4. Living Things and Their Environment

³ <https://fas.calendar.utoronto.ca/degree-requirements-hba-hbsc-bcom#Breadth%20Requirement>

5. The Physical and Mathematical Universes

The ease with which students can satisfy the BR depends on the program that they are enrolled in. A student enrolled in a specialist or major program in Psychology in the FAS can satisfy their BR directly within their program, while programs in Sociology, Physics, Mathematics program only offer courses in one breadth category. Hence, despite the breadth that the double-major and minor programs bring to students, parts of the BR is often satisfied by choices of ‘electives’, courses outside students’ specialists, majors and minors programs. Moreover, because of the professional value of a major or minor in comparison to non-degree granting courses, it is rare that students have many electives to spare in their 20.0 Full-Course-Equivalent (FCE) degree.

Sustainability Scholar pathways would create a problem similar to that of the BRt: an added breadth to undergraduate curriculum for all students, based in a variety of courses at least partly not already offered in these students’ programs, and which require additional credit commitment. However, the BR is a mandatory constraint, while the Sustainability Scholar pathway would be optional. Hence, the FAS BR would reduce the number of electives students can use towards Sustainability Scholar pathways, and it is very likely that this would impact the enrollment in Sustainability Scholar pathways.

One of the central proposals that emerged out of the meeting between John Robinson, Thomas MacKay, and Martha Harris, highlighted the value of designing the Sustainability Scholar Pathways to satisfy the Breadth Requirement of the FAS. Defining sustainability pathways so they directly satisfy the BR would thus be an opportunity to:

- Avoid the conflict between satisfying the BR and following a Sustainability Scholar Pathway;
- Not expect students to only be able to use their electives not committed to the BR towards Sustainability Scholar pathways;
- Harness the constraint of the BR as an incentive for students to follow Sustainability Scholar pathways;
- Ensure a multidisciplinary perspective for sustainability in each Sustainability Scholar pathway; and
- Offer an internally coherent option for satisfying the FAS Breadth Requirement.

From another perspective, this approach would allow the CECCS to work within the current constraints of the University of Toronto curricula. Changing curricula towards a certain focus can be difficult, as exemplified by a proposal a few years ago to add mandatory Indigenous Studies courses which was rejected by referendum. Integrating the Sustainability Scholar Pathways into the FAS BR would align the program with existing educational requirements and provide greater benefit to students.

iv. Three Sustainability Scholar pathways

Before the BR was created, the FAS was basing its separation between categories of breadth on the Distribution Requirement (DR), which classified every course in the Faculty into one or more of three large distribution categories: Social Sciences (SS), Humanities (H), and Science (NS). While the Breadth Requirement has become the unique official program of the FAS to ensure the curricular breadth of students enrolled after September 2010, the classification of each FAS course by DR still exists.

Through discussion between John Robinson, Thomas MacKay, and Martha Harris, it was proposed that three unique Sustainability Scholar pathways be created - one for each of these three distribution categories defined by the DR. We believe this is currently the most feasible approach to the Sustainability Scholar pathways.

For the Sustainability Scholar program, each of these pathways would consist of a trajectory of sustainability-related courses focused on either the Social Sciences, Humanities, or Science distribution category. From the 2018-2019 Sustainability Course Inventory, in the Faculty of Arts and Science, we have noted that there are a total of 844 sustainability-related courses. This pathway ‘focus’ on some distribution category can be imagined as something very practical.

Say that each pathway proposes 40 courses, out of which students have to choose 3 FCEs in order to receive a Sustainability Scholar certificate. A focus in one of the distribution categories (Humanities, Social Sciences, Natural Sciences) would mean that each pathway would comprise a majority - say 22, for instance - of courses classified in their respective distribution category, while the remaining 18 courses would be made of courses in the remaining two distribution categories.

It is important that each of these pathways be ‘focused’ on a Distribution Category rather than exclusive to it. The goal of the pathways is to provide a common theme for sustainability learning, but at the same time conserve a very multidisciplinary perspective on the issues raised in the field. Moreover, as the BR and the DR share an initial objective, exclusively defining a pathway as formed around one unique Distribution Category would highly limit the number of courses available in less related Breadth Categories. This point is illustrated further in this section.

Creating three Sustainability Scholar pathways aligned with the Faculty’s Distribution Categories has the following strengths:

- Creating only three pathways makes their management relatively easy as a first iteration, while nonetheless opening interdisciplinary sustainability curriculum options
- Additionally, in this respect it reduces the amount of administrative work needed to select and update their course options.
- Using information already available for undergraduate courses in the FAS makes it easier to structure and work with the courses to be integrated in these pathways.
- Creating pathways using these categories would permit students self-identifying⁴ with the Humanities, Social Sciences, or Natural Sciences to dive into sustainability from perspectives they are most familiar with.

⁴ As ‘academic sector’ is not a category that is officially defined to classify departments, majors or degrees in the Faculty of Arts and Science, it is important that this Sustainability Pathways program does not refer to officially to it. We believe that it is something that, in the academic environment, would not be legitimized. However, ‘academic sector’ (implicitly represented by the Distribution Categories) is also a category that we can expect students to self-associate with, whether with one or several sectors. As such, by proposing three Sustainability Scholar pathways based on the Distribution Categories, students who associate their background more towards the Humanities will be able to follow a Humanities-focused Sustainability Scholar pathway which would propose more Humanities (as a distribution category) courses. Those Distribution Categories permit the pathways to bear the names ‘Humanities’, ‘Social Sciences’, ‘Natural Sciences’, but without referring to the idea of academic sector, and simply letting students choose the pathway that they most closely relate to.

- Additionally, the students are more likely to have access to courses that they have prerequisites for, compared to the possibility of creating one pathway for students from all backgrounds, or theme-based pathways (like ‘the built environment’, or ‘climate change’)
- The ‘focus’ on particular distribution category permits to conserve a certain coherence in the trajectory, while at the same time creating interdisciplinary sets of courses that permit the satisfaction of the BR

However, creating pathways according to the Distribution Categories also poses a series of challenges:

- Each pathway is broad and covers a range of possible disciplines of study from which students may enrol.
- It is impossible to choose courses for each Distribution Category which span all five Breadth Categories, as the BR was designed to supersede the DR. Therefore, in order for students to fulfil any BR category through all pathways, the pathways will need to contain some courses from other Distribution Categories. The processes of selections of courses will thus need to keep this more difficult problem in mind.

The ESE has developed tools which can enable university decision makers to select courses for the sustainability pathways. Specifically, the ESE has developed a 2018-2019 Sustainability Course Inventory which provides an exhaustive list of the sustainability-related courses offered in the Faculty of Arts and Science. The courses in the inventory are categorized based on their relation with the Sustainable Development Goals (SDGs). This tool is described in wider detail **further in this report**, and links to the full inventory are available in the **Appendix**.

The ESE recommends that the Sustainability Course Inventory be used to select courses for the pathways. While it is not the role of the ESE to recommend specific courses, there are a few criteria that seem valuable to highlight as recommendations for this selection:

1. The ESE 2018-2019 Sustainability Course Inventory provides an exhaustive list of the sustainability-related courses offered in the Faculty of Arts and Science, based on their relation with the Sustainable Development Goals (SDGs).
2. The number of SDGs to which a course is clustered in the Inventory can be used to indicate how sustainability-related they are.
3. The variety of SDGs to which a course relates can be used as an assessment of the breadth of sustainability problems which the course addresses.
4. Courses that are regularly offered and do not often have waiting lists should be preferred, so to increase the chances that there would be room for students wanting to follow a Sustainability Scholar pathway
5. Courses that have few prerequisites should be preferred, so to allow students from a variety of backgrounds to follow the pathway

For the sake of creating Sustainability Scholar pathways as trajectories offering various constrained choices of learning to students, this first set of 40 courses available in a pathway would have to be structured into ‘buckets of courses.’ The trajectory between courses would form a trajectory

between buckets of courses, hence opening options for students to shape their learning based on their interests, requisite training or availability.

v. Buckets of courses

We define course “buckets” as subsets of sustainability-related courses from the Sustainability Course Inventory. The objective of the bucket structure is to provide a focused and varied set of options for course selection for students enrolled in these pathways. These course options will create a trajectory of sustainability learning throughout the pathway, rather than leaving students open choice from one large pool of sustainability-related courses.

These buckets of sustainability-related courses could be organized by either: i) year level, or ii) Breadth Category. For each alternative the ESE has identified benefits, challenges, and other considerations which are introduced briefly here.

1. Buckets of courses - classified by year

For each Sustainability Scholar Pathway, one bucket of sustainability-related courses could be created for each of the four curriculum year levels: 100-level, 200-level, 300-level and 400-level buckets. As noted above, there are a total of 844 sustainability-related courses in the FAS recognized in the 2018-2019 Sustainability Course Inventory. Their distribution by course-level found in Table I. It is found that most sustainability courses in FAS are at the 300- and 400-level (about 70% of all sustainability courses).

Table I. Number of courses in FAS by year level

Academic Division	100-Level	200-Level	300-Level	400-Level	Total
Faculty of Arts and Science	81	174	329	260	844
Ratio over total courses	0.1	0.2	0.4	0.3	1.0

Other useful information to have is course enrolment, as it indicates the potential availability of a course to students in the pathway⁵. However, this type of data is intensive to collect and therefore has not been assessed.

It is not within the ESE’s mandate to outline precisely the courses that could fit within these buckets. However, there are a variety of characteristics that can be highlighted:

1. We expect registration in Sustainability Scholar pathways would occur at the end of First Year: the formation of these course-level buckets would have to account for this restriction (note that undergraduate students in the FAS are only allowed 6 FCEs at the 100-level).
2. Upper-year buckets should contain more courses than lower-year buckets: first year courses have larger enrolment capacity, and it is important to propose more choices at the higher level, so to allow a variety of personalized trajectories for students to follow.

⁵ This is assuming that the course seats are not vastly reserved for students from a specific program of study.

3. There are more prerequisites in higher-level courses, so it is important to propose a variety of upper-year courses to allow students from different backgrounds to find courses which they have the prerequisites for.
4. As mentioned above, courses that do not have ‘too many’ prerequisites should be preferred.

Moreover, students should be able to satisfy entirely their BR over their complete Sustainability Scholar trajectory (ideally, in several ways). Hence, several courses from the five Breadth Categories should be present in each bucket. In ideal conditions, each should include courses from the five Breadth Categories. The distribution of breadth categories by course-level is presented in Table II.

Table II. Repartition of courses by year level and breadth category

	Breadth Category	1	2	3	4	5
Course level (year)	Total courses	80	91	446	142	61
100-level	81	13	15	44	6	11
200-level	174	23	19	88	30	15
300-level	328	37	41	187	46	14
400-level	259	7	16	127	58	21

Most breadth categories follow the trend of having more sustainability-focused courses at the 300- and 400-level. This supports the recommendation to include more upper-year courses in the course buckets. However, to ensure that each Breadth Category is adequately represented in each course bucket, special consideration must be applied in some specific instances. For example, there are only 6 ‘100-level’ sustainability courses in Breadth Category 4, and therefore it should be ensured that these courses are accessible to all students who may wish to take this breadth category - considering enrolment restrictions, program timetables, and other factors. Another example is that there are only 7 ‘400-level’ sustainability courses in Breadth Category 1.

2. Buckets of courses - classified by Breadth Category

For each Sustainability Scholar Pathway, one bucket of courses could be created for each of the five Breadth Categories forming the FAS Breadth Requirement:

1. Creative and Cultural Representations
2. Thought, Belief, and Behaviour
3. Society and Its Institutions
4. Living Things and Their Environment
5. The Physical and Mathematical Universes

As highlighted in the pathways the pathways are *focused* on each Distribution Category, but contain courses from all DR (for example, 50-25-25, with 50% being the pathway focus). This is important because - as seen in Table III- it is not possible to cover all BC in each DR (for instance, NS does not cover 1), however students should be able to complete courses from any BC they choose regardless of the pathway to which they self-identify.

Table III. Repartition of courses by breadth category and distribution category

	Breadth Category	1	2	3	4	5
Distribution Category	Total courses	80	91	446	142	61
H	180	75	51	117	1	0
SS	372	16	36	356	12	5
NS	208	0	15	18	134	56

Table IV. Percentage of courses from Breadth Category in each Distribution Category

Distribution Category	Breadth category					Total Courses
	1	2	3	4	5	
H	42%	28%	65%	1%	0%	180
SS	4%	10%	96%	3%	1%	372
NS	0%	7%	9%	64%	27%	208

Note: Percentages do not add to 100%, as some courses are tagged by more than one breadth category.

As the Breadth Categories and the Distribution Categories were supposed to fulfill a similar role, there are some Breadth Categories that are widely underrepresented or even absent from some Distribution categories. Course inventory results presented in Table IV confirm this intuition: there is one or no sustainability-related course satisfying Breadth Category 4 or 5 in the Humanities Distribution Category, and similarly there is no sustainability-related course satisfying Breadth Category 1 in the Science Distribution Category. As such, while creating buckets of courses in each pathway focusing on a particular distribution category, this is a problem that would have to be kept in mind.

vi. Certificate, Registration, and Hosting the Sustainability Scholar Pathways

In terms of registration, ideally the Sustainability Scholar Certificate would be similar to any curricular program. Hopefully, students interested in sustainability could start applying for them at the end of first year on ACORN, similar to Subject POST enrollment. Students could also be able to register afterwards, as long as they meet the requirements.

The ESE has also developed an inventory of the Big First Year courses in FAS as a tool for registration in Sustainability pathways, as well as a direct objective for democratizing sustainability. The Big First Year Course inventory is a list of courses that have student enrollment of equal to or more than 500 students, occur every year, and are prerequisites for many upper year courses and degree programs. As they are first year courses, they do not have any prerequisites and therefore, are accessible to any student. The Big First Year course inventory can be used as a tool for creating exposure and interest in sustainability early on in many students' degrees, and hence to 'advertise' (create interest in) Sustainability Pathways. Further, this further emphasizes the importance to inject sustainability content into first year courses, as described in the UTM Sustainability Pathways Working Group report.

Currently, there are a variety of different ways students register for certificates, depending on the academic division. Currently for students in FAS can enrol in a certificate by adding them via ACORN during the regular program enrolment period (normally at the beginning of their second year), but they must be approved by the department prior to final enrolment.⁶ In a meeting with Dr. Kim Strong in May 2018, she told the ESE that many of the certificate programs within the School of the Environment are moving to the School of Continuing Studies. At the School of Continuing Studies, students who are eligible are told to inform the School that they are pursuing a certificate program, at 416-978-2400 or email learn@utoronto.ca.⁷ If registration for the Sustainability Scholar certificate will be by individual emailing, it will likely be difficult. This could be a problem as if enrollment is a tedious process, students are less likely to join the program. If we want to widely increase the number of students reached by sustainability curriculum with these pathways, then the registration process must be simple.

vii. Tool: The Sustainability Course Inventory

The ESE created an inventory of all the sustainability-related courses offered at the undergraduate level at the University of Toronto in January 2018⁸. This inventory was renewed and updated in the summer of 2018 for the 2018-2019 academic year.

This inventory is a critical tool in advancing student engagement in sustainability and in improving sustainability curriculum, as it is internationally recognized benchmark for assessing sustainability in HEIs. Many HEI across the world have developed and maintain a Sustainability Course Inventory to know what sustainability content is being taught at their institutions (See Appendix for a brief list of universities with sustainability course inventories). Furthermore, both the International Sustainable Campus Network (ISCN) and the Association for the Advancement of Sustainability in Higher Education (AASHE) use a Sustainability Course Inventory as a benchmark for assessing the sustainability involvement of HEI, especially as an important resource for universities to develop their curriculum. They use the inventory as data that indicates what sustainability courses and content already exist at universities, therefore they can compare universities to each other and develop best practices for improving the sustainability curriculum. As well, the Sustainability Course Inventory assists faculty and administration develop programs like sustainability pathways, sustainability certificate, or developing

⁶ <http://www.artsci.utoronto.ca/current/program/enrolment-instructions/index.html#focus>

⁷ <https://learn.utoronto.ca/how-to-register/before-you-register#CertificateCandidates>

⁸ See: *ESE Annual Report 2017* (January 2018).

new minor programs. Lastly, the direct communication of this inventory to students enables them to choose courses that have sustainability course content. The 2018-2019 Sustainability Course Inventory is currently available online on the St George Sustainability Office website.

Our conception of sustainability for the inventory follows the wide and regenerative approach adopted by the CECCS and outlined in the CECCS 2017 Annual Report, encompassing both social and environmental well-being.

It is a framework we apply to the University of Toronto undergraduate curriculum by classifying offered courses as sustainability-related using sixteen of the Sustainable Development Goals (the seventeenth goal being procedural).⁹ Courses were selected from the Course Finder using a set of keywords characteristic of each of the SDGs. The methodology for selecting these keywords is outlined in the appendix.

The keywords were collectively selected by the researchers in the ESE to characterize uniquely certain SDGs, with the goal that they wouldn't be repeated for others. These keywords were applied to the University of Toronto CourseFinder, and each course which course description contained at least one of those keywords was selected at first. Then, the ESE went over the descriptions of these selected courses and deleted subjectively but transparently the ones they found were clearly not related to sustainability (the list of deleted courses is available). About 25% of all initially selected courses were at such taken out.

The Sustainability Course Inventory comprises 2022 sustainability-related undergraduate courses across the University of Toronto divisions. For each course at the U of T, the Inventory contains information about number of credits, campus, department, term, division, instructors, keywords, and SDGs related to the course. Moreover, a separate course inventory was created from that first Inventory, comprising uniquely the sustainability-related undergraduate courses in the Faculty of Arts and Science. This FAS Course Inventory holds 844 courses, and contains, in addition to the ones previously cited, information about the Breadth Category and the Distribution Category they satisfy for each course. Both Inventories are linked in the appendix.

Following, and in the appendix of this report are provided a large variety of tools to support the creation of these buckets of sustainability courses per department, year, academic sector or breadth requirement in the Faculty of Arts and Science.

Table V. Number of sustainability courses by academic division

⁹ SDG 17, "Strengthen the means of implementation and revitalize the goal partnership for sustainable development," was excluded from the methodology as it reinforces the other goals but does not bring a new sustainability perspective.

Our Approach to Sustainability is Regenerative
"The concept of regenerative sustainability differs in two key ways from more conventional approaches to sustainability. First, it recognizes the interconnectedness between human and environmental wellbeing and focuses equally on both. Second, it emphasizes the goal of creating net positive outcomes in human and environmental wellbeing, not just reductions in damage or harm. In other words, it asks, can our activities actually improve both environmental quality and human

Definition of sustainability used to develop the Sustainability Course Inventory. Source: CECCS

Division	Number of courses
Faculty of Arts and Science	844
Faculty of Applied Science & Engineering	190
University of Toronto Mississauga	477
University of Toronto Scarborough	460
Faculty of Music	7
John H. Daniels Faculty of Architecture, Landscape, & Design	44
Total	2022

Figure I. Number of courses per SDG in U of T 2018-2019 Sustainability Course Inventory

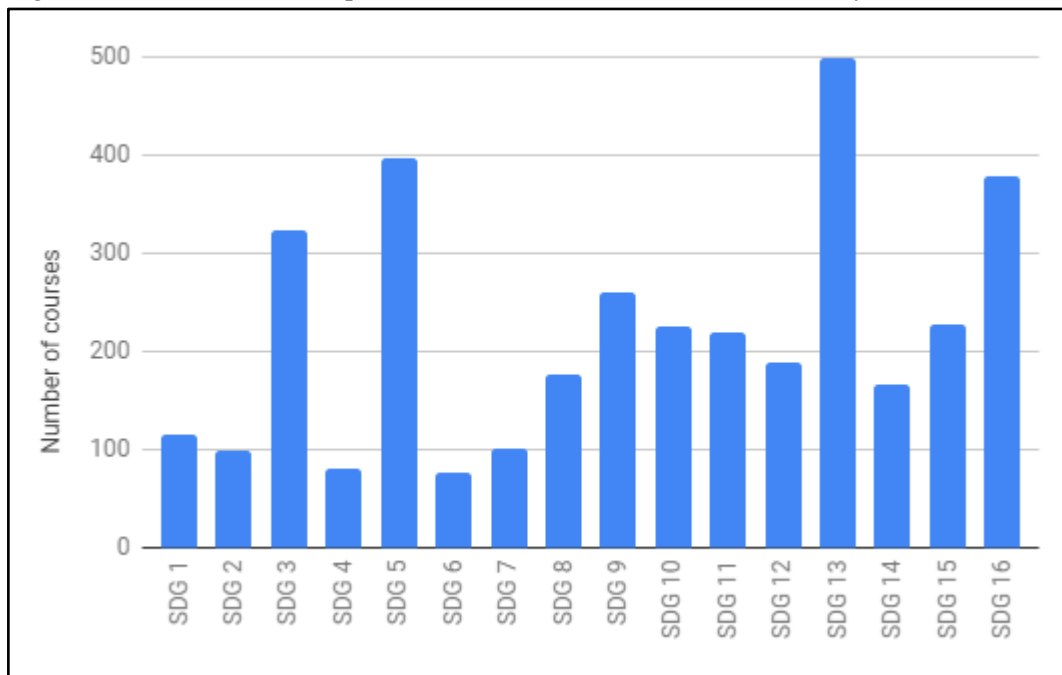
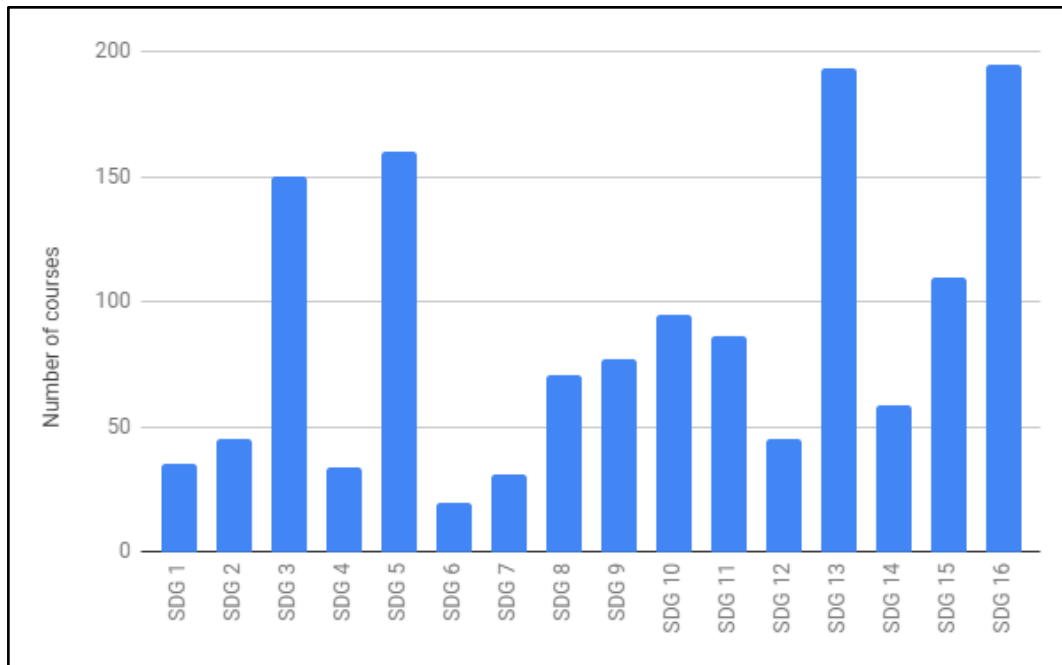


Figure II. Number of courses per SDG in FAS 2018-2019 Sustainability Course Inventory



As seen in Figure I, the most common SDGs in sustainability courses across U of T are Goals 13, 5, 16, 3, and 9. Figure II reveals the most common SDGs in the FAS reflect this university-wide trend: Goals 16, 13, 5, 3, and 15 are the most common. The 20 courses in that are tied to the greatest number of SDGs are highlighted in **Appendix A.5**.

In order to maintain the Sustainability Course Inventory as a tool to sustain the design of curricular sustainability pathways, it would need to be updated every year, accounting for courses added, modified or cancelled. It was estimated¹⁰ that there are about 200 new courses each year. If we apply the SDG keyword to the new courses, a certain number will already get dropped, and updating the inventory would be a quite manageable. Such a process would need to be monitored by each division, since they have to approve the modification, removal or addition of courses.

c. Sustainability Leader

The final tier of the Sustainability U Framework is the Sustainability Leader level, which combines the first two levels together and includes a capstone course or Community Engaged Learning (CEL) course in their final year/during their degree. Students will receive a different notation on their CCR and a different certificate called “Sustainability Leader” as they have engaged in co-curricular and curricular activities on sustainability. The co-curricular activities will be the same as the activities recognized in the CCR inventory and student group inventory. In terms of the curricular requirements, students apart of the Sustainability Leader program will register for the certificate along with the major

¹⁰ July 2018 meeting with Thomas MacKay and Martha Harris

and minors on ACORN. They will be required to take the recognized sustainability courses along with a recognized capstone/living lab course or CEL course in their final year/during their studies.

Other universities in North America have established exclusive programs similar to this conception of Sustainability Leader. The University of Alberta's (UofA) Certificate in Sustainability program involves undergraduate students applying for the program after their first year. Students will receive a transcript notation after taking a series of courses and then in their final year designing and conducting an integrative project, after which they have to present their findings to Sustainability at U of A to get the certificate. The UofA also has a Sustainability Scholars program for graduate students, which offers them paid positions to work with professional mentors from the City of Edmonton and other institutions on applied research projects in sustainability. The Graham Sustainability Institute at the University of Michigan hosts an Undergraduate Sustainability Scholars program, in which students can also get a notation on their transcript along with their main degree program after they apply to the program after their first year. Accepted students are required to participate in co-curricular activities and complete a minimum of nine (9) credit hours of coursework (core courses) and a field-based experience course.

This level of the Sustainable U Framework is currently not the focus of the ESE as we want to establish the first two levels first, before working to create this new program. But, the ESE has created and maintained an inventory of sustainability-focused CEL courses. This inventory was created using following seven keywords were used: *placement, community, experiential, internship, partner, client, and service*. As was previously done, for all undergraduate courses, both titles and course descriptions were searched through the Course Finder database.

There are a series of challenges with implementing this level. First, there are currently only a few departments/academic divisions that have capstone course requirements for students. The School of the Environment has a CEL or capstone course requirement for their major students and every student in the Faculty of Applied Science and Engineering has a capstone requirement to graduate. The CESSC wants to start the process to create more capstone courses over the next two years or so. Another challenge is that the one of main goals of the Sustainability U Framework is to ensure that as many students as possible have the ability to become Sustainability Leaders. At this level, the Sustainability U Framework deviates from the Global U Framework significantly, as this level in the Global U Framework is designed to be only for a small number of students.

A potential solution to both of these challenges might be implementing a program similar to McGill University's Applied Student Research (ASR) program. This is a capstone program in which students research living lab projects within their main academic department/ academic divisions. As an independent study course, fourth year students can conduct sustainability research under the supervision of a professor in their department. Students can then apply to be accredited by the ASR through applying and proving that their research involves sustainability content, works to address a community-sustainability related problem, and helps develop living lab projects on campus. The Sustainability Office at McGill will also help students find professors working on living lab projects on campus, so that they can be a part of the ASR program.

It is central that students are able to follow the progress of their sustainability scholar pathway with the same tool as they follow the progress of their degree. Integrating the Sustainability pathways into Quercus, Acorn, and Degree Explorer would be an important step towards their democratization with

students. For this matter, it is equally as central to address the challenge of the implementation of certificate programs on those platforms.

The success of the implementation of these sustainability pathways, whether it be from the integration of sustainability content in courses, the creation of CEL programs and courses in sustainability, or the support of particular departments and divisions, will rely heavily on Sustainability champions: faculty members, administration members, facilities and services professionals, governance people, etc., who are interested in sustainability.

The Sustainability Course Inventory and the CEL inventory both have a list of faculty members teaching courses. However, the Global U program has also put together a table of divisional champions - the ones most interested in Global U, and particularly Global Scholars, the Global U Champions list does not include only faculty members, but also vice-presidents, staff, governance actors. These non-teaching champions of sustainability have not yet been identified but would be great people to contact to further sustainability education, through the pathways or not, at the University of Toronto.

Appendix

A.1 CCR Competencies Framework

*See Attached PDF entitled “Competencies Framework 2015-2016”

A.2 Student Group Inventory

*See Attached Excel File entitled “Student Group Inventory”

A.3 CCR Sustainability Activity Inventory

*See Attached Excel File entitled “CCR Sustainability Activity Inventory”

A.4 2018-2019 Sustainability Course Inventory

*Sustainability Office webpage:

<http://www.fs.utoronto.ca/SustainabilityOffice/Resources/SustainabilityCourses>

* Additionally, see attached Excel File entitled “Big First Year course inventory” for FAS

A.5 Courses in the FAS that satisfy between 5 and 7 SDGs

Course code	Course name	Credits	Campus	Department	Session	Instructor	Distribution Category	Breadth Category
VIC187H1	Prosperity, Justice, and Sustainability: Introduction to Public Policy	0.5	St. George	Victoria College	2018 Fall	Rae, B.	SS	2
ECO324H1	Economic Development	0.5	St. George	Economics	2018 Fall	Blouin, A.	SS	3
GGR334H1	Water Resource Management	0.5	St. George	Geography and Planning	2018 Fall	Verma, R.	SS	3
GGR434H1	Building Community Resilience	0.5	St. George	Geography and Planning	2019 Winter	Poland, B.	SS	3
HIS418H1	Themes in Canadian Environmental History	0.5	St. George	History	2018 Fall	Penfold, S.	H	3

<u>POL439H1</u>	The Canadian Welfare State in Comparative Perspective	0.5	St. George	Political Science	2018 Fall	Haddow, R.	SS	3
<u>CHM210H1</u>	Chemistry of Environmental Change	0.5	St. George	Chemistry	2019 Winter	Abbatt, J.	NS	5
<u>CAS202H1</u>	Global Asian Studies: Sites and Practices	0.5	St. George	Contemporary East and Southeast Asian Studies	2019 Winter	Clark, D.	SS	3
<u>ECO105Y1</u>	Principles of Economics for Non-Specialists	1	St. George	Economics	2018 Fall +	Cohen, A.	SS	3
<u>ECO313H1</u>	Environmental Economics and Policies	0.5	St. George	Economics	2019 Winter	Anjomshoa, M.	SS	3
<u>GGR112H1</u>	Geographies of Globalization, Development and Inequality	0.5	St. George	Geography and Planning	2018 Fall	Thapa Bhattarai, S.	SS	3
<u>GGR438H1</u>	Environment and Development	0.5	St. George	Geography and Planning	2019 Winter	Anderson, Z.	SS	3
<u>INI236H1</u>	A Multidisciplinary Introduction to Urban Studies II: Urban Challenges and Theoretical Application	0.5	St. George	Innis College	2019 Winter	Mehta, A.	SS	3
<u>NEW106H1</u>	Science and Social Justice I	0.5	St. George	New College	2018 Fall	Whissell, P.	SS	3

NEW111H1	Food Matters II	0.5	St. George	New College	2019 Winter	–	SS	3
ENV451H1	Current Environmental Topics	0.5	St. George	School of Environment	2018 Fall	Vogt, E.	SS	3
MUN101H1	Global Innovation I: Issues and Perspectives	0.5	St. George	School of Global Affairs	2018 Fall	Wong, J.	SS	3
TRN162Y1	Political Economy and Social Inequality	1	St. George	Trinity College	2018 Fall +	Ewing, C.	–	3
EEB375H1	Organisms and Their Environment	0.5	St. George	Ecology and Evolutionary Biology	2018 Fall	–	NS	4
GGR314H1	Global Warming	0.5	St. George	Geography and Planning	2019 Winter	Harvey, L.	SS, NS	5

A.6 Sustainability Pathways initiatives from other Higher Education Institutions (HEI)

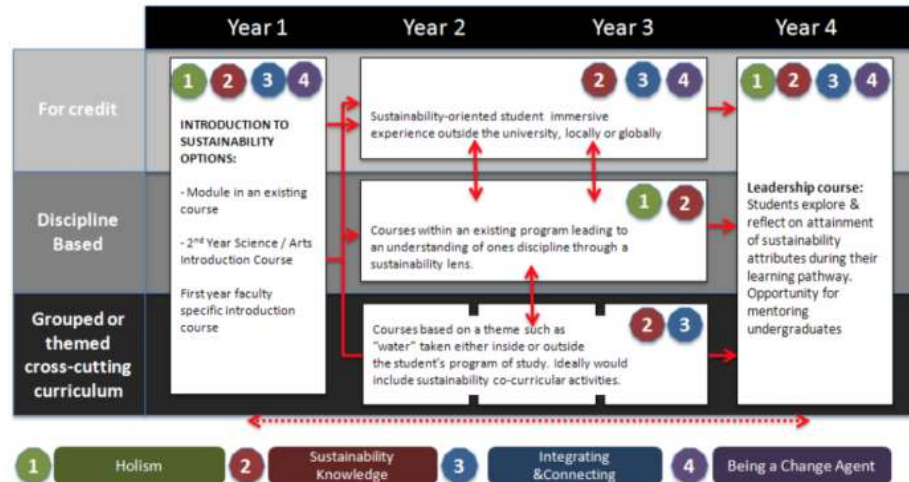
A.6.1 Canadian HEIs

★ The University of British Columbia- Public Research University: 64,900 Students

- Do have a Sustainability Course Inventory
- UBC has the UBC Sustainability Initiative (USI), which works to implement the university’s sustainability goals in terms of research, facilities and services, and improving sustainability curriculum. The USI has roughly 20 staff members and works with professors across the university.
- The USI hosts considerable information about the different sustainability fund and research grants offered at the university. Specially for curriculum innovation, USI offers Interdisciplinary Education Grants for faculty to hire research assistants for a summer to assist them in integrating sustainability content and exercises into their courses.
- Other useful and important notes on UBC’s SPI not described in the context notes on pathways:
 - As stated above, UBC’s sustainability teaching attributes are detailed and useful for developing sustainability curriculum. Here is a link to a detailed report on the four attributes (1) holistic systems thinking, 2) sustainability knowledge, 3) awareness and integration, and 4) acting for positive change) from 2013: Transforming Sustainability Education at UBC Desired Student Attributes and Pathways for Implementation - Sustainability Learning and Student Attributes
 - A key concept in developing the SLP is the bookend approach (Figure 1). And there are three different models to implement these SLPs; Discipline Based

Pathway, Theme Based Pathway, and “Beyond the Classroom” pathway. This bookend approach requires injecting sustainability content into big first year courses and ensuring students have access to many different sustainability courses and CEL/capstone courses.

- There are two examples of the Discipline Based Pathway at UBC: Within the Department of Biology and within the Sauder School of Business- a Sustainability Concentration



(Figure 1, from USI)

- ★ Dalhousie University- Public Research University: 18, 948 students
 - The College of Sustainability has a small list of sustainability courses (under 20 courses)
 - Dalhousie has the College of Sustainability, which is a community of faculty members and students interested in addressing sustainability and it is the host of the university's Environment, Sustainability, and Society (ESS) undergraduate program. They also have an Office of Sustainability which works with Facilities and Services to improve energy and resource efficiencies on campus.
 - Neither the College of Sustainability nor the Office of Sustainability offer grants for sustainability research or for the development of sustainability curriculum
 - Since 2012, the College of Sustainability has offered the RBC Sustainability Leadership Certificate. The program is open to all Dalhousie students and graduates, it costs \$150, and students require to do the following:
 - attend all three weekend modules (not necessarily in one academic year);
 - engage in two action projects; and
 - complete several reflection exercises on their personal program experiences.
- ★ University of Victoria- Public Research University: 21,696 students
 - Do have a sustainability course inventory

- UVic Sustainability has division on Sustainability in Education, which focuses on the academic side of sustainability, and Sustainability Office, which focuses on sustainability in facilities and services
- UVic Sustainability does not have a grant for sustainability curriculum, but they do have a Campus Sustainability Fund, in which faculty member, administration, and students can apply for funding for projects on campus to reach the university's Sustainability Action Plan
- The university also offers many community engaged learning opportunities especially through the Institute for Studies & Innovation in Community University-Engagement
- UVic Sustainability highlights three programs called Academic Sustainability Spotlights:
 - The Gustavson School of Business has been developing students' skills and awareness to do business sustainably and responsibly by building these values into core curriculum. In 2011, the School launched the Centre for Social and Sustainable Innovation (CSSI), UVic's first intra-faculty centre, that connects teachers, researchers and community around building Gustavson's pillar of sustainability.
 - The School of Environmental Studies is an interdisciplinary program based on three pillars: ethnoecology, political ecology and ecological restoration.
 - The Division of Continuing Studies offers a series of practical how-to courses and seminars on environmental sustainability for the campus and surrounding community. They also have a certificate programs called Ecological Restoration Professional Specialization Certificate.

★ The University of Alberta- Public Research University- 38, 423 students

- Do have an inventory of courses and of professors working on sustainability related projects, along with many minors, majors, masters, and PhD programs related to sustainability as well
- They have the Office of Sustainability, which is the main center of sustainability activities at the university
- The Office of Sustainability is a community partner of the Community Service Learning program, which gives students the opportunity to complete projects that help the university's sustainability performance
- The University of Alberta's Certificate in Sustainability program involves undergraduate students applying for the program after their first year (must have a minimum GPA) from the nine participating faculties in the program (ALES, Arts, Augustana, Business, Extension, Education, Native Studies, Physical Education and Recreation, and Science).
 - The program involves students taking a series of courses and then in their final year designing and conducting an integrative project, after which they have to present their findings to Sustainability at U of A to get the certificate. It is also a transcript notation, similar to U of T.
- The University of Alberta also has a Sustainability Scholars program for graduate students, which offers them paid positions to work with professional mentors from the City of Edmonton and other institutions on applied research projects in sustainability.

- They also have many of living lab opportunities, especially in terms of grants and so on for students and faculty

★ McGill University- Public Research University - 37,230 Students

- Do Have a detailed inventory with a faculty list along with each faculty's research topic area
- Have a list of sustainability/environmental student groups and so on
- McGill has developed a detailed Sustainability Plan
- They have established many sustainability strategic partners, with the city, region, and province.
- The Sustainability Office at McGill University has created a yearly levy tax from every McGill student for a Sustainability Projects Fund. Such levies have to be accepted by a majority in a referendum: once passed, 25 to 50 cents are taken from each student every year to fund sustainability initiatives (with an opt-out or non-opt-out possibility). A central part is: the university matches the funding provided. The McGill Sustainability Office made sure to secure the promise of the funding match before proposing the Sustainability Project fund levy for referendum.
- This is a capstone program in which students research living lab projects within their main academic department/ academic divisions. As an independent study course, fourth year students can conduct sustainability research under the supervision of a professor in their department. Students can then apply to be accredited by the ASR through applying and proving that their research involves sustainability content, works to address a community-sustainability related problem, and helps develop living lab projects on campus. The Sustainability Office at McGill will also help students find professors working on living lab projects on campus, so that they can be a part of the ASR program.

A.6.2 American HEIs

★ University of Michigan- Public Research University- 44,718 Students

- Program in the Environment (Pit Program)- a partnership with the School of Natural Resources & Environment, this interdisciplinary undergraduate program offers both a concentration (major) three different minors (Sustainability, Environment, and Sustainable Food Systems), plus courses open to all U-M students. Pie's curriculum encompasses the natural sciences, social sciences, and humanities coursework—with a focus on hands-on field experience.
- The major program within the PitE includes capstone course and practical hands on experiences
- The Graham Sustainability Institute at the University of Michigan hosts an Undergraduate Sustainability Scholars program, in which students can also get a notation on their transcript along with their main degree program after they apply to the program after their first year. Accepted students are required to participate in co-curricular activities and complete a minimum of nine (9) credit hours of coursework (core courses) and a field-based experience course.

- The University of Michigan's Dow Sustainability Fellows Program is an innovative program that supports 75 outstanding fellows per year at the master's, doctoral, and postdoctoral levels. The program also includes a Distinguished Awards for Interdisciplinary Sustainability competition for applied projects that cut across disciplines and academic levels, and involve U-M students at all academic levels. On behalf of the U-M Provost, the Graham Institute provides administrative support for this university-level program.

★ Penn University- State-Related University- 99,133 Students

- Penn Sustainability has an initiative on learning sustainability in curricular courses
- Do have Sustainability Course Inventory, which is maintained by the Sustainability Office, along with a list the variety of undergraduate major and minor programs
- The Vagelos Integrated Program in Energy Research (VIPER) is a program for students who are interested in energy science and engineering. VIPER students get research experience to develop sustainable ways to harness, convert, and use energy. Candidates for the program apply as they seek admission to the University.
- There is also a joint program of Penn's School of Arts and Sciences (SAS) and the School of Engineering and Applied Science (SEAS), VIPER leads to dual Bachelor of Arts (BA) and Bachelor of Science in Engineering (BSE) degrees by combining majors from each school. Possible combinations include: Physics and Astronomy, Chemistry, Biology, or Mathematics from SAS and Chemical and Biomolecular Engineering, Electrical Engineering, Materials Science and Engineering, or Mechanical Engineering and Applied Mechanics from SEAS. Some students may also apply for a master's degree through a fifth year of study.
- Penn State also has the Integrating Sustainability Across the Curriculum program (ISAC), which is an eight-week summer program teaming undergraduates with faculty to refine an existing course or develop a new course that incorporates sustainability as an academic theme. Over the course of the program, the students participate in mini-workshops and field trips to provide an opportunity to exchange ideas and share experiences with fellow participants.
- The Organizational Dynamics Sustainable Development Concentration In collaboration with other Penn departments and external partners, Organizational Dynamics has created a series of courses designed to help leaders implement sustainability initiatives today. This program is funded through Dow Chemical Company and is a master's degree in Organizational Dynamics focused on applying sustainability principles broadly across an organization.
- They have many grant/fellowships programs; Center for Undergraduate Research & Fellowships (CURF), Ben Franklin Scholars (BFS) Course Design Grants, and The Penn Program in Environmental Humanities.
 - The Master of Science in Organizational Dynamics program provides you with the knowledge-base you need to understand and address complex organizational issues — and allows you to take a deeper dive into the concentration areas of

your choice. Throughout your studies, you will work with an academic advisor to help you create a curriculum suited precisely to your interests

- As a Master of Science in Organizational Dynamics student, you will complete 12 course units (c.u.)* that balance core learning with individual exploration. Your course of study includes the following elements: (You can read about each curricular element in further detail below.)
 - Foundations (4 c.u.); Methods of Diagnosis and Evaluation (1 c.u.) ; Applications (4 c.u.); Elective courses (2 c.u.); Capstone project (1 c.u.)

★ Syracuse University- Private Research University- 22, 484 Students

- Do have a Sustainability Course Inventory- fairly small
- They do not have a certificate programs for undergraduates- just major and minors with fewer requirements than in other programs
- Graduate students (any program) can take certificate programs with their programs-The Certificate of Advanced Study in Sustainable Enterprise (CASSE) is offered collaboratively by the Whitman School of Management, the College of Engineering and Computer Science, the State University of New York College of Environmental Science and Forestry, and the Syracuse Center of Excellence in Environmental and Energy Systems. The CASSE integrates business, science, engineering, policy, and practice, taking a transdisciplinary approach to sustainable enterprise
- Have many research centers that focus on different aspects of sustainability; Center of Excellence in Environmental and Energy Systems (SyracuseCoE); Syracuse University Environmental Finance Center; Center for Environmental Policy and Administration (CEPA); Sustainable Enterprise Partnership (SEP); Center for Advanced Systems and Engineering (CASE); Syracuse University Industrial Assessment Center (IAC).
- They have a Campus as a living lab grant program in which students and faculty can get funding programs for research to study sustainability on campus
- Have a webpage with a list of sustainability student groups & a page for internships and opportunities for students on their website

★ University of California- Berkeley- Public Research University- 41,910 Students

- UC Berkeley offers at least 560 sustainability courses. There are courses on the list from 46 different departments.
- The Environmental Science, Policy, and Management (ESPM) department has the highest number of courses on the list (115), while Civil and Environmental Engineering has forty-five. This means that around 10% of total courses offer instruction in some aspect of sustainability. In 2013-14, 29% of undergraduates took at least one course focused on sustainability.
- UC Berkeley also offers a wide range of related degree programs -- over 25 undergraduate programs related to the environment or sustainability and almost 30 graduate degree programs, with almost 20 minors. The campus supports a large number of research centers related to the environment and sustainability.

- UC Berkeley Extension Education, or "UNEX " has an extensive range of sustainability-related courses and programs, including sustainable design, energy for sustainability, and environmental monitoring. Extension Education classes can be taken to supplement regular course offerings, for self-enrichment, or to earn a certificate.
- Decals: Student Taught Classes- UC Berkeley offers students the opportunity to receive credits for taking - and teaching - classes designed and led by other students. Many of these classes are related to sustainability. A list of sustainability-related DeCals offered for the current semester can be found here.
- Grants and internships for students under their advisory committee

A.6.3 Non-North American HEIs

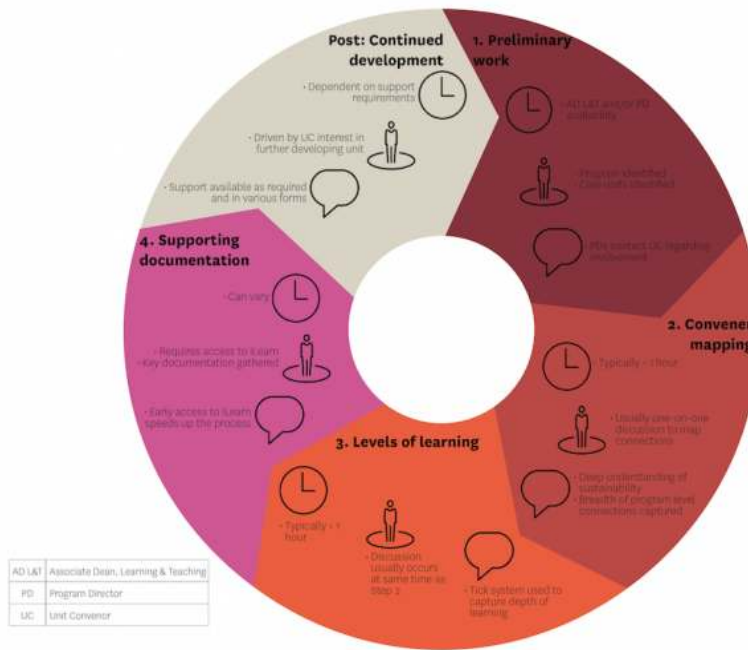
★ University of Edinburgh- Public Research University- 36,491 Students

- The Department of Social Responsibility and Sustainability (DSRS) was created in 2014 to respond to the sustainability responsibility of the university before global and local challenges, with the role of catalyzing action and collaboration across campus. It offers services such as advice and support to departments, schools, staff and faculty; workshops; quarterly reports on the state of sustainability in the university; or responsible investment guidance.
- They do have a sustainability course inventory
- The DSRS developed and initiated in the 2017-18 academic year five sustainability pathways. These pathways are made of opportunities for experiential learning on campus, in the community, and in businesses and other organizations, nationally and internationally, as well as of. They can fit both within and beyond students' main programs, and are open for all students across the University, no matter what their degree. The five current pathways are: 1) Social enterprise; 2) Sustainability; 3) Global citizenship; 4) Leadership through innovation; 5) Design for well-being
 - Each pathway has four key stages, which are phased over a maximum three-year period.
 - Awareness raising: a series of events and workshops for students interested in learning more about social responsibility and sustainability issues
 - Knowledge, skills development and mindset: a portfolio of courses building skills and knowledge which may be taken as electives within degree programmes (with permission from Personal Tutors) and opportunities to undertake SLICC (Student-led individually created courses) project work.
 - Mentoring and placements: a programme of short-term placements and mentoring with involvement from a range of organizations and alumni.
 - Capstone project: a group-based project with community groups
 - *Stages 1 and 2 of the pathways opened for 2017/18 and stages 3 and 4 will follow in 2018/19.

- Students who participate in and complete the capstone project will be recognized at the University's Sustainability Awards Ceremony to be held in the second semester of each academic year.
 - All this information (pathways, inventory, programs) is available on the DSRS' website, embedded within the University of Edinburgh's website.
- ★ Macquarie University (MQU)- Public Research University- 39,335 Students
 - MQU has a Sustainability Office, that focuses on three primary action-oriented initiatives: 1) M-Power, which educates and engages towards best everyday practices towards sustainability; 2) Target Better Futures, an accreditation framework designed to help departments and offices work towards embedding sustainability as part of their 'business as usual; and 3) Education for Sustainability initiative, which aim is to embed sustainability into every program of the curriculum. They work in engagement and services to departments, curriculum innovation, guidance for individual and communal sustainable practices, and in cooperation with facilities and services.
 - Two of these initiatives are important as curriculum innovation projects:
 - Education for Sustainability Initiative: Their methodology is a program-level approach, which addresses sustainability learning through a framework which maps program offerings to 5 different sustainability themes; 1) Harmony and Wellbeing; 2) Economies and Economic Well-being; 3) Natural Resources; 4) Climate Change; 5) Implementation and Governance. This framework is rooted in international platforms such as Agenda 21 and has been reviewed in several instances at the international level. It is the basis of their approach to making implicit connections to sustainability more explicit.
 - Each program in MQU has the opportunity to go through the 4-step + 'post: continued development' journey towards embedding sustainability in their education: 1) Preliminary work; 2) Convener Mapping; 3) Levels of Learning; 4) Supporting documentation. Heavy concerns were raised about the amount of time needed by a program to be involved in this initiative. MQU Sustainability ensures the impact to the program staff's workload is minimal and provides, as a guide, detailed suggestions for

involvement in this sustainability program-based initiative. Each step relies heavily on meeting with MQU staff.

- **Target Better Futures:** The accreditation aims to encourage departments to be more involved in sustainability. It is separated in three categories: It is a department-level approach



- **Bronze:** Departments undertake an initial assessment to ascertain what is already happening within the department and determine the level of maturity.
- **Silver:** Departments gain a deeper understanding of sustainability and its relevance to the department’s mission and purpose.
- **Gold:** Assists the move from planning to implementation, where sustainability becomes a part of business-as-usual.
- ****Those accreditations are heavily based in participation in workshops to build awareness of sustainability goals and create engagement and collaboration**
- This accreditation is just a part of the degree for students



UNIVERSITY OF
TORONTO

**Carbon Markets and Climate Finance:
Alternative-Financing Paths to a
Low-Carbon Future; The University of
Toronto's Path Forward**

8:15 AM – 4:30 PM

Tuesday, 19 June 2018

**University of Toronto, St. Michael's College
81 St Mary Street, Charbonnel Lounge, Elmsley Hall
Toronto, Ontario M5S 1J4**

Organizing Committee:

**Patricia Koval, Paul Leitch, Donna Nielsen, John Robinson,
Kimberly Strong, Gray Taylor, Rob Wilson**



OVERVIEW:

The University of Toronto and the School of the Environment's Environmental Finance Advisory Committee (EFAC) are pleased to present ***Carbon Markets and Climate Finance: Alternative-Financing Paths to a Low-Carbon Future; The University of Toronto's Path Forward.***

In this inaugural University Climate Change Coalition or "UC3" climate change forum, we are continuing earlier conversations on rapidly evolving carbon markets and related opportunities and financing challenges.

The University of Toronto as a Case Study

Using the University of Toronto as an example of a cap and trade "covered emitter" with a public commitment to meet aggressive emissions reduction targets, the conference will focus on identifying the various financing options and market mechanisms currently and prospectively available to organizations such as U of T.

Emphasis will be placed on identifying alternative paths that represent future potential sources of climate finance for leading market participants such as the university sector. Touching on Green/Climate Bonds, structured finance, carbon market activities, innovative leverage strategies and more, the goal is to identify a broad array of ways to finance U of T's GHGE emission reduction commitments, making use of both public and private market funding sources.

Sessions

The morning sessions will begin with an overview of international market developments, followed by a review of the federal government's backstop and carbon pricing requirements. This will be followed by a deeper dive into Ontario's growing carbon and climate finance market, with a strong focus on the impact of the June 7 Ontario election results on the path forward. After a panel discussion of climate finance strategies, the morning will end with an overview of the City of Toronto's greenhouse gas reduction and climate finance plans, which will serve to highlight various financing options.

Lunch Speaker: University of California Representative on the UC3 and UC's Carbon Neutral 2025 Pledge. Over lunch, a representative of the University of California will share information on UC's remarkable climate progress and commitment to Carbon Neutrality by 2025 and to the international University Climate Change Coalition.

The afternoon sessions will begin with a comprehensive overview of the U of T's commitment to achieve a 37% reduction in greenhouse gas emissions from 1990 levels by 2030, equivalent to approximately 60,000 tonnes of emissions over the three campuses.

Having recently joined UC3, U of T is committed to collaborate with community, business leaders, elected officials and other stakeholders to improve sustainability and reduce or potentially eliminate emissions across the entire university infrastructure, including the downtown St. George campus (which is a "mandatory participant" emitter under the current Ontario cap-and-trade system) and the Mississauga and Scarborough campuses.

However, success in achieving U of T's emission reduction goal is likely dependent on U of T being able to access other sources of capital to leverage existing financial contributions from the Province of Ontario's Greenhouse Gas Reduction Account, the account into which money from the auction of allowances is placed. Financing requirements to meet the University of Toronto's aggressive carbon reduction goals to and beyond 2030 may require somewhere between \$150 and \$300 Million in additional capital finance over that period.

University staff will be laying out these challenges in detail and, with the active participation of a panel of experts as well as conference attendees, we will explore a broad array of existing and emerging financing options. Given the scale of the financial requirements, emphasis on the use of offsets, retrofit programs, co-generation and clean tech programs, among other potential finance structures and instruments, will be explored.

The goal of this conference is to engage the broadest possible group of stakeholders to identify the many paths possible to reduce emissions and creatively finance these various undertakings. Moreover, U of T's experience can serve as a pilot to identify and create paths forward for other institutions to develop similar greenhouse gas reductions and climate finance programs.

By way of background, more detailed information concerning the U of T's commitment to UC3 can be found at this link:

<https://www.utoronto.ca/news/u-t-joins-coalition-leading-universities-driving-climate-action>

Information about this event and the slides from some sessions can be found at this link:

<https://www.environment.utoronto.ca/events/carbon-markets-and-climate-finance-alternative-financing-paths-to-a-low-carbon-future-the-university-of-torontos-path-forward/>

PROGRAM:

8:15 - 8:45 AM	Registration and Refreshments
8:45 - 9:15 AM	<p>Opening Remarks</p> <p>Introduction: Kimberly Strong, Director, School of the Environment, University of Toronto</p> <p>Welcoming Remarks and introduction to the University of Toronto’s commitment to the international University Climate Change Coalition: Meric Gertler, President, University of Toronto.</p>
9:15 - 9:30 AM	<p>Expert Panel on Sustainable Finance</p> <p>Speaker: Tiff Macklem, Dean, Rotman School of Management, University of Toronto, and Chair of the Canadian government’s recently-formed Expert Panel on Sustainable Finance</p>
9:30 - 10:10 AM	<p>Carbon Market Overview: Dominant Currents in Carbon Markets & Climate Change Legislation: Who is leading and what are they doing? The Canadian Commitment: Pan Canadian Framework on Clean Growth and Climate Change.</p> <p>Speakers: Katie Sullivan, Managing Director, International Emissions Trading Association (IETA) Xiaolu Zhao, China Climate Initiative Program Manager, Environmental Defense Fund (EDF)</p>
10:10 - 10:45 AM	<p>Focus on Ontario and Linked Markets: Challenges and Opportunities within the regulatory carbon market and developing voluntary carbon market.</p> <p>Speaker: Patricia Koval, member of the Environmental Finance Advisory Committee of the University of Toronto’s School of the Environment</p>
10:45 - 11:00 AM	Break – Refreshments
11:00 - 11:30 AM	<p>Climate Finance: Practical Levers to Deploy Capital to Reduce GHG Emissions.</p> <p>Moderator: Gray Taylor, General Counsel and Principal, The Climate Solutions Group Limited</p> <p>Panel Members: Paul Martin, CPA, Director of Business Operations, Western University William (Bill) J. Murphy, National Leader, Climate Change & Sustainability Services, KPMG</p>
11:30 - 12:00 Noon	<p>Spotlight on the City of Toronto: How Toronto is implementing and financing GHG emission reduction programs – now and in the future:</p> <ul style="list-style-type: none"> • the design and goals of Transform TO • Toronto's Green Bond issue

	<ul style="list-style-type: none"> • value of the Cap and Trade forum to Toronto’s work • carbon credits as way to raise funding • how Toronto utilizes recoverable debt financing to keep energy efficiency retrofits from counting towards the City's mandated debt ceiling • use of local improvement charges as a tool for financing • partnering with private capital and • how municipal policy regulations can and do drive availability of financing <p>Speaker: Jim Baxter, Director, Environment & Energy Division, City of Toronto</p>
LUNCH	
12:00 - 1:00 PM	<p>Lunch Speaker: The UC3 Challenge – What is it and how UC and others are responding, including the UC 2025 carbon neutral commitment.</p> <p>Speaker: Matt St. Clair, Director of Sustainability, University of California, Office of the President</p>
1:00 - 1:45 PM	<p>Laying out the University of Toronto Climate Challenge – Retrofit, Conversion and Greenfield Programs & Financing Requirements.</p> <p>Speaker: Paul Leitch, Director of Sustainability Operations & Services, St. George Campus, University of Toronto</p>
1:45 - 2:45 PM	<p>Creative Finance: An Overview of the Financing Instruments available for use by organizations, with specific Recommendations for U of T (e.g. University-issued “Green Bonds”, Project Backed Green Bonds, the “ESCO” approach, Carbon Offsets, Carbon Markets, Venture Capital, etc.).</p> <p>Moderator: Jennifer Reynolds, President and CEO, Toronto Financial Services Alliance (TFSA)</p> <p>Panel Members: David Berliner, Managing Director and Co-founder, CoPower Rob Keen, Chief Executive Officer, Forests Ontario Tim Stoate, Vice-President, Impact Investing, The Atmospheric Fund Shaaj Vijay, Vice-President, Debt Capital Markets, RBC Capital Markets</p>
2:45 - 3:00 PM	Break – Refreshments
3:00 - 4:00 PM	<p>“Town Hall” Discussion: Conference attendees will be encouraged to actively take part in these discussions, with interactive opportunities to ask questions and offer suggestions and recommendations to achieve U of T’s goals.</p> <p>Moderator: John Robinson, Professor, Munk School of Global Affairs and School of the Environment; Presidential Advisor on the Environment, Climate Change and Sustainability, University of Toronto</p>
4:00 - 4:30 PM	<p>Response to Discussions and Recommended Paths Forward</p> <p>Speaker: Scott Mabury, Vice President University Operations, University of Toronto</p>
4:30 PM	Closing Remarks and Adjournment: Kimberly Strong

SPEAKERS AND ORGANIZERS (in alphabetical order):



**Jim Baxter,
P. Eng., MBA
Director, Environment
& Energy Division
City of Toronto**

Jim Baxter is the Director of the Environment and Energy Division at the City of Toronto, responsible for combined environment and energy programs. In 2016, the Division managed the City's successful application for funding from the Rockefeller Foundation to retain a Chief Resilience Officer. In addition, the Division created the City's 33-year plan to reduce greenhouse gas emissions. Titled: "TransformTO", the plan lays the framework to attain the City's goal of an 80% reduction in GHG emissions by 2050 and includes: energy conservation and demand management (ECDM), Community Energy Planning (CEP), low-carbon thermal networks, greater use of active transportation, net-zero building and community designs, green roofs, electrification of transportation (both public transit and personal transportation) community outreach, and improving resiliency to high impact events. Jim's focus is on managing the division's environmental and energy challenges in a rapidly changing external environment while capitalizing on opportunities, to balance economic growth, attract private investment, and improve energy security and resiliency.

Prior to joining the City in 2010, Jim's career has taken him to gas & electric utilities, oil & gas pipelines and into academia in Ontario and Alberta. Jim has an MBA and an Engineering degree from the University of Toronto. He is a Registered Professional Engineer.



**David Berliner,
Managing Director
and Co-founder,
CoPower**

David Berliner is co-founder and Managing Director of CoPower. He previously worked at Inerjys, a clean energy investment firm. He has consulted for the New York City Mayor's Office on renewable energy, was Sustainability Coordinator for the University of Toronto, and worked at the Carbon Disclosure Project. David has been named "Emerging Solar Leader" by the Canadian Solar Industries Association and "Top 30 Under 30" by Corporate Knights. David holds an M.P.A. from Columbia University and a B.Sc. from the University of Toronto.



**Meric Gertler,
CM, FRSC, FBA, FAcSS,
MCIP,
President, University
of Toronto**

Meric S. Gertler began his term as the 16th President of the University of Toronto on November 1, 2013. Prior to that, he served as the Dean of the Faculty of Arts & Science—the largest faculty at the University—from 2008 to 2013. He is a Professor of Geography and Planning, and the Goldring Chair in Canadian Studies at the University of Toronto. He is a co-founder of a large research program at U of T's Munk School of Global Affairs investigating the role of city-regions as sites of innovation and creativity in the global economy. His work engages in comparative analysis of North American and European cities to understand how local social and cultural dynamics create the foundations for economic success and prosperity.

President Gertler has served as an advisor to local, regional and national governments in Canada, the United States and Europe, as well as to international agencies such as the Organisation for Economic Cooperation and Development (Paris) and the European Union. He has authored or edited nine books, including *Manufacturing Culture: The Institutional Geography of Industrial Practice* and *The Oxford Handbook of Economic Geography* (with Gordon Clark and Maryann Feldman). He has held visiting appointments at Oxford, University College London, UCLA, and the University of Oslo. Currently, he serves as chair of the Working Group on Higher Education-Business Research Partnerships of the Business-Higher Education Roundtable. He is also the campaign cabinet chair for the education sector of the United Way, Toronto & York Region; a trustee for the Hospital for Sick Children; and a member of the board of directors of MaRS Discovery District; Waterfront Toronto; and Mitacs, a national non-profit research and training organization.

A graduate of McMaster University (BA), the University of California, Berkeley (MCP) and Harvard University (PhD), Professor Gertler was awarded an honorary doctorate from Lund University, Sweden, in 2012, and from Shanghai Jiao Tong University, China, in 2017. He is a Fellow of the Royal Society of Canada, the Academy of Social Sciences (UK) and a Corresponding Fellow of the British Academy. He received the Award for Scholarly Distinction in Geography from the Canadian Association of Geographers in 2007, and in 2014, both the Distinguished Alumni Award from the University of California, Berkeley and the Distinguished Scholarship Honor from the Association of American Geographers (AAG). In December 2015, Professor Gertler was appointed to the Order of Canada.



**Robert H. Keen,
Chief Executive
Officer, Forests
Ontario**

In 2014, Rob Keen assumed the role of Chief Executive Officer of Forests Ontario (the merged organization of Trees Ontario and Ontario Forestry Association) after serving as CEO of Trees Ontario since 2011. Rob is currently leading the Forests Ontario team in sustaining and generating new partnerships to support and achieve its re-greening mandate.

Rob is a Registered Professional Forester (RPF) who founded a forestry consultant business upon graduating with a BScF from the University of Toronto in 1982. He has been involved in many facets of the forestry industry, primarily in the Great Lakes St. Lawrence forest region. Rob has provided forestry services to landowners, developed forest management plans on Crown and private lands, conducted wood supply and feasibility studies, led forest audits for the Forest Stewardship Council (FSC) and Ontario Ministry of Natural Resources (and Forestry).

Rob has been an active member of the Ontario Professional Foresters Association since 1985, where he served as vice-president for two terms. He was a director and chair of the Algonquin Forestry Authority, and currently serves as a Director for Invasive Species Centre, Maple Leaves Forever and Westwind Forest Stewardship.



**Patricia A. Koval,
Member of the
Environmental
Finance Advisory
Committee of U of T's
School of the
Environment**

Patricia A. Koval is a corporate director and lawyer based in Toronto, Canada. She recently retired as a Senior Partner of Torys LLP, where she practised as a corporate finance, securities and governance lawyer.

As well, Patricia was an Adjunct Professor at University of Toronto Law School, and she is a member of the School of the Environment's Environmental Finance Advisory Committee. Patricia is the current board Chair of The Canada-India Business Council and the Toronto and Region Conservation Authority Foundation (also known as The Living City Foundation) and serves on several other boards in Canada and the United States. Patricia is also on the Ontario Executive of the Institute of Corporate Directors and is a member of the Canadian Performance Reporting Board of CPA Canada.

She is a contributing author to "The Law of Climate Change in Canada", published by Canada Law Book and author and co-author of several studies on liability and disclosure related to climate change. Patricia graduated from the joint MBA/J.D. program at Schulich School of Business and Osgoode Hall Law School in Toronto, Canada.



**Paul Leitch, P.Eng.,
CMVP, Director of
Sustainability
Operations &
Services, St. George
Campus, University of
Toronto**

Paul Leitch is the Director, Sustainability Operations & Services, at the University of Toronto, St. George Campus, located in the core of Toronto which provides top tier education to over 60,000 students in more than 120 buildings with 13 million square feet of floor space with an average age of 85 years.

Paul manages a staff of energy engineers who qualify and quantify energy reduction projects, shaving more than 8 GWh of electricity and 2 MW of power off the campus in 4 years. Paul also manages the Sustainability Office whose mandate is to connect, inspire and educate the campus population about sustainability issues, well-being and success stories.

Graduating from U of T as a mechanical engineer in 1979, Paul has been involved with energy conservation, on-site generation and sustainability initiatives since then and thrilled with his role helping his alma mater, staff, students and faculty to sustainably achieve the energy and GHG reduction targets we are aiming at.



**Scott Mabury,
Professor and Vice-
President University
Operations,
University of Toronto**

Professor Scott Mabury was appointed as Vice-President of University Operations on January 1, 2012, having previously served as Vice-Provost, Academic Operations and Chair of the Department of Chemistry. Portfolios reporting to him include Information Technology Services, Facilities and Services, Ancillary Services, Office of Planning and Budget, University Planning Design & Construction encompassing Campus and Facilities Planning, Project Development, Project Management, Design & Engineering, Leasing and Academic + Campus Events.

Mabury's achievements as VPUO include:
Creating the Utilities Reduction Revolving Fund, which has seen many divisions save money by reducing energy use.
Saving \$54 million last year—a year ahead of schedule—through retrofits to improve operations and maximize efficiency.
Creating entrepreneurial space in the Banting & Best buildings for U of T-affiliated startups.
Receiving \$84 million in federal strategic investment funding for rehabilitation of almost half of our research space including major projects at UTM and UTSC.

Mabury is the only academic in this role at a Canadian university. He holds a Ph.D. in Agricultural and Environmental Chemistry.



**Tiff Macklem,
Dean, Rotman School
of Management,
University of Toronto**

Tiff Macklem is Dean of the Rotman School of Management at the University of Toronto and Chair of the Canadian government's recently-formed Expert Panel on Sustainable Finance. He served as Senior Deputy Governor of the Bank of Canada, sharing responsibility with the governor and four deputy governors for monetary policy and the Bank's role in promoting financial stability. In that role, he was also the Bank's chief operating officer and a member of its board of directors, overseeing strategic planning and coordinating the Bank's operations. Macklem has also played a leading role in efforts to ensure stable financial systems worldwide through the Financial Stability Board.



**Paul Martin,
CPA, CGA, P.Mgr.,
C.Mgr.,
Director Business
Operations, Facilities
Management,
Western University**

Paul Martin graduated from the University of Windsor with Honours Bachelor of Commerce in 1980 and received his CGA designation in 1986. He started his career in Toronto in the eighty's first in public accounting then moving into corporate accounting as a controller in 1986. In the early ninety's Paul moved back to his home town of London to accept a job with a local firm, where he became interested in computers. These interests in computers lead him to accept a position with The University of Western Ontario in 1993, where he has worked for the last 25 years.

During his tenure at UWO Paul has worked with both financial and computer systems working as part of a team to transform Western's administrative systems from home grown mainframe technology to leading edge Higher Education software Oracle PeopleSoft. In 2009 Paul moved to Facilities Management as Director Business Operations where he became responsible for Western's utilities and the associated budgets. In this role Paul first started working with the IESO, local LDC and other Universities in the province to better understand electricity costs.

Paul was elected Energy Chair of Ontario APPA (OAPPA) in 2014 and OAPPA President in 2016. In these positions he advocated for the Higher Ed sector with the Ministries of Energy (MOE); Environment and Climate Change (MOECC); and Advanced Education and Skills Development (MAESD).

For the past three years Paul has been engaged with various the MOECC and MAESD in the development of the Cap & Trade program and the Greenhouse Gas Reduction Plan for Colleges and Universities.



**William (Bill) J. Murphy,
National Leader,
Climate Change &
Sustainability
Services, KPMG**

Bill Murphy is a senior client service partner and practice leader with KPMG Canada. Over his 35 year career, Bill has helped drive governance and risk management innovation as waves of regulatory change and increasing business complexity have created the need for breakthrough solutions and unique subject matter expertise. As national leader of KPMG's Sustainability Services practice, Bill focuses on the breadth of technological, social and environmental impacts of emerging business issues including:

- Governance, reputation and risk
- Clean technology and innovation
- Renewable and alternative energies
- Sustainable supply chains
- Carbon reduction and offset trading mechanisms
- Performance reporting and assurance.

Bill is an author and speaker at various conferences and seminars for directors and executives. He is a significant contributor to KPMG's Corporate Responsibility Reporting survey and other global thought leadership publications.

Throughout his career, Bill has established and led integrated teams of experienced professionals that have helped some of Canada's largest corporations and financial institutions implement leading practices in governance, financial risk management and corporate responsibility strategies.

Bill has served as a member of the Audit and Assurance Standards Board, the Board of Examiners' Syllabus Committee, and various task forces on behalf of the Canadian Institute of Chartered Professional Accountants.

Bill received an FCA fellowship from the Ontario Institute of Chartered Professional Accountants for his career accomplishments and community leadership, including as Board Chair for a number of important arts and health organizations. He is currently active as a senior volunteer in the conservation of an environmentally sensitive UNESCO world biosphere reserve.



**Jennifer Reynolds,
MBA, ICD.D,
President & CEO
Toronto Financial
Services Alliance**

Jennifer Reynolds is the President and CEO of the Toronto Financial Services Alliance (TFSA), a public-private partnership whose mission is to promote and develop Toronto's financial services sector, and to establish its prominence as a leading global financial centre. Jennifer's 20-year career in the financial services industry has included senior roles in investment banking, venture capital, and global risk management. Prior to joining TFSA, Jennifer was the President & CEO of Women in Capital Markets (WCM), Canada's largest industry association and advocacy group for women in the financial sector.

Jennifer is a Director on the Board of the Canada Development Investment Corporation ("CDEV"), Director on the Board of Women's College Hospital Foundation, and is a former Member of the Ontario Venture Capital Fund Advisory Committee, former Chair of the Board of Advisors of the Micro skills Business Incubator, and former Director on the Board of Studio 180, an independent, Toronto based theatre company. In 2015 and 2017, she was named a Women's Executive Network (WXN) Canada's Most Powerful Women: Top 100 Award Winner.

Jennifer is a graduate of the Harvard Business School Women's Leadership program, and she received her MBA from McGill University, as well as a Bachelor of Arts with a double major in Economics and Political Science from McGill University. Jennifer also holds the Institute of Corporate Directors Designation, ICD.D.



**John B. Robinson,
Professor, Munk School
of Global Affairs and
the School of the
Environment, U of T**

John Robinson is a Professor at the Munk School of Global Affairs, and the School of the Environment, at the University of Toronto; an Honorary Professor with the Institute for Resources, Environment & Sustainability at The University of British Columbia; and an Adjunct Professor with the Copenhagen Business School. At the University of Toronto, he is also Presidential Advisor on the Environment, Climate Change and Sustainability.

John's research focuses on the intersection of climate change mitigation, adaptation and sustainability; the use of visualization, modeling, and citizen engagement to explore sustainable futures; sustainable buildings and urban design; the role of the university in contributing to sustainability; creating partnerships for sustainability with non-academic partners; and, generally, the intersection of sustainability, social and technological change, behaviour change, and community engagement processes.



**Matthew St. Clair,
Director of
Sustainability,
University of
California, Office of
the President**

Matthew St. Clair is the first Director of Sustainability for the University of California's Office of the President, leading sustainability efforts across the 10-campus UC system since 2004.

Mr. St.Clair was a founding member of the Board of Directors for the Association for the Advancement of Sustainability in Higher Education. He is also a member of the Board of Directors of Strategic Energy Innovations, a non-profit organization implementing energy conservation and sustainability education programs in California.

Mr. St.Clair has delivered lectures at numerous universities, been an invited keynote speaker at several regional and national conferences, and has advised the U.S. House of Representatives on the formation of an Office of Sustainability for the U.S. Capitol.

Mr. St.Clair has a Masters degree in environmental policy from the Energy and Resources Group at UC Berkeley and a Bachelors degree in economics from Swarthmore College. He is a LEED Accredited Professional and a Certified Energy Manager.



**Tim Stoate,
Vice-President,
Impact Investing, The
Atmospheric Fund**

With nearly 30 years of experience in corporate finance, Tim Stoate oversees The Atmospheric Fund's impact investing and designs and tests new financing options that support low-carbon solutions. Tim focuses on structuring capital funding for energy-efficient retrofits in the high-rise residential/condominium sector and the MASH (municipalities, academic institutions, school boards, and health and social service providers) sector. In addition, Tim oversees TAF's investments in low-carbon enterprises. He also serves on the board of the Green Ontario Fund (GreenON).



**Kimberly Strong,
Professor and
Director, School of
the Environment**

Kimberly Strong has been a Physics Professor at the University of Toronto since 1996, and was appointed inaugural Director of the School of the Environment in 2013. She has a BSc from Memorial University of Newfoundland and a DPhil in Atmospheric Physics from the University of Oxford, and has held postdoctoral appointments at the University of Cambridge and York University. Her expertise is in atmospheric remote sounding using ground-based, balloon-borne, and satellite instruments for studies of ozone chemistry, climate, and air quality, and she has published more than 150 refereed papers in her field.

Kim is the Deputy PI and Theme Leader for the Probing the Atmosphere of the High Arctic network, which runs the PEARL facility on Ellesmere Island. She is also the founder of the University of Toronto Atmospheric Observatory and Co-I on the ACE and Odin satellite missions, and recently completed six years as Director of the NSERC CREATE Training Program in Arctic Atmospheric Science. Kim is a member of the School of the Environment's Environmental Finance Advisory Committee, and previously served as its co-chair for four years.



**Katie Sullivan,
Managing Director,
International Emissions
Trading Association**

Katie Sullivan serves as Managing Director of the International Emissions Trading Association (IETA), the leading global multi-sector business voice for the intersection of markets and climate change. On behalf of IETA's 150+ corporate members, Katie leads efforts to inform environmental market design while driving engagement across the Americas and Pacific Rim. She also manages IETA's growing climate finance, aviation and digital innovation initiatives. Katie currently sits on the University of Toronto's Environmental Finance Advisory Committee, Ivey Foundation's Advisory Committee, the International Student Energy Summit's Advisory Panel, and the Climate Advisory Group to Ontario's Minister of Environment & Climate Change. She is a Board Member to the new International Carbon Capture & Storage (CCS) Knowledge Centre and acts as Special Advisor to Biological Carbon Canada.

In addition to frequent global public speaking engagements, Katie is regularly called upon to share expert testimony across various state, provincial and national legislatures. Prior to IETA, she worked as Senior Associate at ICF International. Katie holds an Honors Bachelor of Public Affairs & Policy Management and a Masters in Environmental Policy & Development (University of Sussex, UK).



**Gray Taylor,
General Counsel and
Principal, The Climate
Solutions Group
Limited**

Gray Taylor is the General Counsel and a Principal of the Climate Solutions Group, an entity that aims to bring significant amounts of capital to projects to create ghg offsets and sell those offsets to large emitters in the Western Climate Initiative and Alberta markets. He is also the principal of Gray Taylor Law, a Canadian boutique law firm.

Gray is a former Chair of the National Environmental, Energy and Resources Law Section of the Canadian Bar Association, a former IETA Council member, former co-Chair of IETA's Canadian Working Group and a member of the Environmental Finance Advisory Committee of the University of Toronto's School of the Environment. He is the inaugural Distinguished Visiting Fellow in Environment at the School of the Environment and a Fellow of the Royal Canadian Geographic Society.

Gray's international emissions trading involvement led to him being placed consistently for several years in Band 1 for international climate change legal work by Chambers International, the leading lawyer rating agency, where he is today ranked as a "Senior Statesman". He is also rated as a Senior Statesman in Chambers Guide for Canadian Environmental Law.



**Shaaj Vijay,
Vice-President, Debt
Capital Markets, RBC
Capital Markets**

Shaaj Vijay is a Vice President in the Government Finance team responsible for the coverage of public sector issuers including provinces, municipalities and universities from a debt origination capacity. As part of the broader Green Bond team, Shaaj has been involved in the growth of the Green Bond market in Canada with significant expertise in recent green bond transactions in the provincial and municipal space.

Shaaj has been with RBC Capital Markets since 2012 and holds a B.A.Sc. in Engineering from the University of Waterloo, an MBA from the Rotman School of Management, University of Toronto and received the Chartered Financial Analyst designation.



**Robert P. Wilson,
Director of
Conservation Finance,
The Nature
Conservancy of
Canada**

Rob Wilson joined The Nature Conservancy of Canada (“NCC”) in 2007, after many years with The TD Bank Financial Group. Rob is the Director of Conservation Finance in the New Conservation Strategies group at NCC and is responsible for managing NCC’s carbon finance program and conservation offset activities, in addition to various other new conservation initiatives. Rob is a member of the Ontario Forest Carbon Policy Technical Working Group and recently completed sitting on the Verification Committee of the Canadian Roundtable for Sustainable Beef. Rob is involved in a number of large-scale, land conservation programs in his work at NCC.

Rob holds an undergraduate degree in political science and economics from the University of Toronto and an MBA from the Rotman School of Management. He also holds a Diploma in Resource Management from the University of Toronto’s Faculty of Forestry. Rob is also currently Co-Chair of the University of Toronto’s School of the Environment Finance Advisory Committee. His interest is in creative conservation and climate finance in order to mobilize capital to further conservation efforts across Canada and globally.

The Nature Conservancy of Canada ranks as Canada’s largest land conservation charity, having protected more than 2.8 million acres (1.1 million hectares) of lands across Canada. See <http://www.natureconservancy.ca/en/who-we-are/our-story/>.



**Xiaolu Zhao,
China Climate
Initiative Program
Manager,
Environmental
Defense Fund**

Xiaolu Zhao works as the program manager of the China Climate Initiative at the Environmental Defense Fund (EDF) in Beijing. The EDF is closely coordinating with China’s National Development and Reform Commission (NDRC) Department of Climate Change and the national and pilot carbon markets.

In her leadership role, she assists the government’s work and supports climate research projects. She pioneered the design and implementation of the carbon Emissions Trading Scheme (ETS) simulation tool, which is the first and only artificial intelligence (AI) - enabled system to provide people a first-hand experience with carbon market trading.

Zhao organizes round tables for experts, international study tours for policy makers and international events. She performs carbon market simulation training for key global stakeholders in government, research, and industry, building stronger support of the national carbon market.