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

5 Years of CECCS

2022 Annual Report

November 2022

UNIVERSITY OF TORONTO

ACKNOWLEDGEMENTS

This report was made possible with the following contributions

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ACKNOWLEDGEMENTS

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CECCS work-study students and interns during the reporting year:

Sean Cameron, Melody Chan, Jenna Im, Cedric Jiang, Mariam Khan, Ada Tulay, Ryan Wang, Andi Darell Alhakim, Grace Ma, Basil Abu Sara, Ingrid Cui, Emily MacCallum, Ajinkya Mandlik, Esmée Schimmelpenninck, Xi Wang, Faraz Alidina, Tory Grewar, Lu (Tracy) Xi, and Yazan Zamel.

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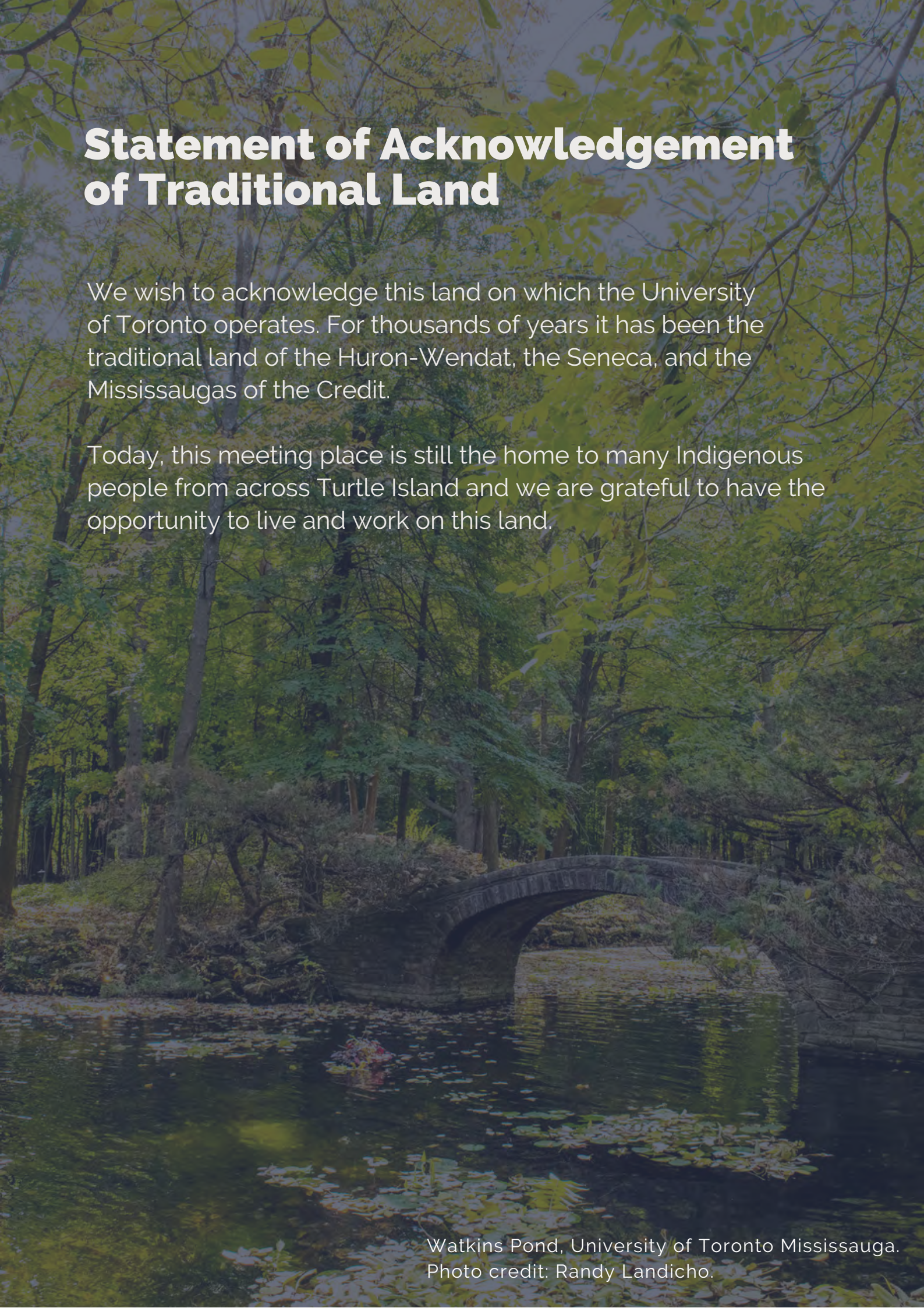
Statement of Acknowledgement of Traditional Land

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit.

Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to live and work on this land.



Watkins Pond, University of Toronto Mississauga.
Photo credit: Randy Landicho.

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A Message from the President

This year marks the fifth anniversary of the President's Advisory Committee on the Environment, Climate Change, and Sustainability (CECCS), whose main goal is to advance sustainability across all aspects of the University of Toronto's mission.

This Report captures the Committee's wide reach and high impact in supporting the work of various sustainability leaders across and beyond the University over the past five years. In its pages, you will learn more about the impressive initiatives of the four Subcommittees—Teaching & Learning, Research, Operations, and Engagement & Partnerships—and the cross-cutting themes of Campus as Living Lab (CLL); University as an Agent of Change (AoC), United Nations Sustainable Development Goals (SDGs), and Student Leadership.

The University's commitment to sustainability was made evident by our second-place ranking in

"The community case studies and personal stories from past and current student champions provide compelling evidence of the impact of the Committee's efforts"

the QS World University Rankings: Sustainability 2023. This commitment, and the Committee's excellent work to accelerate our action on the sustainable development goals, has never been more imperative considering the increasing urgency of the climate crisis.

On behalf of the University of Toronto, I offer congratulations to Co-Chairs John Robinson and Ron Saporta and to all the dedicated members of the Committee on the significant achievements highlighted in the 2022 Annual Report.

Photo credit: Lisa Sakulensky

Executive Summary

The Committee on the Environment, Climate Change and Sustainability (CECCS) report "5 Years of CECCS" highlights milestones and activities aimed at making sustainability part of everything that we do at The University of Toronto, and beyond it. In addition to an update on CECCS activities over the last year, this report features reflections from CECCS students over the last five years as well nineteen new sustainability case studies from partners and champions across the university.

In 2022 the CECCS Secretariat added its first Director, who provides strategic and tactical leadership to the Secretariat, as well as oversight of particular initiatives such as CECCS' involvement in the United Nations Climate Change Conference and Advisory Groups on Agent of Change and Transdisciplinary Co-Production training workshops that make up part of the Teaching & Learning (T&L) and Research Subcommittees programs of work.

Other highlights from this year include notable progress on a renewed mandate for the Research Subcommittee, formal recognition and funding for the T&L supported Sustainability Teaching Community of Practice, two new publications and the launch of the Sustainability Citizen program. The Engagement & Partnerships (E&P) Subcommittee and Sustainability Offices on all three campuses helped to support active engagement of students during Orientation Week in September. On the Operations side, we launched a new online Sustainability Event Calendar and saw major developments and investment into the University of Toronto's Climate Positive Plan, including through a new partnership with the Canada Infrastructure Bank and renewed activity on the university's Air Travel Emissions Mitigation Initiative, among others.

Regular CECCS Secretariat activities also continued through the year, including updates to various course, research and project inventories and frameworks as well as the Campus as a Living Lab (CLL) and Community Engaged Learning (CEL) databases. The CECCS also continued to promote the Sustainability Pathways Program to different divisions and faculties across campus, contributed to the implementation of the City of Toronto's Transform TO climate action strategy and participated actively in international climate networks.

As in previous years, the CECCS is once again hosting the 2022-2023 edition of the Adams Sustainability Celebration, which will culminate in an in-person ceremony and Innovation Prize Pitch Competition at Hart House in March 2023.

Milestone Map

Advisory Committee on Divestment (2015) and Beyond Divestment response report (2016) set the stage for CECCS

2017

John Robinson named as Presidential Advisor

Committee on Environment, Climate Change and Sustainability (CECCS) becomes first Presidential Advisory Committee

CECCS is given a 2-year mandate to establish value with the support of 16 appointed members

2018

Agent of Change, Campus as a Living Lab and Curriculum Innovation subcommittees meet for the first time

U of T becomes a founding member of the University Climate Change Coalition (UC3)

John Robinson is named a Clean50 recipient in the Education and Thought Leadership Category

2019

Small budget is secured for staff and student salaries; mandate is extended by 2 years

Adams Sustainability Champions Internship established

1st peer-reviewed journal article on sustainability inventories published

Milestone Map

2020

1st Adams Sustainability Celebration is held

Sustainability Scholar Program is launched in the Faculty of Architecture, Landscape, and Design and the Faculty of Applied Science and Engineering

U of T joins U7+ world alliance of universities

2021

Ron Saporta's appointment as Co-Chair cements integration of operational and academic sustainability

CECCS expands to 4 cross-cutting themes, 2 principles and 4 subcommittees

Mandate extended 2 more years; budget increased to hire 2 more full-time staff; additional staff representatives added to committee

U of T announces ambitious and innovative Climate Positive Plan

U of T divests from fossil fuels

2022

Community of Practice established with support of Teaching and Learning subcommittee

1st Director of Secretariat joins the team

Wendy Adams renews gift for 4 more years

CECCS launches Citizen Program

Sustainability Scholar is now in 5 programs across 4 divisions and sees a 53% increase in enrollment

Ron Saporta named Clean50 and Clean16 recipient in the buildings category

1.1 Five Years of CECCS

The theme of this year's Annual Report is "5 Years of CECCS" in celebration of this important milestone for the Committee on the Environment, Climate Change and Sustainability (CECCS) and the University of Toronto (U of T). If there is one thing that the last five years has highlighted, it is that our community of champions at U of T is passionate and committed to making our institution and the world a more sustainable place for all.

Our community is also growing in numbers and impact. With the appointment of Dr. Kristy Faccer as the inaugural CECCS Director earlier this year, the expansion of the CECCS Secretariat proposed to and approved by President Gertler in 2020 is now complete. In addition to our two Co-Chairs, we have four full-time staff, and at least double that number in part-time work-study students and casual staff helping us to deliver on our mandate at any given time during the year. Even more incredibly, we have somewhere in the region of 75 Committee members, subcommittee members, Sustainability Office partners, and friends actively contributing their time and energy throughout the year to putting sustainability at the centre of everything we do.

This is a notable achievement not only for our paid staff, but also for the committed group of people helping us do this work on top of their other professional or educational commitments. It is also evidence of the dedication and energy devoted to sustainability and climate action by the 37 student research assistants we have engaged in our work to date. We hope you will enjoy reading their stories and reflections that are included throughout the report.

Over the last five years, and with the help of our broader community, the CECCS has not only created a strong foundational awareness at the University and helped sustainability rise to the top of our list of institutional priorities, but also seeded some of the capabilities, connections, and processes needed to accelerate progress on our goal of broader transformation. We have also attracted the commitment of another five years of funding from our major supporter Wendy Adams. Yet, a redoubling of efforts is now needed to fill in and build on the scaffolding that we have created, and to engage more champions in our work. If we are successful, our reporting after 10 years of the CECCS will extend beyond the examples and solutions to the sustainable impacts and outcomes that our work at U of T has contributed to achieving.

1.2 Where Are They Now? CECCS Student Reflections

Since the beginning of the CECCS, students have played a key role in advancing our goal of making sustainability part of the U of T identity. Over the last five years, the CECCS has employed 37 students as Research Assistants (RAs), Communications Assistants, Event Planning & Marketing Assistants, or Adams Championship Interns (see 4.3 for more information about the internship). Since working with the CECCS more than a third of these students have gone on to formal employment post university. The majority of those we spoke to remain in Toronto, while a handful live in other parts of Canada. One past CECCS student is currently living overseas in London, UK and seven are studying towards post-graduate degrees.

The CECCS Secretariat conducted a survey to ask for an update on what they are doing now and for reflections on their time at CECCS. More than half of those we reached out to participated in the survey and of these, most indicated that their experience at CECCS influenced their course choice and enhanced their understanding and view of sustainability. We were also pleased to see that most respondents felt that they came away from their time at CECCS with a greater sense of how to be a better agent of change and active leader around sustainability issues. The teal-colored boxes and quotes throughout this annual report capture some of their reflections.

> **"I learnt that we cannot wait for others to take action, and that, if we want to see change in the world, we are responsible to lead that change. I also learnt that there is not just one form of leadership, and I believe that is extremely encouraging for those that feel they don't fit the traditional mold"**
>
> - Former CECCS Student

Emily Shaw, Energy Market Analyst, Brookfield Renewable (CECCS RA, 2019)
Photo credit: Emily Shaw

Emily was one of the inaugural CECCS RAs who, together with student colleagues CECCS Co-Chair John Robinson wrote the paper "Expanding Student Engagement in Sustainability: Using SDG- and CEL-Focused Inventories to Transform Curriculum at the University of Toronto." The paper contextualized and presented our approach to growing sustainability at U of T, where we see the University as an agent of change in the community and where we work toward transforming the campus into a living laboratory for sustainability initiatives. The experience taught Emily about working in a team, how to think about academic research, and how to communicate research findings. In fact, the team traveled to Stockholm, Sweden to present the paper at the International Sustainable Campus Network (ISCN) Conference in 2018. The paper went on to receive an international campus research award from the Association for the Advancement of Sustainability in Higher Education in 2019.

In her current position, Emily draws on the teamwork and strategic/systems-thinking skills she learned during her time at CECCS. This has been especially helpful as she communicates complicated concepts in her role working in energy market modeling, which involves thinking about complex systems to create a realistic model for the future. She remains impressed by the work of John Robinson, the CECCS and the team of our work study students in continuing to improve sustainability at U of T.

2) Overall Activities

2.1. Introduction

Throughout 2022, the CECCS has continued to strive for an integrated approach to operational and academic sustainability. For the purposes of this document, we have organized our contributions to this principle according to the work of our four subcommittees in Teaching & Learning (section 3), Research (section 4), Operations (section 5), and Engagement & Partnerships (section 6).

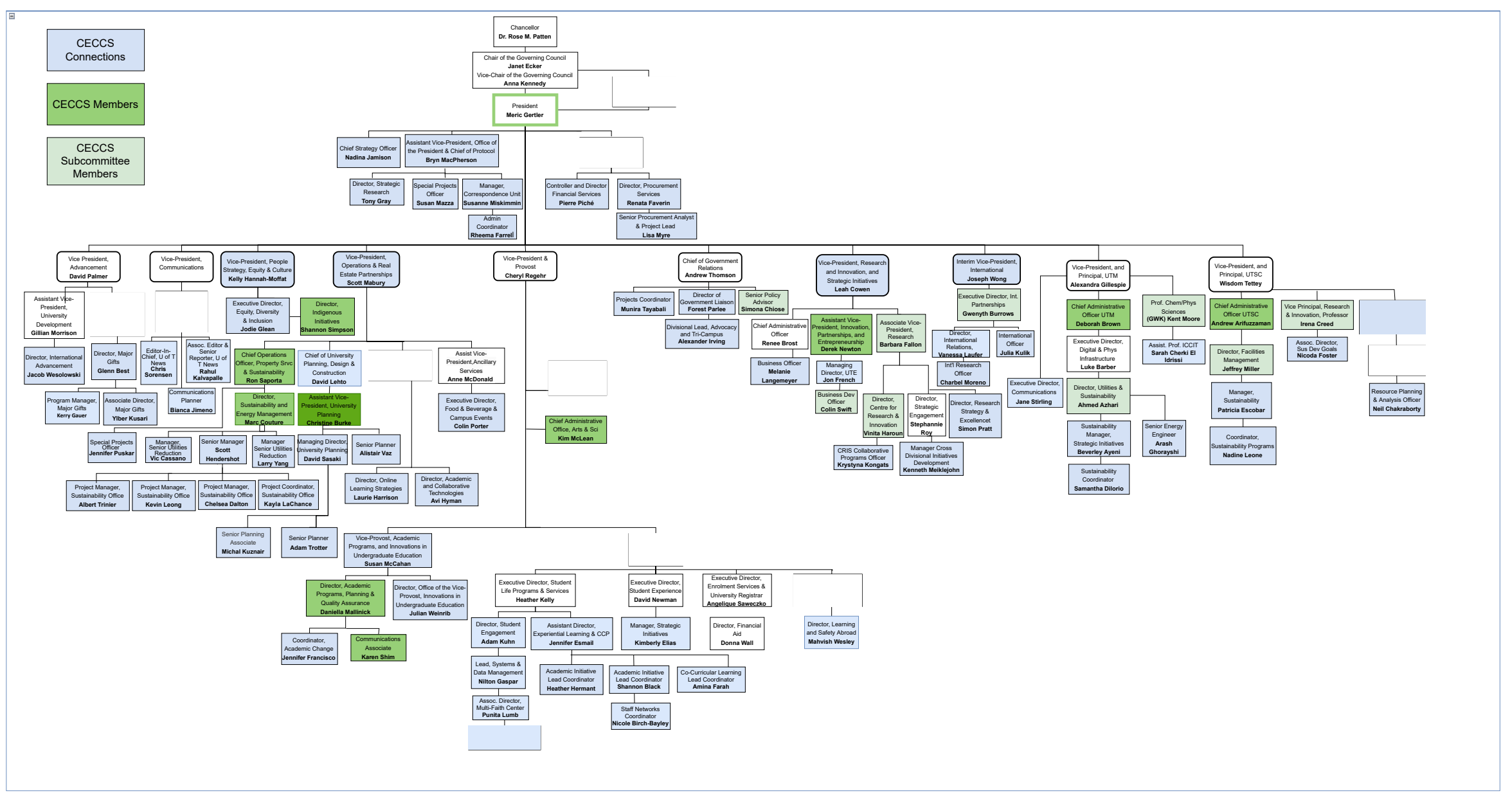
Some of our activities, such as the Campus as a Living Lab (section 3.6) and the Adams Celebration (section 2.2), span across all four subcommittees, whereas others, such as Community-Engaged Learning (sections 3.4 and 6.5), span across more than one subcommittee.

Given this integrated approach, the way in which we have categorized our activities by subcommittee in this annual report is not necessarily reflective of subcommittee divisions. Many aspects of our work include involvement from members from multiple subcommittees and members of our broader community, as outlined above.

Our efforts to address our four cross-cutting themes of Campus as a Living Lab (CLL), University as an Agent of Change (AoC), United Nations Sustainable Development Goals (SDGs), and Student Leadership are also woven throughout the document, as is content from the broader University of Toronto sustainability and climate community in the form of case studies and personal stories from past students.

As of November 2022, CECCS has expanded its faculty engagement list and map of connections into 9 Vice-Presidential offices and 10 of 18 on sustainability integration See more on the following pages.

> **“I learned to develop my confidence when it came to voicing my opinions as a leader, that everyone's voice is valuable and that we all have important contributions to make towards sustainability”**
>
> - Former CECCS Student


CECCS Connections
CECCS Members
CECCS Subcommittee Members
Chancellor
Dr. Rose M. Patten
Chair of the Governing Council
Janet Ecker
Vice-Chair of the Governing Council
Anna Kennedy
President
Meric Gertler
Chief Strategy Officer
Nadina Jamison
Assistant Vice-President, Office of the President & Chief of Protocol
Bryn MacPherson
Director, Strategic Research
Tony Gray
Special Projects Officer
Susan Mazza
Manager, Correspondence Unit
Susanne Miskimmin
Admin Coordinator
Rheema Farrell
Controller and Director Financial Services
Pierre Piché
Director, Procurement Services
Renata Faverin
Senior Procurement Analyst & Project Lead
Lisa Myre
Vice President, Advancement
David Palmer
Assistant Vice-President, University Development
Gillian Morrison
Director, International Advancement
Jacob Wesolowski
Director, Major Gifts
Glenn Best
Program Manager, Major Gifts
Kerry Gauer
Associate Director, Major Gifts
Ylber Kusari
Vice-President, Communications
Editor-In-Chief, U of T News
Chris Sorensen
Assoc. Editor & Senior Reporter, U of T News
Rahul Kalvapalle
Communications Planner
Bianca Jimeno
Vice-President, People Strategy, Equity & Culture
Kelly Hannah-Moffat
Executive Director, Equity, Diversity & Inclusion
Jodie Glean
Director, Indigenous Initiatives
Shannon Simpson
Vice-President, Operations & Real Estate Partnerships
Scott Mabury
Chief Operations Officer, Property Srvc & Sustainability
Ron Saporta
Director, Sustainability and Energy Management
Marc Couture
Special Projects Officer
Jennifer Puskar
Manager, Senior Utilities Reduction
Vic Cassano
Senior Manager
Scott Hendershot
Manager Senior Utilities Reduction
Larry Yang
Project Manager, Sustainability Office
Albert Trinier
Project Manager, Sustainability Office
Kevin Leong
Project Manager, Sustainability Office
Chelsea Dalton
Project Coordinator, Sustainability Office
Kayla LaChance
Chief of University Planning, Design & Construction
David Lehto
Assistant Vice-President, University Planning
Christine Burke
Managing Director, University Planning
David Sasaki
Senior Planner
Alistair Vaz
Director, Online Learning Strategies
Laurie Harrison
Director, Academic and Collaborative Technologies
Avi Hyman
Assist Vice-President,Ancillary Services
Anne McDonald
Executive Director, Food & Beverage & Campus Events
Colin Porter
Vice-President & Provost
Cheryl Regehr
Chief Administrative Office, Arts & Sci
Kim McLean
Senior Planning Associate
Michal Kuznair
Senior Planner
Adam Trotter
Vice-Provost, Academic Programs, and Innovations in Undergraduate Education
Susan McCahan
Director, Academic Programs, Planning & Quality Assurance
Daniella Mallinick
Director, Office of the Vice-Provost, Innovations in Undergraduate Education
Julian Weinrib
Coordinator, Academic Change
Jennifer Francisco
Communications Associate
Karen Shim
Executive Director, Student Life Programs & Services
Heather Kelly
Director, Student Engagement
Adam Kuhn
Lead, Systems & Data Management
Nilton Gaspar
Assoc. Director, Multi-Faith Center
Punita Lumb
Assistant Director, Experiential Learning & CCP
Jennifer Esmail
Academic Initiative Lead Coordinator
Heather Hermant
Executive Director, Student Experience
David Newman
Manager, Strategic Initiatives
Kimberly Elias
Academic Initiative Lead Coordinator
Shannon Black
Staff Networks Coordinator
Nicole Birch-Bayley
Co-Curricular Learning Lead Coordinator
Amina Farah
Executive Director, Enrolment Services & University Registrar
Angelique Saweczko
Director, Financial Aid
Donna Wall
Director, Learning and Safety Abroad
Mahvish Wesley
Chief of Government Relations
Andrew Thomson
Projects Coordinator
Munira Tayabali
Director of Government Liaison
Forest Parlee
Divisional Lead, Advocacy and Tri-Campus
Alexander Irving
Senior Policy Advisor
Simona Chiose
Vice-President, Research and Innovation, and Strategic Initiatives
Leah Cowen
Chief Administrative Officer
Renee Brost
Business Officer
Melanie Langemeyer
Assistant Vice-President, Innovation, Partnerships, and Entrepreneurship
Derek Newton
Managing Director, UTE
Jon French
Business Dev Officer
Colin Swift
Director, Centre for Research & Innovation
Vinita Haroun
CRIS Collaborative Programs Officer
Krystyna Kongats
Associate Vice-President, Research
Barbara Fallon
Director, Strategic Engagement
Stephannie Roy
Manager Cross Divisional Initiatives Development
Kenneth Meiklejohn
Director, Research Strategy & Excellencet
Simon Pratt
Interim Vice-President, International
Joseph Wong
Executive Director, Int. Partnerships
Gwenyth Burrows
Director, International Relations,
Vanessa Laufer
Int'l Research Officer
Charbel Moreno
International Officer
Julia Kulik
Executive Director, Communications
Jane Stirling
Vice-President, and Principal, UTM
Alexandra Gillespie
Chief Administrative Officer UTM
Deborah Brown
Executive Director, Digital & Phys Infrastructure
Luke Barber
Director, Utilities & Sustainability
Ahmed Azhari
Sustainability Manager, Strategic Initiatives
Beverley Ayeni
Sustainability Coordinator
Samantha Dilorio
Prof. Chem/Phys Sciences
(GWK) Kent Moore
Assist. Prof. ICCIT
Sarah Cherki El Idrissi
Senior Energy Engineer
Arash Ghorayshi
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Wisdom Tettey
Chief Administrative Officer UTSC
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Director, Facilities Management
Jeffrey Miller
Manager, Sustainability
Patricia Escobar
Coordinator, Sustainability Programs
Nadine Leone
Vice Principal, Research & Innovation, Professor
Irena Creed
Assoc. Director, Sus Dev Goals
Nicoda Foster
Resource Planning & Analysis Officer
Neil Chakraborty

List of CECCS Connections by Division

Green = CECCS or subcommittee members

Purple = CECCS emeritus members

Blue = CECCS connections

Faculty of Applied Science & Engineering

- **Dionne Aleman**, Associate-Dean, Cross-Disciplinary Programs
- **D. Grant Allen**, Chair, Department of Chemical Engineering and Applied Chemistry
- **Aimy Bazylak,** Department of Mechanical & Industrial Engineering
- **Timothy Bender**, Department of Chemical Engineering and Applied Chemistry
- **Sharon Brown,** Assistant Director, Cross-Disciplinary Programs
- **Christine Bezruki,** Director, Communication and Marketing Engagement
- **Vanessa Bullock,** Donor Relations Office
- **Mel Duhamel**, Research Associate, Department of Civil & Mineral Engineering
- **Tamer El-Diraby**, Department of Civil & Mineral Engineering
- **Bryan Karney**, Associate Dean, Cross-Disciplinary Programs
- **Heather MacLean**, Department of Civil & Mineral Engineering
- **Eric Miller,** Department of Civil & Mineral Engineering and Director, U of T Transportation Research Institute
- **David Sinton**, Department of Mechanical & Industrial Engineering, Academic Director, Climate Positive Energy ISI
- **Marianne Touchie**, Department of Civil & Mineral Engineering
- **Christopher Yip,** Professor, Department of Chemical Engineering and Applied Chemistry

Faculty of Kinesiology & Physical Education

- **Catherine Amara,** Director of Undergraduate Studies
- **Caroline Fusco,** Director, SPaCE (Sport, Physical activity and Cultural Environments) Lab

Faculty of Music

- **Farzaneh Hemmasi,** Department of Music and School of Cities

John H. Daniels Faculty of Architecture, Landscape, and Design

- **Petros Babasikas,** Director, HBA Architectural Studies Program
- **Daniel Chung**
- **Juan Du, Dean**
- **Hans Ibelings**
- **Alstan Jakubiec**, John H. Daniels Faculty of Architecture, Landscape and Design / The School of the Environment
- **Bomani Khemet**
- **Jeannie Kim,** Associate Dean, Academic
- **Vivian Lee,** Director, Master of Architecture
- **Robert Levit,** Associate Dean Academics
- **Liat Margolis,** Associate Dean Research
- **Danijela Puric-Mladenovic**
- **Andrea McGee**, Registrar

Faculty of Arts and Science

- **Christian Abizaid**, Acting Director, School of the Environment
- **Ariana Bradford,** Executive Director, Munk School of Global Affairs & Public Policy
- **Heather Bruce,** Global Internships Coordinator, Munk School of Global Affairs & Public Policy
- **Kiran Champatsingh,** Communications Officer, School of the Environment
- **Karen Chapple,** Director, School of Cities
- **Michael Classen**, Coordinator, Certificate in Sustainability, School of the Environment
- **Jessica D'eon**, Undergraduate Associate Director, School of the Environment
- **Steve Easterbrook,** Director, School of the Environment
- **Paolo Granata**, St. Michael's College
- **Martha Harris,** Assistant Director, Governance & Curriculum
- **Tamara Jones**, Associate Director, Enrolment Service and Records,
- **Helena Juenger,** Student Placement Coordinator, Department of Germanic Languages & Literatures
- **Kim McLean,** Chief Administrative Officer
- **Andrea Muehlbach**, Department of Anthropology
- **Jennifer Murphy,** Department of Chemistry
- **John Robinson**, Presidential Advisor on the Environment, Climate Change, and Sustainability
- **Stephen Scharper**, Director of Sustainability, Trinity College / School of the Environment
- **Stefan Soldovieri**, Chair, Department of Germanic Languages & Literatures
- **Nicole Spiegelaar**, School of the Environment

- **Romila Verma,** School of the Environment
- **Clare Wiseman,** School of the Environment

Ontario Institute for Studies in Education

- **Hilary Inwood,** Coordinator, Sustainability & Climate Action Network
- **David Montemurro, A**ssociate Director, Master of Teaching Program
- **Jennifer Sumner,** Assistant Professor, Adult Education and Community Development Program
- **Jenaya Webb,** Public Services & Research Librarian, OISE Library
- **Fikile Nxumalo,** Assistant Professor, Dept. of Curriculum, Teaching & Learning
- **Elisabeth Rees-Jonstone,** Executive Director, Continuing & Professional Learning

Rotman School of Management

- **Richard Blundell**
- **Kenneth Corts,** Vice-Dean, Research, Strategy & Resources
- **Walid Hejazi**
- **Jan Mahrt-Smith,** Academic Director, Full-Time MBA Program and cross-appointed to the School of the Environment
- **Rod Lohin**, Executive Director, Michael Lee-Chin Family Institute for Corporate Citizenship, and Senior Lecturer
- **Anita McGahan,** Rotman School of Management and the Munk School of Global Affairs & Public Policy

Dalla Lana School of Public Health

- **Paula Braitstein,** Epidemiology Division / Centre for Global Health
- **Lissa Ceolin,** Occupational & Environmental Health Division
- **Erica Di Ruggiero**, Center for Global Health / SDGs ISI Co-Chair
- **Fiona Miller,** Chair in Health Management Strategies, Institute of Health Policy, Management and Evaluation
- **Sarah Patton**, Research Officer, Centre for Sustainable Health Systems, Institute of Health Policy, Management and Evaluation

- **Nicole Simms,** Managing Director, Centre for Sustainable Health Systems, Institute of Health Policy, Management and Evaluation
- **Helen Valkanas**, Research Officer, Centre for Sustainable Health Systems, Institute of Health Policy, Management and Evaluation

University of Toronto Mississauga

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- **Michael Liut,** Department of Mathematical and Computational Sciences
- **Claire Westgate,** Placement & Employer Relations Officer, Master of Science in Sustainability Management Program, Institute for Management & Innovation

University of Toronto Scarborough

- **Marc Cadotte,** Department of Biological Sciences / SDGs ISI Co-Chair
- **Nicole Klenk,** Department of Physical & Environmental Sciences
- **Jim MacLellan,** Director, Environmental Studies Program, Department of Physical & Environmental Sciences
- **Ana Martinez,** Department of Physical & Environmental Sciences

No contacts yet

- School of Continuing Studies
- Faculty of Dentistry
- Faculty of Information
- Faculty of Law
- Temerty Faculty of Medicine
- Lawrence S. Bloomberg Faculty of Nursing
- Factor-Inwentash Faculty of Social Work
- Leslie Dan Faculty of Pharmacy

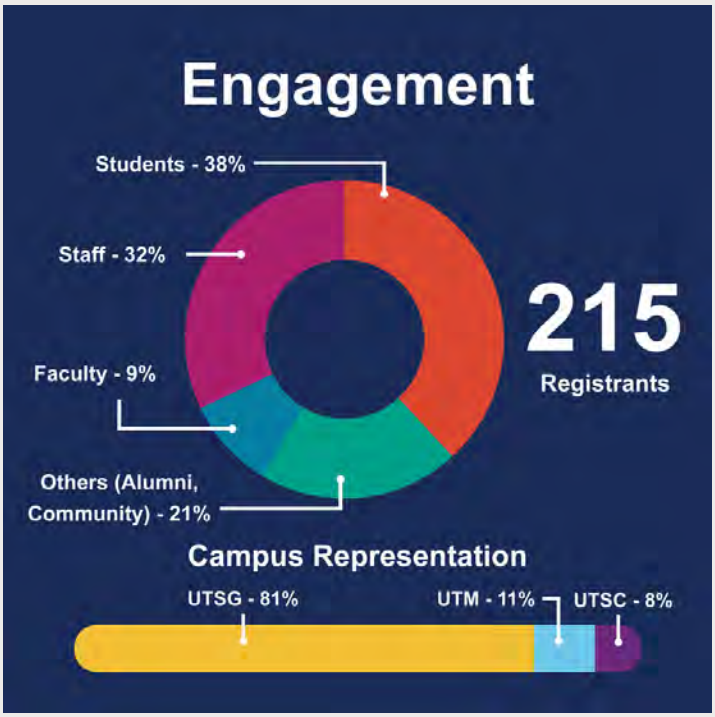
2.2 Adams Sustainability Celebration

Hosted by the CECCS and supported by the generous donation of Wendy Adams, the Adams Sustainability Celebration is a tribute to the growing community of sustainability-minded students, faculty, and staff at U of T and our valued partners outside of the University.

This event series acknowledges our progress, envisions our future, and celebrates sustainability. Through the Celebration, our aim is to inspire new activities, build knowledge and relationships, and collaboratively deepen engagement around sustainability topics on and off campus.

> **"I learned that one does not need to necessarily be in a position of authority to be an effective leader. Leadership is more about how you present yourself, the knowledge you possess and the way you interact with those around you."**
>
> - Former CECCS student

2.2. 2021-22 Adams Sustainability Celebration



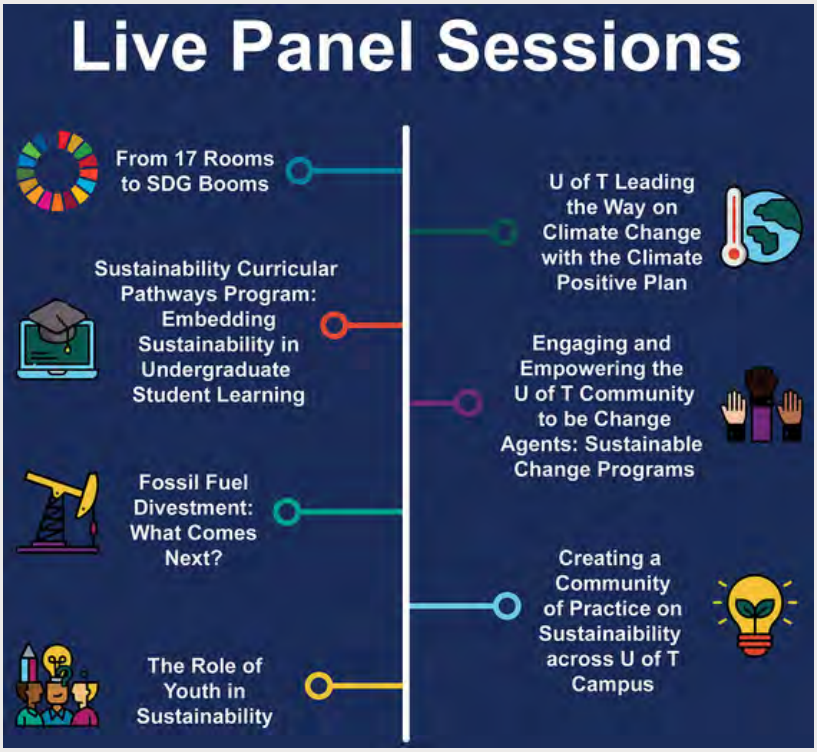
The second Adams Sustainability Celebration ran from February to April 2022. Although we had hoped that pandemic restrictions would allow us to do a hybrid event series, ongoing challenges with the pandemic meant that the Celebration had to remain fully online for a second year. With Zoom fatigue setting in among many community members, we saw a decline in the number of total participants from 503 in 2020-21 to 215 in 2021-22. We believe this decline can also be explained by other factors, such as differences in calculating total participant statistics, and launching the Celebration in the winter term when many students tend to be less engaged.

At the same time, we recognize that improvements can be made in marketing and communications of the Celebration, and we have incorporated improvements to our planning and marketing for future iterations.

As in the prior year, $55,500 in prizes and grants were awarded to faculty and students to support sustainability initiatives at U of T. We hosted seven live virtual panels over Zoom, two of which were organized and led by students. We also housed 18 virtual showcases and 16 student group exhibits on the Cvent website. As we are losing access to the Cvent website at the end of 2022, we will transfer these details shortly over to our main Adam Sustainability Celebration website.

Live Virtual Panels

From February 23 to April 9, we hosted seven live virtual panels on Zoom:



Panelists,:

- Patricia Escobar, Sustainability Manager, Sustainability Office, UTSC
- Nicoda Foster, Associate Director, Sustainable Development, Office of the Vice-Provost, Research & Innovation (OVPRI)/UTSC
- Simon Pratt, Director, Research Strategy & Excellence, OVPRI
- Gwen Burrows, Executive Director, Office of the Vice-Provost, International
- Amanda Harvey-Sánchez (moderator), PhD student, Sociocultural Anthropology & Environmental Studies

From 17 Rooms to SDG Booms (February 23)

The United Nations Sustainable Development Goals (SDGs) were adopted in 2015 as a global framework to achieve prosperity for people and the planet by approaching sustainability in a holistic manner. These goals encompass both environmental and social aspects of sustainability, and as we approach the 2030 target, the need to evaluate current strategies and align future progress towards the goals becomes an urgent topic of debate. In December of 2020, U of T hosted a 17 SDG Rooms event to discuss, analyze, and innovate new ways to advance U of T's commitment to the goals. This panel introduced the SDG-focused actions adopted by U of T since the 17 Rooms event including the SDG Institutional Strategic Initiative (ISI), UTSC's very own 17 Rooms event, U of T's SDG Conceptual Report and Times Higher Education Impact Rankings, and international partnerships for the goals. The panel closed their discussions with a Q&A for audience members to discover and connect with a variety of SDG-centred methods U of T has adopted to respond to the imperative change necessitated by the goals and to work towards achieving a sustainable future.

U of T Leading the Way on Climate Change with the Climate Positive Plan (March 2)

Panelists:

- Ahmed Azhari, Director, Utilities & Sustainability, UTM
- Marc Couture, Director, Sustainability Operations, UTSG
- Jeff Miller, Director, Facilities Management & Capital Projects, UTSC
- Ron Saporta (moderator), Chief Operations Officer, Property Services & Sustainability, UTSG
- David Sinton, Climate Positive Energy ISI Lead; Professor, Department of Mechanical & Industrial Engineering

In recognition that climate change is one of the most pressing challenges of our time, the University of Toronto St. George (UTSG) campus has committed to achieving a climate positive (i.e., net negative emissions) campus by 2050. As part of this commitment, the Climate Positive Plan was released in Fall 2021, representing a major step forward for carbon mitigation on the St, George campus, which makes up over 80% of U of T's total operational carbon footprint. A key component of the Climate Positive Plan is the St. George Campus Carbon and Energy Master Plan, which describes how U of T will invest in the transformational infrastructure renewal necessary to significantly reduce the operating carbon footprint — a critical first step on the path to becoming climate positive by 2050. Although the Climate Positive Plan is currently only for the St. George campus, the discussion also explored opportunities for alignment with the University of Toronto Mississauga (UTM) and University of Toronto Scarborough (UTSC) management plans.

This panel discussion provided an overview of the Campus Positive Plan, details of how it will be executed from an operations perspective, and a research perspective from the Climate Positive Energy ISI Lead Professor David Sinton. Participants also heard from representatives from the UTSC and UTM campuses to learn how sustainability initiatives on those campuses will complement the Climate Positive vision.

Sustainability Curricular Pathways Program — Embedding Sustainability Undergraduate Student Learning (March 8)

Sustainability Citizen: Student completes a certain number of approved sustainability-oriented co-curricular activities and is recognized on the Co-Curricular Record (CCR).
Sustainability Scholar: Student completes a Certificate or Minor in sustainability and is recognized on the transcript.
Sustainability Leader: Student completes Citizen and Scholar requirements and adds an experiential learning capstone activity.

The U of T Sustainability Pathways Program clusters courses and co-curricular activities with a common theme of sustainability to allow students to explore sustainability from various disciplinary, methodological, and practical perspectives. The program aims to develop and offer both curricular and co-curricular pathways to provide all undergraduate students with the opportunity to incorporate sustainability learning into their program, regardless of the degree program that they are in, and to develop cross-cutting interdisciplinary skills, in the following three tiers:

At the core of the Pathways Program, the Sustainability Scholar Program, also known as the Sustainability Curricular Pathways Program, provides integrated curricular courses across multiple subjects with the goal of encouraging students to voluntarily enrich their undergraduate experiences with sustainability learning and adopt positive strategies and skills for change, regardless of their degree program.

This panel provided an in-depth look into the structure, opportunities, and benefits of the Pathways program for all undergraduate students at U of T. It also featured presentations by the five participating Faculties on their experiences with the development and implementation of the program in their respective Faculties.

Engaging and Empowering the U of T Community to be Change Agents: Sustainable Change Programs (March 16)

Panelists:

- Beverley Ayeni, Sustainability Manager, Strategic Initiatives, UTM
- Chelsea Dalton, Project Manager, Sustainability Office, UTSG
- Scott Hendershot, Senior Manager, Sustainability Office, UTSG
- Kayla LaChance, Project Coordinator, Sustainability Office, UTSG
- Nadine Leone, Student Life & Sustainability Programs Coordinator, UTSC

The announcement of the University's Climate Positive Plan and its commitment to reducing more greenhouse gasses than it emits by 2050 clearly shows a dedication to taking decisive, operational action against climate change. However, there is another side to this climate change commitment. The success of the Climate Positive plan is also based on the sustainability actions and habits of the members of our community. Therefore, the question posed by the panelists was how can students, staff, and faculty get more involved to not only help reduce greenhouse gasses, but embed all elements of sustainability into the University's fabric? The Sustainable Change Programs offer one possible way to contribute.

This discussion included members of the tri-campus Sustainability Offices, who discussed the Sustainable Change Programs from development to launch. The panelists talked about their journey creating a best-in-class certification program designed to engage and empower the U of T community to actively follow sustainable practices in their offices, residences, events, courses, and labs. The panelists also offered their experience and lessons learned throughout the pandemic on how we can all be more sustainable in a virtual world.

Fossil Fuel Divestment — What Comes Next? (March 30, Student-Initiated Panel organized by Leap U of T)

This event provided an opportunity for connection between students, faculty, staff, and community members who care about the impact of the University of Toronto's investments on the environment. Panelists celebrated the 2021 commitment to divest the endowment from the fossil fuel industry, discussed the role of university endowments and pensions in creating new norms for responsible investing, and explored next steps for the University and the divestment movement. The discussion was then followed by a Q&A with the audience.

Panelists:

- Patrick DeRochie, Senior Manager, Shift Action for Pension Wealth & Planet Health
- Rivka Goetz, Divestment Organizer with Leap U of T; 4th year undergraduate student
- Rebecca Sinclair, Research & Policy Analyst, Indigenous Climate Action
- Amanda Harvey-Sánchez (moderator), PhD student, Sociocultural Anthropology & Environmental Studies

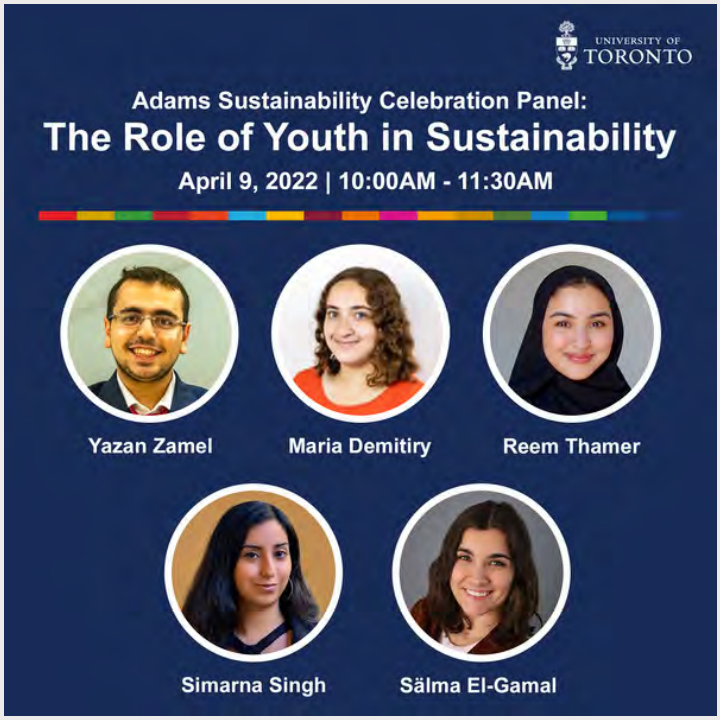
Creating a Community of Practice on Sustainability across U of T Campus (April 6)

This Adams event invited panelists and participants to consider how faculty could accelerate the shift toward sustainability in their work as scholars and educators. The discussion was led by a group of faculty members involved in facilitating U of T's new Community of Practice (CoP) on Sustainability in this interactive webinar. They provided details on the CoP's plans and initial steps to engage faculty in collaboratively deepening their sustainability practices in their courses, pedagogy, and programs, as well as consulted with those in attendance on how the CoP can support the needs of faculty across all three U of T campuses.

Panelists:

- Michael Classens, Assistant Professor, School of the Environment, Faculty of Arts & Science (FAS)
- Hilary Inwood, Coordinator, Sustainability & Climate Action Network, Ontario Institute for Studies in Education (OISE)
- Liat Margolis, Associate Professor, Faculty of Architecture, Landscape & Design (FALD)
- Nicole Spiegelaar, Assistant Professor, School of the Environment (FAS); Associate Director of Sustainability, Trinity College
- Sarah Urquhart, Graduate Assistant, Sustainability & Climate Action Network, OISE

The Role of Youth in Sustainability (April 9, Student-Initiated Panel organized by the Sustainable Engineers Association)



This student-initiated panel discussion organized by the Sustainable Engineers Association (SEA) looked at ways to empower youth and involve them in the sustainable engineering community. Strategies to address gaps in the educational system to promote green jobs were also discussed.

Panelists:

- Maria Demitiry, Transportation Planner at HDR, Recent Civil Engineering Graduate
- Sälma El-Gamal, Officer at International Renewable Energy Agency and former Intern, United Nations Office, Vienna
- Reem Thamer, Future Sustainability Leader at Masdar
- Simarna Singh, Chief Executive Officer at Coca Veda, UN Youth Ambassador, Sustainability Entrepreneur
- Yazan Zamel, President of Sustainable Engineers Association at U of T; Future Sustainability Leader at Masdar

Showcases

Throughout the three-month celebration, there were 18 virtual showcases available on our online Celebration platform for community members to browse. These showcases served as virtual booths highlighting different sustainability initiatives at U of T. The virtual showcases including the following:

- 2021 CECCS Annual Report
- 2021 Adams Sustainability Student Grant Recipients
- Certificate in Sustainability, School of the Environment
- U of T Cool New Buildings
- EaRTH District
- ENV461 and Trinity One Inspiration
- The Green Will Initiative
- Institutional Strategic Initiatives
- Master of the Environment & Sustainability, School of the Environment
- Nikibii Dawadinna Giigwag — Indigenous Youth Access Program
- OISE's Sustainability and Climate Action Plan
- School of the Environment, U of T
- Team E-quester
- UTM Sustainability Office
- UTSC Edible Campus
- UTSC Sustainability Office
- UTSG Sustainability Office
- UTM Sustainability Week
- Water Allies

Student Groups

Our virtual Celebration event platform also included profiles of 16 different sustainability student groups, specifically highlighting the importance of student leadership. The virtual showcase replaced what would have been in-person student group booths planned before the pandemic. Serving as an invitation to get involved in these student groups, the virtual showcases offered a small sampling of the 242 sustainability student groups identified in the 2021-22 CECCS Sustainability Student Group Inventory. They included:

- Bike Chain
- Canadian Electrical Contractors Association (CECA) U of T
- Civ Club
- Dig In! Campus Agriculture — Student Led, Student Fed
- Future Living Lab
- Hart House Student Farm Committee
- Leap Chapter U of T
- MoveU
- Rotman Net Impact
- Sustainable Engineers Association
- Trinity College Sustainable Food Systems Research Group (SFSRG)
- University of Toronto Supermileage Team
- U of T Concrete Canoe Team
- UTM Regenesis
- UTM Student Association of Geography (SAGE)
- Veg Club — Bringing an Edge to Veg

Adams Sustainability Innovation Prize Competition

For a second year, the Celebration provided a total of $55,500 in grant and prize money to support sustainability initiatives across the three campuses. The Adams Sustainability Innovation Prize Competition provided $25,500 in prizes to recognize, reward, and accelerate U of T's most innovative student-led sustainability ideas. The winners of the 2021-22 Adams Sustainability Innovation Competition were:

1st Place Winner ($10,000): MealCare

MealCare is an organization that decreases food waste by diverting surplus edible food and delivering it to food aid partners across Canada. MealCare provides a sustainable, scalable, and low-cost solution that is making the food system more efficient.

2nd Place Winner ($7,500) - Arbre

Arbre is a sustainable sun care brand on a mission to create inclusive and innovative sun protection products. Arbre's debut product is a mineral-based powder dry shampoo with SPF for the scalp.

3rd Place Winner ($5,000): Yatra-Si Youth Foundation

Yayra-Si Youth Foundation (YSYF)'s Banana Fiber Bags, which are manufactured almost entirely from naturally abundant banana and plantain fibers, are a sustainable alternative to plastic bags in Ghana. These products will reduce plastic waste and fatal flooding, economically empower women in rural communities, and increase public environmental health awareness.

Runner-up Winners ($1,000 each):

BioBlends

BioBlends Diesel Solutions recycles waste products from the local community into usable renewable fuels for diesel-powered engines, creating a circular economy that promotes environmentally friendlier fuel alternatives for local farmers at below-market diesel prices.

Lente Marketplace

48% of Canadian consumers are unsure where to find sustainable apparel. Lente, a novel sustainable apparel marketplace, solves this issue by aggregating sustainable-certified brands and their clothing into one usable interface for consumers to browse and shop.

Reper Technologies

Reper Technologies regenerates post-consumer plastic waste into polyethylene precursors. They provide waste collectors with landfill alternatives for contaminated plastic waste and plastics manufacturers with recycled material identical to virgin plastics.

Adams Sustainability Student and Faculty Grants

In addition to the Innovation Prize, the CECCS distributed three grants of $5,000 each to faculty and students. Faculty grant applicants were asked to consider how they might incorporate and advance sustainability in their courses. Student grant applicants were asked to come up with creative proposals to implement sustainability initiatives across campus between May 2022 and April 2023. The recipients of the 2021-22 Adams Sustainability Student Grants were:

U of T Sustainability Film Festival — Nivaal Rehman and Maryam Rehman

The U of T Sustainability Film Festival aims to use the power of storytelling to raise awareness about sustainability on campus, and encourage students and faculty members to get involved and take action for the UN Sustainable Development Goals. The grant funding will help them achieve this mission by hosting a student short film competition, four virtual film events, and a week-long film festival.

Photo credit: Samina Umar

The Free Store at UTSC — Sarah Gigi and Yaoyan Huang

Regenesis UTSC has secured space at a UTSC residence building for a Free Store, where items such as clothing, accessories, household goods, and books are collected from donations and offered for free to students, faculty, and the UTSC community. The Free Store helps promote education and awareness on anti-consumption and production and waste diversion. Funding from the Adams Sustainability Grant will assist in the hiring of a work-study position and a store coordinator who will collect donations from UTSC lost-and-found and residences, helping low-income students obtain items they need for free.

Adams Sustainability Student and Faculty Grants

Tree Discovery Walk — UTSC Parks Canada
Working in collaboration with the UTSC Department of Biological Sciences, the grant funding will assist in the design and implementation of an interactive tree walk through the UTSC Valley Trail, which will highlight tree species of ecological, cultural, and research significance via QR codes and durable vinyl labels. The Tree Walk will facilitate curiosity and knowledge seeking through self-directed learning while nurturing physical and mental wellbeing.

The recipients of the 2021-22 Adams Sustainability Faculty Grants were:

Developing Sustainability Modules for GIS Capstone Project — Professor Tingting Zhu
Tingting Zhu is an Assistant Professor in the Department of Geography, Geomatics and Environment at UTM. She received funding for her proposal to hire two Research Assistants to develop sustainability modules for a GIS Capstone Project course, which has a Community-Engaged Learning component in partnership with the City of Mississauga. Capable of integrating multidisciplinary data and analyzing spatial interactions, GIS allows administrators to make informed decisions, contributing to global collaboration based on holistic sustainable design.

Photo credit: Tingting Zhu

Adams Sustainability Student and Faculty Grants

Enhancing Campus as a Living Lab in Undergraduate Courses — Professor Marianne Touchie

Marianne Touchie is an Assistant Professor in the Department of Civil and Mineral Engineering, and Director of the Building Energy and Indoor Environment Lab. She will be using the grant funding to support mini-labs in campus buildings for Building Science and HVAC Fundamentals courses, which have an enrollment of about 200 students a year.

Photo credit: Colin Anderson,

Re-imagining Sustainability Pedagogy — Dr. Hilary Inwood

Hilary Inwood teaches in the Master of Teaching program in the Department of Curriculum, Teaching and Learning at OISE. She leads the OISE Sustainability & Climate Action Network, and its Environmental & Sustainability Education (ESE) Initiative, as well as its Arts Education courses. Hilary will use this grant funding to support changes to CTL1122, Exploring the Praxis of Environmental & Sustainability Education. These changes will use the city as a classroom to develop transformative sustainability pedagogies that offer students relational, community-engaged and action-oriented learning.

Photo credit: Karen Somers

2022-23 Adams Sustainability Celebration

For the third iteration of the Adams Celebration, we are excited to be able to plan in-person events for the first time. We have reverted to a schedule that has the Celebration kick off in September with the announcement of the grant and innovation prize funding opportunities, and targeted outreach to new students and those returning to campus. We are hoping the overall excitement with a return to in-person activities on campus this year and improved outreach will contribute to higher participation levels. For example, the CECCS was able to participate in Clubs Day activities on all three campuses this September as part of Orientation. Promoting student opportunities to get involved with the Adams Sustainability Celebration was a key element of our sustainable change agent pledge activity conducted with students during Orientation (section 6.7).

This year, for the first time, we have introduced a grant category for staff. Three $5,000 grants will be awarded to U of T staff members with concrete plans to advance sustainability initiatives in their respective capacities on campus.

With active involvement in the day-to-day operations and administration of the University, and with intimate knowledge of how this institution functions, staff are uniquely positioned to drive sustainability in their individual offices.

This $15,000 expansion in grant awards will enable the CECCS to empower U of T staff members to be agents of change by providing the funding required to turn their ideas into action. This year's celebration was planned to include one event on each campus and funding of up to $300 to support and promote student-led events on each campus as part of Adams Celebration programming. Unfortunately the UTSC event on the Sustainable Development Goals and the Transformative Role of Universities featuring speakers John Robinson, Irena Creed, Erica Di Ruggiero, and Andrea Cuesta Claros planned for October 17 to align with UTSC's Waste Reduction Week had to be canceled as a result of illness of two speakers.

This event will be rescheduled to an online-only event on January 18, 2023 to accommodate international participation by one of our panelists. The UTM event on November 22 was titled, "Our Climate is Changing: the story our data is telling us about climate in Mississauga." This event was delivered in collaboration with the UTM Sustainability Office and featured speakers from UTM and the City of Mississauga.

The UTSG event will be held in early February and is being planned in collaboration with the Community of Practice on Sustainability Teaching (see also section 3.2). In-person showcases will also be part of the Innovation Prize Pitch Competition and Award Ceremony planned for the afternoon of Friday, March 3, 2023 at the Great Hall in Hart House, and will close out this year's Celebration. It is hoped that by holding events and showcases on each campus, with campus-specific sustainability topics, the Celebration will become truly tri-campus and result in increased engagement with UTM and UTSC community members.

2.3 CECCS Inventories/Resources

The CECCS maintains the below inventories on our website which serve as a resource to anyone interested in tri-campus sustainability activities as U of T:

- Sustainability Undergraduate Course Inventory (last updated Nov. 2022; section 3.3)
- Sustainability Graduate Course Inventory (new in 2022; section 3.8)
- Sustainability Community Engaged Learning (CEL) Course Inventory (being updated; section 3.4)
- Sustainability School of Continuing Studies Course Inventory (new in 2022; section 3.1)
- Sustainability Graduate Program Inventory (last updated 2021; section 4.4)
- Sustainability Master's Thesis Inventory (being updated; section 4.4)
- Sustainability Doctoral Thesis Inventory (being updated; section 4.4)
- Sustainability Research Unit Inventory (last updated 2021; section 4.4)
- Campus as Living Lab Courses (new in 2022; section 3.6)
- Campus as a Living Lab and Community Engaged Learning Project Database (last updated Nov. 2022; section 3.5)
- Sustainability Student Group Inventory (being updated; section 6.8)

> **My time at the CECCS left me with a sense that I could reach out to anyone and connect their work with sustainability.**
>
> - Former CECCS student

2.4 Communications

Communications and outreach are key to keeping our sustainability and climate community engaged and informed about relevant resources, information, events, and initiatives on and off campus.

Collaboration with University of Toronto Communications (UTC)

The CECCS works with UTC in planning and executing a number of communications strategies to reach a wider audience. Please refer to Appendix 4, which includes a list of articles and videos by UTC for further details.

Website and Social Media

The CECCS website has been updated with new content to reflect the goals and structure of the subcommittees. Restructuring the content on the website streamlined the site with new and relevant information. This new structuring draws upon the content from the 2021 Annual Report. New social media icons, the Sustainable Office Platinum badge, and a rolling menu of sustainability offices at the three campuses were also added to each page. View the changes on our website.

UTSC green roof. Photo credit: Ken Jones.

The Secretariat has also looked at ways to increase our social media presence. In collaboration with the tri-campus sustainability offices, we had a presence at Orientation events on all three campuses in September 2022 to ignite and build upon student awareness of our programs and initiatives (see also section 6.7). As a result of this outreach, we added 136 students to our monthly newsletter. The CECCS partnered with the UTSG sustainability office for two prize giveaways during the month of September 2022. As a result, we gained about 330 new Instagram followers and continue to grow.

We also gained 72 new faculty subscribers to our newsletter. These faculty were invited to join the newsletter subscriber list after they had responded to the invitation for their paper(s) to be featured in the SDG research publication inventory. As a result of these new groups, a more personalized and welcoming newsletter was sent out and targeted to this new student and faculty audience. In addition, the CECCS is working on making our monthly newsletter less internally focused so it will be of interest to a broader U of T community audience.

New registrants to the CECCS monthly newsletter resulting from orientation week activities:

	UTSG	UTM	UTSC	TOTAL
Total pledge participants/form submissions	115	43	18	176
Students agreed to receive CECCS newsletter	84	38	14	136

Our website also experienced an increase in activity after Orientation events at all three campuses as a result of the QR code we used. This QR code linked to our Orientation 2022 website and provided students with ideas on how they can engage with CECCS programming to become sustainable change agents.

Chapter 3

Teaching & Learning Subcommittee

5 Years of CECCS

3) Teaching and Learning Subcommittee

Chaired by Professor Liat Margolis, Associate Dean, Research, and Director, Green Roof Innovation Testing Laboratory, Faculty of Architecture, Landscape and Design, the Teaching and Learning (T&L) Subcommittee reviewed the goals inherited in 2018 from the former Curriculum Innovation Subcommittee to evaluate whether they captured the ideas for new initiatives identified by previous members. The 2018 priorities were:

- Sustainability curriculum pathways for every undergraduate student
- Sustainability community of practice for faculty

The expansion of the sustainability curriculum pathways to include graduate students has been suggested and adopted, stressing that the pathways makes sustainability a core value in all teaching and learning. The Subcommittee also confirmed that incorporating Campus as a Living Lab (CLL) and Community-Engaged Learning (CEL) are important considerations as we develop and expand the sustainability curriculum pathways.

Subcommittee members reaffirmed the second goal: developing a sustainability community of practice (CoP) for faculty. Members agreed that sustainability pedagogy had traditionally been understood within the boundaries of disciplines, and the CoP (see online hub) provided an opportunity to learn about and consider improvements to pedagogy across different disciplines. In meetings throughout the year, T&L Subcommittee members reiterated the importance of continuing to support the CoP and examining how program development, principles, and disciplinary and interdisciplinary requirements support or hinder sustainability integration and identity development at, and across, U of T.

The T&L priorities have been updated as follows:

- Sustainability curriculum pathways for every student, with the following subheadings:
  - Undergraduate
  - Graduate
  - Campus as a Living Lab (CLL)
  - Community-Engaged Learning (CEL)

- Sustainability community of practice for faculty; pedagogy is the umbrella, with the following subheadings:
  - Curricular/Course development
  - Program development

This year, the T&L subcommittee expanded its membership to ensure greater representation from divisions where the Sustainability Pathways Programs are established, and where faculty are involved in developing and delivering sustainability course content. As a result, the following nine new members — three students and six faculty members — were added to the Subcommittee:

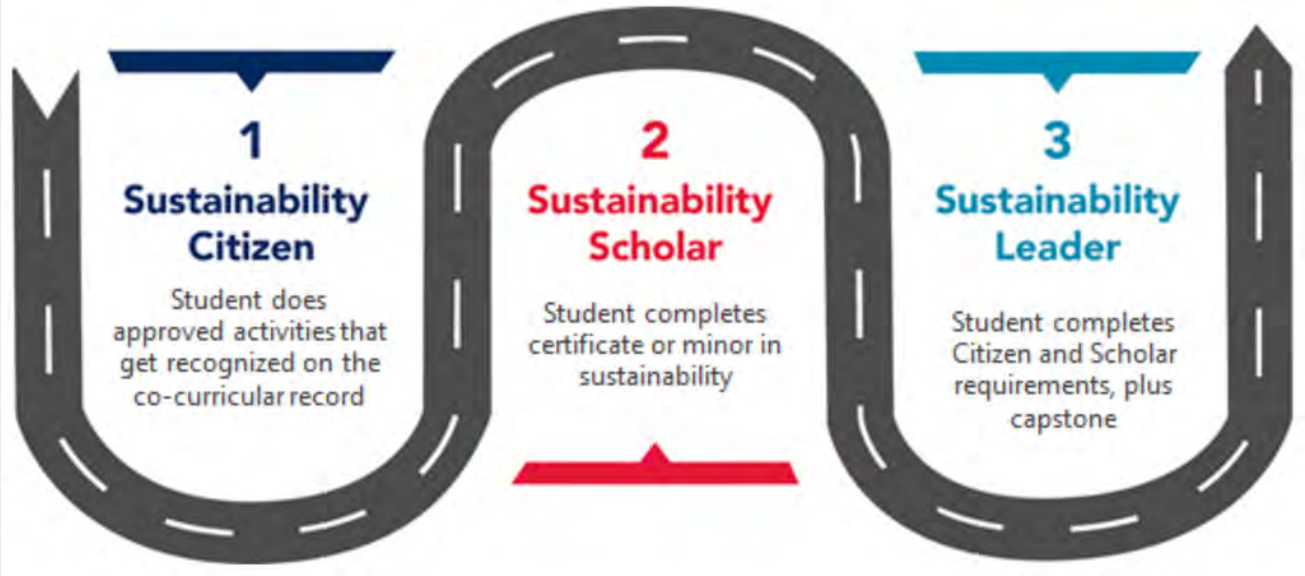
- Daniel Bender, Faculty Member, Department of Historical & Cultural Studies, University of Toronto Scarborough (UTSC); Canada Research Chair in Food & Culture; and Director of the Culinaria Research Centre
- Sean Cameron, Master's Student, Public Policy
- Michael Classens, Faculty Member, School of the Environment, Faculty of Arts & Science (FAS)
- Tamer El-Diraby, Faculty Member, Faculty of Applied Science & Engineering
- Monika Havelka, Faculty Member and Director, Programs in Environment, UTM
- Alexandra Rahr, Faculty Member, Centre of the Study of the United States
- Nicole Spiegelaar, Faculty Member, School of the Environment, FAS; and Associate Director of Trinity Sustainability Initiative
- Maria Vamvalis, PhD Student, Ontario Institute for Studies in Education (OISE)
- Ryan Wang, BSc Student, Astronomy & Physics, FAS

The continuing committee members are as follows:

- Liat Margolis (Chair), Faculty Member, Associate Dean, Research, and Director, Green Roof Innovation Testing Laboratory, Faculty of Architecture, Landscape, and Design
- Daniella Mallinick, Director, Academic Programs, Planning & Quality Assurance, Office of the Vice-Provost, Academic Programs
- Hilary Inwood, Faculty Member, OISE
- Romila Verma, Faculty Member, School of the Environment and Department of Geography
- Alexandria Gill, BA Student, Political Science and Public Policy, UTSC (2021-22)

Five T&L subcommittee meetings were held over the course of 2022. This number represents an increase from the typical frequency of one CECCS subcommittee meeting per semester and reflects the active desire of members to maintain momentum and progress on ongoing conversations relating to student and faculty engagement in sustainability teaching and learning content development. There was also extended discussion on the revision of SDG keywords we use for updating our various inventories (see section 3.4).

3.1 Sustainability Pathways Program



The Sustainability Pathways Program consists of clusters of courses and co-curricular activities that are available to all students. The program allows students to explore sustainability from various disciplinary, methodological, and practical perspectives and is one of the flagship initiatives of the CECCS and a top priority for the T&L Subcommittee. The Pathways Program will consist of three tiers:

- **Sustainability Citizen:** Student completes a certain number of approved sustainability-oriented activities, for which they are recognized on their Co-Curricular Record (CCR).
- **Sustainability Scholar:** Student completes a Certificate or Minor in sustainability, which is then recorded on their transcript.
- **Sustainability Leader:** Student completes Citizen and Scholar requirements, and adds an experiential learning activity. Appropriate recognition for this level is still being determined.

To date, there have been five minor or certificate programs developed across four divisions in which students can enroll to satisfy the Sustainability Scholar tier, with a fifth in development at UTM. Significant progress on the Citizen tier has been made through 2022 and it will be launched on CLNx before the release of this report.

Sustainability Citizen

The Sustainability Citizen Program on CLNx will allow U of T students to receive official recognition for their sustainability-related extracurricular activities. The Program is being run by the CECCS in partnership with the Sustainability Offices on each campus.

As part of the Program, students must complete an "Introduction to Sustainability" module available on Quercus. This module introduces students to some of the different definitions of sustainability and the United Nations Sustainable Development Goals (SDGs).

The first version of this module was developed in early 2022, in collaboration with the Sustainability Offices and with significant contribution from two Sustainability Office work-study students, Noah Foster and Masato Webb.

Upon sharing the initial version with the T&L Subcommittee, we received significant feedback on how the module might be made more engaging. Under the guidance of T&L Subcommittee member Hilary Inwood and her Graduate Assistant Sarah Urquhart, CECCS work study students Esmée Schimmelpenninck and Melody Chi Lok Chan redesigned the module, adding interactive elements such as discussion boards on Quercus and filming student narrators. They also filmed four videos highlighting different sustainability student groups to provide examples of how students are leading sustainability efforts on campus. These short videos are meant to inspire students to get engaged with these or other student groups, or perhaps even develop their own sustainability campaigns on issues they are passionate about. The student groups featured currently are MealCare, the Trinity Food Systems Lab (formerly known as the Trinity Sustainable Food Systems Research Group), UTSC Regenesis, and the U of T Sustainability Film Festival.

We intend to add videos of more sustainable student groups over time, though it will only be necessary for students to watch three of these short videos as part of the module, selecting those that are most aligned with their own interests.

Going forward, there are also plans to facilitate in-person Intro Module completion in workshops hosted by different student groups with support from the CECCS. This would create cohorts of Sustainability Citizens who will be able to complete the rest of the program together.

Whether done online or in-person, the Intro Module must be completed before students can start earning additional credits in the program on CLNx. There is a 10-credit completion requirement.

One credit is earned for completion of the Intro Module, and one credit is earned for completion of a brief final reflection module at the end. The remaining eight credits are earned by participating in activities under the following current categories: Events, Community Service, Student Group Executive Service, involvement in a Sustainability Student Group Campaign, Conferences, or UTM Global Sustainability Modules.

Participation will be validated by the CECCS Secretariat and Sustainability Office staff via CLNx.

In the first category, we anticipate that most of the events will be those offered by different student groups and departments at U of T, which will be posted in the Tri-Campus Sustainability Calendar on CLNx. Students can choose between activities to customize the experience as they wish. Students can also submit activities to the CECCS for credit that are not captured in the Sustainability Calendar, for example off-campus community service or sustainability student group executive service. Upon completion of the program, students will receive Co-Curricular Record (CCR) recognition on their academic transcript. A Sustainability Citizen Program website has been created to explain these details, and will provide direction on how students can enroll in the program on CLNx.

It is our hope that this program will help to reinvigorate involvement in sustainability student groups across the three campuses, many of which have struggled to remain active over the pandemic. It will also help the CECCS engage with students more broadly, and serve as a vehicle for us to promote sustainability initiatives and the SDGs. The program is emblematic of our cross-cutting theme of student leadership, and of our understanding that students will serve as agents of change for a sustainable future.

Upon completion of the Sustainability Citizen program, students will be encouraged to continue their learning by enrolling in one of our Scholar programs, thereby advancing to the next tier of Pathways.

Sustainability Scholar

The Scholar Programs are currently offered in:

- John H. Daniels Faculty of Architecture, Landscape, & Design (FALD) — Certificate in Sustainability of the Built Environment
- Faculty of Applied Science & Engineering (FASE) — Sustainable Energy Minor and Environmental Engineering Minor
- Faculty of Arts & Science (FAS) — Certificate in Sustainability
- University of Toronto Scarborough (UTSC) — Certificate in Sustainability

An additional Scholar Program has been developed for students at UTM and is expected to launch in the 2023 fall term.

The Sustainability Scholar tier of the Pathways program targets the 96% of the undergraduate student body, who did not choose sustainability or environment studies as their major, minor and specialist. It offers these students an opportunity to incorporate sustainability learning and interdisciplinary skills into their education, regardless of degree program. In Fall 2021, the program was offered in FALD, FAS, FASE, and UTSC.

Undergraduate students in these four divisions account for 73% of the entire undergraduate student body, meaning these students had access to the Scholar program (in the form of Certificate or Minor program). However, the enrolled students in the program comprised only 0.5% of all undergraduate students (or 0.8% of all undergraduate students in these divisions). In Fall 2022, the overall enrollment across the five Scholar programs in four divisions saw a 53% increase from last year. While the total undergraduate enrollment numbers for 2022-23 have yet to be released for comparison, the low enrollment in the Scholar programs remains a challenge.

In 2022, the T&L subcommittee conducted a comparative review of the existing programs and began to evaluate how they have formed with different structures, content, methodology, definitions and learning competencies. This review will continue until members are satisfied that considerations relating to curriculum effectiveness and student interests and concerns have been duly addressed. Further investigation into how best to target the remaining 96% of students not currently enrolled in these programs has also begun. he aim is to consider improved engagement and outreach opportunities, as well as ensuring accessibility through expansion to other undergraduate divisions and graduate programs.

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In the Fall 2022 semester, a group of students in Professor John Robinson's Campus as a Living Lab (CLL) course (ENV461) examined ways to increase awareness and enrollment of Sustainability Scholar programs as their class project. Two project managers in the CECCS Secretariat served as "clients" on this project.

> **"The Sustainability Scholars program was the first time I worked on a project that would end up in the real world, and I cared a lot about where it was going. This project is what drew me to the world of policy and program development instead of pure academic research."**
>
> - Former CECCS student

The objective of the ENV461 CLL project was to assess the Sustainability Scholar programs and make recommendations to better understand factors influencing student awareness and increasing enrollment. The students proposed the following four components in their assessment methodology:

1. Qualitative, semi-structured interviews with faculty leads, registrarial staff members, and undergraduate program directors in FALD, FAS, FASE, and UTSC.
2. Short survey for undergraduate students not taking the Certificate/Minor programs on the awareness, accessibility, and appeal of the program utilizing student union listservs, outreach to student groups, and a social media campaign for a representative sample.
3. Collection and synthesis of observations from students taking the Certificate/Minor program; a majority of students in the class have taken or are currently taking the Scholar program at FAS.
4. Brief literature review on the marketing of sustainability curricula/courses.

The students' final report will be shared with the T&L Subcommittee to inform future planning for the Sustainability Pathways Program.

Anushka Kurian, Consultant, McMillan Vantage Policy Group. CECCS RA 2020-21.

Photo credit: McMillan Vantage Policy Group.

Anushka was the driving force behind the success of the inaugural Adams Sustainability Celebration event in 2020-21. Together with the then-CECCS event coordinator Saima Zulqarnain, Anushka designed and executed the first of this event series held in the early stages of the COVID-19 pandemic, which saw 503 total participants, 6 live panel sessions, 40 student group exhibits, 10 virtual showcases, and $55,500 in grants and awards.

From her work experience managing the event and incorporating the UN SDGs into the event content and branding, she was brought on to support clients across sectors, including innovation and social impact, with McMillan Vantage Policy Group, a public and government relations services firm. Her time at the CECCS helped shape her thinking and conduct in the private sector by helping her understand how operational staff go about planning to implement big sustainability solutions that span large campuses to make a difference in the everyday lives of "U of T citizens."

Pathways Paper

"Reaching the Rest: Embedding Sustainability in Undergraduate Student Learning"

By John Robinson, Ayako Ariga, Ryan Wang, and Sean Cameron

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Abstract

There exists a substantial and growing literature on sustainability pedagogy. Much of it addresses individual courses, sustainability programs, or the learning competencies that are encouraged. The implicit focus is on students who have chosen to specialise in some way on sustainability topics by obtaining a degree in programs such as sustainability science, sustainability management, environmental science, or environmental studies. However, such students are a small minority at most universities. More recently, there has been emerging literature calling for embedding sustainability into entire university curricula as sustainability becomes a more prominent issue for higher education institutions. Four key themes have emerged in this literature that are relevant to the goal of developing sustainability pedagogy relevant to all students at the university: (i) what the organisational framework should be for the content of sustainability pedagogy, (ii) how interdisciplinarity and trans-disciplinarity should be conceptualised and taught, (iii) the relative merits of compulsory or voluntary sustainability programming, and (iv) the role of course inventories.

In this paper, we examine the University of Toronto's introduction of a new model of sustainability learning and evaluate it against the themes and recommendations found in the literature. This model aims to establish University-wide sustainability learning trajectories, called Sustainability Pathways, which are aimed at that larger population of students. The program's novelty is in its offer to reach a much larger fraction of the student population than other approaches aimed at increasing the number and popularity of programs for students who want to specialise in sustainability issues. The key themes emerging from the literature will serve as a basis for evaluation of the Sustainability Pathways program. It is found that the Pathways program does embody some of these themes but that further development would be desirable. The program and the course inventories at its foundation will go through periodic evaluation to assess progress on program goals and objectives.

In recognition of the growing demand for sustainability innovation and leadership in organizations across industries, the Rotman School of Management launched this six-week executive certificate in 2022.

Sustainability Leader

Now that the first and second tiers (the Citizen and Scholar programs, respectively) of the Sustainability Pathways are in place, the CECCS is exploring options for the design and recognition opportunities for the third tier: the Sustainability Leader. The Sustainability Leader program is for students who have completed both the Citizen and Scholar requirements, and are interested in adding an experiential learning activity and being recognized for their sustained engagement with sustainability learning opportunities at U of T.

Initially, when the three-tier design was conceived, the plan was to cap it off with an experiential learning course such as a sustainability Community-Engaged Learning (CEL) course.

However, as the divisions roll out their own Sustainability Scholar programs, some have made an intentional decision to include CEL courses in the Scholar program given the courses' alignment with the division's unique learning goals. In light of these developments, the T&L subcommittee are now exploring various design options for the Leader program, including:

- designating the CECCS's Agent of Change student leadership workshop offerings in development as Sustainability Leader program (section 3.1.9);
- integrating other leadership training program(s) at U of T into the Leader component;
- examining alternative opportunities for capstone projects that do not conflict with existing offerings; or
- revisiting the role and demand for the Leader tier in light of existing offerings.

3.2 Toward Transformative Sustainability Pedagogies Community of Practice (CoP)

Graphic recording by Patricia Kambitsch.

The University-wide Community of Practice (CoP) on Sustainability Teaching is funded by the School of the Environment and the Jackman Humanities Institute (JHI) and is led in collaboration with members of the T&L Subcommittee. It is a forum for dialogue and collaboration between U of T faculty members, students, program directors, and staff focused on sustainability to reflect on both the what and the how of teaching sustainability in comprehensive, coordinated and transdisciplinary ways across multiple divisions and units. The participants are expected to field big questions around definitions, framing, and values as they relate to sustainability teaching.

CoP held their first event on February 22 to talk about ways in which sustainability is defined and confined in the university. Next, they launched an event series on Toward Transformative Sustainability Pedagogies focused on aligning pedagogies that are used to teach sustainability with equity, inclusion, and transformation to re-imagine the ways that teaching and learning occurs in higher education.

The first event was a virtual symposium held on March 23 titled Anishinaabe Teachings on Sustainability. Nicole Bell from Trent University shared how Indigenous knowledge and worldviews can inform our understanding and teaching of sustainability. Opportunities for how to actualize an ethic of interconnection and responsibility in post-secondary education was discussed in small break out groups.

The second event of the series was held on June 2. Black Liberation and Sustainability Pedagogy highlighted how intersections with anti-Black racism and Black liberation can strengthen sustainability curricula and pedagogy in courses and programs across multiple disciplines. This panel discussion featured Fikile Nxumalo, (Assistant Professor, OISE, University of Toronto), Ingrid Waldron (HOPE Chair in Peace and Health, McMaster University), and Jennifer D. Adams (Associate Professor, University of Calgary) and was moderated by Matthew Webbe (Superintendent — Human Rights and Employment Equity, Simcoe County District School Board).

On June 21, the Community of Practice held a half-day in-person retreat for U of T faculty and doctoral students to debrief their first two webinars. They considered how to apply the knowledge to pedagogies in practice and theory, and how to move forward as a community.

On September 23, Isaac Crosby (Indigenous Knowledge Keeper, UTSC) led a Farm, Forage, and Feast Retreat at UTSC in collaboration with UTSC Campus Farm, Grounds, and the Culinaria Research Centre. The event also involved Nikibii Dawadinna Giigwag (Anishinaabemowin for Flooded Valley Healing), an employment, mentorship and pathway to postsecondary education program for Indigenous youth at the Faculty of Architecture, Landscape and Design. It was a great opportunity for CoP members interested in land-based pedagogy, Community-Engaged Learning and decolonial practices to gather for a day of learning and community building. Participants learned about Indigenous agricultural practices and nutritional, and/or medicinal benefits of plants while harvesting late September vegetables.

They walked through the valley trail to see UTSC's vision for creating an edible campus and taking an ecological approach to campus grounds, forging seasonal edibles along the way under the guidance of UTSC Grounds Supervisor, Mark Neilson. The harvested and foraged items were then brought to the Culinaria Research Centre to prepare and enjoy collaboratively together.

The CoP will continue to host webinars on select sustainability topics throughout the 2022-23 academic year and explore ways to broaden their impact with the additional support made available through their recognition as a JHI working group for 2022-2023. As part of this, the CoP recently added a new digital hub housed within the OISE website. Recordings and presentation materials of past symposia can be found on the hub web page.

Megan Ty, BASc, Chemical Engineering (CECCS Work-Study RA 2020-21)

Photo credit: Michelle Lin.

Megan is still very connected to sustainability — her current 4th-year capstone project is on the design of a sustainable energy system to efficiently heat a greenhouse, and her 4th year thesis is centred around data science and analysis of energy systems. She also wants to further explore various environment and energy-related courses in forestry, policy, and engineering. 2022 is her 5th year volunteering with the Sustainable Engineers Association, a professional development club that provides learning and networking opportunities to encourage students to pursue sustainability-related careers.

At CECCS, Megan's focus was on communications. She says that one of the highlights of her RA experience was attending the 17 Zoom Rooms @U of T event in December 2020 where faculty and staff discussed possible ways to incorporate the SDGs into curricular and co-curricular student experiences. Being able to contribute her perspective and to interact with world-renowned researchers and professors was an amazing and inspiring opportunity.

Getting exposure to the CECCS's realm of work and learning and contributing to different levels of sustainability on-campus has strengthened Megan's commitment to supporting long-term environmental, economic, and social health and vitality. After graduation, Megan plans to continue her dedication to sustainability by pursuing a career in energy and/or environment policy.

Sustainability Leadership: Innovation for Growth Rotman Certificate Program

In recognition of the growing demand for sustainability innovation and leadership in organizations across industries, the Rotman School of Management launched this six-week executive certificate in 2022.

The program delivers strategic frameworks to help participants build a case for sustainability initiatives and successfully lead them in their organizations. At the end of the online program, participants are able to:

- Explain how to use sustainability as a source of innovation to drive new growth and generate economic, social, and environmental outcomes;
- Describe how to improve the overall governance of leadership and teams
- Outline the steps involved in attracting, retaining, and growing employees, customers, and suppliers; and
- Articulate the impact of sustainability on profitability and build a case for sustainability initiatives.

The program is geared towards business leaders, professionals, and consultants looking to understand the role of different functions in developing, adapting, and executing sustainability strategies in their organization. It is led by Rotman's expert faculty:

Richard Blundell, an executive-in-residence at the Rotman School of Management with more than 35 years of senior executive management and consulting experience in the global environmental services and technology sectors, including operations management, corporate and market development, mergers and acquisitions, new business initiation, and consulting.

Richard Blundell

Waliz Hejazi (photo credit: Rotman Marketing)

Walid Hejazi, an associate professor of international business at the Rotman School of Management. He has researched, advised, and testified extensively on global competitiveness and is currently working on a series of studies that shed light on the competitiveness and productivity of Canadian organizations. He teaches macro and global economics in Rotman's MBA and EMBA programs and has also delivered lectures in more than 30 countries.

3.3 SDG Keyword Revision and Sustainability Undergraduate Course Inventory

The CECCS has been updating our SDG-based inventories annually since 2017 using an approach developed initially for categorizing and capturing sustainability content in the Sustainability Undergraduate Course Inventory. This comprehensive and coherent approach has played an essential role in helping us identify and assess the extent of sustainability learning content in the existing curriculum, validate and promote existing sustainability-related courses, provide a basis for future research (e.g., which SDGs are best covered in current courses), and act as a resource for sustainability instructor communities of practice.

Feedback from these efforts has suggested that our inventories are used extensively by members of the U of T community, including for external reporting purposes and as input to university rankings. In the summer of 2022, the T&L subcommittee, itself a cross-disciplinary team of sustainability faculty members, staff and students, conducted a critical, fine-grained internal review of the SDG keywords used to update the inventories to assess the extent to which the keywords accurately reflected our evolving appreciation of global and Canadian sustainability priorities and responsibilities.

In light of our aim of maintaining an up-to-date and publicly accessible sustainability course inventory, the initial list of 73 keywords selected and published by the CECCS in 2017 was revised to:

- add more keywords based on the UN Global Indicator Framework for SDG;
- add more keywords related to Indigenous worldviews and equity, diversity, and inclusion that are not immediately obvious in the SDG framework; and
- remove overly broad keywords that were yielding a great deal of false positives.

From these changes, the list grew to include 388 keywords. The keyword review, and more broadly the re-evaluation of the purpose of the inventories, was a learning process for all involved that will be repeated each year. Additionally, we intend to cross check with individual units and program directors the courses identified to validate that these courses fit within their definition of sustainability as it related to their program(s) of study.

As a result, the proportion of courses with sustainability content decreased to 25% in 2022 from 30% in 2021. That is, 2,702 courses have been found to have sustainability content, as evidenced by the presence of SDG keyword(s) in the course title and/or course description, out of a total of 11,019 courses offered in 2022-23. In 2021-22, the number of courses was 3,059 out of 10,366. This decrease is due to more focused keywords and more streamlined guidance on the manual review of keyword search outputs, suggesting a more targeted result has been achieved using this process. Figure 1 below shows the four-year growth in the total number of undergraduate courses offered and the number of sustainability courses, tracked by the presence of SDG-related keywords in the course title, course description, or both. The 2022 Sustainability Course Inventory has been published on the CECCS website along with the breakdown by division shown on the next page:

Figure 1: Undergraduate Sustainability Courses at U of T over the last Four Years

Source: CECCS

Table 1: Undergraduate Sustainability Courses by Division

University Divisions	Unique Sustainability Courses	% of Total Courses	% of Undergraduate Students	Number of Sustainability Courses per 10 Students (Divisional)
ARTSCI- UTSG	1,261	47	38.7	0.4
UTSC	558	21	18.7	0.4
UTM	612	23	21.2	0.4
APSE	109	4	7.5	0.2
FALD	12	<1	1.4	0.1
KPE	53	2	1.4	0.5
MUSIC	24	1	1	0.4
INFO	7	<1	<1	1.3
PHARM	65	2	1.5	0.6
GRAD	1	<1		
Total	**2,702**	**100**	**91.4**	

Source: CECCS

*The following divisions were not included in the table as they had no undergraduate courses in the inventory: Dentistry, Law, Medicine, Nursing, OISE, Woodsworth Certificate, Transitional Year Program.

ARTSCI- UTSG = Faculty of Arts & Science, St. George Campus
UTSC - University of Toronto Scarborough Campus
UTM - University of Toronto Mississauga Campus
APSE - Faculty of Applied Science and Engineering
FALD - John H. Daniels Faculty of Architecture, Landscape and Design
KPE - Kinesiology and Physical Education
MUSIC - Faculty of Music
INFO - Faculty of Information
PHARM - Faculty of Pharmacy
GRAD - School of Graduate Studies

Table 2: Undergraduate Sustainability Courses Breakdown by SDG

SDG Group	Number of Courses	% of Total Courses
1. No Poverty	129	4.8
2. Zero Hunger	101	3.7
3. Good Health and Well-Being	469	17.4
4. Quality Education	326	12.1
5. Gender Equality	684	25.3
6. Clean Water and Sanitation	77	2.8
7. Affordable and Clean Energy	86	3.2
8. Decent Work and Economic Growth	387	14.3
9. Industry, Innovation, and Infrastructure	342	12.7
10. Reduced Inequalities	789	29.2
11. Sustainable Cities and Communities	311	12.3
12. Responsible Consumption and Production	152	5.6
13. Climate Action	471	17.4
14. Life Below Water	186	6.9
15. Life on Land	328	12.1
16. Peace, Justice, and Strong Institutions	1,001	37

Source: CECCS

Vrije Universiteit learns from CECCS SDG keywords

Over the years, the CECCS has been contacted by a number of higher education institutions interested in starting a sustainability course inventory of their own. In response to this interest, the CECCS co-led workshops on methods and strategies for developing sustainability-oriented course and activity inventories amongst a group of signatory universities in the U7+ Alliance (see Case Study 13 for more details about the U7+ Alliance). We were therefore pleased to see U of T's SDG keywords cited as a foundation of the Vrije Universiteit Amsterdam's SDG course inventory in their presentation at the 2022 ISCN conference: Visualizing Societal Impact: Research and Education Dashboards of the Sustainable Development Goals (Slide #22)

Image Credit: United Nations

Source: Brugmann, R., Côté, N., Postma, N., Shaw, E. A., Pal, D., & Robinson, J. B. (2019). Expanding student engagement in sustainability: Using SDG-and CEL-focused inventories to transform curriculum at the University of Toronto. *Sustainability*, *11*(2), 530.

Multi-Faith Centre's Spiritual Supports for Climate Anxiety

The Multi-Faith Centre at the University of Toronto offers a spectrum of supports that facilitate the spiritual wellbeing of students, including their connection to identity, culture, community, sense of purpose, and a sense of connection to the world around us.

We have heard students' rising concerns over the impact of the climate crisis. When concern rises to stress and distress they are often termed eco-anxiety or climate anxiety. The 2021 Ontario Student Drug Use and Health Survey conducted by the Centre for Addiction and Mental Health (CAMH) found that more than 30% of grade 11 and 12 students in Ontario are worried about climate change and more than 50% of students agreed or strongly agreed with the statement, "I feel depressed (sad) about the future because of climate change."

In response to these and other stressors, the Multi-Faith Centre offers several programs to support student mental health and wellbeing including mindfulness meditation, yoga, interfaith meditation, and eco-spirituality programming. Launched in 2014, Mindful Moments is the largest of these programs. It provides beginner-friendly, drop-in, non-religious mindfulness meditation and yoga in collaboration with partners across campus.

This year there are more than a dozen weekly sessions where students can access qualified facilitators from the U of T community, connect in a warm community environment, and learn life skills to help manage stress.

Students in yoga practice.

Photo credit: Student Life Communications.

In related programing, the Multi-Faith Centre hosted an art installation in the spring of 2022, featuring works by 11 U of T students that addressed spirituality and the environment and how climate change affects community and identity. The event included a discussion about the intersection of art, climate change, and spirituality.

In the fall of 2022, the Centre partnered with the Well Being Collective at Hart House for Indigenous, Black, and Racialized students. Participants had the opportunity to experience the outdoors, connect with nature and spirituality through reflective meditations and wellness activities, while building community.

3.4 Community Engaged Learning (CEL) Course Inventory

Given the extensive revisions to our SDG keywords over the summer and subsequent delays in updating the Sustainability Course Inventory, we also experienced delays in updating the CEL Course Inventory. The CEL Course Inventory is created from the main Sustainability Course Inventory by running the following CEL keywords in the course titles and descriptions. Note that these keywords have not changed from last year:

*placement, *community, *experiential, *internship, *partner, *client, *service, *capstone, *office, and *professional.

The 2021 CEL Course Inventory included 93 sustainability oriented CEL courses and is in the process of being updated for 2022. The purpose of this inventory is to increase the visibility of sustainability courses that foster community engagement and partnerships. It is also currently our only measure of how many students are engaged in CEL opportunities on an annual basis. Based on the maximum course enrollments, this is 2050; however for many courses in our inventory, there is no maximum enrollment listed.

We are in the process of reaching out to divisional Registrar's Offices to obtain more precise CEL enrollment data. We have also learned that the Centre for Community Partnerships (CCP) had 329 students participate in their co-curricular CEL programming on the St. George campus this year (not counting workshops or Social Action Pop-Ups; see Case Study 14). We have reached out to offices at UTM and UTSC that provide co-curricular CEL programming to assess the extent of annual CEL engagement by students.

> **Speaking with faculty and staff at U of T that were committed to enhancing sustainability as part of their profession was inspiring and helped make sustainability a more tangible concept for me.**
>
> - Former CECCS student

3.5 Campus As a Living Lab (CLL) and Community Engaged Learning (CEL) Project Database

The SDG-based Campus as a Living Lab (CLL) and CEL Project Database currently includes 332 on- and off-campus student projects that have been captured since we began the database in 2020, representing the addition of 125 projects over last year. The majority of these project reports can be downloaded to facilitate information sharing and cumulative knowledge development for new CLL and CEL projects.

Despite our best efforts to obtain these reports, this is not an exhaustive list. One challenge continues to be compiling records that are mostly kept at the departmental level. There is also the issue of non-disclosure agreements for some CEL projects, for example in final research projects like MSM1100: Master of Science, Sustainability Management (Institute for Management in Innovation) that prevent us from publishing the final reports. Permission to publish must be obtained from the students and clients, and this can be difficult to obtain after the fact. In the absence of full reports, report titles and details are captured in our database wherever possible.

Over the coming months, the CECCS Secretariat plans on reaching out to instructors of CEL and CLL courses to recommend that notification of report publication in our database be included in the course syllabus on a go forward basis. This would eliminate the need to seek permission on a case by case basis after the completion of the projects. Although we hope to be able to standardize the sharing of reports, there is no way to avoid the administrative work required of instructors to provide these reports at the end of term, which can pose particular challenges in larger courses such as APS112H1: Engineering Strategies and Practice II.

> **I learned about how to make my research more accessible in terms of language and jargon, incorporating non-Western perspectives and knowledge into my work.**
>
> - Former CECCS student

3.6 Campus as a Living Lab (CLL) for Sustainability Courses

The School of the Environment in the Faculty of Arts and Science offers two Campus as a Living Lab (CLL) courses that embody CLL principles and offer students the opportunity to undertake group projects on real-world sustainability challenges proposed by operational and academic staff at U of T. ENV1103: Living Labs for Applied Sustainability is taught by Professor Alstan Jakubiec while ENV461: The U of T Campus as a Living Lab of Sustainability is taught by Professor John Robinson. The projects for 2022 included in these two courses are below, with the clients indicated in brackets.

ENV461:

- Increasing Awareness and Enrollment of Sustainability Scholar Programs (Ayako Ariga/Kristy Bard, CECCS Secretariat)
- Identify Methods for Creating Sustainable Change on Campus (Kayla LaChance, UTSG Sustainability Office)
- Review of Food Packaging (Robert Grieve, Food Services)
- Sustainable Swag Guide and Alternatives to Swag (Adam Kuhn and Trent Barwick, Student Life)
- Waste Sorting on Campus: Evaluation and Optimization (Scott Hendershot and Nabil Yacoub, UTSG Sustainability Office and Waste Management)

ENV1103:

- Life Cycle Analysis of Non-Hazardous Waste Disposal Options (Chelsea Dalton, UTSG Sustainability Office)
- Communicating the University's Climate Positive Plans and Initiatives to Capital Project Stakeholders (Adam Trotter, University Planning, Design & Construction)
- Deep Energy Retrofit Research (Alistair Vaz, University Planning, Design & Construction)
- Review of Wellness Standards to Current Sustainability Requirement (David Sasaki, University Planning, Design & Construction)
- Sustainability Metrics and Visual Dashboard (Kevin Leong, UTSG Sustainability Office)
- Expanding Fair Trade Products at UTSC (Patricia Escobar, UTSC Sustainability Office and Alexandra Hoa, UTSC Beverage Services)

There are 25 students enrolled in each of ENV461 and ENV1103, for a total of 50. In addition to these two, we are aware of at least 12 other courses that include elements of CLL principles. The additional CLL-related courses identified by the CECCS, including three new courses this year, are listed in the table below. This list will serve as the basis for a future CLL Course Inventory, which will allow us to reach out to instructors to obtain reports for our CLL/CEL database, as noted above. Such an inventory will also be important to measure progress on the number of students engaged in CLL opportunities each year. We recognize this list is a work in progress and invite CLL course instructors to contact us if their course is not listed.

In addition, we have had discussions with faculty members interested in incorporating CLL elements into their courses. For example, in May, eight members of John H. Daniels Faculty of Architecture, Landscape and Design met with the CECCS Secretariat and some of the Subcommittee chairs to explore how to integrate tours of campus sustainability construction and retrofit projects into their courses. Members of the CECCS Secretariat also met with UTSC CAO Andrew Arifuzzaman and Culinaria Research Institute Director Daniel Bender in the summer to discuss the possibility of adapting the existing models for a future CLL course at UTSC.

> **My studies at the graduate level revolve around the intersection between environmental justice and diasporic communities with an emphasis on sustainability and I am involved in community volunteer work that looks at the overlapping themes between Islam and sustainability.**
>
> - Former CECCS student

Table 3: Additional Courses with Campus as Living Lab Elements

Course Code	Course Title	Instructor	Department/Faculty	Semesters Offered
ARC3402HF	The Ha/f Research Seminar: How do we halve the greenhouse gas emission of the U of T's own buildings?	Alstan Jakubiec and Kelly Doran	Faculty of Architecture, Landscape, & Design	New course, Fall 2022
JAV303H1	Cities, Society, Environment	Petros Babasikas	DFaculty of Architecture, Landscape, & Design	New course, Winter 2022
ENV332H5	Practicum in Environmental Management	Adam Thorn in 2020; David Passmore in 2022	Geography, Geomatics & Environment, UTM	Winter 2020; Winter 2022
ENV496H5	Restoration Ecology	Monika Havelka	Geography, Geomatics & Environment, UTM	Every Winter
EESC34H3	Sustainability in Practice	Ana Maria Martinez; Jim MacLellan in Fall 2022	Physical & Environmental Sciences, UTSC	Winter 2020, Winter 2021, Fall 2022
APS112H1	Engineering Strategies and Practice II	Varies	Engineering	Every Winter
MIE490Y1/ 491Y1	Capstone Design	Dionne Aleman and Kamran Behdinan	Mechanical & Industrial Engineering	Every year
RSM436H1	Sustainable Finance	Jan Mahrt-Smith	Rotman School of Management	New course*; every Fall
CIV375 / CIV575	Studies in Building Science	Marianne Touchie	Civil & Mineral Engineering	Every Fall; joint undergraduate/ graduate course
CIV1240	Building Performance Assessment	Marianne Touchie	Civil & Mineral Engineering	
MIE507	Heating, Ventilating, and Air Conditioning (HVAC) Fundamentals	Marianne Touchie	Civil & Mineral Engineering	Every Winter
CTL1122H	Exploring the Praxis of Environmental and Sustainability Education	Hilary Inwood	Curriculum, Teaching & Learning, OISE	Every year

*Taught previously under a special topics course code; now approved as permanent.
**Note CLL Courses ENV461 and ENV 1103 are not listed in this table
Source: CECCS

3.7 Agent of Change (AoC) Student Workshop

The CECCS has been developing a workshop that would prepare students nearing graduation to become agents of change in their lives and workplaces after university. Rather than focusing on a particular sector, this workshop will provide information, guidance, and resources to students interested in moving beyond individual behaviour change solutions and toward influencing broader cultural change in the organizations they participate in.

The AoC workshop initiative started to take shape at the CECCS two years ago when one of our work study students advocated for such a training opportunity at the University of Toronto. Objectives of the workshop are to empower students using a regenerative, net-positive approach to sustainable action and to introduce tools, resources, and competencies that will support students in becoming agents of change, such as storytelling, coalition-building, and adaptability.

The T&L subcommittee provided feedback on principles and processes based on the concept paper prepared by the Secretariat and the RAs' literature review.

The AoC Advisory Group was then formed, comprising the following T&L Subcommittee members and representatives from Student Life who bring added insight and access to student training and wellness needs and resources.

- Kristy Faccer, Director, CECCS Secretariat (Advisory Group Chair)
- Liat Margolis, Faculty Member, FALD, and T&L Subcommittee Chair
- Kelci Archibald , Lead Career Education Coordinator, Career Exploration & Education, Student Life
- Vhil Castillejos, Health Promotion & Community Liaison, Student Life
- Michael Classens, Faculty Member, School of the Environment (SoE), FAS Certificate in Sustainability Coordinator, and T&L Subcommittee Member
- Máiri McKenna Edwards, Coordinator, Diversity, Equity & Student Experience, OISE
- Hilary Inwood, Faculty Member, OISE, and T&L Subcommittee Member
- Romila Verma, Faculty Member, SoE and Geography, and T&L Subcommittee Member

The group has met three times in 2022 to discuss design principles and content and to contribute to a working version of the workshop agenda.

Current proposed content includes an acknowledgement of the climate crisis and the concept of critical hope, followed by a brief review of sustainability and examples of agents of change. Following a presentation on change agent competencies adapted from Co-Chair John Robinson's seven metaphors for steering institutional change, a role playing exercise to work through change agent tactics and strategies will be included in order to diversify content. Sessions on Indigenous values and views on leadership, self-care, and career strategies are also being explored, as well as a section on acknowledging and providing resources on eco-anxiety.

The current target is to pilot the workshop during the Winter 2023 term to a group of 20 to 30 students nearing completion of their degree.

3.8 Additional Course Inventories

Since its inception in 2017, the CECCS has been working to measure U of T's sustainability initiatives and to document active sustainability efforts through developing and maintaining UN SDG-based inventories. Our efforts began with the sustainability undergraduate course inventory (section 3.3) aimed at supporting students interested in finding out about and enrolling in sustainability courses. Since then, the CECCS has expanded its inventories into community-engaged learning (CEL) courses, sustainability student groups, graduate programs, graduate theses, and research units with sustainability orientations.

This year, we added the continuing studies and graduate course inventories to this list. We expect these inventories to serve as useful tools in understanding the sustainability landscape beyond the undergraduate level. They will also be featured as part of U of T's contribution to sustainability teaching and learning in our institutional submission to the Association for the Advancement of Sustainability in Higher Education (AASHE)'s Sustainability Tracking, Assessment & Rating System (STARS) certification (section 5.2).

Chapter 4

Research Subcommittee

5 Years of CECCS

4) Research Subcommittee

Chaired by Professor Fiona Miller, Chair in Health Management Strategies, Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, the Research subcommittee did not inherit a specific mandate or set of priorities from the period before the CECCS mandate extension and reorganization in December 2021, unlike the other subcommittees. The focus of this year has therefore been on exploring and establishing the group's priorities, identifying champions to participate in the subcommittee, and articulating a new mandate.

Five new members in central research administrator roles and one member co-leading the University's SDG Institutional Strategic Initiative (ISI) have joined with the aim of supporting the subcommittee's efforts to identify, articulate, and address relevant gaps in sustainability research:

- Marc Cadotte, Faculty Member, Department of Biological Sciences, UTSC and Co-Chair, SDG ISI Steering Committee
- Vinita Haroun, Director, Centre for Research Innovation & Support (CRIS)
- Irena Creed, Faculty Member, Department of Physical & Environmental Services, UTSC and Associate Vice President, Research and Innovation, UTSC
- Barbara Fallon, Faculty Member, Faculty of Social Work and Associate VP, Research
- Kent Moore, Faculty Member, Department Chemical and Physical Sciences, UTM and Associate Vice-Principal, Research & Innovation, UTM

The continuing committee members are as follows:

- Fiona Miller (Chair), Faculty Member and Chair in Health Management Strategies, Institute of Health Policy, Management & Evaluation, Dalla Lana School of Public Health
- Aimy Bazylak, Faculty Member, Faculty of Applied Science & Engineering (2021-2022)
- Amanda Harvey-Sánchez, PhD Student, Anthropology
- Nicole Klenk, Faculty Member, Department of Physical & Environmental Sciences, UTSC
- Tenley Conway Faculty Member, Department of Geography, Geomatics & Environment, UTM

Members of the Research subcommittee have agreed to catalyse the research mission of the university by focusing on the sustainability dimensions of research content and conduct at a landscape rather than project level. Members are therefore currently exploring opportunities to build SDG considerations into research practice and the implications of doing so for institutions involved in the research ecosystem.

Research practice can be about research processes, e.g. transdisciplinary knowledge co-production (TDCP; section 3.2.3), and research incentives and opportunities, e.g., tenure and promotion or funding conditions for sustainability work.

An overarching point of attention for the subcommittee has been on normalizing sustainability and the opportunities for the group to facilitate better integration of sustainability considerations into research activities. One analogy currently being explored relates to systematic consideration of equity, diversity and inclusion (EDI) or Gender-Based Analysis Plus (GBA+) by funding agencies such as the Canadian Institutes of Health Research (CIHR) in their application processes.

Relevant to this work, Professor John Robinson, CECCS Co-Chair, served on the advisory group for a multi-year international study of how the SDGs are being addressed in research, co-led by the University of Sussex, University College London, and the United Nations Development Programme (UNDP).

The project is called "Steering Research and Innovation for Global Goals (STRINGS)," and it studied the alignment between science, technology and innovation (STI) and the SDGs, highlighted a glaring mismatch, and made recommendations about how to tackle this imbalance.

Two of the recommendations were to adopt a more holistic approach to research funding design and evaluation, valuing constructive and equitable partnerships, and interdisciplinary and transdisciplinary research and to empower stakeholders to form different interpretations of what counts as SDG-related STI by developing and maintaining user-friendly and open analytical tools in collaboration with policymakers and civil society organizations. We found these suggestions to have implications for our ongoing transdisciplinary knowledge co-production work (4.2).

The STRINGS project also mapped the SDG-related publications for each SDG by organization (mostly higher education institutions), and found that U of T's count of research publications relative to the world is in the top tier for all SDGs except for SDGs 6 and 14 (SDG 17 was not part of the analysis), also highlighted with U of T's second place ranking in the inaugural QS World University Rankings: Sustainability (section 6.4).

Andi Darell Alhakim, Adams Championship Intern 2020, 2021.

Photo provided by Andi Darell Alhakim.

After co-leading the finalization of the Adams Championship Interns' research project titled "Odd couples: Reconciling academic and operational cultures for whole-institution sustainability governance at universities" (see 4.3 for more details on the internship), Andi worked as a Trainee in Sustainable Development and Regional Innovation Ecosystems at the Helsinki-Uusimaa Regional Council in the summer of 2022 in Finland. He also volunteered as Sustainability Lead at the 2022 Canada Games in Niagara Region, and is currently taking sustainability reporting/policy and carbon management certificates at UBC and U of T.

Andi found the Adams project comparing ten universities — his main investigation was on the University of São Paulo —insightful. He learned how best practices in sustainability from an academic standpoint get translated into policy at universities and the challenges and potentials that accompany that. He was able to bring his learning from CECCS of how academic and operational sides of a university can have different cultures and ways of doing to his time in Finland. There, he analysed how the dynamics of government-industry-academia interactions within 5 place-based innovation ecosystems either advance or impede innovative sustainable policies throughout a region.

To Andi, the time with CECCS provided an exciting and rare opportunity to contribute to a cause that will inevitably define the University's future.

4.1 Urban Climate Action Network (UCAN) and Urban Climate Action Project (UCAP)

The CECCS supports a local node of the Urban Climate Action Network (UCAN), an initiative with the University Climate Change Coalition (UC3; section 6.2). The focus of UCAN is to create university and city collaboratives focused on supporting the implementation of urban climate action plans and delivering on existing climate targets. In Toronto, the city's climate plan, TransformTO, has the following overall strategy "to reduce community-wide greenhouse gas (GHG) emissions in Toronto to net zero by 2040 — 10 years earlier than initially proposed." As of Fall 2022, four UC3 universities have agreed to join UCAN: U of T, UBC, U Arizona, and Drexel.

To support this work, the U of T node of the network called the University Climate Action Project (UCAP) hired two assistants during the summer of 2022, Jacob Ventura and Angelina Ouyang who report to Kim Slater, U of T postdoc and UCAN Fellow. Funding for the UCAP Fellowship is secured to 2024 and involves oversight from Dr. Slater to students actively contributing to City of Toronto Climate Action Projects through a Campus as a Living Lab Course taught by the CECCS Co-Chair John Robinson (section 6.5). Thanks to funding by Mitacs and a partnership with Social Innovation Canada, a synthesis from these projects will also be developed together with other community-engaged learning courses (a total of 37 reports) as part of the fellowship.

Dr. Slater and Professor Robinson are also pursuing a number of additional proposals and opportunities, including: further support from the Energy and Climate Division (ECD) of the City of Toronto to the four Toronto universities involved in the ClimateACT committee; on the idea of a net positive (human and environmental) plan for the St. Lawrence Centre for the Arts redevelopment project ($300 million) following a discussion on this topic in this year's Better Buildings Boot Camp (section 6.6); a Social Sciences and Humanities Research Council (SSHRC) Insight Grant Proposal on developing an urban living lab in Toronto, and; various projects with the Sustainable Development Goals (SDG), Climate Positive Energy (CPE) and Mobility Network Institutional Strategic Initiatives (ISIs).

The UCAP team is also co-editing a special issue of the journal Buildings and Cities on how cities around the world are doing with respect to their climate goals and providing support to

a team of five PhD and seven Master's students whose graduate work is focused on UCAP projects. Finally the team is also leading a series of industry-focused sectoral workshops (on mobility, energy and the circular economy) aimed at advancing progress on TransformTO targets. The first workshop was held in June 2022 and focused on building retrofits and was co-hosted by UCAP, ECD and Sustainable Buildings Canada.

4.2 Transdisciplinary Knowledge Co-Production Workshop

Academic research can often involve extractive forms of research where members of the public are seen as data sources, or where the interests of society are seen as distant from more conventional academic goals. However, engaged scholarship that addresses the real world and complex challenges of sustainability and climate change requires a different approach to building knowledge and facilitating action. Engaged scholarship is typically more solutions-focused and involves deeper engagement and co-creation of solutions with non-academic partners. To address this gap, the CECCS is planning a transdisciplinary sustainability knowledge co-production (TDCP) training workshop for early-career researchers and PhD students on approaches to transdisciplinary community-engaged research. In this workshop, particular attention will be paid to knowledge co-production issues, the various forms of collaborative interaction (co-design, co-management, co-creation, co-implementation, etc.) and on ways to ensure respectful and reciprocal research relationships with non-academic partners.

The Research Subcommittee is assembling an Advisory Group to guide, endorse, and support delivery of this future workshop. The Advisory Group is currently comprised of Research subcommittee members with new members to be added as needed. The first meeting was held in November to provide feedback on the literature review (see Appendix 8), an internal environmental scan of similar workshops and events, and the draft outline of the workshop. The planned pilot is expected to be a three-hour in-person workshop focused on community/non-academic partners (NGOs, non-profit, government.) Based on feedback from pilot participants, additional workshops focused on particular aspects of TDCP research could be developed and implemented at a later date. The TDCP workshop is expected to be piloted to 20 to 30 early career scholars in Winter 2023.

Climate Positive Energy (CPE) Institutional Strategic Initiative

To avert the worst impacts of climate change, the Government of Canada is committed to achieving net-zero emissions by 2050 — and with energy consumption being the biggest source of human-caused greenhouse gas emissions, finding cleaner sources will play a key role in our ability to reach this target.

The Climate Positive Energy (CPE) strategic initiative is the University's hub for multidisciplinary clean energy research. CPE unites researchers, students, faculty, and external partners to fuel collaborative research that can transform our energy systems and advances progress towards the country's 2050 net-zero emissions targets.

Climate Positive Energy research is centered on two integrated pillars:

Photo credit: CPE Institutional Strategic Initiative.

- the Envision pillar, which represents the interplay between social and policy considerations for just climate change mitigation in the service of local and global communities; and
- the Empower pillar, which is focused on the development of clean energy technologies and decarbonization for more energy-efficient cities, transport, and building practices.

CPE activity engages more than 300 student and faculty researchers from across the University's three campuses, representing 29 different academic units that range from political science to mechanical engineering.

In August 2022, CPE offered audiences an opportunity to hear from its students directly on how their research is advancing the country's net-zero targets. More than 120 students, faculty, staff, and experts from partner organizations gathered for CPE's inaugural Research Day project showcase and student awards event.

Research Day featured multidisciplinary presentations from CPE student researchers, observed by a panel of judges who awarded prizes to projects that demonstrated exceptional capabilities to advance CPE themes.

Climate Positive Energy (CPE) Institutional Strategic Initiative

Among the top-level prize winners was research exploring a sustainable design for next-generation solar cells that would be capable of capturing more energy than current alternatives. Another prize-winning researcher examined the political economy of large firms, which can support or oppose ambitious climate change policies, asserting that climate change is a political problem just as much as a technical one.

Receiving more than just recognition, top-level researchers were awarded Intellectual Property services from Research Day sponsor Ridout & Maybee LLP, helping the research teams to determine next steps for their ideas and knowledge.

Research Day represented an important opportunity to organize around the topic of climate change and energy, and demonstrated that everyone benefits from CPE collaboration, whether it be through research that facilitates non-traditional explorations, conversations that create lasting impact, or knowledge that inspires hope for the future. CPE continues to offer workshops, lectures, and other in-person and online events that facilitate collaborative research, build partnerships, promote knowledge translation, and provide training.

Photo credit: CPE Institutional Strategic Initiative.

4.3 Adams Sustainability Champion Internship

In 2022, the CECCS wrapped up the three-year research project made possible by the generous donation of Wendy Adams engaging nine Adams Sustainability Champion Interns. The project established a process of creating a comparative framework to look at the sustainability governance and activities at various universities around the world. This framework allowed for the students to evaluate sustainability integration at each institute from the intersecting domains of teaching and curriculum, research, operations and community engagement.

The work began in 2019 when the first intern visited the University of Edinburgh and another visited Utrecht University in the Netherlands. Although visits to additional universities were expected, international visits were not possible in 2020 due to the COVID-19 pandemic. In spite of this, the work was continued and adapted to include remote interviews by seven Adams interns with informants from eight additional universities: University of Toronto and University of British Columbia in Canada, Arizona State and Massachusetts Institute of Technology in the United States, University of São Paulo in Brazil, University of Cape Town in South Africa, University of Hong Kong, and Monash University in Australia.

The resulting article entitled “Odd couples: Reconciling academic and operational cultures for whole-institution sustainability governance at universities” has been submitted to the International Journal of Sustainability in Higher Education (see Case Study 5). The paper lists the nine interns and thirteen members of the nine partner universities as co-authors and at the time of publication of this annual report has been invited to revise and resubmit by journal editors.

Andi Darell Alhakim and Grace Ma, two student co-authors and interns on the paper were also named as finalists of the UTM Undergraduate Research Symposium held in March 2022. See Appendix 10 for the research poster.

Odd Couples Paper

"Odd Couples: Reconciling Academic and Operational Cultures for Whole-Institution Sustainability Governance at Universities"

Authors: Andi Darell Alhakim, Grace Ma, Fernanda da Rocha Brando Fernandez, Manfred Braune, Michelle Brown, Denise Crocce Romano Espinosa, David Gorman, Maarten Hajer, John Madden, Rob Melnick, John Metras, Julie Newman, Rob Raven, Victoria Smith, Lysanne van der Lem, Arnim Wiek, and John Robinson

Researchers: Nicolas Côté, Rutu Patel, Grace Ma, Monisha Alam, Ana Karen Garza, Andi Darell Alhakim, Christina Wong, Hoor Tariq, Kenneth Sergienko

Abstract

This paper explores barriers and pathways to a whole-institution governance of sustainability within the working structures of universities. It draws on multi-year interviews and hierarchical structure analysis of 10 universities in Canada, the United States, Australia, Hong Kong, South Africa, Brazil, the United Kingdom, and the Netherlands. The paper addresses and challenges existing literature that has championed further integration between the two organisational sides of universities (academic and operations) as the answer to better embedding sustainability into their four primary domains of activity (education, research, campus operations, and community engagement). This research found that effective sustainability governance would have to recognize and reconcile the distinct cultures, diverging accountability structures, and contrasting manifestations of central-coordination and distributed-agency approaches characteristic of the academic and operational sides of the university. The positionality of actors appointed to lead institution-wide embedding influenced which domain received most attention. The paper concludes that a whole-institution approach would require significant tailoring and adjustments on both the operational and academic sides to be successful.

4.4 Research Subcommittee Inventories

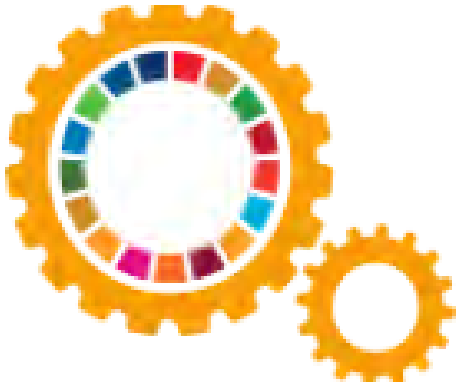
The CECCS's work to quantify and capture U of T's sustainability initiatives is active on the research front through the following SDG-based research-related inventories:

- Sustainability Graduate Program Inventory
- Sustainability Research Unit Inventory
- Sustainability Master's Thesis Inventory (2009-2022)
  Overall, 2,505 of 9,648 (25%) Master's thesis papers have been found to have sustainability content. The CECCS is currently conducting a manual review to remove false positives from the most recent release of papers so this number is an overestimation.
- Sustainability Doctoral Thesis Inventory (2009-2022)
  Overall 3,006 of 11,175 (27%) doctoral thesis papers have been found to have sustainability content The CECCS is currently conducting a manual review to remove false positives from the most recent release of papers so this number is an overestimation.
- Sustainability Research Publication Inventory - newly developed to include in the submission package for the Association for the Advancement of Sustainability in Higher Education (AASHE)'s Sustainability Tracking, Assessment, and Rating (STARS) framework (section 5.2).

> **Completing the Transdisciplinary Knowledge Co-Production literature review gave me an insight into how university research can be made more accessible to non-academic sustainability organizations. This imbued me with an awareness of the need to ensure that my research is accessible to my target audience, which I incorporated into my research project at the City of Toronto about the equity of vehicles for hire.**
>
> - Former CECCS student

Chapter 5

Operations Subcommittee



5 Years of CECCS

5) Operations Subcommittee

Chaired by Marc Couture, Director, Sustainability and Energy Management at UTSG , the Operations Subcommittee aims to bring together students, faculty, and staff to strategically align, prioritize and advance tri-campus operational objectives and encourage collaboration on sustainability projects with operational and academic activities. When the Subcommittee was first formed in 2021 to carry on the mandate of the previous Campus as a Living Lab Subcommittee, it consisted of:

- Alexandria Gill, BA Student, Political Science & Public Policy, UTSC
- Jan Mahrt-Smith, Faculty Member, Rotman School of Management
- Kim McLean, Chief Administrative Officer, Faculty of Arts & Science
- Karen Shim, Communications Associate, Office of the Vice-Provost, Academic Programs

In 2021, it was decided this new Subcommittee should also include key members of the Tri-Campus Sustainability Board to bring together those working on operational sustainability across the three campuses.

In early 2022, the Tri-Campus Sustainability Board was dissolved. Those key members were formally invited, and the Operations Subcommittee expanded to include:

- Ahmed Azhari, Director, Utilities & Sustainability, UTM
- Andrew Arifuzzaman, Chief Administrative Officer, UTSC
- Deborah Brown, Chief Administrative Officer, UTM
- Christine Burke, Assistant Vice-President, University Planning, Operations & Real Estate Partnerships
- Jeffrey Miller, Director, Facilities Management & Capital Projects, UTSC

Expansion of Campus as Living Labs (CLL) to further our goal of having as many students a year involved in CLL projects a year as possible continues to be an important priority of the Operations Subcommittee. This goal also overlaps with the Teaching & Learning Subcommittee. The familiarity of Operations subcommittee members and our partners in the Sustainability Offices with the day-to-day functioning of the University of Toronto is key to identifying and facilitating access to and information about potential CLL learning and project opportunities to be included in CLL courses. In many

cases, staff have provided relevant data to CLL projects, participated in these projects as clients to campus-based climate and sustainability challenges, and offered important input and guidance to the solutions proposed by students. The limited availability of staff to participate regularly in CLL classes as clients, however, presents a challenge to scaling these activities more widely.

Other Operations Subcommittee activities this year included steps to create a staff workshop on the SDGs in collaboration with the Equity, Diversity & Inclusion portfolio within the Office of the Vice President, People Strategy, Equity and Culture (PSEC) (section 5.3) and preparing for the launch of the Sustainability Citizen Program (section 3.1) which overlaps with the Pathways Program leadership provided by the Teaching & Learning subcommittee.

Other key partners on the Citizen program development include CECCS member Hilary Inwood and her Graduate Assistant Sarah Urquhart from OISE and staff from the tri-campus Sustainability Offices. These partners were instrumental in informing the development of the Citizen program. Sustainability Office staff will be involved in the validation of co-curricular activities on CLNx for the Citizen program, and in collaboration with CLNx staff assisted with the launch of the Tri-Campus Sustainability Calendar this year (section 5.1). Sustainability Office staff and staff from other areas of the University will assist the CECCS in keeping this calendar populated with sustainability events happening across the University.

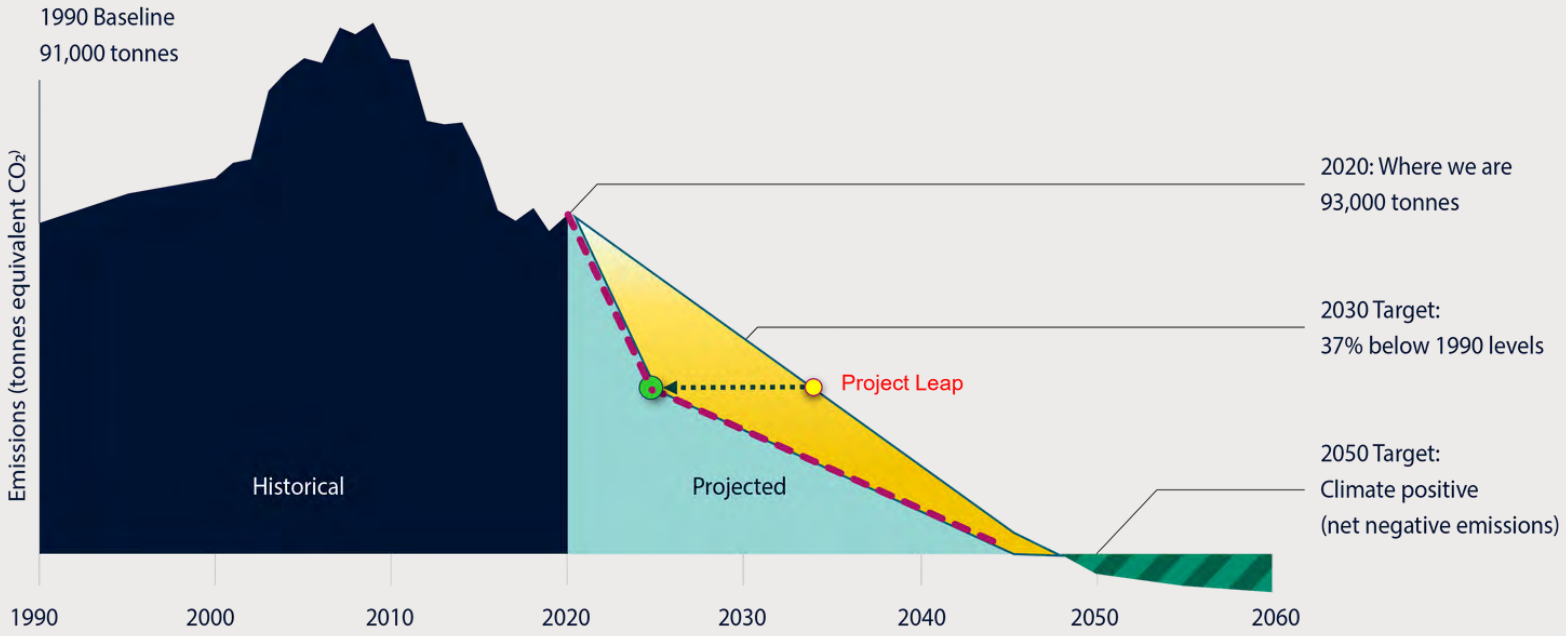
Other initiatives that fall under the Operations Subcommittee include continuing work on the Social Procurement Pilot Project (section 5.5), the Air Travel Emissions Mitigation Initiative (ATEMI; Case Study 9) and university submissions to sustainability rankings such as The Times Higher Education (THE) Impact Rankings (section 6.4) and the Association for the Advancement of Sustainability in Higher Education Sustainability Tracking Assessment & Ranking System (AASHE STARS) (section 5.2).

The Subcommittee members have met and established priorities for the coming year to help focus the efforts of the three sustainability offices to align and advance our institutional commitments and priorities.

The Operations subcommittee and Chair also support our Climate Positive Campus commitment through a carbon and energy master plan focused on responsible growth, renewal and resiliency. The St. George campus will become climate positive by reducing more greenhouse gases than we emit, creating a net benefit in our community. Further to this, we are accelerating our actions through Project LEAP (Case Study 6).

We are proud to see the U of T's bold climate commitments and leadership on buildings and our campus energy infrastructure recently recognized through CECCS Co-Chair and Chief Operating Officer Ron Saporta's recognition this year as a Clean16 awardee in the buildings category and honouree in this year's Canada Clean50.

Figure 2: Illustration of how Project Leap will accelerate progress on our 2050 climate positive target



Source: U of T Sustainability Office.

Canada Infrastructure Bank (CIB) Invests in Climate Positive Campus

In July, U of T announced $56 million in financing from the Canada Infrastructure Bank (CIB) to accelerate Climate Positive Campus, U of T's ambitious plan for the St. George campus to become a carbon sink by 2050. Through the launch of Project LEAP (Low Emission Accelerator Project), this CIB financing will be used to complete deep energy retrofit projects on two labs at the Earth Sciences Centre. Other funded projects will include converting gas boilers to electric, installing energy storage solutions, and establish a local low carbon energy source that supplies renewable energy through technology such as solar. Private sector debt partners will also be involved in this project, along with an energy performance contractor to ensure stringent performance requirements are met.

There are also plans to pilot green technology solutions such as carbon capture and energy storage to support the decarbonization of our district energy network. There will be opportunities for students studying sustainability to engage in these projects through Campus as Living Lab (CLL) projects.

These projects will accelerate progress on climate positive targets and reduce the

Ron Saporta, U of T's Chief Operating Officer, Property Services and Sustainability and CECCS Co Chair, shows Karina Gould, families, children and social development, President Meric Gertler, and Ehren Cory, CEO of CIB, the Landmark Geothermal project currently under construction. (Photo credit: Johnny Guatto.)

Canada Infrastructure Bank (CIB) Invests in Climate Positive Campus

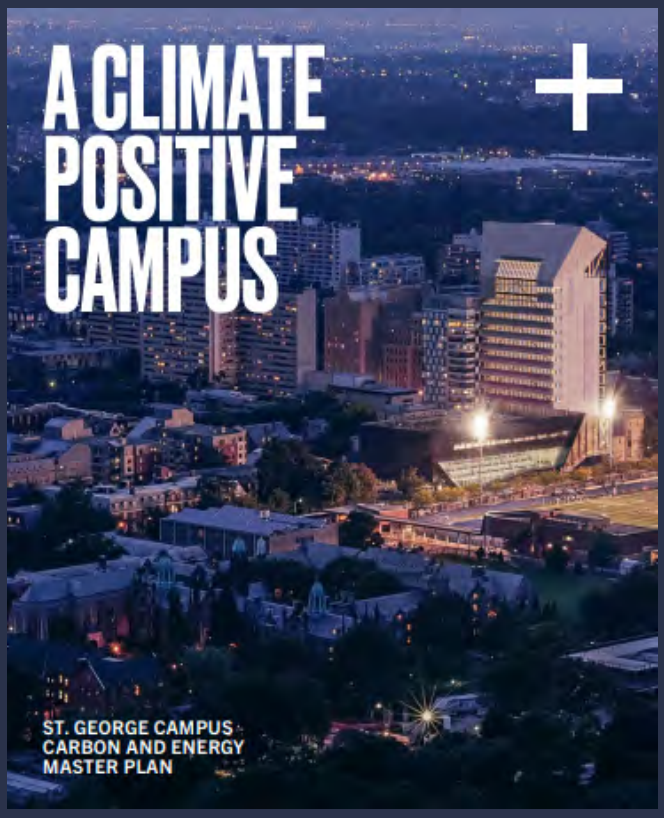
University's greenhouse gas emissions by more than 50%, or 45,000 tonnes of CO_2 equivalents, by the end of 2025, putting the U of T a decade ahead of schedule on its climate commitments for the St. George Campus.

Over the course of 2022, construction has continued to progress on U of T's Landmark Project, which includes an urban geoexchange system beneath King's College Circle on the St. George campus. This has involved the drilling of 374 boreholes 260m deep into the ground to store surplus heat generated by nearby mechanical cooling systems in the summer for use in the winter. It's estimated that this system, as an integrated part of the district energy network, will help reduce the University's greenhouse gas emissions by 15,000 metric tonnes per year.

This infrastructure-focused strategy complements efforts to advance sustainability across U of T's research, innovation and teaching missions — including the development of clean-tech innovations that will aid Canada's efforts to fight climate change and transition to a green economy.

Learn more:

- U of T Partners with Canada Infrastructure Bank to Boost Climate Positive Efforts
- CIB Retrofit video
- Episode 1, season 2 of the Institutional Strategic Initiatives (ISI) Groundbreakers series highlighting the important Climate Positive research happening at U of T that will help us achieve our climate positive goals



5.1 Tri-Campus Sustainability Calendar

The Tri-Campus Sustainability Calendar on CLNx launched in March 2022 with the aim of creating a single hub of information for sustainability programming and events on all three University of Toronto campuses and elsewhere. The calendar provides easy access to the dates, times, and details of these events for the upcoming period and provides access to staff and an event submission form for those wishing to have an event added by the CECCS team.

So far, staff from the tri-campus Sustainability Offices, the School of Environment, Climate Positive Energy ISI, the Faculty of Architecture, Landscape and Design, UTSC's Edible Campus and UTM's Master of Science in Sustainability Management (MScSM) have access to add events directly. We hope this list will continue to grow, and that staff members across the sustainability community at U of T who regularly organize events will begin adding their events to this calendar.

Events in the calendar will be connected to our Sustainability Citizen Program in CLNx and allow students to earn credit towards the Sustainability Citizen Program, and Co-curricular Record (CCR) recognition through their attendance.

5.2 AASHE STARS Submission for St. George Campus

The St. George Campus is shooting for….STARS!

The St. George campus is currently planning its first application for a rating through the Sustainability Tracking, Assessment, and Rating (STARS) framework. STARS is a well respected, transparent, self-reporting framework for colleges and universities to measure their sustainability performance. STARS is a program of the Association for the Advancement of Sustainability in Higher Education (AASHE).

The STARS framework gathers data on five areas of campus sustainability: Academics, Engagement, Operations, Planning & Administration, and Innovation & Leadership. Campuses are then assigned a rating of Bronze, Silver, Gold, or Platinum based on the percentage of points scored. Over 550 campuses across the world have received a STARS rating; the UTM campus earned a STARS silver rating in 2021.

Completing a STARS application is a challenging project, with inventories of sustainability courses, sustainability research, and even food and beverage purchasing required for submission. This information is submitted alongside information on a range of other university activities and metrics, from greenhouse gas emissions and waste diversion, to sustainable investing and student engagement.

The Sustainability Office has partnered with the CECCS to gather the data required and complete the inventories. With help from the CECCS and Sustainability Office work-study students, an inventory of sustainability research on campus has already been completed, and existing inventories of sustainability courses are being updated to include Graduate and School of Continuing Studies courses.

The Sustainability Office anticipates submitting the application in early 2023; and be sure that when it comes to a target rating – we are shooting for the stars!

More information on STARS can be found at https://stars.aashe.org/.

5.3 Staff Workshop on the SDGs

Earlier this year, the CECCS met with Jodie Glean, the new Executive Director for the Equity, Diversity & Inclusion (EDI) portfolio within the Office of the Vice President, People Strategy, Equity and Culture (PSEC) office. The purpose of the meeting was to follow up on prior conversations with this office and past interest in developing a staff workshop on the SDGs and integrating the SDGs into the EDI portfolio. The CECCS's interim review of a subset of current professional development courses available for U of T staff for SDG content was also shared.

The meeting discussion revealed the extensiveness of EDI programming around key themes of relevance to a just and sustainable transition, but that were not picked up by the SDG keyword search. In addition to the 32 courses relating to SDG4 (Quality Education), SDG5 (Gender Equality), and SDG10 (Reduced Inequalities) identified by the review, the discussion also highlighted a wide range of other relevant activities that occur throughout the year, including, but not limited to, programming during Black History Month and the Trans Day of Remembrance, on Truth and Reconciliation and on staff wellness. The EDI office has also played an important supporting role in the activities and recommendations made by U of T's Anti-Black Racism Task Force.

As a next step to this discussion, the CECCS and representatives of the EDI office will meet again to better understand the interconnections and potential areas of overlap in the pursuit of equity, justice and sustainability for all in our training materials, programming and more broadly. We expect that further discussion and collaboration will deepen our understanding of this important work at U of T and improve our planned sustainability workshop for staff. Such an awareness must include the first overarching principle of CECCS: that regenerative sustainability includes increasing overall human equity and wellness, not just a reduction of environmental harm.

5.4 Aligning Efforts on a Tri-Campus Level

Although the former Tri-Campus Sustainability Board was folded into the Operations Subcommittee, staff from the CECCS Secretariat and the tri-campus sustainability offices have continued to meet on a monthly basis to collaborate on the implementation of key initiatives such as the Adams Sustainability Celebration (section 2.2), and student engagement at Orientation events (section 6.7). Other areas of coordination include sustainability ranking submissions (section 6.4) and Campus as Living Lab projects (section 3.6) proposed and overseen by sustainability staff. These regular meetings are also critical in moving the development of the Sustainability Citizen co-curricular program forward (section 3.1) and will support future integration and ongoing delivery.

While sustainability operations at U of T continue to be undertaken at a campus level, increasing collaboration and coordination has also been seen in the areas of energy modeling and utility performance standards, which sets performance targets for new construction and major retrofit projects.

> **Since my time at CECCS I've done an internship with the Pension Fund's Responsible Investment Team and worked on ESG [Environmental, Social, and Governance] integration for public equities and ESG assessment frameworks for the private equity team.**
>
> **With my student club called Rotman Commerce Sustainable Business, I'm organizing events and educating students on sustainable business practices.**
>
> **I'm also taking a Sustainable Strategy course which is a case-based class where we take a deep dive into what an ESG strategy consists of as well as fundamental reporting standards.**
>
> - Former CECCS Student

Ana Karen Garza Canales, Parliamentary Intern, GreenPAC (Adams Championship Intern 2020 and CECCS RA 2020 21)

Photo credit: Ana Karen Garza Canales.

Working with CECCS provided Ana with a sense of confidence to continue growing in her sustainability-oriented career. During her internship, she worked with partners at the University of Cape Town, South Africa researching the sustainability work underway at the institution, including the role of academics, operations and governance structures. As an RA, she supported the CECCS' role in the U7+ Alliance (see Case Study 12).

After graduation, Ana has continued pursuing her passion for sustainability. She hosted the second season of the podcast "In the Green Chair" by Relay Education where she talked about an array of environmental topics with professionals in the green sector earning her a spot on Spotify's Earth Day playlist. Most recently, Ana has stepped into the role of a parliamentary intern on a non-partisan environmental leadership program on Parliament Hill. She recalls her time with the CECCS as a valuable one. At the beginning of the internship there was a presentation given to the students by Co-Chair John Robinson and she always remembers a statement he made, which impacts her current sustainability work. He said, "It is not about creating more change, we have a lot of that already. It is about steering that change in a positive direction." When things get a bit overwhelming working on climate change issues and sustainability, this quote continues to guide her perspective and career.

UTM Sustainability Strategic Plan — First Progress Report

In 2021, the University of Toronto Mississauga (UTM) released a 10-year Sustainability Strategic Plan with the goal of fostering a culture of sustainability on campus for the UTM community to enjoy. A year later, UTM continues to collaborate with internal and external partners to either complete, start, or prepare the implementation of the goals outlined in the Plan.

The Plan has five pillars: Academic Programs and Curriculum; Research; Campus Engagement; Civic Engagement; and Human Resources & Infrastructure. Each pillar has a set of goals, actions, and timelines that guide the sustainability work amongst all teams on campus.

Additionally, each goal is tied to the Sustainability, Tracking & Assessment Rating System (STARS) global sustainability standard for higher education. UTM earned a STARS silver rating in 2020 and is working towards achieving a platinum rating in the long term.

The Plan is managed by the Sustainability Office and supported by the Principal's Sustainability Advisory Committee (PSAC) and its many subcommittee working groups. These subcommittees are composed of a group of students from across a range of disciplines, staff, faculty, and librarians, all of whom come together to discuss sustainability progress and initiatives across campus.

Over the past year, UTM has seen significant progress in integrating sustainability principles into academics and curriculum, on-campus initiatives, and through engagement with stakeholders and the community.

In the academic space, a new Certificate of Completion in Global Sustainability was launched, along with Campus as a Living Lab courses that provide students with experiential learning opportunities.

Progress Report cover.

UTM Sustainability Strategic Plan — First Progress Report

On campus, many departments are involved in the development and delivery of sustainability initiatives at UTM. In one example, the UTM campus community is making improvements to waste management and diversion practices through the OZZI program led by the Hospitality and Ancillary Services department and the new waste bins piloted by the Sustainability Office.

Also, and in spite of a largely remote academic year, engagement with UTM's stakeholders continued through virtual participation in the People Power Challenge (2021); Elizabeth May's keynote speech, "After COP26 — What now? Can we keep 1.5 alive?"; and the Adams Sustainability Celebration hosted by the CECCS. These are just a handful of success stories that the UTM community has achieved over the past year and a half. For a detailed overview of accomplishments thus far, check out the Progress Report.

5.5 Social Procurement Pilot Launch

In March 2022, Procurement Services launched a one-year social procurement pilot to advance equal procurement opportunities for underrepresented groups who are not traditionally part of the supply chain (e.g., BIPOC, 2SLGBTQ+, etc.). By leveraging institutional purchasing power in support of this social imperative, significant benefits can be achieved:

- Foster an inclusive economy, reduce poverty, and create employment opportunities
- Support the values of inclusion and equity
- Support the U of T Truth and Reconciliation Calls to Action and Anti-Black Racism Taskforce
- Expand the supplier pool and increase the variety of products and services
- Contribute to UN Sustainable Development Goals 1, 3, 5, 8, 10, 11

Over the past several months, additional memberships with supplier certification councils were obtained to further diversify the supplier pool, making it easier to connect buyers with diverse suppliers in their search for goods and services using the Diverse Supplier Portal. Presentations and training of the program are ongoing and there are currently over 100 pilot buyers across the U of T community with access to the Portal.

Earlier this year, Procurement Services conducted a pilot with Ancillary Services as they were seeking to introduce a diverse culinary experience for several food locations across the St. George campus to students, faculty, and staff in the Fall of 2022. In collaboration with Women Business Enterprise (WBE), Procurement Services facilitated a "Meet the Buyer" and invited diverse suppliers to participate, ask questions about the project, and meet with Ancillary Services. The request for proposal was posted and as a result, several contracts have been awarded.

> **More involvement with climate change research in guiding institutional decisions or the implementation of the climate positive plan would be valuable. I feel like student voices are missing out from these opportunities.**
>
> - Former CECCS student

> **The 'Meet the Buyer' event gave our project team a chance to meet with potential diverse suppliers from a variety of industries and answer their questions in real-time. We felt it was crucial to participate in the social procurement program to provide commercial opportunities to underrepresented groups the chance to bid on our project.**
>
> Anne Macdonald, Assistant Vice-President, Ancillary Services

Two other pilots are also underway with Facilities & Services, and First Nations House from the St. George Campus.

Procurement Services has also partnered with Buy Social Canada to establish a solid foundation for social procurement via learning and development in collaboration with key stakeholders to identify and highlight current social procurement activities, opportunities, and challenges. The insights from these sessions will contribute to a recommendations report in late Fall 2022.

CECCS is supporting this pilot through the hiring of a work-study student dedicated to enhancing the diverse supplier portal user experience.

For further information on the Social Procurement Program, contact Renata Faverin, Director, Procurement Services, or Lisa Myre, Senior Program Lead.

Sustainable Change Programs Launch

In the spring of 2022, the Sustainability Office at St. George launched a suite of Sustainable Change Programs to help University community members identify, assess, and implement sustainable change across courses, events, labs, offices, and residences on campus. These five programs, each tailored to different spaces and operations on campus, were developed through extensive consultations, best practice research, and are aligned with the United Nations' Sustainable Development Goals.

The Sustainable Change Programs were created to promote, inspire, and recognize sustainable action at U of T through a simple certification and scoring system that allows for sustainability benchmarking and discovering opportunities for improvement.

There are four levels of certification (bronze, silver, gold, and platinum) for offices, labs, residences and events, and a single certified level for courses. The level of certification you receive is determined by the percentage of total available points of each form. Once certified, participants receive a virtual badge (groups) or ribbon (individuals) and a certificate that can be used for promotional purposes. Participants can also choose to display their score on the Sustainable Change Programs Leaderboard to inspire others.

Since its launch, the Sustainable Change Programs have already had a significant impact on the U of T community!

- The Sustainable Offices Program has seen the most uptake, with more than 200 people working in 30 certified offices across campus — 83% of all participants receiving a gold or platinum certification.
- Over 12,500 people have attended an event certified through the Sustainable Events Program which includes platinum certification of one of the biggest events on campus, the University of Toronto Students' Union student orientation!
- As well, three of the largest residences on campus have been certified through the Sustainable Residences Program, and 75% of the Sustainable Labs Program participants have received a gold or platinum certification.

Take part in the Sustainable Change Programs and get certified today!

Air Travel Emissions Mitigation Initiative (ATEMI)

Photo credit: Wikimedia Commons.

In November 2020, CECCS released the Business Air Travel Report (PDF), which documented the University's first attempt at quantifying scope 3 air travel emissions, resources for reducing business-related air travel, and the proposal for the emissions mitigation pilot program to institute a flat fee on air travel for a group of senior leadership at the University that was subsequently delayed due to the COVID-19 pandemic. CECCS Co-Chair John Robinson was invited to contribute a chapter on the report to be part of a book titled Conversations on Ethical Leadership: Lessons Learned from University Governance, compiled and edited by his former colleague and former Director of the School of the Environment (formerly the Centre for the Environment), Professor Ingrid Stefanovic. Members of the CECCS Secretariat Dione Dias and Ayako Ariga assisted in co-authoring this chapter. Publication is expected in early 2023.

While air travel may be necessary to conduct the business of the University, it is important to strike a balance between reducing our air travel emissions and offsetting those emissions for necessary travel.

With this in mind, the U of T St. George campus (UTSG) Sustainability Office set out to restart its efforts to address business air travel emissions, expected to be the largest component of the University's scope 3 (indirect) greenhouse gas (GHG) emissions.

Air Travel Emissions Mitigation Initiative (ATEMI)

This included the hire of a new project manager, Albert Trinier, and the development of a revised approach to measure and address these emissions as a first step to a more comprehensive look at all scope 3 emissions. Pre-COVID air travel emissions were estimated to be between 26,000 and 57,000 tonnes of eCO2, approximately half of UTSG's combined scope 1 and 2 (direct) emissions.

The Air Travel Emissions Mitigation Initiative (ATEMI) program is the full rollout of that initial 2020 pilot and will use collected fees to fund carbon offset projects to mitigate the impact of scope 3 emissions resulting from air travel.

An advisory committee consisting of faculty and senior operational staff from all three campuses has been established to develop and provide guidance on ATEMI program governance and principles. Project Principles were developed by the Committee for offset projects and are based on industry best practices as well as U of T priorities for project selection and development. Projects will range from tree planting to vehicle electrification to carbon capture techniques. Unlike other universities, third-party offsets will not be purchased as part of this program and all projects will be managed by U of T and focused on reducing U of T emissions.

The ATEMI program is targeted to launch at the end of 2022 and will apply to air travel related to University operations. This will consist of a distance-based fee informed by the federal price of carbon. This fee will be doubled for any travel class above economy. A fee based on distance travelled matches what is currently being offered in the commercial air travel market and ensures that it is equitable based on the amount of produced emissions.

Albert Trinier, Project Manager at the Sustainability Office overseeing ATEMI.
Photo credit: Charlie Sun.

Rutu Patel, Masters of Public Policy & Global Affairs, University of British Columbia (Adams Championship Intern 2019 and CECCS RA 2019 20).

Photo credit: UBC School of Public Policy and Global Affairs.

After working as one of the inaugural Adams Championship Interns and contributing her analysis on the sustainability governance at Utrecht University and U of T in the academic journal paper co-authored by Adams Interns and partners (see Case Study 5 for more details), Rutu continued to support the CECCS as an RA in Fall 2019 and Winter 2020. She led the writing of the Business Air Travel Report titled "Addressing University of Toronto's Business-Related Scope 3 Air Travel Emissions," which proposed an institutional plan to capture the size and significance of air travel related scope 3 emissions across U of T. The report addressed air travel at the University by quantifying, reducing and mitigating emissions. The report has served as a foundation for the development of the Air Travel Emissions Mitigation Initiative (ATEMI) at U of T (see Case Study 9 for more details). Applying academic knowledge about sustainability and climate change toward practical solution-building was the highlight of her RAship at the CECCS.

Now pursuing a graduate degree in public policy at UBC, Rutu and her classmate and fellow CECCS RA alumnus, Nicolas Côté, have resumed advocating for reductions in air travel emissions within their department and across UBC. In November 2022, they will be presenting details about the U of T ATEMI report at a Community of Practice meeting. They hope the mutual learning will lead to further collaboration and sustainable air travel at both universities.

Forward Food and Plant-Based Meals at U of T

Plant-based eating is gaining momentum across the country as more and more Canadians opt to reduce their meat consumption in favour of vegetarian and vegan fare. Currently, two-thirds of Canadians eat plant-based foods regularly. Consumers of all ages are increasingly concerned with the conditions under which their food was produced and the impact on animal welfare, the environmental footprint of their meals, and the long-term health consequences of consuming large quantities of animal products.

As a result of this demand within the community at large and within the University of Toronto community in particular, in August 2022, U of T hosted a two-day plant-based culinary training session for campus chefs. This professional development session brought chefs from the Humane Society International/Canada's Forward Food program to campus to train our chef participants on how to create delicious, cost-effective, and sustainable plant-based dishes.

Chefs from the St. George and University of Toronto Mississauga (UTM) campuses and Hart House were in attendance. Following the training, both campuses committed to continuing to increase their plant-based and plant-forward menu options.

Each has signed the Forward Food Pledge, which is a commitment to convert 20% of campus menus to plant-based (above and beyond their current plant-based offerings).

The training was hosted by Chef Jaco Lokker, Director of Culinary Operations and Executive Chef, University of Toronto. At the beginning of the training, participants were addressed by Riana Topan, Campaign Manager, Humane Society International/
Canada, who welcomed the chefs and gave a brief overview of the Forward Food initiative. Chefs Amy Symington and François Murphy, Forward Food Culinary Specialists, Humane Society International/Canada, discussed the schedule for the sessions and gave an overview of the recipes, ingredients, and techniques that would be covered throughout the training.

Attendees sample plant based fare.
Photo credit: Kristy Faccer.

Forward Food and Plant-Based Meals at U of T

Throughout the two-day program, chefs worked on new appetizers, soups, sandwiches, salads, sweets, and pastries all created with sustainable, plant-based ingredients. Students, representatives from U of T's Residence Life and Sustainability Offices, as well as Deans and Principals were invited to a well-attended, highly successful, and delicious buffet lunch featuring the hard work of our chefs.

An official launch event for the dishes developed in the program was held in the fall, with invitations will be extended to students, student leaders, University administrators, residence life staff, and various other community stakeholders.

Media coverage of the initiative has included:

- U of T chefs bring more sustainable, plant-based food to campus menus
- U of T chefs serve up new menu of plant-based dishes (National Observer)
- U of T chefs serve up new menu of plant-based dishes (Yahoo! News)

Program partners:

Humane Society International/Canada is a leading force for animal protection, with active programs in companion animals, wildlife and habitat protection, marine mammal preservation, farm animal welfare, and animals in research. HSI/Canada represents tens of thousands of supporters across the country and is proud to be a part of Humane Society International — one of the largest animal protection organizations in the world.

HSI/Canada's **Forward Food** program works to make alternative proteins — from plants, cellular agriculture, and fermentation — more widely available. As part of this effort, Forward Food helps institutions across Canada increase their offerings of delicious and nutritious plant-based options that are better for animals, the environment, and human health. Forward Food offers culinary training, menu development assistance and recipes, educational support and materials, and help with marketing and promotion, all free of charge.

Taste is queen.

You can talk all you want about how plant-based eating is good for environment and is less cruel to animals, but if it doesn't taste good and look good, we haven't done our job.

- Chef Amy

Ha/f Research Seminar: Operational & Embodied Carbon of Campus Buildings

Instructors: Kelly Alvarez Doran, Alstan Jakubiec.

University Sponsors: Alistair Vaz* (Senior Planner, University Planning); Ron Saporta (COO); Marc Couture (Director, Sustainability Office); Jeffrey Miller (Director, Facility Management & Capital Projects, UTSC); Patricia Escobar (Manager, Sustainability, UTSC); Ahmed Azhari (Director, Utilities & Sustainability, UTM); Beverley Ayeni (Manager, Sustainability & Energy Management).
(* = Course Coordinator for the University)

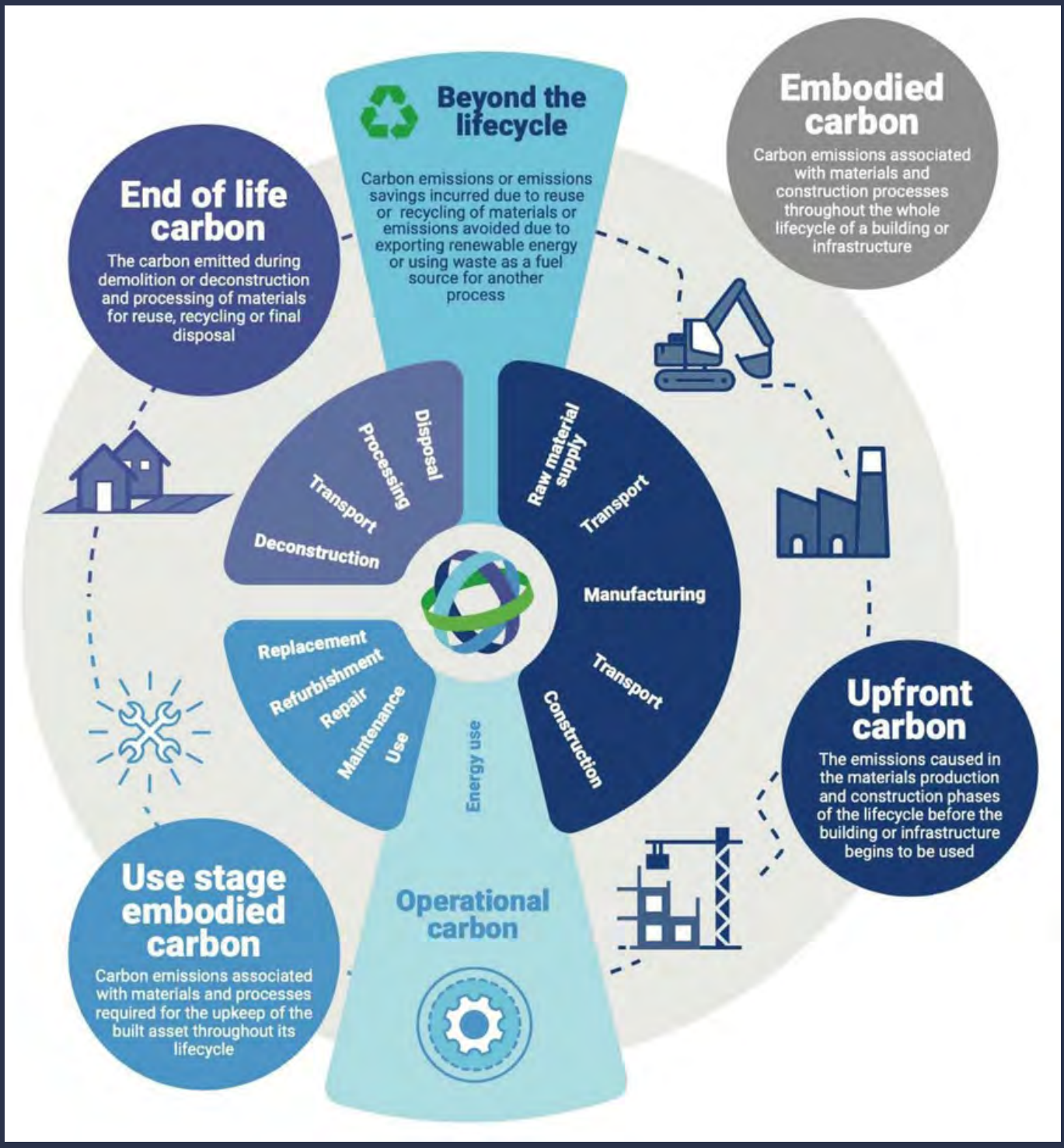
Our Climate Positive Campus (CPC) targets were set out with the understanding that we must contribute to meeting Canada's climate targets, and innovate better ways of slowing global warming and adapting to reduce the impacts of climate change in our communities. Part of this discourse has been to shift our attention from energy to international calls to action to address the "hidden" sources of carbon in one of the largest sources of emissions in Canada — buildings. In addition to Operational Carbon (OC), this means addressing Embodied (Upfront) Carbon (EC); i.e., the carbon emissions generated from raw material extraction through manufacturing, transportation, and construction processes.

The CPC framework has set us on a path towards significantly dropping our OC footprint as an institution. EC, however, is 14 times higher than OC over a 60-year period for new low-emissions buildings aimed at minimizing OC. This puts a greater emphasis on developing EC benchmarking data for our campus such that it informs retrofits, renovations, and new buildings. The gravity of this is particularly relevant to the University as the St. George campus alone is expected to double in size over the next 30 years.

Hosted at the John H. Daniels Faculty of Architecture, Landscape and Design, the focus of this Master of Architecture (M.Arch.) graduate research seminar is the application of Life Cycle Assessment (LCA) and post-occupancy analysis methods to provide a holistic view of the EC and OC of our buildings. The buildings selected for analysis represent teaching and lab-intensive buildings completed in the last 10 years, with sub-metered utility usage data for the last 3 to 5 years, across all three campuses. The course will involve site visits and engagement with both the project design teams and building operators.

This term's research seminar builds on the work of previous years where the Ha/f Research Seminar has looked at Multi-Unit Residential Buildings (MURBs) in Toronto and Mass Timber buildings in Canada and Europe. This research was the basis of the City of Toronto's inclusion of EC in its

Ha/f Research Seminar: Operational & Embodied Carbon of Campus Buildings



Project lifecycle showing both the scope of the definition and need for whole life consideration. (Source: "Bringing Embodied Carbon Upfront," World Green Building Council.)

Ha/f Research Seminar: Operational & Embodied Carbon of Campus Buildings

Green Standards and informed a policy primer on EC Targets for Ontario Municipalities who are also trying to understand and roadmap their own response to EC. The 14 students enrolled in the course will be studying the following seven buildings:

- Leslie Dan Pharmacy Building (St. George)
- Myhal Centre for Engineering Innovation & Entrepreneurship (St. George)
- Terrence Donnelly Centre for Cellular & Biological Research (St. George)
- Rotman Business School expansion (St. George)
- Maanjiwe nendamowinan (UTM)
- Terrence Donnelly Health Sciences Centre (UTM)
- Environmental Sciences & Chemistry (UTSC)

Results for this research will be published and shared early next year and will directly inform our intention to move to whole building lifecycle (Embodied + Operational) carbon targets for projects through future updates to the Climate Positive framework and Design Standards. The University has already begun to ask for reporting on key elements of our projects currently in development, further adding to the benchmarking data required to develop and set effective targets.

Contact:
Alistair Vaz, OAA, MRAIC, Senior Planner, University Planning, Design & Construction (UPDC)

Learn more:

- Why We Need Embodied Carbon Benchmarks and Targets in Building Standards and Policies: An Open Letter
- Technical: Mass Timber Through a Life Cycle Lens
- St. George Campus Climate Positive Plan

A report by the City of Toronto and Mantle Developments.

UTM Waste Ambassador Program

The University of Toronto Mississauga (UTM) Sustainability Office launched the Waste Ambassador Program this past summer (2022), a program led by passionate students to train and communicate waste sorting practices. UTM recognizes the importance of reducing its ecological footprint and strives to provide a sustainable campus experience. This program is Co-Curricular Record (CCR) approved.

Through the Waste Ambassador program, the Sustainability Office hopes to effectively communicate knowledge on waste management to students, staff, and faculty, and to ultimately change behaviour through better waste sorting on campus.

Objectives:

- Educate students, staff, and faculty on waste management
- Train passionate students to lead and educate their peers
- Increase the waste diversion rate at UTM (how much of our waste actually goes to recycling or compost vs. landfill)

Training sessions have been held and 20 students have been trained as Waste Ambassadors. During orientation week, the Waste Ambassadors participated in a shoreline cleanup hosted by UTM's Centre for Student Engagement (CSE). The ambassadors led icebreaker activities and provided education to first-year participants on proper waste sorting.

Contact: sustainability.fmp@utoronto.ca.

Waste Ambassadors participating in the Centre for Student Engagement's shoreline cleanup during Orientation Week at Erindale Park. Photo credit: UTM Sustainability Office.

UTM Waste Ambassador Program

UTM Waste Ambassadors

OBJECTIVE

Play a key role in helping to make UTM a more sustainable campus and support the Sustainability Strategic Plan through waste management efforts.

WASTE MANAGEMENT

The UTM Sustainability Office welcomes you to join the Waste Ambassadors Program to take action in increasing waste diversion rates on campus.

NO EXPERIENCE? NO PROBLEM

We will teach you how to sort waste on campus and give you the foundational knowledge to educate your peers on waste management!

VOLUNTEER OPPORTUNITY

- Attend a **mandatory** training session
- Participate in and facilitate events on campus with other waste ambassadors
- Events may include:
  - Tabling
  - Bi-weekly patrolling
  - Litter Clean Up
- Educate and engage students, faculty, and staff on waste sorting and management at events
- Check in with the lead waste ambassador weekly via group chat/email communications
- Commit a **minimum of 10 hours** for the entire school year (fall and winter semester)

DEVELOP YOUR SKILLSETS

- Gain valuable and marketable skills
- Communication
- Teamwork
- Leadership
- Waste management knowledge
- Meet new people and make new friends
- End-of-year volunteer recognition event
- CCR Recognition *(in the works)*
- Free merch!
- It's fun!

If you're interested in volunteering for the Waste Ambassador Program, send an email to **sustainability.fmp@utoronto.ca** and a staff member will get back to you shortly.

Chapter 6

Engagement & Partnerships Subcommittee

5 Years of CECCS

6) Engagement and Partnerships Subcommittee

The Engagement & Partnerships (E&P) Subcommittee is chaired by Derek Newton, Assistant Vice-President, Innovation, Partnerships and Entrepreneurship at the Innovations & Partnerships Office (IPO). Although it aims to promote U of T's local and international sustainability partnerships, it is also heavily involved in engaging members of the U of T community through the annual Adams Sustainability Celebration (section 2.2) and the CECCS involvement this year in Orientation activities on all three campuses (section 6.7).

Like the other subcommittees, E&P also saw an expansion of members with the addition of the following new members this year to ensure broad representation across the University:

- Colin Swift, Business Development Officer, Industry Partnerships, Innovations & Partnerships
- Ivette Vera-Perez, President & CEO, Canadian Hydrogen & Fuel Cell Association (CHFCA)
- Matthew Adams, Faculyt Member, Department of Geography, Geomatics & Environment, UTM
- Gwen Burrows, Assistant Vice-President, International Engagement & Impact
- Karen Chapple, Faculty Member and Director, School of Cities; Department of Geography & Planning
- Simona Chiose, Divisional Lead, Public Affairs, Government Relations Office
- Shashi Kant, Faculty Member and Director, Master of Science in Sustainability Management (MScSM); Institute for Management & Innovation; Department of Geography, UTM
- Basil Abu Sara, BASc student, Engineering Science

The continuing committee members are as follows:

- Derek Newton (Chair), Assistant Vice-President, Innovation, Partnerships & Entrepreneurship
- Christian Abizaid, Faculty Member & Acting Director, School of the Environment
- Andrew Arifuzzaman, Chief Administrative Officer, UTSC Staff
- Lisa DeMarco, Senior Partner & CEO, Resilient LLP
- Amanda Harvey-Sánchez, PhD Student, Anthropology
- Karen Shim, Communications Associate, Office of the Vice-Provost, Academic Programs
- Shannon Simpson, Director, Indigenous Initiatives

In terms of priorities, this year the Subcommittee has begun discussions on taking a more institutional approach to partnering with industry to create opportunities for students to research, pilot, and demonstrate new sustainable technologies. To that end, the subcommittee added Ivette Vera-Perez, then of Mitacs, to the Subcommittee. Ms. Vera-Perez has since become the President of the Canadian Hydrogen and Fuel Cell Association. As such, a new representative from Mitacs, which co-funds research projects with students and community or industry partners is being sought. The subcommittee also added Colin Swift, Business Development Officer, Industry Partnerships, Innovations & Partnerships and Simona Chiose, Divisional Lead, Public Affairs, Government Relations Office, to their membership this year.

The CECCS Secretariat is in the process of reaching out to divisional registrarial offices requesting enrollment data for the 93 courses captured in our 2021-22 Sustainability Community-Engaged Learning Course Inventory to better understand the extent of student engagement in Community-Engaged Learning (CEL) projects — a key priority of the CECCS. The CECCS is also in the process of updating the CEL course inventory for the year (section 3.4). In addition to the CEL courses captured in the inventory, there are also a wide range of co-curricular CEL activities offered through the University of Toronto St. George's Centre for Community Partnerships (CCP) (see Case Study 14) and similar offices at UTM and UTSC. While the CCP connects students, faculty, and staff to community partners to work collaboratively on projects, these do not include for-profit industry partners, but instead focus on grassroots nonprofit and public sector organizations. Further collaboration with CCP offices is currently being explored by the E&P Subcommittee.

> **"I think that more opportunities to engage the students around campus to introduce and encourage sustainability in their lives and studies are needed."**
>
> - Former CECCS student

Work has also continued on the international scene with UC3, the University Climate Change Coalition (section 6.2) and the U7+ Alliance of World Universities (Case Study 13). The CECCS will strengthen our international alliances with partner institutions through continued participation in important international events such as the COP27 (section 6.1).

U7+ Alliance of World Universities

The U7+ Alliance of World Universities is the first coalition of university presidents aimed at defining concrete actions universities can take to collectively address global challenges in coordination with government leaders in G7 countries and beyond. Alliance members from over 20 countries meet annually to establish a common agenda and identify key areas for collective action. Together, U7+ members take stock of their universities' unique civic and social responsibilities and pledge concrete action to address the world's most pressing challenges at local, regional, and global levels.

Since 2019, U of T has collaborated on several Principles and Actions to which it is a signatory — most notably Principle 3, which it co-champions with Université PSL and the University of Edinburgh. Under our leadership, U7+ university presidents unanimously adopted the U7+ Statement on Climate Change and Sustainability during the meeting of the presidents on October 25, 2021. By doing so, members committed to more ambitious climate action, including to develop sustainability pathways — clusters of courses and co-curricular activities, including to develop approaches to estimating, benchmarking, and ultimately addressing scope 3 emissions, such as business travel, employee commuting, waste disposal, and purchased goods and services.

U7+ Summit 2022.
Photo credit: Université Côte d'Azur.

U7+ Alliance of World Universities

U of T is also a member of the U7+ Presidential Steering Committee, where it contributes to discussions and planning related to the Alliance's membership, ongoing focus, and long-term sustainability. In 2023, it will assume leadership of the Committee and guide the vision for the Alliance over the next three years.

U of T has also worked closely with other U7+ members to establish closer engagement with G7 members and its summit, as well as a larger role in various multilateral discussions. In June 2022, the U7+ issued the U7+ Statement to the G7, which highlighted members' commitment to the fundamental values of peace, truth, democracy, academic freedom, and international cooperation. It also identified specific areas for collaboration with G7 leaders on issues of importance to this year's multilateral agenda, including sustainability, digital infrastructure, and economic stability.

As part of the strategy to deepen multilateral engagement, U of T is co-hosting a side event at the upcoming United Nations Framework Convention on Climate Change (UNFCCC) COP27 meeting in Sharm El-Sheik, Egypt in November 2022. This event will feature a group of university alliances, including the U7+ Alliance, who will demonstrate through specific examples how universities partner with a diverse set of stakeholders to co-create impactful solutions to climate change.

6.1 Participation in the United Nations Climate Change Conference

Over the last year, university networks, including the three international networks of which U of T is an active member — U7+, UC3, and International Sustainable Campus Network (ISCN) — have been meeting to discuss how universities and university networks can work together for greater collective impact on climate action. In February of this year, the CECCS Co-Chair John Robinson was invited by co-hosts of the ISCN and UK Universities Network to participate in a dialogue of university networks with Alok Sharma, the President of the 26th United Nations Climate Change Conference of the Parties (COP26). In his remarks to the group, President Sharma invited participants to consider how they can better harness the critical role of universities in society to support climate action momentum coming out of COP26.

John Robinson also shared his own thoughts on how a "network of networks" could help to achieve this and seed further activity at COP27 in Egypt.

Subsequently, the CECCS worked with the UK University Network representative, Cambridge Zero Deputy Director Stephen Davison, and key members of UC3, U7+, ISCN, and several other university networks to set up two dialogues that took place at the "All In" Pavilion at COP27 in Egypt. The discussion explored gaps and opportunities in university network programming and coordination to enhance accelerated climate action, its implementation, and what the United Nations High Level Champions refer to as "radical collaboration."

Photo credit: ISCN.

On October 26th, CECCS Secretariat Director Kristy Faccer participated in "Innovation for Climate," a preparatory workshop for Science day hosted by the High Level Champions, which explored how cross-sector partnerships on science and innovation can advance climate implementation. Kristy was involved in moderating the official UN Side Event on Solutions Day co-hosted by the U7+ highlighted in Case Study 13, which also featured representatives from the UC3, Worldwide Universities Network (WUN), and the Italian University Network for Sustainable Development (RUS). Both events were attended by a wide range of participants and delegates to COP27, including businesses, diplomats, universities, civil society organizations, and youth.

6.2 University Climate Change Coalition (UC3)

On June 23rd and 24th, U of T joined university leaders from Canada, the United States, and Mexico at the University of British Columbia (UBC) as part of the UC3's first in-person summit since the beginning of the pandemic.

During the meeting, CECCS Director Kristy Faccer joined steering committee members in discussing how best to deliver on the goals of the UC3 Strategic Plan while U of T postdoc and University Climate Action Network (UCAN) Fellow Kim Slater shared updates (see Appendix 11) from the University Climate Action Project (UCAP) collaboration with the City of Toronto.

Photo credit: Geoff Lister, UBC.

Kim also met with her UCAN Fellow counterparts and discussed successes, challenges, and opportunities to expand the fellow network.

6.3 International Sustainable Campus Network (ISCN)

Earlier this year, the University of Toronto became a member of the International Sustainable Campus Network (ISCN), which provides an international forum to support higher education institutions exchange information, ideas, and best practices for achieving sustainable campus operations and integrating sustainability in research and teaching. The ISCN provides global reach but also supports connectivity between institutions on areas of mutual interest, including around university climate action, convening at UN climate change conferences, and on city/university collaborations. The ISCN has also made an important investment in increasing membership and engagement with universities in the Global South, including through a new chapter of the ISCN in Latin America. There are currently 91 member universities in 30 countries and the ISCN is headquartered at EPF Lausanne.

Shortly after joining ISCN, U of T's Climate Positive Campus plan was featured in the March 2022 edition of their newsletter and from June 7-10, the ISCN hosted their 15th annual conference online, which included the following recorded sessions:

- Sustainability in Higher Education: An Agenda for Transformational Change: A Manifesto for Change and 'Third-way' People
- Radical Reforms for the Campus of the Future
- Visualizing Societal Impact: Research and Education Dashboards of the Sustainable Development Goals
- Accelerating Sustainability in Higher Education: Perspectives and Experiences from Latin American Universities
- How to Report the Transformation in Higher Education for Global Sustainability
- Embedding Climate Change Education within Higher Education Institutions

> **I frequently use the communication and research skills that I refined during my time with CECCS in community involvement, my studies, and my work outside of academia.**
>
> - Former CECCS student

6.4 THE Impact and QS Sustainability Rankings

This year U of T once again participated in the Times Higher Education (THE) Impact Rankings. THE has been known for its World University Rankings, as well as subject-specific rankings, reputation, teaching, and regional rankings. THE is a UK magazine that launched their University Impact Ranking in 2018, publishing their inaugural ranking in 2019.

THE Impact Ranking aims to assess the impact that universities have outside of their teaching and research missions by measuring universities' performance against the SDGs, creating an overall rank by combining the best performing three SDGs for each university plus SDG 17 as a mandatory submission. More than 1,400 universities participated in the 2022 ranking (up from 1,200 the previous year), including many universities that are not ranked in THE's World University Rankings.

Although U of T ranked 28th in 2020 (6th in Canada) and 34th in 2021 (4th in Canada), in 2022 we disappointedly fell to 90th in the world (15th in Canada). This drop was due to a number of different factors, including more institutions participating and providing better evidence, and changes to methodology.

U of T was not alone in seeing a significant change to our ranking this year. THE Impact Rankings provide the opportunity for smaller and more specialized institutions to perform better on sustainability measures than the larger institutions that tend to be rewarded in rankings such as THE World University Rankings, which are more reflective of specialization and investment in research and teaching. The Office of the Vice-President, Research and Innovation (OVPRI) coordinates the University's submission for THE Impact Rankings with contributions from other portfolios such as the tri-campus Sustainability Offices, the CECCS, and the Institutional Research and Data Governance team. Our 2022 submission was 45 pages and included 400 different quantitative data elements about student and staff demographics, operations, and finances, which is combined with information about the University's policies and activities related to the SDGs.

The CECCS will continue to work with the OVPRI to review data, to contribute the information that is used as evidence for some of the statistics, and to support improvements to our submission on an annual basis.

6.5 Community-Engaged Learning Work — Sustainability in the World: A Living Lab Course

One example of Community-Engaged Learning (CEL) opportunities made available to students this year came through Professor John Robinson's GLA2029: Sustainability in the World: A Living Lab Course (see also section 3.2.2 re: Urban Climate Action Network). In this Munk School of Global Affairs course, 56 graduate students worked on projects proposed by staff and managers from the City of Toronto and The Atmospheric Fund, a regional climate agency that supports low-carbon solutions across the Greater Toronto and Hamilton areas. These projects reflect real challenges the city faces in meeting their ambitious climate targets and ranged from the equity considerations of building retrofits to communicating and inspiring climate action from Toronto citizens. At the end of the course in April, students presented their work to their clients outlining their analysis and recommendations and received feedback on opportunities for project findings to inform future municipal activities on climate. The student projects have all been uploaded to the CECCS CEL/CLL Project Database and can be accessed by clicking on the adjacent project titles.

- Understanding the social equity implications of decarbonization in existing buildings
- Neighbourhood and community-led solutions to building retrofitting
- Innovative programs for driving emission reductions in existing buildings
- Understanding the qualitative and quantitative benefits of the city's PollinateTO community grants program
- Investigating incentives and disincentives in the transition to zero-emission vehicles in Toronto
- Scaling and delivering climate solutions
- Climate change communication
- Integrating climate considerations into procurement
- Zero emissions construction product and knowledge gaps
- Integration of climate in asset management processes
- Jurisdictional scan of retrofit initiatives
- Indoor health co-benefit of building retrofit projects

The course and final presentations were covered by U of T News in this article written by Rahul Kalvapalle: Students Contribute to City of Toronto climate action projects through U of T 'Living Lab' course.

Rahul also captured reflections from the project 'clients' from the City of Toronto:

> **"It was a pleasure to work with the students — they asked insightful questions and their work was high quality. The students' report is a very helpful resource as we consider ways that the City can help support the transition to low carbon transportation."**
>
> Deborah Herbert, client for group 5.

> **"The contents of the final report are a valuable resource that the City can integrate into the implementation of the Net Zero Existing Buildings Strategy. Their recommendation on the creation of a tenant advocacy board, in particular, drew our attention since it is a concept we haven't explored yet."**
>
> Ana Maria Medina, client for group 1.

> **"What's been great about the course is the process for co-creating the research questions, defining, and refining them with John and the students. I know I find the process very rewarding, the outputs are impressive and I believe the students really benefit from the experience of addressing real-world challenges."**
>
> Steward Dutfield, Senior Manager, Environment and Energy Division, City of Toronto.

GLA2029 students. Photo credit: Geoffrey Vendeville.

Above: Sarah Klein, Tingwei Lyu, Luca Dannetta, Anna Lazaris, and Arnaud Nsamirizi.

Right: Hilda-Matilda Idegwu, Jessica Armstrong, and Sofia Padernal.

Elsewhere in the University, efforts are underway to support and encourage faculty interested in integrating CEL into their courses, for example through the Faculty of Arts & Science Experiential Learning Faculty Fellows Program. Through this pilot funded through the Provost's Experiential Learning University Fund, faculty are supported in creating a new experiential learning (EL) course, or in integrating EL components into an existing course. Incentives include $3,000 a year for three years for course resource development and delivery, nd faculty professional development.

Other incentives include honoraria for partners, plus the option of either a 0.5 full-course equivalent (FCE) teaching release or $5,500 for administrative support in course development (e.g., hiring an RA). Applications will open in February 2023 for the 2023-24 cohort of Faculty Fellows. Further details can be found at Experiential Learning Faculty Fellows Program, Faculty of Arts & Science.

Programs such as this will be critical in maximizing the opportunities for students to be engaged in CEL projects and courses.

Centre for Community Partnerships (CCP)

The Centre for Community Partnerships (CCP) collaborates with community partners, students, faculty, and staff to advance community-engaged learning (CEL) and research (CEL/R) at the University of Toronto through building community, enhancing capacity, and learning together.

At the CCP, we work in three priority areas:

- Knowledge, experience, and resources: As a "centre of excellence," we gather and share knowledges, experiences, wise practices, and resources.
- Connection and collaboration: We bring people together for shared learning and reciprocal partnerships.
- Community-Engaged Learning and Research Initiatives: We co-create and co-deliver meaningful CEL/R initiatives for students with our community partners.

The CCP connects University of Toronto students, faculty, and staff with community partners to address sustainability issues that directly impact local communities, such as food insecurity, climate change, poverty, and systemic inequalities. Through co-curricular programs like Alternative Reading Week (ARW) and Community Action Projects (CAPs), and the CEL Doctoral Seminar, the CCP offers students opportunities to work with community partners and contribute to positive social change.

The CCP's CEL Doctoral Seminar, for example, brings together PhD students from across the University to discuss CEL and other forms of community-university engagement. In seven monthly seminars throughout the academic year, students review CEL literature, discuss their experiences in the field, undertake reflective exercises, and benefit from professional development activities related to CEL. In addition to monthly meetings, a key component of the Doctoral Seminar involves a collaborative project with fellow seminar participants and a community partner.

CCP Alternative Reading Week, Albans Boys and Girls Club Black History month project 2019-20. Please note the image was taken pre pandemic, which is why participants are unmasked.

Centre for Community Partnerships (CCP)

During the 2021-22 Doctoral Seminar, several of the collaborative projects focused on assessing the effectiveness of existing community programs, such as the Immigrant Women Integration Program (IWP) organized by the Toronto Centre of Learning & Development (TCLD) and the adult literacy programs offered by Frontier College. One project paired doctoral students with the Kensington Health Research Institute (KHRI) to conduct literature reviews and focus groups that would evaluate the quality of service and clinical health equity of the population in their hospice care. Another group of doctoral students worked with FoodShare Toronto to research the viability of a community land trust model aimed at acquiring land for retail grocery operations under community control. This project was informed by FoodShare's interest in combating gentrification in areas of the city where small, independent Black, Indigenous, and People of Colour (BIPOC) grocers have been losing their buildings. As a result of these CEL projects, doctoral students were able to learn about the impacts of social inequity, while sharing their research skills to help community partners improve their evaluation methods, strengthen community programs, and produce more effective reports on program impact.

Find out more about learning opportunities for students with the CCP, or email info.ccp@utoronto.ca.

Other CEL resources, including instructional modules, tip sheets, and a range of support services, can be accessed through the University of Toronto's Experiential Learning Hub.

UTSC Living-Learning Community (LLC)

The Living-Learning Community (LLC) program at the University of Toronto Scarborough (UTSC) connects first-year students living together in residence to build a thriving community around a common interest. Students have the opportunity to learn beyond the classroom and bring diverse academic and lived experiences to critical conversations about topics that affect their daily lives.

At UTSC, there are three Living-Learning Communities: Global Citizenship, Health & Wellbeing, and Sustainability. Each community runs thematic events, programs, and initiatives intended to ignite discussions to learn and grow from global and local challenges.

Everything is connected to sustainability and everyone can work toward creating lasting and effective change. The Sustainability LLC is interdisciplinary and focuses on core concepts that provide a starting point for students to learn about how they are connected to sustainability issues. The workshops held throughout the academic year will delve deeper into themes such as climate change, Indigenous stewardship, plastic pollution, and civic action through thought-provoking sessions with critical discussions and educational activities. During these workshops, members of this LLC will connect what they are learning in the classroom to their own lives, think critically about their daily habits, learn how to hold governments and organizations accountable, and actively engage in conversations about how they can incorporate actionable measures for positive change.

The goals of the Sustainability LLC are to build a community of students with a foundation of sustainability knowledge, foster a culture of sustainability conversations and actions in residence, and ignite a passion for sustainability that students want to continue to explore further.

Students who actively participate in the LLC program will receive a Co-Curricular Record credit and also find a sense of belonging, feel connected at UTSC, and work towards achieving their academic goals.

Contact: residence.utsc@utoronto.ca.

Arts & Science Internship Program (ASIP) Sustainability Skill-Building Course (PDC320)

Sustainable Development module in the PDC320 course.

In the fall of 2022, the Faculty of Arts and Science launched a new skill-building course, prominently featuring sustainability and the United Nations Sustainable Development Goals (UN SDGs), for students in the Arts & Science Internship Program (ASIP) stream of their studies.

ASIP is in its second year and supports students from 20 academic programs, including the humanities, life sciences, and computer science, in their professional and career development. Students complete professional development courses to better understand the labour market and their own career journeys.

The new skill-building course, PDC320, introduces students to the concept of sustainability and challenges them to consider sustainability in the workplace, in the labour market, and in their own lived experiences. To develop strong links with the labour market, students explore environmental, social, and governance criteria and corporate social responsibility initiatives, as well as case studies that demonstrate how different organizations operationalize the SDGs in their unique industries and environments. Links are made between sustainability actions and students' specific disciplines to highlight the relevance of these issues to the workplace and to their own career prospects.

Arts & Science Internship Program (ASIP) Sustainability Skill-Building Course (PDC320)

Throughout the course, students work in teams to attempt to resolve an overarching challenge: "How does automation impact, challenge, or advance the UN SDGs?" In pursuit of addressing this challenge, students complete assignments across a series of modules to enhance and develop in-demand transferrable skills, including design thinking, universal design, project management, and workplace communication. At the conclusion of the course, students will be invited to pitch their sustainability ideas in friendly competition to our industry partner for awards and prizes.

This project is funded through eCampusOntario's Virtual Learning Strategy and features contributions from U of T faculty, the CECCS, external partners, current ASIP students, and ASIP staff and educators. The course, and each module therein, will be available as an open education resource in 2023 that can be accessed and adapted by educators across Canada.

Contact: asip@utoronto.ca.

Associate Professor Paolo Granata in a video on the SDGs.

The CECCS will continue to work with the OVPRI to review data, to contribute the information that is used as evidence for some of the statistics, and to support improvements to our submission on an annual basis. U of T, through Simon Pratt, Director of Research Strategy and Excellence, is also one of 10 institutions globally to be represented on THE Impact Rankings advisory board and is engaged in discussions relating to reducing year to year volatility in the rankings.

2022 also marked the first time that QS World University Rankings released a Sustainability ranking. In this one, U of T ranked second in the world and first in Canada. QS also featured an interview with CECCS Director Kristy Faccer in the 2023 Sustainability Rankings Higher Ed Report 'WE Can. We Must.' released in tandem with the rankings on October 26th this year.

The QS methodology currently emphasizes research publication counts related to the SDGs (produced by Elsevier) and reputation measures, areas where U of T is particularly strong. Unlike THE Impact Rankings, the QS Sustainability ranking does not require universities to opt-in and includes all universities from the QS World University Rankings, excluding some smaller institutions that do not meet the publication threshold.

The QS Sustainability ranking uses institution specific and national level data and is based on 37 indicators split into two categories: Environmental Impact and Society Impact. Further details on the QS Sustainability methodology can be found here. See also the U of T News Article: U of T ranked 2nd in the world in first-ever QS sustainability ranking.

> **Because we were able to work so closely with staff all over the university (and other universities), I started feeling that these 'busier' people could actually need or be interested in what I could propose.**
>
> **A lot of our work at the CECCS relied on building capacity in other parts of the university, and creating projects and programs for others to lead. This was an important lesson in leadership for me. I am definitely keeping that in mind as I reach out to people to try to create projects.**
>
> - Former CECCS student

6.6 Sustainable Buildings Canada 2022 Better Buildings Boot Camp

Sustainable Buildings Canada (SBC) successfully hosted the third annual Better Buildings Boot Camp (BBBC) from August 22 to 26, 2022. The camp was held online through the PheedLoop virtual platform. The week-long virtual event featured 21 live interactive plenary sessions facilitated by a group of leading academic experts (including CECCS Co-Chair Prof. John Robinson) and industry professionals. This year's Boot Camp project was the re-imagining of the St. Lawrence Center for the Arts (STLC), an iconic city building in downtown built to commemorate the 1967 Canadian Centennial.

Topics discussed included retrofits that would achieve high performance goals, indoor environmental quality, opaque and transparent building assemblies, mechanical systems, and lighting design. Sessions with a more specialized focus were also held on accessibility, designing for people, embodied carbon, and life cycle assessment. Each day of the week was organized around a specific theme:

- Monday — Goals
- Tuesday — Tools
- Wednesday — Humans
- Thursday — The Professional Integrated Design Workshop
- Friday — Overcoming Obstacles

There are several useful outcomes for the students who participated, including a holistic understanding and practical hands-on experience with integrated sustainable designs; opportunities to learn from academic experts, government policymakers, industry professionals, and fellow students; and knowledge about how different disciplines can be combined in the integrated design process. Students from 18 institutions and over ten diverse disciplines attended the 2022 Boot Camp. During the professional integrated design workshop, subject matter experts offered their recommendations to the proponent teams. The Boot Camp further encouraged students to directly engage with presenters through a Q&A session, coffee breaks, and a gamification system where students earned points that can be redeemed for prizes.

As the STLC is a performing arts center, attempts were made to further expand the audience beyond traditional architecture/engineering/construction attendees to include students in the arts, humanities, and business disciplines. Six students this year presented during the Friday Shift and Share session.

This gave students an opportunity to speak on topics of interest and what they are knowledgeable in. Enbridge provided incentives by providing three $1,000 student awards.

After the bootcamp concluded, the feedback provided indicated high levels of satisfaction among those who participated. Specifically, attendees noted that interactions with other students from different institutions and disciplines, and with industry professionals, were the most valuable component of the Boot Camp.

See the 2022 Better Buildings Boot Camp final report. See also Appendix 9 for the full 2022 BBBC program.

6.7 Student Engagement at Orientation 2022

The CECCS, the tri-campus Sustainability Office staff, and work-study students had a lot of fun engaging with students during Orientation (also known as Club Days) on each campus over the month of September.

In addition to sharing information with students about CECCS initiatives such as our Sustainability Pathways (section 3.1.2) and the Adams Sustainability Celebration (section 2.2), we asked students to consider making a sustainability pledge and outline what they will do over the next year to become Sustainable Change Agents for the chance to win some great prizes.

Photo credit: Kristy Faccer.

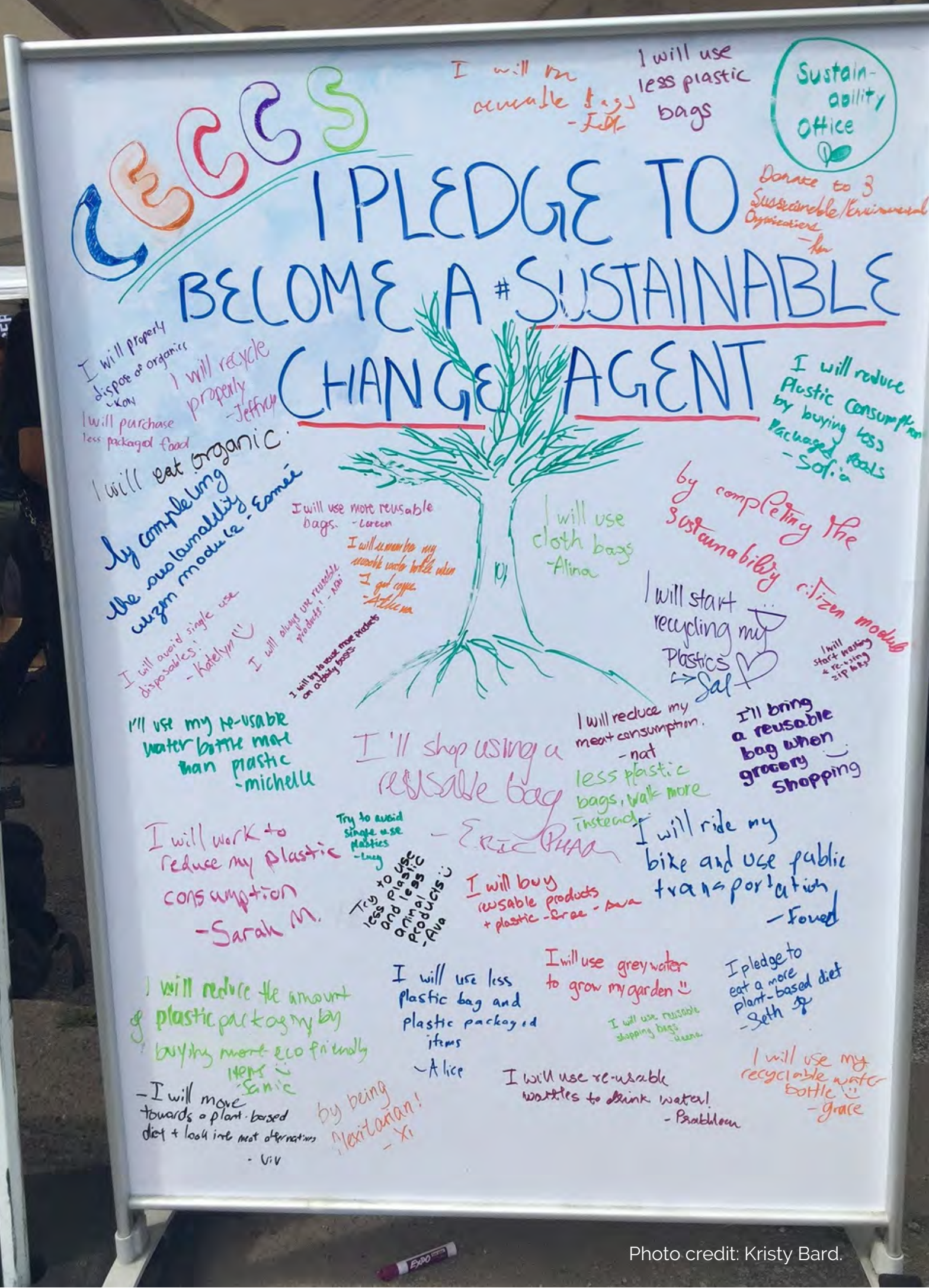


Photo credit: Kristy Bard.

Sustainability Coordinators at the 3 campuses (left to right): Samantha Dilorio (UTM), Kayla LaChance (UTSG), and Nadine Leone (UTSC).
Photo credit: UTM Sustainability Office.

UTM Orientation week.
Photo credit: UTM Sustainability Office.

UTSC Orientation week.
Photo credit: Conchita Ferrao

Many students posed for photos and scanned a QR code that took them to our Orientation 2022 web page detailing a number of ways they can advance sustainability on campus by engaging with CECCS initiatives.

In total, we had 191 students from all three campuses participate in our #SustainableChangeAgent pledge activity. Many of these students also signed up to the CECCS monthly newsletter to receive updates on our activities (see also section 2.4). In addition, CECCS collaborated with the UTSG Sustainability Office on two social media prize giveaways during the month of September, resulting in significant increases in our social media audience on Instagram (section 2.4).

You can view the Jamboards resulting from our pledge activities at the below links:

- UTSG: I pledge to be a Sustainable Change Agent by...
- UTM: I pledge to be a Sustainable Change Agent by...
- UTSC I pledge to be a Sustainable Change Agent by...

See also our Instagram post on Orientation 2022.

6.8 Student Group Inventory

The 2021 Student Group Inventory included 242 student groups across the University's three campuses and affiliated colleges that focus on topics related to the UN SDGs. As we reported last year, this represents roughly 30% of the 800 student groups that existed when the inventory was completed, and was an increase of 250% over two years from when the CECCS completed the first student group inventory in 2018-19. Due to ongoing attention to update our SDG keywords for all inventories beginning with the Course inventory (section 3.3) and the need to adapt our method to the new Student Organization Portal, the 2022 update is still underway.

Our expectation is that the updated inventory will be completed by the end of 2022, and we will continue to support students interested in getting more involved in sustainability co-curricular activities and student groups on campus. This update will also be integrated into our Sustainability Citizen Program (see section 3.1) and once complete, will replace the 2021 version on our website.

Sustainable Engineers Association (SEA) Student-Led Initiatives

The Sustainable Engineers Association (SEA) is fueled by the drive to increase interest and awareness about sustainability. The association aims to equip students with the tools and knowledge to carry out change and development in the realm of sustainability.

We strive to define sustainability as planning our usage of resources in order to meet our future environmental, social, and economical needs. With this in mind, SEA's mission is to empower students and professionals with knowledge, passion, and experience within the domain of sustainable development. SEA acts as a platform to connect individuals on both an academic and industry-wide level.

Our events allow us to educate students on the technical aspects of sustainable design, provide support for students to develop their own visions and interest in sustainability, and create a platform for networking with industry professionals.

One of our largest events is the Annual Sustainability Conference. In January 2022, the theme of the conference was "Sustainable Technology: Building a Better Tomorrow." This theme gave attendees the opportunity to learn about different careers in sustainability as they explored how recent advancements in technology can be used to create a more sustainable world through topics including renewables, policy, and clean tech.

Our 10 speakers were Frances Edmonds, Lorne Mlotek, Marc Couture, Marianne Hatzopoulou, Phil Mckay, Ahmed Mahmoud, Nik Schruder, Ahmed El Ganzouri, David Boroto, and Amee Sandhu.

SEA student leaders of 2020.
Photo credit: Daniel Hosseini.

Sustainable Engineers Association (SEA) Student-Led Initiatives

More than 200 students, young professionals, entrepreneurs, and leaders attended the conference.

The conference was followed by an Annual Mentorship Program, which aims to connect students to industry and academic professionals working in sustainability. The 2022 Mentorship Program successfully paired 56 students with mentors in sustainability, and hosted four workshops on the topics of why businesses care about sustainability today, experiences of industry professionals working in sustainability, careers in sustainability, and climate risk management.

Through this program, we have been able to reach many students in the U of T community and provide them with opportunities to learn more about careers in sustainability and aspects of sustainability that may be less common, furthering SEA's mission and contributing to the community.

Another major annual event is the SEAHacks. In this design competition, SEA promoted innovative designs that serve practical purposes. The theme of 2022 SEAHacks was transportation, and during SEAHacks 2022, students explored and discussed sustainable designs to make the transportation sector more sustainable.

The event provided a collaborative space to 30 students, forming eight design groups, to discuss what sustainability looks like in the transportation sector.

For the upcoming year, SEA plans to continue these initiatives, in addition to working with course instructors at the University of Toronto to integrate sustainability and Sustainable Development Goals (SDG) principles into the curriculum. Our goal for the upcoming year is to engage with at least five alumni through the Sustainability Mentorship Program, Annual Sustainability Conference, and Annual Hackathon. The team also plans to continue engaging with CECCS through its various sustainability initiatives and programs.

Contact: Yazan Zamel, Co-President, SEA.

Yazan Zamel speaks at an SEA event. Photo credit: Daniel Hosseini.

Earth System Governance Conference

From October 21 23, the Environmental Governance Lab at the University of Toronto cohosted, with the University of Waterloo, the latest conference of the Earth System Governance Project. The conference welcomed almost 300 scholars and students to the St. George campus (with more participating online) to discuss the challenges and ways forward with efforts to accelerate the social, political, and technological shift towards more fundamentally sustainable and inclusive social ecological systems, societies and polities.

The conference was kicked off by an inspiring keynote address from activist Tzeporah Berman (International Program Director for Stand.Earth), that included a call for support for an increasingly visible Fossil Fuel Non Proliferation Treaty. With more than 100 panels on wide ranging issues from biodiversity loss, to climate change, to the SDGs, and more, this interdisciplinary community shared cutting edge research, worked together on innovative research and communication methods, and grappled with the imperatives and challenges of engaged, action oriented scholarship. The conference closed with a plenary panel composed of scholars and practitioners who shared thoughts on how the academic and practitioner communities can benefit from working more closely together and provide momentum for addressing the current sustainability crises.

.

The 2022 Toronto Conference stood in a long tradition of global conferences organized by The Earth System Governance Project, a longstanding global research alliance that seeks to mobilise research at the interface of global environmental change and governance, across local to global scales. The conferences [Amsterdam (2007 and 2009), Colorado (2011), Lund (2012 and 2017), Tokyo (2013), Norwich (2014), Canberra (2015), Nairobi (2016), Utrecht (2018), Mexico (2019) and Bratislava (2021)] are organized around the earth system governance research agenda (as captured in the Earth System Governance 2018 Science and Implementation Plan).

The 2022 Toronto Conference was able to welcome scholars and students from all over the world at the U of T to delve into fundamental questions of sustainability and justice with the help of many generous sponsors. These included U of T sponsors (the Environmental Governance Lab, The Munk School of Global Affairs and Public Policy, the School of the Environment, and the office of the Vice President International), University of Waterloo sponsors (the TRANSFORM project, and the Interdisciplinary Centre on Climate Change) and a host of others (the Social Science and Humanities Research Council, Utrecht University, MIT Press, Earth Systems Governance journal, Universidad Autónoma de México, Sussex University, The Earth Politics Institute at Science Po, and the Transition Accelerator.)

Climate Economy Strategic Council

Current efforts of organizations in the public and private sectors to reduce their greenhouse gas (GHG) emissions will be insufficient to meet Canada's net-zero by 2050 target. Instead, new technologies will be required that respond to the entire range of opportunities to impact climate change, including renewable energy generation and storage, electric vehicles and transportation networks, and heating and cooling technologies such as geothermal systems.

Indeed, according to the International Energy Agency, half of the emissions reductions required to reach net zero are yet to be invented.

Canada's leading companies and institutions can play a significant role in supporting clean-tech startups to be part of the solution. By deploying the power of procurement, developing financing and partnership models that reward long-term horizons and investing in training, organizations can increase their competitiveness and support the green economy.

The University of Toronto is playing a significant role in each of these areas. U of T is a powerhouse of research and commercialization in sustainability, with approximately $500 million in funding for clean-tech research, more than $292 million raised by clean-tech startups in the past decade and an interdisciplinary approach to addressing climate change through the Climate Positive Energy Initiative.

Through the Climate Economy Strategic Council, convened by the Toronto Region Board of Trade and MaRS, the University is now sharing its actions with top organizational leaders in the Greater Toronto Area (GTA).

U of T President Meric Gertler participates in the Council, among other public and corporate sector CEOs in the region with expert insights on climate action, financial markets, and clean-tech commercialization. Lisa DeMarco, a CECCS member and Senior Partner and CEO of Resilient LLP, is also a participant in the group. Other industries represented include power generation, Canada's largest public pension funds, and large public infrastructure such as airports, banking and government.

The Council's objectives include:

- Positioning climate innovators and the region as global leaders in the climate transition
- Developing a roadmap to drive the adoption of new technology
- Monitoring and tapping into financial incentives to deploy clean-tech and
- Demonstrating the potential of collaboration between innovators and industry leaders.

Climate Economy Strategic Council

Photo credit: David Lee.

As a hub of clean-tech research and innovation as well as one of the top GHG emitters in the GTA, the University of Toronto is uniquely positioned to demonstrate the impact a large public-sector organization can make when it is committed to sustainability. The Low Emissions Accelerator Project (Project LEAP) is being championed by the Strategic Council as a lighthouse project.

LEAP will reduce 50% of U of T's current scope 1 and scope 2 emissions through measures that include modernization of the energy system, deep energy retrofits and implementation of energy storage technology.

LEAP will be an aggregator of clean-tech solutions sourced from emerging and visionary companies, with technology to be integrated throughout the University's infrastructure. And through a novel financing mechanism, Project LEAP is being supported with $56 million in financing by the Canada Infrastructure Bank (see also Case Study 6), the first university in Canada to receive CIB support and a model of how public investment can accelerate adoption and scale-up of clean technology.

CONTACT

ceccs@utoronto.ca

sustainability.utoronto.ca/ceccs-home/

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Toronto, ON M5T 1W7

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Appendix 1: Call for Nominations 2022

Call for Nominations — Committee on the Environment, Climate Change, and Sustainability (PDAD&C [Principals, Deans, Academic Directors, and Chairs Committee] memo #10)

From: Meric Gertler, President
Date: October 7, 2022
Re: Call for Nominations — Committee on the Environment, Climate Change, and Sustainability (PDAD&C #10)

Background

The President's Advisory Committee on the Environment, Climate Change, and Sustainability (CECCS) was created in 2017, with the goals of making sustainability a key component of the University of Toronto identity, achieving international leadership in the integration of operational and academic sustainability, and coordinating sustainability activities across the three campuses. Since then, the Committee has extended its reach and impact across new cross cutting themes and subcommittees and supported the work of sustainability leaders across and beyond the university. In light of the university's commitment to sustainability and increasing urgency of the climate crisis, the Committee's work to accelerate our action on the sustainable development goals is more crucial than ever.

Call for Nominations — Committee on the Environment, Climate Change, and Sustainability

I am seeking nominations for the following CECCS positions for a one-year term, ending December 2023:

One member of the undergraduate student community (full or part-time)

One faculty member (divisional appointment St. George Campus)

Members of the University community are invited to submit nominations or expressions of interest to serve on the CECCS by October 31, 2022. You may submit nominations on your own behalf or nominate another individual. The submission should demonstrate knowledge of U of T's sustainability efforts, express an interest in the field, and include a brief CV/résumé.

Additional information on the Committee and its work may be found in the Terms of Reference, included below.

Submissions or inquiries should be addressed to:

Kristy Faccer, Director, Secretariat
Committee on the Environment, Climate Change, and Sustainability
k.faccer@utoronto.ca

Terms of Reference
University of Toronto
Committee on the Environment, Climate Change, and Sustainability

Mandate and Context
In February 2017, the CECCS was created with a mandate 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.

Over the five years of operation, the CECCS has developed a footprint at the university by helping to develop and embed a wide range of impactful initiatives, relationships, and outcomes at the university and elsewhere that contribute to the ultimate vision of a transformed, sustainable, and a just future for all.

To deliver on this aim, the CECCS committees and Secretariat employ a range of strategies that promote the integration of operational and academic approaches to sustainability, develop partnerships on sustainability issues with the various communities internal and external to U of T, and create meaningful sustainability curriculum and leadership opportunities available to all students. Across the activities of these subcommittees, CECCS identifies, facilitates, supports, enables, and promotes sustainability initiatives across all three campuses by leveraging individual campus identities, fostering a sense of common purpose, and bringing together existing sustainability networks and connections at U of T and in the community.

The overall goals of CECCS are the following:

- Sustainability as key component of U of T identity
- Local and international leadership in operational and academic sustainability
- Recognition, sharing and aggregation of good sustainability practices across the university

Since 2021, the organizing framework for the CECCS has included the following components:

2 Overarching Principles

- Regenerative Sustainability which looks for net positive ways to increase both human and environmental wellbeing, instead of simply focusing on reducing environmental damage
- Integration of Operational and Academic Sustainability which looks at ways to combine research, teaching, partnerships and operations

3 Cross-Cutting Themes

- Campus as living lab which brings together faculty members, students, staff, and, external partners to collaborate on developing sustainability projects that contribute to both operational and academic outcomes
- University as Agent of Change which supports 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
- United Nations Sustainable Development Goals (SDGs) which CECCS uses to orient our understanding of the many dimensions of sustainability across the campus, in keeping withs its conception of regenerative sustainability as including both environmental and human well being

4 Subcommittees

- Teaching and Learning
- Research
- Operations
- Engagement and Partnerships

Membership

The CECCS is co-chaired by Professor John Robinson, Presidential Advisor on the Environment, Climate Change, and Sustainability, and Ron Saporta, Chief Operating Officer, Property Services & Sustainability. The members include:

- Academic leaders and scholars in relevant fields from across the University's three campuses and multi- and single-departmental Faculties

- Individuals from each of the following constituencies — teaching staff, non-teaching staff, undergraduate students, graduate students, and alumni; and
- Three individual members designated by the Vice-President and Provost; the Vice-President, Research and Innovation, and Strategic Initiatives; and the Vice-President, Operations and Real Estate Partnerships

All members will serve on at least one subcommittee.

Operation

When the Committee reaches a consensus on any matter on its agenda in deliberation with members, it may make recommendations to the President and the relevant Vice-Presidents.

The full Committee and the four Subcommittees normally meet at least once per semester.

The Secretariat provides administrative support to the Committee and subcommittees.

The current CECCS term is up for review at the end of 2023.

Annual Report

The Committee submits an annual report to the President, describing its activities over the previous year and the progress of the University in implementing the commitments. View the CECCS Annual Report 2021 (PDF).

Appendix 2: CECCS Membership

Co-Chairs

John Robinson, Professor, Presidential Advisor on the Environment, Climate Change, and Sustainability.

Ron Saporta, Chief Operating Officer, Property Services and Sustainability.

Faculty Members

Aimy Bazylak, Associate Professor, Faculty of Applied Science and Engineering (FASE).

Tenley Conway, Professor, Department of Geography, Geomatics and Environment, University of Toronto Mississauga (UTM).

Steve Easterbrook, Professor and Director, School of the Environment.

Hilary Inwood, Lecturer, Ontario Institute for Studies in Education (OISE).

Nicole Klenk, Associate Professor, Department of Physical and Environmental Sciences, University of Toronto Scarborough (UTSC).

Jan Mahrt-Smith, Associate Professor, Rotman School of Management.

Liat Margolis, Professor, Associate Dean, Research, and Director, Green Roof Innovation Testing Laboratory, Faculty of Architecture, Landscape, and Design (FALD) .

Fiona Miller, Professor and Chair in Health Management Strategies, Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health.

Romila Verma, Lecturer, School of the Environment and Department of Geography.

Staff

Andrew Arifuzzaman, Chief Administrative Officer, UTSC

Deborah Brown, Chief Administrative Officer, UTM.

Christine Burke, Assistant Vice-President, University Planning, Design and Construction, Office of the Vice-President (VP), Operations and Real Estate Partnerships; VP, Operations and Real Estate Partnerships Liaison.

Marc Couture, Director, Sustainability and Energy Management.

Daniella Mallinick, Director, Academic Programs, Planning and Quality Assurance, Office of the Vice-Provost, Academic Programs; VP and Provost Liaison.

Kim McLean, Chief Administrative Officer, Faculty of Arts and Science.

Derek Newton, Assistant Vice-President, Innovation, Partnerships and Entrepreneurship; VP Research and Innovation Liaison.

Karen Shim, Communications Associate, Office of the Vice-Provost, Academic Programs.

Shannon Simpson, Director, Indigenous Initiatives.

Alumni

Lisa DeMarco, Senior Partner and Chief Executive Officer, Resilient LLP.

Students

Alexandria Gill, Undergraduate Student, Political Science and Public Policy, University of Toronto Scarborough.

Amanda Harvey-Sánchez, PhD Candidate, Anthropology.

Emeritus Members

Conor Anderson, PhD candidate, UTSC.

Shamaila Bajwah, Undergraduate student, FAS.

Maria Banda, Graham Fellow, Faculty of Law (alumni representative).

Ken Corts, Professor and Vice-Dean, Faculty and Research, Rotman School of Management.

Gilbert Delgado, Chief, University Planning, Design and Construction, Office of the Vice-President, Operations and Real Estate Partnerships.

Aviatar Inbar, Graduate Student, Master of Science in Sustainability Management Program, UTM.

Shashi Kant, Professor and Director, Master of Science in Sustainability Management Program, UTM.

Bryan Karney, Professor and Associate Dean, Cross-Disciplinary Programs, FASE.

James MacLellan, Assistant Professor and Program Director, Environmental Studies, Department of Physical and Environmental Sciences, UTSC.

Jennifer Murphy, Professor and Associate Chair, Graduate Studies, Department of Chemistry, FAS.

Tim Lang, Manager, Sustainability Office, UTSC.

Andy Macdonald, Director of Facilities, Faculty of Kinesiology and Physical Education.

Ron Swail, Chief Operations Officer, Property Services and Sustainability.

Jason Hinde, Undergraduate student, FAS.

Locke Rowe, Professor; Vice-Provost, Graduate Research and Education and Dean, School of Graduate Studies.

Kim Strong, Professor and Director, School of the Environment.

Appendix 3: CECCS Meetings 2021-2022

Committee on the Environment, Climate Change, and Sustainability

- February 24, 2022
- May 27, 2022
- September 14, 2022

Teaching and Learning Subcommittee

- December 3, 2021
- March 9, 2022
- April 13, 2022
- June 16, 2022

Operations Subcommittee

- February 16, 2022

Research Subcommittee

- April 25, 2022

Engagement and Partnerships Subcommittee

- February 11, 2022
- July 6, 2022

Appendix 4: University of Toronto Communications Report

Introduction

Since July 2021, University of Toronto Communications (UTC) delivered communications support on a wide range of environment, climate change and sustainability initiatives at the University of Toronto. In partnership with the President's Advisory Committee on the Environment, Climate Change, and Sustainability (CECCS), the Sustainability Offices and stakeholders across the three campuses, UTC leveraged its owned, earned, and social channels to showcase U of T's actions to address climate change, and through this integrated approach, position the University as an international leader in sustainability and climate action among post-secondary institutions.

Communications Plans

The communications strategy and planning team developed a communications plan in support of a vast array of institutional initiatives including Project LEAP, Climate Positive Campus, the Climate Positive Energy Initiative, the Adams Sustainability Celebration, and the Campus as a Living Lab program, and provided ongoing communications guidance and issues briefs for a variety of topics.

Owned Media

During this period, U of T News published **99 stories** (see Appendix 4.A), generating a total of **134,006 unique page views**, on a number of environment, climate change, and sustainability topics. Of these, **26 stories** profiled the University's institutional initiatives relating to research and innovation, academic programs, operations, and community engagement, increasing awareness among target audiences.

The most popular stories were U of T ranked 2nd in the world in first-ever QS sustainability ranking, U of T's massive geoexchange project built on pioneering work of late prof, and U of T's divestment from fossil-fuel investments, all of which received well-above-average readership*.

*A high-performing U of T News story receives 1,000 unique page views or more.

Social Media

All U of T News stories related to institutional initiatives were promoted on social media, producing a total of **73 posts**, generating **over 1.2 million impressions** and an **overall engagement rate of 4.18%** (see Appendix 4.C). By channel, the top-performing story on Facebook and Twitter, U of T's partnership with the Canada Infrastructure Bank to boost climate positive efforts, achieved above-average engagement rates** (4.6% and 6.6%, respectively), generating a cross-platform total of **40,465 impressions**, while the top-performing story on Instagram, U of T to divest from fossil fuel investments and create climate-positive campus, achieved an average engagement rate of 10.4%, generating **90,282 impressions**.

** 2020-21 average engagement rates: Facebook — 3.6%; Twitter @UofT — 3.9%; Instagram — 10.8%.

Earned Media

UTC's targeted efforts generated strategic external coverage in top-tier local and national media outlets that further elevated awareness of U of T's latest environmental and climate change research, and enhanced U of T's reputation as a global leader in sustainability research, education, and operations. The media relations team also responded to **23 media requests** on a number of sustainability topics, primarily divestment.

Goal	Results
Proactively pitch owned content and other developments that enhance the profile of U of T as a leader in sustainability to top-tier local, national, and international media outlets	16 U of T News and Magazine stories amplified with **67 unique pieces** of earned media coverage, including Reuters, Bloomberg, and Globe and Mail (see Appendix 4.B1)
Leverage sustainability stories with the aim to amplify earned media coverage that reinforces key messages to target audiences with an average quality score of **8 or above**	Average quality scores of **8.7**, **9.6**, and **9.3** for the three key messages, reaching target audiences, including coverage in BBC Radio, Globe and Mail, and CBC TV (see Appendix 4.B2 and 4.B3)

Appendix 4.A: U of T News Stories

2021

- 07/20/2021, 'Like an arms race': U of T researchers study impact of household water pumps on Delhi's water system (858 unique page views)
- 08/04/2021, 'Air quality in Toronto's subways improves with new trains, reduced friction braking: U of T study (1,414 unique page views)
- 08/18/2021, Can green infrastructure keep microplastics out of the environment? (660 unique page views)
- 08/30/2021, U of T statistics students analyze oceans of data to understand how water temperature affects sharks (425 unique page views)
- 09/03/2021, U of T researcher explores impact of climate change on food security in the Yukon (822 unique page views)
- 09/16/2021, Cities need to boost resident knowledge of green infrastructure: U of T study (640 unique page views)
- 09/23/2021, Higher levels of organic pollutants found in homes located near natural gas wells: U of T study (445 unique page views)
- 09/30/2021, Want to reduce your carbon footprint? Build a smaller house with no basement: U of T study (1,107 unique page views)
- 10/13/2021, 'Inadequate and unsafe': U of T report highlights need for better walking and cycling network in Scarborough (535 unique page views)
- 10/14/2021, U of T alumnus Olugbenga Olubanjo one of 15 finalists for $1.7-million Earthshot Prize (1,548 unique page views)
- 10/14/2021, Indigenous artists transform tree protection hoardings outside Hart House into eye-catching murals (548 unique page views)
- 10/22/2021, How can lizards adapt to a changing climate? (277 unique page views)
- 10/27/2021, U of T to divest from fossil fuel investments, create climate-positive campus (10,279 unique page views)*
- 10/28/2021, EaRTH District at U of T Scarborough aims to make eastern GTA a hub for green-tech training and innovation (759 unique page views)*
- 10/28/2021, Scott Mabury highlights U of T's sustainability efforts at Toronto Region Board of Trade event (363 unique page views)*
- 11/02/2021, With more than 700 green roofs, Toronto is missing an opportunity to grow its own food: U of T researchers (1,617 unique page views)
- 11/02/2021, U of T among 29 universities pledging to reduce emissions, enhance access to climate education (426 unique page views)*

*Story profiled a U of T-led initiative.

- 11/04/2021, U of T researchers design microfluidic device to understand how air pollution affects lungs (239 unique page views)
- 11/04/2021 Getting to net-zero emissions — what role does the health-care sector play? (758 unique page views)
- 11/05/2021, 'If you want to see where the future starts, it's here': Canada's innovation minister tours U of T (778 unique page views)*
- 11/09/2021, 'A global leader': U of T's sustainability efforts highlighted by Ontario Chamber of Commerce (356 unique page views)*
- 11/10/2021, U of T student team among 23 winners in Elon Musk's XPRIZE carbon removal competition (2,747 unique page views)
- 11/16/2021, After COP26, U of T climate scientist says the world is on thin ice (378 unique page views)
- 11/17/2021, 'Strive for change': U of T grad Alexandra Gaspar took action and advocated for a sustainable future (136 unique page views)
- 11/23/2021, 'An inclusive space': U of T Scarborough breaks ground on Indigenous House (1,804 unique page views)
- 11/23/2021, Scientists find evidence of a warming planet high in the Earth's atmosphere (571 unique page views)
- 11/25/2021, Researchers investigate health effects of fracking in B.C.'s Northeast (876 unique page views)
- 12/03/2021, 'Very exciting': Startup co-founded by U of T researcher can create hydrogen without producing CO_2 (7,566 unique page views)
- 12/14/2021, U of T breaks ground on student residence at Spadina and Sussex Avenues (5,108 unique page views)*
- 12/15/2021, 'An everybody problem': David Sinton on how U of T experts can help Canada — and the world — get to net-zero (3,477 unique page views)
- 12/16/2021, From climate action to social justice, U of T accelerates tri-campus sustainability efforts (661 unique page views)*

2022

- 01/05/2022, As part of new course, U of T Engineering students work with global stakeholders to address key challenges (768 unique page views)
- 01/05/2022, U of T researchers help design blueprint for Black food sovereignty in Toronto (784 unique page views)
- 01/07/2022, Bioinnovation partnership: U of T Engineering and Ford Canada introduce new, sustainable automotive material (818 unique page views)*

*Story profiled a U of T-led initiative.

- 01/27/2022, 'He'd be thrilled to see this': U of T's massive geoexchange project built on pioneering work of late prof (5,790 unique page views)
- 01/31/2022, OISE's Sustainability and Climate Action Network reviews progress made towards sustainability (247 unique page views)
- 02/03/2022, U of T's geoexchange project to cut emissions by 15,000 tonnes per year: blogTO, CBC (528 unique page views)*
- 02/08/2022, The road to net zero: U of T research group takes on decarbonization of transportation (562 unique page views)
- 02/10/2022, Universities 'a golden bullet' in race to realize Canada's net-zero future, U of T's Scott Mabury says (575 unique page views)*
- 02/16/2022, Improving water equity in India: Research team one of 17 to receive support from U of T's Data Sciences Institute (400 unique page views)
- 02/22/2022, U of T's geoexchange project to reduce carbon footprint of heritage buildings: The Globe and Mail (227 unique page views)*
- 02/22/2022, Adams Sustainability Celebration 2022: Four key events focused on building a sustainable future at U of T (459 unique page views)*
- 02/24/2022, As U of T retrofits buildings, researcher studies links between built environment and well-being (546 unique page views)
- 03/03/2022, 'Working with the Earth': U of T's Andrei Swidinsky finds climate change solutions beneath our feet (1,058 unique page views)
- 03/04/2022, Academic-industry partnership develops better way to manage sulfur compounds at mining sites (317 unique page views)
- 03/08/2022, Turning CO2 into shampoo and lawn furniture? U of T startup doing what 'no one has done before' (2,815 unique page views)
- 03/15/2022, Road traffic isn't just bad for the air — it's potentially a major source of water pollution: U of T study (821 unique page views)
- 03/17/2022, Urbanization is driving the evolution of plants around the world, U of T study finds (1,762 unique page views)
- 03/22/2022, Solar-powered UV water treatment could improve health outcomes in rural Tanzania: U of T researcher (220 unique page views)
- 03/25/2022, A friend to frogs: U of T student studies threat posed to local amphibians by GTA traffic (545 unique page views)
- 04/13/2022, More developed countries dumping toxic e-waste in Global South, U of T researchers find (941 unique page views)
- 04/13/2022, From biogas to vaccines, U of T students collaborate across time zones through 'Global Classrooms' initiative (835 unique page views)

*Story profiled a U of T-led initiative.

- 04/19/2022, Unearthing the truth: Michael Pollanen on the role of forensic pathology in war zones (315 unique page views)
- 04/20/2022, U of T student team in top 60 of Elon Musk's XPRIZE Carbon Removal competition (606 unique page views)
- 04/22/2022, Earth Day: See how U of T's campuses are building sustainability into their operations (448 unique page views)*
- 04/25/2022, U of T researchers use machine learning to speed up counting of microplastics (669 unique page views)
- 04/25/2022, U of T geoexchange project to reduce emissions, boost sustainability learning: National Observer (212 unique page views)
- •04/26/2022, Student-run program helps redirect surplus food to those in need (1,486 unique page views)
- 04/26/2022, Reach Alliance leads "change for a sustainable and inclusive future": Joseph Wong in Times Higher Education (254 unique page views)
- 05/02/2022, Students contribute to City of Toronto climate action projects through U of T 'Living Lab' course (858 unique page views)*
- 05/04/2022, U of T Engineering students build 'unique' engine for eco-race on famed Indy 500 track (296 unique page views)
- 05/16/2022, U of T researcher seeks to improve clean water access in Africa (328 unique page views)
- 05/24/2022, Drone-based technology remotely assesses health of trees impacted by climate change (408 unique page views)
- 05/25/2022, Engineering Research Day showcases the role of engineers in addressing sustainability issues (272 unique page views)
- 06/13/2022, With Helsinki as his first stop, U of T grad charts a career path in sustainability (959 unique page views)
- 06/21/2022, Photographer Edward Burtynsky's new show focuses on environmental challenges 'at our doorstep' (581 unique page views)
- 06/24/2022, 'Always dare to dream,' says U of T grad Kehkashan Basu, who started an environmental non-profit at age 12 (848 unique page views)
- 06/27/2022, Startup partners with U of T students to 'IKEA-fy' its fog harvesting apparatus (624 unique page views)
- 07/08/2022, Academic-industry partnership aims to lower the cost of cultivated meat (408 unique page views)
- 07/12/2022, Canadians are not nearly as divided about environmental issues as we may think: Study (578 unique page views)

*Story profiled a U of T-led initiative.

- 07/19/2022, U of T partners with Canada Infrastructure Bank to boost climate positive efforts (2,139 unique page views)*
- 07/20/2022, U of T experts work with U.S. startup to turn trains into giant carbon-capturing machines (1,115 unique page views)
- 07/21/2022, 'Look after each other': U of T researcher on the threat posed to cities by extreme heat — and how to respond (876 unique page views)
- 07/26/2022, With app to cut emissions from rice burning in India, U of T student wins global entrepreneurship competition (135 unique page views)
- 08/04/2022, Reef 'hope spots' may help rescue coral habitats damaged by climate change: Researchers (512 unique page views)
- 08/12/2022, Focused on climate change, U of T grad student is working on bioreactors to clean water and sequester CO2 (777 unique page views)
- 08/16/2022, U of T report shows food insecurity persists across Canada, varies by province (1,251 unique page views)
- 08/16/2022, Earth sciences researchers locate billion-year-old groundwater in South Africa (889 unique page views)
- 08/26/2022, U of T chefs bring more sustainable, plant-based food to campus menus (1,263 unique page views)*
- 08/29/2022, From air pollution to Indigenous storytelling: New courses at U of T Mississauga (311 unique page views)
- 09/09/2022, Courses, clubs and committees: How to get involved with sustainability at U of T (427 unique page views)*
- 09/13/2022, PhD student aims to reduce pulp and paper's environmental footprint, inspire underprivileged youth (270 unique page views)
- 09/13/2022, Non-profit brings clean drinking water to communities in Sudan (269 unique page views)
- 09/22/2022, 'Sputtertron', among latest CFI-funded U of T projects, could help develop new materials for a greener economy (443 unique page views)
- 09/22/2022, What's new in construction and renovations across U of T's three campuses (1,669 unique page views)*
- 09/23/2022, U of T researchers help vulnerable populations in Southeast Asia tackle climate change (394 unique page views)
- 09/27/2022, Season 2 of Groundbreakers series: 'Diverse research communities solving the world's grand challenges' (146 unique page views)
- 09/28/2022, Researchers identify mechanism responsible for temperature and salinity 'staircases' in Arctic Ocean (2,524 unique page views)

*Story profiled a U of T-led initiative.

- 09/29/2022, As demand for EVs grows, student researcher explores social and ecological risks of lithium 'gold rush' (293 unique page views)
- 10/03/2022, To help meet global EV demand, researchers develop sustainable method of recycling older lithium-ion batteries (598 unique page views)
- 10/07/2022, Why some countries lead — and others lag — in the race to clean energy: Study (432 unique page views)
- 10/13/2022, U of T campus used as a living laboratory to study sustainable, 'last-mile' package deliveries (486 unique page views)*
- 10/17/2022, Startup lands federal contract to plant one million trees across Canada using drones (782 unique page views)
- 10/18/2022, Study finds lethality of air pollution in India may be overestimated (451 unique page views)
- 10/18/2022, National climate science satellite mission co-led by U of T secures more than $200 million (435 unique page views)
- 10/20/2022, Good for you, better for the planet: U of T cyclists pedal toward a more sustainable future (842 unique page views)
- 10/26/2022, U of T ranked 2nd in the world in first-ever QS sustainability ranking (33,161 unique page views)*

*Story profiled a U of T-led initiative.

Appendix 4.B1: Earned Media Coverage

U of T News and Magazine stories amplified

- U of T to divest from fossil fuel investments, create climate-positive campus. (Reuters)* (Bloomberg)* (Globe and Mail)* (CBC Online)* (Toronto Star)* (Toronto Star)* (BNN Bloomberg)* (National Observer)* (Times Higher Education)* (Global: News Morning)* (660 News — Calgary) (680 News) (BNN) (iPolitics) (CBC Online) (Daily Commercial News) (Hamilton Spectator) (Montreal Gazette) (University Affairs) (Corporate Knights)*
- 'He'd be thrilled to see this': U of T's massive geoexchange project built on pioneering work of late prof. (Globe and Mail)* (Toronto Star)* (Financial Post)* (blogTO) (Radio-Canada: Dans la Mosaïque)* (Daily Commercial News)* (Urban Toronto) (Corporate Knights)*
- U of T partners with Canada Infrastructure Bank to boost climate positive efforts. (CBC Toronto)* (CityNews)* (National Observer)* (Daily Commercial News)* (Sustainable Biz)

- EaRTH District at U of T Scarborough aims to make eastern GTA a hub for green-tech training and innovation. (CP24)* (AM920)
- U of T researcher leads project focused on transitioning health-care system to 'net-zero' emissions. (Toronto Star)
- Researchers identify mechanism responsible for temperature and salinity 'staircases' in Arctic Ocean. (Hakai Magazine)
- From air pollution to Indigenous storytelling: New courses at U of T Mississauga. (Insauga)
- U of T chefs bring more sustainable, plant-based food to campus menus. (CBC: Here and Now)* (CBC: Fresh Air)* (National Observer)*
- U of T experts work with U.S. startup to turn trains into giant carbon-capturing machines. (BBC Online) (Forbes) (Daily Beast) (Toronto Star)
- Pregnant women living near natural gas sites experience higher rates of depression, substance use: Study. (CTV Online)* (CBC Eadio)* (CTV TV)*
- U of T student team in top 60 of Elon Musk's XPRIZE Carbon Removal competition. (Global Online) (National Observer)
- 'Very exciting': Startup co-founded by U of T researcher can create hydrogen without producing CO2. (CBC TV)*
- Want to reduce your carbon footprint? Build a smaller house with no basement: U of T study. (NOW)* (Toronto Star)*
- Higher levels of organic pollutants found in homes located near natural gas wells: U of T study. (CTV Online)* (CBC Radio)* (CTV TV)*
- Ontario's Growing Goldfish Problem. (CBC Online)* (CBC Radio)* (Citytv)*
- U of T ranked 2nd in the world in first-ever QS sustainability ranking. (Guardian) (blogTO)* (Narcity)* (Curiocity)* (Taipei Times) (Narcity)* (MTL Blog) (Daily Hive)* (Slice)

* Pitched or facilitated by UTC.

Appendix 4.B1: Earned Media Coverage

Quality Score Analysis			
Desirable Criteria	**Score**	**Undesirable Criteria**	**Score**
Conveys key message	4	No key message	-1
Desirable spokesperson quoted or paraphrased	1	Critic quoted or paraphrased	-2
Desirable visual	1	Undesirable visual	-2
Leaves audience more likely to support the initiative	2	Leaves audiences less likely to support goal	-3
Dispels a myth	1	Negative message or myth reinforced	-2
Display copy contains key message	1	Not applicable	
Total	10	Total	-10

Appendix 4.B2: Earned Media Coverage — Quality Scores for Pitched Hits Reaching Target Audiences

As a global leader in sustainability research and education, U of T plays a vital role in providing solutions to tackle climate change, and pathways for learning to inspire the next generation of leaders in sustainability.

Target outlets	Date	Outlet	Headline	Total	Key message		Visuals		Support for goal		Myths		Display copy
			Average	8.7	Conveys key message +4	No key message 1	Spokes person mention +1	Desirable +1	Undesirable 2	Increase +2	Decrease 3	Dispels +1	Reinforces 2	Contains U of T mention and key message +1
1 top-tier print/digital	1-July-21	Associated Press	Arctic's 'Last Ice Area' shows earlier-than-expected melt	8.5	4		1	1		2		0		0.5
1 top-tier broadcast	21-October-21	BBC Radio	Science in Action	8.8	4		1	Not applicable		2		0		Not applicable
1/5 mid-market or specialized	1-July-21	Globe and Mail	Arctic's 'Last Ice Area' shown to be at risk in climate study	8.5	4		1	1		2		0		0.5
2/5 mid-market or specialized	1-July-21	CBC Online	Arctic's 'Last Ice Area' losing twice as much ice compared to rest of region: Study	8.5	4		1	1		2		0		0.5
3/5 mid-market or specialized	1-July-21	Toronto Star	Study says High Arctic sea ice affected by climate change	8.5	4		1	1		2		0		0.5
4/5 mid-market or specialized	23-September-21	Globe and Mail	Homes near fracking sites in B.C. have higher levels of some pollutants, study finds	8.5	4		1	0		2		0		0.5
5/5 mid-market or specialized	23-August-22	CBC Toronto	Hydrogen production breakthrough	9.4	4		1	1		2		1		Not applicable

Appendix 4.B2: Earned Media Coverage — Quality Scores for Pitched Hits Reaching Target Audiences

Over the past decade, U of T has made significant strides in reducing its greenhouse gas emissions and carbon footprint on all three campuses, while providing opportunities for faculty, staff, and students to collaborate on its sustainability projects.

Target outlets	Date	Outlet	Headline	Total	Key message		Visuals		Support for goal		Myths		Display copy
			Average	9.6	Conveys key message +4	No key message 1	Spokes person mention +1	Desirable +1	Undesirable 2	Increase +2	Decrease 3	Dispels +1	Reinforces 2	Contains U of T mention and key message +1
1 top-tier print/digital	27-October-21	Reuters	University of Toronto to divest all fossil fuel investments	10	4		1	1		2		1		1
1 top-tier broadcast	29-October-21	BNN Bloomberg	University of Toronto making symbolic move in fighting climate change by divesting its fossil fuel investments	10	4		1	1		2		1		1
1/5 mid-market or specialized	27-October-21	CBC Online	University of Toronto pledges to divest from fossil fuels, run 'climate positive' campus by 2050	10	4		1	1		2		1		1
2/5 mid-market or specialized	27-October-21	Toronto Star	University of Toronto to fully divest $4 billion endowment from fossil fuels by 2030	10	4		1	1		2		1		1
3/5 mid-market or specialized	28-October-21	Times Higher Education	University of Toronto joins fossil fuel divestment movement	9	4		1	0		2		1		1
4/5 mid-market or specialized	21-February-22	Globe and Mail	Donors line up to fund Canada's largest urban geothermal system at University of Toronto	9	4		1	1		1		1		1
5/5 mid-market or specialized	27-October-22	blogTO	U of T was just ranked second in the world in new global university study	9	4		0	1		2		1		1

Appendix 4.B2: Earned Media Coverage — Quality Scores for Pitched Hits Reaching Target Audiences

Together, we will rise above this global challenge — by leveraging the breadth and depth of our collective knowledge across multiple backgrounds, cultures, and disciplines, we will create a sustainable future.

Target outlets	Date	Outlet	Headline	Total	Key message		Visuals		Support for goal		Myths		Display copy
			Average	9.3	Conveys key message +4	No key message 1	Spokes person mention +1	Desirable +1	Undesirable 2	Increase +2	Decrease 3	Dispels +1	Reinforces 2	Contains U of T mention and key message +1
1 top-tier print/digital	25-August-22	National Observer*	U of T chefs serve up new menu of plant-based dishes	8	4		1	1		2		1		1
1 top-tier broadcast	19-July-212	CBC Toronto	CIB invests in U of T renewables	8.9	4		0	1		2		1		Not applicable
1/5 mid-market or specialized	21-February-22	Globe and Mail	Donors line up to fund Canada's largest urban geothermal system at University of Toronto	9	4		1	1		1		1		1
2/5 mid-market or specialized	19-July-22	Citytv	Feds fund U of T carbon reduction project	8.9	4		0	1		2		1		Not applicable
3/5 mid-market or specialized	19-July-22	National Observer	Ottawa ponies up cash to help U of T with its carbon-positive vision	10	4		1	1		2		1		1
4/5 mid-market or specialized	18-August-22	CBC Radio: Here and Now	Chefs serve up new menu of plant-based dishes	10	4		1	Not applicable		2		1		Not applicable
5/5 mid-market or specialized	13-October-22	Corporate Knights	Sustainable city leadership 101	10	4		1	1		2		1		1

*Dropped score.by 2 points as outlet is not top tier.

Appendix 4.B3: Earned Media Coverage

Media coverage roundup amplifying key messages

Key Message #1: As a global leader in sustainability research and education, U of T plays a vital role in providing solutions to tackle climate change, and pathways for learning to inspire the next generation of leaders in sustainability.

- Kent Moore of UTM shares his research on the accelerated melting of Arctic sea ice and its vulnerability to climate change. (Associated Press)* (Globe and Mail)* (CBC Online)* (CBC: World at Six)* (Toronto Star)* (Bloomberg Radio) (Globe and Mail)* (BBC Radio)*
- Jessica Green of Political Science finds there is no evidence that top oil and gas firms are making meaningful efforts to decarbonize. (Weather Network)
- Pierre Desrochers and Joanna Szurmak of UTM write that if handled properly, plastics are greener than substitute products made of plants and animals. (Financial Post)
- The Trash Team led by Chelsea Rochman of Ecology & Evolutionary Biology. (CBC Online) (blogTO) (Citytv) (CBC Online) (CBC News Network) (CBC Radio: The World at Six) (Oakville News) (CTV Online) (CBC: Here and Now) (Toronto Sun) (blogTO) (Newstalk 1010) (CityNews) (CBC: Here and Now) (CityNews)
- Chelsea Rochman of Ecology & Evolutionary Biology discusses her findings. (Los Angeles Times)
- Ryan Wolfe of Ecology & Environmental Biology discusses his research to protect the blue racer. (Canadian Geographic)
- Stephan Heblich of the Munk School of Global Affairs & Public Policy discusses his research on how historical pollution affected neighbourhoods. (NPR: Freakonomics Podcast)
- Fred Urquhart's discovery on where monarchs migrate is referenced. (CBC: Metro Morning)
- John Scott-Railton of the Citizen Lab at the Munk School of Global Affairs & Public Policy first spotted the spill scrutinizing images of the storm's damage. (New York Times) (Forbes)
- Chelsea Rochman of Ecology & Evolutionary Biology estimates that between 24 to 34 million metric tons of plastic was released into oceans, lakes and rivers last year. (Global Online)
- Shoshanna Saxe of Civil & Mineral Engineering is profiled. (Globe and Mail)*
- Kennedy Bucci of Ecology & Evolutionary Biology studies the impact of microplastics in freshwater ecosystems. (CBC: Quirks & Quarks)

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- Story cites plastic pollution research by Chelsea Rochman of Ecology & Evolutionary Biology. (iHeartRadio)
- Élyse Caron-Beaudoin of UTSC finds living close to oil and gas wells may lead to short- and long-term health effects. (Canadian Press)* (CBC Radio)* (CTV Two Dawson Creek)*
- Shoshanna Saxe of Civil & Mineral Engineering finds concrete basements drive carbon emissions. Karen Chapple of Geography & Planning also comments. (NOW)* (Toronto Star)*
- Chelsea Rochman of Ecology & Evolutionary Biology discovers the brown bullhead catfish contains the most synthetic particles ever recorded. (TVO Online)
- A group of Engineering students win $25,000 for their efforts to capture carbon dioxide from the atmosphere and isolate it using only electricity. (Global Online) (National Observer)
- Chelsea Rochman of Ecology & Evolutionary Biology shares her work studying how mibrofibres end up in lakes, rivers and drinking water. (CTV Your Morning) (Toronto Star) (Waterloo Region Record)
- The Centre for Sustainable Health Systems at the Dalla Lana School of Public Health researches and implements green strategies. (Toronto Star)
- Heather MacLean of Civil & Mineral Engineering shares her research on the sustainability of electric vehicles compared to conventional ones. (NPR)
- Student Elysia Fuller-Thomson and Matthew Adams, both of UTM, track air quality in Hamilton. (Hamilton Spectator)* (Hamilton Spectator) (Global Online) (CBC Online)
- Miriam Diamond of Earth Sciences shares her research on how chemical pollution threatens the “viability” of human civilization. (CTV Online)*
- Research discovered salt was causing negative impacts well into summer. (Toronto Star)*
- Marney Isaac of UTSC discusses her research on green roofs. (CBC: Quirks & Quarks)
- James Santangelo and Rob Ness of UTM share their findings on how urban environments alter plants. (CTV Online) (Global News Radio) (Toronto Star)
- A university team will return for a second year to track the distribution of microplastics. (CityNews)
- Chelsea Rochman of Ecology & Evolutionary Biology finds germs on microscopic plastic fibres contaminate the shellfish that consume them. (Sacramento Bee) (Fox Online)
- Nicholas Mandrak of UTSC studies the booming goldfish population. (CBC Online)* (CBC Radio)* (Citytv)*
- Researchers study the impact of microplastics in lakes. (CBC Radio)

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- Lisa Erdle of Ecology & Evolutionary Biology finds microfibre filters significantly decrease environmental pollutants in lake systems. (Orillia Matters)
- Matthew Roorda of Civil & Mineral Engineering plans to study a pilot program to allow for large e-cargo bikes. (Bloomberg)
- Research shows how growth in demand for electric vehicles will add strain to the marketplace due to metal requirements like lithium and cobalt. (Hill Times)
- Milan Ilnyckyj of Political Science discusses his research on campus fossil fuel divestment. (CBC: Spark)
- Chelsea Rochman of Ecology & Evolutionary Biology works with a United Nations group to create a global plastics treaty. (Toronto Star)
- Geoffrey Ozin of Chemistry discusses his research. (BBC online) (Forbes) (Daily Beast) (Toronto Star)
- Karen Smith of UTSC studies how different communities cope with extreme temperatures. (Global Online)
- Ben Hatton of Materials Science & Engineering and Raphael Kay of Mechanical & Industrial Engineering design a shading system inspired by the skin of krill. (Bloomberg) (Bloomberg) (Bloomberg Radio) (New Atlas) (Fast Company) (Cottage Life)
- Research finds that while more disruptive protests attracted publicity, they could undermine a movement's credibility and alienate potential support. (New York Times)
- Bradley Saville of Chemical Engineering & Applied Chemistry assesses sustainable fuels for the UN's International Civil Aviation Organization. (Corporate Knights)
- Murray Thomson of Mechanical & Industrial Engineering discusses his project. (CBC TV)*
- Recent work shows 90 per cent of cars in the U.S. must be electric by 2050 to meet emissions pledges. (Time)
- Robert Andrews of Civil & Mineral Engineering discusses his work. (BNN Bloomberg)
- Ariel Greiner of Ecology & Evolutionary Biology discusses his findings. (Hakai Magazine)
- The University's Canadian Transport Ridership Trends study is highlighted. (Toronto Sun)
- Lauren Lawson of Ecology & Evolutionary Biology tests chloride levels in GTA waterways. (Narwhal)

*Pitched or facilitated by UTC.

Key Message #2: Over the past decade, U of T has made significant strides in reducing its greenhouse gas emissions and carbon footprint on all three campuses, while providing opportunities for faculty, staff, and students to collaborate on its sustainability projects.

- The University is recognized for being second in the world and number one in Canada in the QS sustainability rankings. (QS) (Guardian) (blogTO)* (Narcity)* (Curiocity)* (Taipei Times) (Narcity)* (MTL Blog) (Daily Hive)* (Slice)
- President Meric Gertler says the growing severity of the climate crisis now demands bold actions that have both substantive and symbolic impact. (Reuters)* (Bloomberg)* (Globe and Mail)* (CBC Online)* (Toronto Star)* (Toronto Star)* (BNN Bloomberg)* (National Observer)* (Times Higher Education)* (Global: News Morning)* (660 News — Calgary) (680 News) (BNN)* (iPolitics) (CBC Online) (Daily Commercial News) (Hamilton Spectator)* (Montreal Gazette) (University Affairs) (Corporate Knights)*
- Scott Mabury, vice-president of operations & real estate partnerships; Ron Saporta, chief operating officer of property services & sustainability; and Marc Couture, director of sustainability & energy management, discuss the project, with comments from Jim Wallace and reference to the late Frank Hooper, both of Mechanical & Industrial Engineering. (Globe and Mail)* (Toronto Star)* (Financial Post)* (blogTO) (Radio-Canada: Dans la Mosaïque)* (Daily Commercial News) (Urban Toronto) (Corporate Knights)*
- University Pension Plan Ontario will reach net-zero emissions across its portfolio by 2040. The University will also divest from fossil fuel investments. (National Observer)*
- The University is named among the organizations that share ambitious targets regarding their own ecological footprint. (Globe and Mail)

Key Message #3: Together, we will rise above this global challenge — by leveraging the breadth and depth of our collective knowledge across multiple backgrounds, cultures, and disciplines, we will create a sustainable future.

- President Meric Gertler and vice-president of operations & real estate partnerships Scott Mabury explain how U of T partners with Canada Infrastructure Bank to boost climate positive efforts. (CBC Toronto)* (CityNews)* (National Observer)* (Daily Commercial News)* (Sustainable Biz)

*Pitched or facilitated by UTC.

- Chief Administrative Officer Andrew Arifuzzaman of UTSC discusses the new initiative to support sustainable technology innovation in the corridor between Toronto and Peterborough. (CP24)* (AM920)
- Jaco Lokker and Olivia Boutilier of Food Services hosts training for the University's culinary team. (CBC: Here and Now)* (CBC: Fresh Air)* (National Observer)*
- School of Cities director Karen Chapple of Geography & Planning explains how the school addresses climate change. (Corporate Knights)*
- UTAM joins the Net Zero Asset Owners Alliance, which commits to achieving increasingly demanding targets every five years en route to net-zero emissions. (Financial Post)*
- President Meric Gertler is part of the new Climate Economy Strategic Council. (National Observer)

*Pitched or facilitated by UTC.

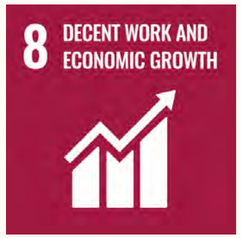
Appendix 4.C: Social Media

	Number of posts	Impressions	Engagements	Engagement rate	Link to the highest performing posts (by engagement)
Facebook	10	223,971	7,406	3.31%	www.facebook.com/6169515998/posts/10159763528955999
Twitter @uoft	26	304,078	7,187	2.36%	twitter.com/UofT/status/1575123511038861313
Twitter @uoftnews	25	75,298	1,133	1.5%	twitter.com/UofTNews/status/1549487069621256200
Instagram	7	451,356	22,612	5.01%	www.instagram.com/p/CViZw23pMx-/
Instagram Stories	5	56,755	627	8.7%	Not applicable
Tiktok	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Total	**73**	**1,111,458**	**38,965**	**4.18%**	

Appendix 5: Sustainable Development Goal (SDG)-Related Keywords for Undergraduate Course Inventory

SDGs	Keywords	SDGs	Keywords
	poverty, income distribution, wealth distribution, socio economic, socio-economic, socioeconomic, homeless, low-income, low income, affordab*, disparity, welfare, social safety, developing country, vulnerability, precarity, precarious, pro-poor		equitable, pedagogy, knowledge, worldview, learning, knowledges, traditional knowledge, land-based knowledge, place-based knowledge, decolonial*, anticolonial, settler, equitable, equity, anti-racism, racism, anti-oppression, oppression, anti-discriminatory, early childhood development, peace, citizen, sustainability teaching, sustainability education, universal literacy, basic literacy, universal numeracy, environmental education, education for sustainable development, ecojustice education, place-based education, humane education, land-based learning, nature-based education, climate change education, vocational, technical learning, free education, accessible education, primary education, secondary education, tertiary education
	agricultur*, nutrition, food security, food insecurity, food-secure, food system, child hunger, food justice, food scarcity, food sovereignty, food culture, culinary, agro*, permaculture, indigenous crops, regenerative agriculture, urban agriculture, organic food, biodynamic, food literacy, food education, benefit sharing, access and benefit sharing (ABS), malnutrition, end hunger, food price, zero hunger		gender, women, girl, queer, female, feminis*, non-binary, non binary, sexes, LGBTQ*, patriarchy, transgender, two-spirit, gender equality, violence against women, trafficking, forced marriage
	well being, wellbeing, well-being, mental health, public health, global health, health care, healthcare, health issues, mental wellness, disabilit*, sexual education, mindfulness, holism, illness, health education, communicable disease, health determinants, vaccine, substance abuse, maternal mortality, family planning, hazardous chemicals, pollution, health equity, neonatal mortality, infant mortality, child health, road traffic accidents, reproductive health, epidemics, universal health coverage		water, sanita*, contamination, arid, drought, hygien*, sewage, water scarcity, remediation, untreated wastewater, water harvesting, desalination, water efficiency, groundwater depletion, desertification, water filtration, latrines, open defecation, hydrological cycle, water and energy nexus, stormwater management, low impact development, green infrastructure, living infrastructure, water education

Appendix 5: Sustainable Development Goal (SDG)-Related Keywords for Undergraduate Course Inventory

SDGs	Keywords	SDGs	Keywords
	energy, renewabl*, wind, solar, geothermal, hydroelectric, fuel efficient, fuel-efficient, carbon capture, emission*, greenhouse, biofuel; energy sovereignty, energy security, energy education		trade, inequality, financial market, taxation, equit*, equalit*, humanitarian, minorit*, refugee, BIPOC, of colour, of color, indigenous, reconciliation, truth and reconciliation, underserved, privileged, affordab*, equal access, marginalized, marginalised, impoverished, vulnerable population, social safety, social security, government program, disparity, income, Gini, anti-oppressive, anti-racist, anti-discriminatory, decolonization
	employment, economic growth, sustainable development, labour, labor, worker, wage, economic empowerment, entrepreneur*, small- and medium-sized enterprises, SMEs, sustainable tourism, youth employment, green job, economic recovery, green growth, sustainable growth		cities*, urban, resilien*, rural, sustainable development, public transport*, metro*, housing, green infrastructure, low impact development, climate change adaptation, climate change mitigation, green buildings, affordable housing, walkab*, transit, civic spaces, open spaces, accessib*, indigenous placemaking, indigenous placekeeping
	infrastructure, buildings, capital, invest*, internet, globaliz*, globalis*, Industrialization, value chain, affordable credit, industrial diversification		consum*, production, waste, natural resource*, recycl*, industrial ecology, sustainable design, supply chain, outsourc*, offshor*, reuse, decarboniz*,decarbonis*, carbon tax, carbon pricing, food waste, public procurement, fossil fuel subsidies

Appendix 5: Sustainable Development Goal (SDG)-Related Keywords for Undergraduate Course Inventory

SDGs	Keywords	SDGs	Keywords
	climate, greenhouse gas, global warming, weather, environmental, planet, vegan, vegetarian, anthropogenic, fossil fuel, emissions, carbon dioxide, CO2, carbon-neutral, carbon neutral, net zero, net-zero, methane, sea level, climate change mitigation, climate change adaptation, climate impacts, climate scenarios, climate solutions, climate justice, global climate models, carbon capture, carbon sequestration, low carbon, resilience, anthropocene, climate positive, offsets, carbon trading, carbon markets, UNFCCC, climate finance, loss and damage, Paris		"forest, biodivers*, ecolog*, pollut*, conserv*, land use, natural habitat, species, animal, regeneration, resilience, sustainable and traditional use, land ecological restroration, forest conservation, carbon sequestration, carbon capture, soil, erosion, habitat loss, endangered species, ecosystem, deforestation, reforestation, wildlife, flora and fauna, benefit sharing"
	ocean, marine, pollut*, conserv*, fish, natural habitat, species, animal, biodivers*, coral, maritime, ocean literacy, ecosystem, overfish*, fish stocks, ocean, sustainable use, traditional use		institut*, governance, peace, social justice, injustice, criminal justice, human rights, democratic rights, voter rights, legal system, social change, corrupt*, nationalism, democra*, authoritarian, indigenous, judic*, ecojustice, indigenous rights, self-determination, sovereignty, violence, exploitation, trafficking, torture, rule of law, illicit, organized crime, bribe*, terroris*, prior and informed consent, access and benefit sharing, UNDRIP (United Nations Declaration on Rights of Indigenous Peoples), indigenous rights

Appendix 6: Co-Chairs and Director Engagements and Presentations

- Faccer, K. “Living Labs: Shared Experiments in Sustainability.” Presentation to the Community Liaison Committee, July 14, 2022.
- Faccer, K. Interview with Paris Hadfield. Monash University Research Project: Governance of University Living Labs, August 7, 2022.
- Faccer, K. “Role of Universities in Advancing Innovation and Climate Action Partnerships.” Remarks during the UN High Level Champions Innovation for Climate Workshop, National Research Centre, Giza, Egypt and online, October 26, 2022.
- Faccer, K. Interview with Tsharna Daniels. QS Sustainability Report, October 26, 2022.
- Faccer, K. “Advancing the SDGs Inside and Beyond Universities.” Presentation during UN Day 77: Toronto Partners for the Goals! Toronto Reference Library, Toronto, October 29, 2022.
- Faccer, K. Davison, S. “Climate Action at Home and at COP — the Role of Universities.” Presentation during Network of Networks meeting, COP 27 Blue Zone, Sharm El-Sheik, Egypt, November 14 and 15, 2022.
- Robinson, J. “Regenerative Sustainability: Achieving Net Positive Outcomes in Both Human and Environmental Terms.” Presentation to Better Buildings Boot Camp 2022, Sustainable Buildings Canada, Toronto, August 22, 2022.
- Robinson, J. “Combining Forces: Fostering University/City Partnerships.” Online Presentation at Race to Zero Public Event, University Climate Change Coalition (UC3) Climate Summit, Vancouver, June 23, 2022.
- Robinson, J. “Combining Forces: Fostering University/City Partnerships.” Presentation at City Deal on Education Conference, Breda, The Netherlands, June 3, 2022.
- Robinson, J. “Pyramids, Planes, and Scaling Up: Some Thoughts on the Institutionalization of Sustainability in a University Context.” Presentation at City Deal on Education Conference, Breda, The Netherlands, June 3, 2022.
- Robinson, J. “Sustainability as Transmutation: An Alchemical Interpretation of a Metamorphosis to Sustainability.” Presentation to IASS Tuesday Talks, Institute for Advanced Sustainability Studies, Potsdam, Germany, May 31, 2022.
- Robinson, J. “Combining Forces: Fostering University/City Partnerships.” Online keynote presentation at staff professionalization day, VIVES University of Applied Sciences, Kortrijk, Belgium, May 19, 2022.

Co-Chairs and Director Engagements and Presentations

- Robinson, J. “A Seat at the Table?” Presentation to “Universities for Glasgow Commitments: COP President Convenes Global University Networks.” February 21, 2022.
- Ma, G., Alhakim, A., and Robinson, J. ”Governing Change: Academic-Operational Cultures of Sustainability Governance at 10 Universities Around the World.” Online presentation at AASHE Global Conference on Sustainability in Higher Education, October 13, 2021.
- Robinson, J. “Regenerative Sustainability.” Invited presentation to Department of Geography seminar series, Memorial University, Newfoundland, March 17, 2022.
- Saporta, R. CAUBO Annual Conference. "Creating a Positive Climate Campus". Virtual presentation (with Marc Couture and Scott Hendershot). Edmonton, Alberta, June 13-15, 2022.
- Saporta, R. "Climate Positive Campus". City of Toronto presentation and tour. July 11, 2022.
- Saporta, R. AASHE Global Conference on Sustainability in Higher Education (GCSHE). "Climate Positive, Leap, Sustainable Change Programs". Virtual presentation (with Marc Couture and Scott Hendershot). October 2022
- Saporta, R. Clean 50 — inducted as a Clean 16 Honoree. Toronto, ON. October 6, 2022.

Appendix 7: Agents of Change Workshop Design — Annotated Bibliography (Working Draft)

Academic Literature

1. David, K., & Boulet, M. (2016). Transformations? Skilled Change Agents Influencing Organisational Sustainability Culture. Australian Journal of Environmental Education, 32(1), 109-123. http://doi.org/10.1017/aee.2015.51

This paper builds on past literature's work on the essential aspects of 'sustainability culture' by offering an explanation on creating a 'sustainability culture' within an organization. It presents a case study of Wannon Water's Green Steps program in Victoria, Australia, which is a staff training program meant to turn their staff into agents of change who can then develop a culture of sustainability within their organization and bring about innovation in their business. This program involves developing a group project over the course of several months and requires participants to develop their investigative, presentation, and argument skills. The program identifies the following learning outcomes: gaining an understanding of environmental issues, developing research and communication skills (including the ability to engage other colleagues in sustainability), and experiencing project and reporting work. Projects ranged from day-to-day operational activities (office energy efficiency initiatives, wasteland recycling management) to long-term issues at the core of the organization's goals (energy and water audits at operation facilities). The paper concludes by raising the key challenge to sustainability training programs: "how do we raise awareness of sustainability issues, provide participants with skills to address these, and then ensure that they actually change behaviours and practices?" It should be noted that this program was closed after 3 years in operation due to the fact that the organization concluded that a sufficient number of staff (1/5) was training in sustainability leadership and could therefore be the force driving change on the "organization's culture and practices."

This article is a good reference for workshop design and lends credence to the idea that workshops of this nature are most effective over the course of weeks or months. The training program in this case study was within an organization with many employees taking part from across different sectors of the organization. This approach allowed staff trained as agents of change to embed a culture of sustainability within the organization. The implemented

sustainability projects ranged from “greening the edges”, meaning relatively minor changes to day-to-day operations, to challenging the “business-as-usual” organizational model. The organizational benefits were environmental, financial, and social, as they led to improvements in “staff wellbeing, morale, and productivity”. As for the individual change agents, the study noted that the wide variety of content in the learning and training portion of the workshop forced them to challenge previously held beliefs and see issues from different perspectives as well as allowing them to acquire new skills. A workshop provided to students who then enter an organization on their own will certainly face greater challenges in implementing sustainability changes than a large group of employees within an organization being trained synchronously. The authors sought to answer the question of whether or not the training program worked by requiring a feedback form shortly after the conclusion of the program, as well as interviewing participants 2 weeks after the program ended. This process matched intended learning outcomes to descriptions of program impacts in both the short- and long-term. This method could be helpful when thinking about how to measure success of an agents of change workshop, although the quality of feedback should not be expected to align with this case study unless the program design was similar.

2. Nielsen, K., Dawson, J., Hasson, H., & von Thiele Schwarz, U. (2021). What about me? The impact of employee change agents’ person-role fit on their job satisfaction during organisational change. Work & Stress, 35(1), 57-73. https://doi.org/10.1080/02678373.2020.1730481

This article looks at the impact of organizational change on improving services provision within a healthcare organization. Certain employees were designated as agents of change and were given responsibilities to implement changes following “a series of cross-disciplinary, participatory dialogue seminars”, during which the change agents were trained in leading those same seminars. This research provides insight into the impact of organizational change of “ordinary workers” who have become change agents, including the impact on employee wellbeing. They found that the “person-job fit” is incredibly important, since the degree to which employees feel they are compatible with the role as a change agent and with the work environment more broadly are determinants of their ability to create positive change. However, employees may be even more motivated to strive for change if they have less satisfaction at work and want to use their skills to create change.

According to the authors, the study is the first to analyze the effectiveness of change agents running dialogue workshops themselves, as a means to have a positive impact on their wellbeing and job satisfaction. This suggests that employees who believe they have the skills and competencies necessary for carrying out the change agent role will not only have more job satisfaction, but will have a greater ability and desire to pursue organizational change. For the purposes of an agents of change workshop, it may be useful to have a student-led component, as it can instill confidence, and improve their communication and project management skills which are essential for implementing organizational change. Although it may be beyond the scope of the workshop, it could be helpful for students to have frank discussions about organizational values and the extent to which they're willing to act as agents of change in the workplace when job satisfaction is either high or low.

3. Ciocirlan, C. E. (2017). Environmental Workplace Behaviours: Definition Matters. Organization & Environment, 30(1), 51-70. https://doi.org/10.1177/1086026615628036

This article discusses the meaning of a "green employee", what motivates them to carry out environmental behaviours in the workplace, and what those behaviours might look like. Green employees should hold an environmental identity, which is considered to be an understanding of and respect for your position in and relationship to the environment and feeling an inherent need to protect the environment, regardless of external factors. Perhaps most importantly, this article discusses how green employees can make positive changes in their organization at any level as long as the correct character traits and organization characteristics exist. There are various kinds and degrees of environmental workplace behaviours (EWBs) that green employees may engage in. These range from recycling or speaking to supervisors about one's concern for environmentally harmful business practices to calling for the formation of a committee to deter the organization from continuing with harmful practices, or even whistleblowing. Leadership skills are vital for green employees to possess in order to foster a workplace culture that values the environment. According to Social Exchange Theory, reciprocity between employee and organization is key — employees in organizations that value environmental protection/sustainability through their business model will in turn be more likely to engage in environmental behaviour and actions because they have a desire to reciprocate the support and benefits that the organization is exhibiting and providing them. However, green employees can find themselves in workplaces whose environmental values do not align with theirs and place less emphasis on environmental consciousness in their business

model. In this scenario, employees are less likely to engage in pro-environmental behaviours, although this paper suggests that the extent to which a green employee is committed to pursuing environmental initiatives could have an impact on their willingness to act environmentally at work. Those seeking employment may have a desire to inquire during the selection process to what extent that company supports environmental behaviours and initiatives.

This article addresses ideas around eco-anxiety when it describes employees' increased sense of belonging and identity when affecting change and helping implement sustainability practices. "Green employees" are becoming increasingly important to employers, particularly those with strong emphasis on ESG. Therefore, a workshop may want to consider discussing how students can identify these organizations and present themselves as motivated and competent in this area, and eager to foster a more sustainable and welcoming work environment in addition to their actual job description. While it may be beyond the scope of a workshop, it is also important for students to identify organizations that are at least open to if not supportive of environmental initiatives. Otherwise, they could face job dissatisfaction and burnout quicker than in another workplace. This article also notes that there are both "low-intensity" and "high-intensity" organizational behaviours that change agents can engage in which come with their own sets of benefits, drawbacks, and potential barriers. A workshop could consider the effectiveness (and risks) of each approach and the potential for building on low-intensity success and moving on to more high-intensity behaviour, as well as what might drive an individual to be willing to exude high-intensity behaviour.

4. Hargreaves, T. (2011). Practice-ing behaviour change: Applying social practice theory to pro-environmental behaviour change. Journal of Consumer Culture, 11(1), 79-99. https://doi.org/10.1177/1469540510390500

This article discusses the need for Social Practice Theory in behavioural change and decision-making given the poor results that lone individuals have had in effecting change. This movement towards thinking about social practice theory necessitates shifting away from individual responsibility in creating behavioural and structural change that is pervasive in environmental circles, towards a system that makes those individuals "'carriers' of social practices, carrying out the various activities and tasks that the practice requires." Even when agents of change face obstruction and resistance in the workplace, persistent, well-informed pro-environmental actions can have impacts on the behaviours of others around them, what this article refers to as "conspicuous environmentalism".

Changing environmental behaviour is examined through the "Environment Champions" initiative, spanning 3-6 months and is run by Global Action Plan UK and carried out in the head offices of Burnetts, a UK construction company. The initiative includes employees from various departments within the organization, with equal gender balance and ranging in age from mid-20s to late-50s. Employees first audited the company's environmental impacts (over the course of 3 weeks) then designed a campaign to both improve impacts and include additional employees in the process. As the group of Environment Champions set goals for reducing environmental impacts, members were conflicted as to whether to set relatively low-stakes but achievable targets, or ambitious targets that they may not achieve and risk making the initiative appear to have failed. During the audit, other employees reacted negatively to feeling like their privacy was being invaded as the audit examined individual energy consumption and waste generation. They were met with further resistance from employees who felt that the initiatives of the Champions were taking away their right to choose whether to participate in pro-environmental initiatives. The Champions were challenged by the Facilities Management team who were more interested in preserving the status quo, and given that the Champions were a new and informal group of volunteers, did not have the knowledge or capacity to effectively combat the desires of management.

The findings of this study are helpful to discuss in an agents of change workshop in terms of the kinds of barriers and challenges students are likely to encounter as they seek to pursue change in their future workplaces. The case study shows that these challenges can come from confrontations with colleagues or resistance from upper management who prefer the status quo. Importantly, while some employee-led initiatives ultimately did not manifest in the way they were intended, the study notes subtle changes in actions and behaviours of employees in their office practices that can "prove central to their broader transformation" which can lay the groundwork for future change, and may even reduce change agent burnout. Workshops should discuss both the barriers to and ways to combat the barriers discussed in this study.

5. Van Poeck, K., Læssøe, J., & Block, T. (2017). An exploration of sustainability change agents as facilitators of nonformal learning: mapping a moving and intertwined landscape. Ecology and Society, 22(2). https://doi.org/10.5751/ES-09308-220233

This paper examines the various roles that agents of change can have in sustainable development and the impact of those varying roles on informal learning. The role that change agents take is dependent on the degree to which there is consensus on the

norms and values around sustainability as well as available information and knowledge of sustainability issues within an organization. The authors explore four ideal types of change agents: "the Technician, the Convincer, the Mediator, and the Concerned Explorer", and analyze those types through the lens of two kinds of tensions which characterize change agents: "instrumental vs. open-ended" and "personal detachment vs. personal involvement". Depending on the characteristics the change agent expresses and the role they find themselves in, they will have different approaches to creating change. Some roles view implementing change for the sake of problem solving as more "results oriented rather than process oriented" while others feel as though the change process is about creating a sense of community and belonging. Some change agents are more likely to facilitate collective problem solving and focus on communication to find solutions, while others focus on creating change through making others aware of issues, approaching issues from a place of personal concern, and sharing their vision for a better future. In summation, it can be said that agents of change are incredibly diverse and have different strengths depending on their own traits, lived experiences, and worldviews. How they go about creating change will be highly dependent on these attributes.

This paper helps us understand that an individual's self (the combination of attributes that make up who they are) will produce different kinds of agents of change with differing strengths and motivation and tactics. Therefore, while efforts to "teach" students how to become agents of change will likely be identical for all students (as is the nature of a workshop), such an approach will have different effects on students. Certain kinds of people/personalities are more suited to different issues regarding sustainability, and the kinds of sustainability issues that are examined in a workshop or undertaken in a workplace are likely to impact the success that an agent of change will have. A challenge will be to determine how to develop an approach that provides the skills and knowledge necessary while instilling an ability to engage with a wide variety of problems and situational complexities, recognizing that the barriers to change will vary across organizations as well.

6. Sidiropoulos, E. (2022). The Influence of Higher Education on Student Learning and Agency for Sustainability Transition. Sustainability, (14), 5. https://doi.org/10.3390/su14053098

This paper begins by illustrating how sustainability education is carried out in higher education institutions and whether the current approach to sustainability education is effective in fostering agents of change. It notes that sustainability education has

historically been individual-focused, and how the individual changes as a result of that sustainability learning remains unclear. To bridge this gap in knowledge, it examines sustainability views and knowledge before and after their education and identifies influencing factors in students' sustainability knowledge. The extent to which someone will exhibit sustainability behaviour is dependent on a multitude of factors, including worldviews, beliefs, and personal motivations. These factors are naturally influenced by "age, gender, level of education, income, culture, and personality". Another key determinant of one's likelihood to engage in environmental and sustainability behaviour is how much they believe that they can have an impact in what they wish to influence and can achieve the outcome that they desire. Because the way in which higher education institutions have typically approached sustainability education has been through ad hoc means, learning outcomes have varied widely as a result of the aforementioned variation in beliefs, attitudes, and skills of students. An important aspect of sustainability learning is ensuring that it is designed in a way to create transformative learning, whereby students are made to "reflect on the content of the problem, the process of problem solving, or the premise of the problem". This reflecting hopes to "disrupt a person's frames of reference".

This paper is a good reference for understanding the role of higher education institutions in creating agents of change. It describes the skills, competencies ("e.g., systems thinking, reflexivity, critical thinking, and social action/engagement"), and agency students require to go forward in their careers making better decisions and turning their sustainability knowledge into action, while also acknowledging that the diversity among students will inevitably lead to varying outcomes. The traditional ad hoc nature of sustainability learning is not effective in embedding the competencies required for students to become agents of change. Therefore, a structured and holistic approach to teaching sustainability is recommended. The paper also refers to higher education institutions as potential agents of change within society, another dimension worth considering.

7. Thomas, I., Holdsworth, S., & Sandri, O. (2020). Graduate ability to show workplace sustainability leadership: demonstration of an assessment tool. Sustainability Science, 15, 1211-1221. https://doi.org/10.1007/s11625-020-00797-8

This article discusses the necessary leadership competencies and values of graduates in order to pursue sustainability initiatives in their workplace, based on the findings of past studies from many different researchers. A 2010 study concluded that "education

institutions will be expected to develop employees, and future business leaders, 'with the knowledge, skills, attitudes and behaviours to manage sustainability issues as an integral part of the way they think about business.'" A 2013 study of 50 higher education institutions with leadership and sustainability programming set goals of systems-thinking and network-building, learned through project-based learning. These programs "defined leadership as engaging people and utilizing group skills". As the share of jobs focusing on soft skills grows in the coming decades, ensuring that graduates are equipped with proficiencies such as teamwork, collaboration, leadership, adaptability, creativity, and empathy will be key. The article goes on to respond to the question of where higher education institutions can effectively develop programs that ensure their graduates are able to demonstrate leadership. The authors note the challenge past researchers have encountered with actually assessing whether leadership has been effectively taught in their program, since measuring leadership capabilities is difficult, particularly in the context of graduates' eventual workplace. The authors analyze the "graduate attribute" case study, which was implemented in the Royal Melbourne Institute of Technology (RMIT) and seeks to "provide graduates with an understanding of sustainability and the relevance of leadership."

This article presents interesting information on how leadership plays out in the workplace after being taught and/or strengthened through one's experience in higher education. Universities evidently look to shape graduates' leadership capabilities and other key competencies that future employers look for. Yet when it comes to actually putting those skills to work in one's organization, graduates are often dissuaded from pursuing leadership roles. The authors suspect that this is due to a combination of having insufficient knowledge of the subject matter in which they would be leading, sensing that their workplace isn't supportive of employees taking on these kinds of leadership roles, and lacking confidence. Therefore, workshops that are designed to foster graduates that have strong leadership capabilities should ensure that they address (but not necessarily "solve") these barriers.

8. van der Heijden, A., Cramer, J. M., & Driessen, P.J. (2012). Change agent sensemaking for sustainability in a multinational subsidiary. Journal of Organizational Change Management, 25(4), 535-559. https://doi.org/10.1108/09534811211239218

This paper considers the concept of 'Sensemaking' in this realm of corporate sustainability and how corporate sustainability is achieved through the initiatives of change agents. Sensemaking is "an interpretative process that organisational members

use 'to understand and to share understanding about such features of the organisation as what it is about, what it does well and poorly, what the problems it faces are and how it should resolve them'". Agents of change engage in sensemaking through how they communicate with others within their organization in order to facilitate changes. It is important for change agents to have strong leadership skills when it comes to sensemaking, as there is no one way to implement change. Further, organizations and the people within them are heterogeneous, so sustainability change must be approached differently. Therefore, they must be able to recognize how changes may be developed in their specific company. In the authors' approach to understanding sensemaking in a corporate sustainability context, 3 elements are highlighted: communicating, acting, and building organizational relationships. The method of communication is divided into two parts, where interacting with others using natural language is most beneficial at first, followed by sustainability-specific language or jargon. By communicating in this way, one can more easily engage with others and communicate information in a more tangible way, before getting into more complex information involving jargon. Communicating and acting allow individuals to build and strengthen relationships in their workplace, providing a shared "incentive to embed corporate sustainability". There are two kinds of interpersonal connections that the authors note as well: "creating shared meaning", which refers to people within the organization connecting with one another around issues of sustainability, and "structuring dominant meanings", referring to the way that agents of change handle formal interactions with others, e.g., instituting "rules, procedures and authority relations".

The article states that a key part of embedding sustainability in an organization is engaging other employees in sustainability actions. This idea is repeated throughout the literature and should be a component of any agents of change workshop. Sensemaking at an organizational level is an integral part of the process of effecting change and is just as important as the focus on "planned action, diffusion processes, competencies and classifications." Therefore, the workshop may want to consider a framework that focuses on the core elements of sensemaking mentioned above while being mindful that outcomes are, as the authors note, context-dependent. Since the case study analyzed in the article follows change agents over a 10-year period, the struggles that change agents experienced early on as well as their reflections in the latter half of the study were able to be observed. These reflections would be very helpful in workshop discussions as it may both comfort students and temper expectations (although tempering expectations may not be a desired outcome of the workshop).

9. Parris, H., Sorman, A. H., Valor, C., & Tuerk, A. (2022). Cultures of transformation: An integrated framework for transformative action. Environmental Science and Policy, 132, 24-34. https://doi.org/10.1016/j.envsci.2022.02.008

This article discusses how social and behavioural transformations are needed throughout society to meet the challenges brought on by climate change (in addition to the technological transformations, which have been the focus of much of the work in the climate space to date). The authors consider how a "Transformation Process Framework" serves as a transdisciplinary tool to connect individual behaviours to society-wide transformational changes. The Framework is built on literature that analyses societal transitions using four approaches: "socio-institutional, socio-technical, socio-ecological and transitions governance". The Framework consists of two core components: the beliefs and emotions of the individual which impact their capacity/desire to create change, and external variables, such as the "social, cultural, economic, and physical environment" in which a certain change may take place.

This article contains many key factors to take into consideration when thinking about how best to construct a "one-size-fits-all" agents of change workshop, although the contents of the article itself are quite theoretical. The Framework as it is described by the authors is a helpful tool for discussing transformation problems and thinking about creating a path for change. That being said, the article does contain guiding questions that may be useful when constructing the design of a workshop or to be used as points of discussion within the workshop itself. Some of those questions are:

- "What would a successful transformation look like in a particular context? What variables need to change? What variables need (or must) stay the same?
- What are the levers needed to facilitate change in the identified variables? How do these levers work? Who has the power to change them?
- Can successful interventions in one location be successfully replicated in another? What changes are needed to adapt to local conditions? Who can be identified as change agents and influencers that can facilitate these cultural shifts?"

10. Hamann, K. R.S., Holz, J. R., & Reese, G. (2021). Coaching for a Sustainability Transition: Empowering Student-Led Sustainability Initiatives by Developing Skills, Group Identification, and Efficacy Beliefs. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.623972

The article examines bottom-up, student-led sustainability initiatives in Germany in which the students are provided coaching by an NGO that encourages sustainability teaching through higher education institutions. The coaches of this program were previously-trained students from other universities and the program includes pre- and post-questionnaires from all participants. This study wanted to explore the factors that affect individual and collective sustainability behaviour, in particular, "the roles of self-, collective, and participative efficacy beliefs (referring to the perceived ability to affect change) in the process of psychological and actual empowerment". The study's analysis of efficacy beliefs allowed for a determination of the contributions to activating individuals in sustainability initiatives and the influences that increase their engagement with sustainability issues.

This article outlines some key knowledge and action and collaboration skills that are important for sustainability volunteers to possess and develop that would improve self- and collective efficacy beliefs. It also describes the importance of collective action not just for effecting change, but the role of social support and encouragement in these initiatives as well. This article highlights some ways that efficacy beliefs were successfully or unsuccessfully manipulated, such as environmental framing, messaging about non-violent protests, and videos from activists which could help inform the contents of an agents of change workshop at U of T.

11. van den Berg, J., Zijp, M. C., Vermeulen, W. J.V., & Witjes, S. (2019). Identifying change agent types and its implications for corporate sustainability integration based on worldviews and contextual factors. Journal of Cleaner Production, 229, 1125-1138. https://doi.org/10.1016/j.jclepro.2019.04.272

This article seeks to shed light on how context-specific worldviews affect change agents from the lens of corporate sustainability. It identifies leadership as a key part of ingraining corporate sustainability into the organizational culture. The article expands on how change agents are characterized, first by noting multiple worldviews that the literature has described change agents as holding, then by describing the traits and capabilities that those worldviews possess. Some examples of these traits are comfort with confrontation, self-awareness, and ability to collaborate. Organizations that have

not engaged with sustainability in their business practices and begin to do so cause disruptions to the status quo, therefore these initiatives tend to be top-down approaches. Bottom-up approaches on the other hand tend to occur within organizations which already have a history of sustainable actions, so change agents will be furthering goals already in place.

This article reaffirms the findings of other literature in this literature review. Namely, that change agents are heterogeneous and therefore may or may not strive to effect change in certain contexts depending on their characteristics and beliefs. In addition, that bottom-up, employee-led organizational change typically occurs when businesses have already engaged in sustainability to some extent in the past. The study, which analyzed the effectiveness of change agents in the context of three different projects, conducted interviews and questionnaires to determine the worldviews of the chosen change agents, although it does not disclose what was asked/what information was gathered in the interviews or questionnaires. However, an agents of change workshop could consider developing a similar survey as a means of evaluating the characteristics of workshop participants which could help guide them in their future workplaces. The researchers discuss both internal and external contextual factors that also influence the efficacy of change agents' efforts in addition to their worldviews. These internal factors, such as strategy, planning, and employee collaboration, as well as external factors, such as management support, lack of knowledge, and organization identity, are also things for individuals to consider as they seek to effect change in their future place of work. Exploring ways to address shortcomings in these different areas in a workshop may be challenging but worthwhile as agents of change are surely to face several barriers in their pursuits.

12. Al-Saidi, M. (2019). Institutional Change and Sustainable Development. In W. L. Filho (Ed.), Encyclopedia of Sustainability in Higher Education. Springer, Cham. https://doi.org/10.1007/978-3-319-63951-2

This chapter of Encyclopedia of Sustainability in Higher Education discusses the issues surrounding the concept of sustainable development, as it has come to be "associated with one dominant or preferable type of institution or change pathway". The author specifically mentioned the Sustainable Development Goals as a reflection of the "convergence of institutional design" which articulates how environmental and sustainability problems must be solved. However, the author does discuss how higher education institutions (HEIs) are a good example of promoting institutional change and sustainable development while avoiding the faults of other institutional efforts to induce sustainable development. The sustainable development initiatives of HEIs, which the

University of Toronto has notably pursued, include “curricula reforms, improvement of campus operations, sustainability accounting and reporting, and comprehensive sustainability assessments”. HEIs which have had success in their sustainable development pursuits have underscored the importance of “co-creation of sustainability trajectories”.

This chapter reinforces that HEIs are a good place to develop change agents for the purpose of sustainable development, and positive societal changes in general. An important note that the author repeated, as mentioned above, is the tendency for discussions of or initiatives pursuing sustainable development to possess this “institutional isomorphism” which actually prevent sustainable changes from occurring. There are other historical examples of institutional change that included more nuance and context in how that change was pursued. In developing an agents of change workshop, historical and political context and nuance are vital to be cognizant of and to discuss with future change agents so that they too are aware of the traps one can fall into if institutional change is pursued irresponsibly. That being said, this specific point may be why HEIs are best designed to develop change agents, as many students are gaining these necessary competencies to be socially and ethically responsible in their careers.

13. Bisschops, S., & Beunen, R. (2019). A new role for citizens’ initiatives: the difficulties in co-creating institutional change in urban planning. Journal of Environmental Planning and Management, 62(1), 72-87. https://doi.org/10.1080/09640568.2018.1436532

This article evaluates the increasingly prominent role and the effectiveness of citizens in local urban planning and urban development through co-creation and “citizen-initiated urban developments” which involve “an open-ended plan, a greater role for smaller private actors and an enabling role for government”. The authors note that public participation faces many challenges and is not effective in swaying government decision making, and literature surrounding citizens’ initiatives have disproportionately highlighted successes, misrepresenting these initiatives’ “creativity, flexibility and decisiveness and their capacity to evoke change”. This article also provides a helpful explanation of what is meant by institutions and institutional change, and the ways in which that change can take place or be pursued. As one can expect to face many challenges when attempting to disentangle institutional practices, three contextual aspects are identified as being key to distinguishing for this purpose: “legacies from the past, interactions between actors and institutions during the process, and shared ideas about the future”.

This is a helpful article for understanding the role of citizens in affecting institutional change, but not necessarily from an employee's perspective within an organization. Still, students participating in change agent workshops and wanting to make an impact in their community would benefit from some of the information and knowledge found in this article, especially with regards to the role of citizens' initiatives. It is well known that municipal government decisions often have low public participation and lack youth representation. However, with increasing digitization and information accessibility, new graduates have a real opportunity to create institutional change, especially at the local level, from a citizen perspective. The role of a citizens' initiative is analyzed through a case study in the Dutch city of Gouda.

14. Neamtu, D. M., Bejinaru, R., Hapenciuc, C. V., Condratov, I., & Stanciu, P. (2020). Analysis and Modelling of Influence Factors in the Configuration of a Sustainable University. Case Study: "Ștefan Cel Mare" University of Suceava. Amfiteatru Economic, 22(54), 391-410. http://doi.org/10.24818/EA/2020/54/391

This study outlines determining factors of individual action towards sustainable development, how influential those factors are, and the role of universities in preparing future professionals for engaging in sustainability. This research has implications as far as how to guide universities in creating educational programs that help students become agents of change in the realm of sustainability.

Again, we see universities described as change agents themselves in fostering sustainability awareness. It's clear that the university is essential in ensuring that students learn the core competencies necessary for supporting sustainability in their future work. The authors mention the following essential competencies: "systemic thinking; interdisciplinary work; anticipatory thinking; justice; responsibility and ethics; critical thinking and analytical work; interpersonal relationships and collaboration; empathy and changing perspectives; digital communication and use of the media; strategic thinking; personal involvement; appreciation and evaluation; tolerance for ambiguity and uncertainty". Although it is unreasonable to expect an agents of change workshop to effectively touch on all these skills, it may be worth considering where the current gaps in learning are in relation to these skills so that a workshop could focus on skill gaps (and provide resources for additional learning).

15. Lozano, R., & Garcia, I. (2020). Scrutinizing Sustainability Change and Its Institutionalization in Organizations. Frontiers in Sustainability, 1(1). https://doi.org/10.3389/frsus.2020.00001

This article discusses the aspects of implementing sustainability in organizational change and where the source of that change tends to come from. The authors note that there is a great deal of literature on efforts to incorporate sustainability in organizations. However, there is relatively less research examining "organizational change management for sustainability", where the focus of that change is on the institutionalization of sustainability (i.e., changing the organization's system and having sustainability diffuse throughout). The article gathered information on organizational sustainability implementation and institutionalization through an online survey. The survey was distributed via a database of over 5,000 contacts (of which 281 usable responses were obtained) from organizations around the world. The majority of survey respondents were from corporations, with other respondents from public sector organizations and civil society. The results indicated that over 90% of organizations working with sustainability had been doing so for at least 5–10 years. The driving forces of that institutionalized sustainability come from an equal number of external and internal factors. Very few respondents indicated that the driving forces behind sustainability within their organization came from solely external or internal forces. Most organizational sustainability changes are top-down, stemming from governance, management and strategy, and operations and production.

The significance of this article is in highlighting the fact that, at least in this sample, many organizations that engage in sustainability initiatives of some kind have been doing so for years, or even decades. Through the survey, we can see the ways in which sustainability can be integrated into organizational structure and practices. Unfortunately, the results that indicate most sustainability changes come from top-down actions. Therefore, new employees hoping to make sustainable changes in their workplace may enter an organization already engaging in these kinds of actions in which case additional change agents aren't necessarily utilized. On the other hand, because most of these initiatives appear to be top-down, they may face significant barriers to instituting sustainable changes if the organization doesn't have experience in sustainability up to that point.

16. Cox, D. (2006). The Edwin Friedman Model of Family Systems Thinking: Lessons for Organizational Leaders. Arkansas State University.

This paper discusses key attributes found in organizational leaders. The author describes the organization as a living system, with leaders and followers being intertwined and having positive or negative effects on each other and the organization as a whole. Leaders of an organization require having "presence", meaning that they exhibit "confidence, poise, bearing, calmness, focus, and energy". Leaders must also be aware that one cannot bring about organizational change with "disturbing the homeostasis" (e.g., disrupting everyday operations). This paper points out a significant risk that leaders take when pursuing organizational change - that in their efforts to push others to take on more responsibility within their organization, they themselves are burdening themselves with greater responsibility as well, which can lead to burnout and lessen one's ability to lead. The leadership model, according to Friedman (1995), is:

- Moving the organization toward its goals
- Maximizing the organization's functioning
- Growing (maturing) everyone in the organization
- Ensuring the health and survival of the organization and its leader

17. Rehrey, G., Shepard, L., Hostetter, C., Reynolds, A., & Groth, D. (2019). Engaging Faculty in Learning Analytics: Agents of Institutional Culture Change. Journal of Learning Analytics, 6(2), 86-94. http://dx.doi.org/10.18608/jla.2019.62.6

This article assesses a Learning Analytics Fellowship Program (LAFP), which is designed to build the capacity of learning analytics "around an innovative Faculty Learning Community already predisposed to improve teaching, learning, and student success." Research shows that while faculty in isolation can provide students with new opportunities for success, encouraging a community of faculty actually helps faculty rethink their approach to the student experience. This in turn helps faculty "envision changes in curriculum sequences, departmental practices, or campus policies that may enhance student pathways to success." This research is focused primarily on how to cultivate an environment for faculty that can improve student learning, therefore its relevance for an agents of change workshop for students isn't entirely applicable. However, it can be referenced as a way to suggest that an interdisciplinary approach to workshop building, or at the least, faculty consultation in that process, would be beneficial.

Grey Literature (Mariam/Ingrid)

1. Ashoka Changemaker Pathway

This website outlines a "Pathway to Change" program that can be implemented as a ready-made curriculum by educators in elementary, middle, and high schools. Because the program is targeted towards a younger audience, it does not seem sophisticated enough in its analysis of the process of social change nor in the metaphors it uses to convey key concepts to be used as a convincing source for the AoC workshop, which is targeted towards the university level and beyond. Moreover, the personality and leadership styles system the program lays out is geared towards a student club organizational roster (President, Vice-President, Treasurer, Secretary) rather than a corporate or non-profit one.

Nevertheless, brief mention of the personality types and their signature traits may be helpful if the workshop wishes to undertake a similar activity:

- Diplomatic: brings people on a team together and makes everyone feel welcome
- Efficient: takes initiative in carrying out the team's mission and leads by example
- Logical: optimizes courses of action according to the team's goals and provides realistic solutions
- Innovative: brainstorms new ways of doing things and inspires rest of team to think differently

Additionally, the program offers a simple, intuitive definition of key concepts: Systems thinking: a type of synthetic thinking where interrelated parts are not examined in isolation but in relation to each other and to the whole they constitute. The advantage of systems thinking over analytical modes of thinking, in which parts are examined in isolation, is that the former can address complex problems that arise from the interdependence of different parts on each other, which are not conceptually visible when each part is studied by itself.

2. Green Steps — Sustainability Leadership Training at Monash University

This is a 5-day workshop spread over 2 weeks that trains young professionals who have no prior knowledge of sustainability in core sustainability competencies so that they can tackle real-world sustainability problems and advance sustainability in their workplaces. Participants apply by signing up for Take One Step and uploading a video describing how they will enact their "step". After the workshop, participants can apply for a 25-hour, team-based,

interdisciplinary sustainability consulting project at the University's Office of the Environment and Sustainability. The workshop is taught by teachers and guest speakers from the Monash Sustainable Development Institute, including from ClimateWorks, BehaviourWorks and Oxfam. In the program's words, "The training combines critical inquiry and pragmatic tools with insights from sustainability experts and entrepreneurial practice. It's highly interactive and is focused on teamwork and group discussion."

The workshop introduces sustainability issues to participants from three perspectives: global, organizational and individual. Five facets of changemaking are explored: sustainability issues and responses, systems thinking and planning interventions, behavioural change and designing interventions, communication for change, and leadership for sustainability.

3. Science Future Leaders Program at Monash University

This program is not related to sustainability as such, but the program structure may be useful as a reference for our workshop. There is an application process and only 30 students will be chosen to participate in the program. The program consists of a 2-day induction workshop (8 hours per day), 6 evening leadership workshops held throughout the year (2 hours per workshop), and a celebration dinner at the end of the program. During the induction workshop, participants identify and learn how to make the most out of their own leadership styles through leadership training and team building activities. The skills and and knowledge gained here will be revisited and built upon in the workshops throughout the year, during which participants will explore how to exercise leadership in a wide range of contexts.

4. Transformational Leadership for Sustainability

This program spans 3 months and offers one 7-hour workshop per month in Oslo, Norway or online. Between workshops, participants will be broken up into groups of 3 for weekly learning group calls with a practitioner coach to put what was learned into action. The program is open to all people — professionals, students, corporations, academics, non-profits — through application, but each participating organization must pay a fee of $4,500–6,500, with a 10% discount if two or more people from the same organization enrol. Participants are asked to come to the workshops with a changemaking initiative already in mind so that they can put their new skills immediately to use.

The goal of the program is to empower people to shift systems and cultures within their places of employment. The first workshop, Being Change, explores the personal qualities necessary to be a changemaker and to persevere in enacting change. The second workshop, Designing Change, focuses on ways to plan and implement solutions to problems that are not isolated, but rather part of a larger system. The third workshop, Leading Change, focuses on how to see initiatives through in the long-term, dealing with problems such as scaling-up change, maintaining unity in the face of diverse perspectives, and coordinating multiple projects to lead to the same goal.

5. McGill Sustainability Workshop Series

This 55-page article provides 5 different templates for changemaker workshops with full scripts attached. The five workshops are called: (1) Storytelling and One-on-Ones, (2) Mobilization and Sustainable Team Structures, (3) Anti-Oppression and Sustainability, (4) Power Mapping and the University, (5) Messaging and Strategy.

(1) Storytelling and One-on-Ones: This workshop is split into two parts: first, participants brainstorm about the importance of storytelling and craft their own "stories of self" (think: characters' origin stories in narratives); then, they practice networking with each other around their sustainability passions in structured one-on-one conversations, with the ultimate goal of inviting the other person to work with them.

(2) Mobilization and Sustainable Team Structures: Storytelling and One-On-Ones; Mobilization and Group Structures; Anti-Oppression and Sustainability; Power Mapping and the University; Messaging and Strategy.

- Have full scripts attached.
- Registration required, seems that the template is provided for students to use in their clubs etc.
- These are a good model for us to run test workshops with if the topics are of interest as all the materials are attached. They can also provide us with a template for how our workshop can be structured in terms of activities to provide. These also seem to be one session workshops so might be more relevant for our purposes.

6. Sustainability Action Program University of Southampton

This is a program run by students of the University of Southampton which provides custom-tailored workshops to different groups within the University addressing the importance of sustainability and how they can develop

sustainability skills. The workshops include interactive activities, teamwork exercises, and reflections on what sustainability means personally for each participant. An example would be a workshop conducted with the University's student union executives to reorient their operations around sustainable values.

7. Rotman Executive Certificate Program — Sustainability Leadership: Innovation for Growth Online

This is a 6-week online learning program targeted towards business leaders, professionals and consultants who want to learn how to embed sustainability into their corporate business models. The program costs $2,600 to register for. It addresses issues such as how sustainability can be a source of innovation, improve governance, grow customer, employee, and investor bases, and increase profit. A key framework introduced in the program is the Triple-Layered Business Model Canvas, which is supposed to create more sustainable business models on three layers: the economic, environmental and social.

The program is divided into 6 modules, with 1 module per week. Module 1 addresses the history and science of sustainability as well as sustainability's effect on dividends. Module 2 addresses the effect of innovation on sustainability outcomes. Module 3 explores how to design sustainable business models and foster sustainable leadership. Module 4 dives into low-carbon and circular economies. Module 5 examines the finances surrounding sustainable and non-sustainable practices. Module 6 addresses stakeholder engagement. The course also looks at real-world case studies, including Unilever, Tesla, Uber, Apple, Airbnb, and Starbucks.

Each week, participants reflect on the material they have learned by brainstorming initiatives related to that week's content. Assessment and learning methods include polls, discussion boards, crowdsources, quizzes, sustainability playbook, and a capstone project.

8. Cambridge Institute for Sustainability Leadership: Advancing Leadership Webinar Series

This is a series of webinars aimed at "advancing leadership" in the workplace. Watching the recordings of these webinars, both the 2020 and 2019 ones seem useful to us as they cover topics we are trying to tackle, such as "explor[ing] how employees at all levels can harness their leadership potential to influence the culture of their organisation." The 2020 webinars are more focused on embedding change in the workplace and in a business setting, whereas the 2019 ones are more generally about leadership and theories of leadership.

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9. Cambridge Institute for Sustainability Leadership: Rewiring Leadership Report

This pamphlet is one part of Cambridge's Rewiring the Economy series. It begins with the argument that, as government regulation is slow and reactive, it cannot be the sole force society relies upon to navigate the challenges of the 21st century, which include climate change, income inequality, and the disruptive power of the information and communication technologies (ICT) constituting the "Fourth Industrial Revolution". Businesses must play a leading role in solving these issues. This, however, will require the fundamental purpose of business, and the current operations of existing organizations, sectors and supply chains by extension, to be changed. "Leadership development" is the mechanism by which a transformation of business practices can be effected to align with the macro-level social changes needed in order to deal with the aforementioned challenges. Businesses must change, the pamphlet argues, for their own best interests: not only does technological and environmental disruption create opportunities for new products and profits to be made, businesses' social contract with the public depends increasingly on the latter's expectation that they will ramp up social responsibility and take action against environmental breakdown.

For businesses to be socially responsible, their purpose must be relevant to the SDGs, holistically applied to all aspects of their operations, followed-up with by senior management, specific enough to serve as a guide in lower-level decision-making, and understood by employees throughout the organization. To reach this point, businesses must transition from adaptive to proactive leadership, by doing so disrupting the status quo and reshaping social and economic systems at the macro level. They must align positive societal outcomes with the pursuit of profit.

The problem, however, is that profit maximization is a short-term objective whereas positive social and environmental change is a long-term one. A divergence in time-scale between these two goals often leads to prioritization of the short-term over the long-term, especially under traditional models of leadership wherein managers' immediate objective is to satisfy shareholders (as opposed to stakeholders — a broader category that encompasses community members). To maintain eyes on long-term goals, a new model of leadership is required — one that focuses on building collective leadership capacity throughout the organization as opposed to nurturing a "heroic few" at the top, emphasizes the importance of ethics, character and personal worldviews in sustaining long-term commitments that may be more abstract than concrete, favours discarding old practices for new ones informed by science and data analysis, and develops skills to enact change at the systemic level.

At present, there is a leadership gap — a lag in transitioning businesses away from the adaptive model and towards the proactive one. Many employees, at all levels, do not possess the necessary knowledge, values or skills to break from the traditional leadership model. In particular, upper management and Board members are too isolated from on-the-ground dynamics of environmental devastation and social hardship to see the need for innovation. However, businesses that did shift their models to prioritize sustainability saw benefits, such as increased employee engagement and retention, and brand amplification. To make the transition, traditional leaders need to learn and harness various aspects of emotional intelligence, such as empathy, communication, collaboration, and transdisciplinary thinking.

The pamphlet can be used as an assigned reading in our workshop in order to give students an overview of the importance of sustainability leadership in a business context and the challenges faced by businesses in the modern world, as well as to introduce them to the Cambridge Leadership Model.

10. Cambridge Institute for Sustainability Leadership: 10 Lessons for Embedding Sustainability Across the Business

This article outlines 10 lessons a CISL Senior associate learned when embedding Unilever's Sustainable Living Plan into the organization. Most of the lessons are quite generic and covered already by the other Cambridge workshops, but two stand out: first, focusing on the moral case for sustainability while neglecting the business case leads to business failure; second, senior leaders of companies need to hold governance meetings where the agenda is

is exclusively on sustainability and all the relevant people are invited, in order to have productive discussions on transforming the business in a sustainable direction.

11. Cambridge Institute for Sustainability Leadership: Rewiring leadership for High-Impact Seminar

This is a two-day professional development seminar aimed at senior managers, HR executives and sustainability office personnel who want to learn Cambridge's leadership model for sustainability transformation and apply it to their own work. The cost of attendance is £700 to £2,250, which includes accommodation and meals. Entry is through application. Over the course of the seminar, participants develop a shared vision for leadership that will drive the change within business organizations needed to reconcile profit with positive societal outcomes. Participants explore leadership dilemmas arising from this task and how to tackle them, the importance of purpose and personal values to professional work, and tools and strategies to influence other organization members. The seminar features guest speakers from academia, business and other specialty areas. The seminar's activities include co-creation, group activity, journaling and reflection time, peer to peer coaching, and pair work.

12. Cambridge Institute for Sustainability Leadership: High Impact Leadership Online Short Course

This is an 8-week online course (8–10 hours per week) open to all professionals seeking to refine their leadership skills within a sustainability context. It costs £2,200 to take, and completion results in a certificate from the Cambridge Institute for Sustainability Leadership. The course is divided into 8 modules (1 module per week), each addressing a different aspect of the transformational leadership Cambridge believes necessary to tackle the sustainability challenges of the 21st century. The modules include "High impact leadership capabilities," "Communicating for influence," "Developing the mindset and skills for innovation," and others.

13. Cambridge Institute for Sustainability Leadership: Business Sustainability Management Online Short Course

This is an 8-week online course (8-12 hours per week) geared towards working professionals seeking to embed sustainability into their organizations and further corporate social responsibility efforts. It costs £2,200 to take, and

completion results in a certificate from the Cambridge Institute for Sustainability Leadership. The course is divided into 8 modules (1 module per week), and addresses "opportunities and challenges associated with sustainable business management, as well as the resources needed to implement sustainable initiatives effectively". Modules educate students on international environmental regulations, the impact of innovative design and technology on transforming businesses, how sustainability fits into production and consumption, and the importance of building partnerships outside the firm.

14. Telling Your Public Story: Self, Us, Now, by Marshall Ganz

This is an informational worksheet about how to tell public stories of oneself for purposes of activism and leadership. A public story consists of three elements: a story of "self," a story of "us," and a story of "now." The story of self recounts what brought you to where you currently are. The story of us mobilizes a larger community which you are a part of by recounting the shared experiences and values that brought you together. The story of now identifies immediate, concrete actions you and your constituency can take to address a problem that runs counter to your values and ideals. The material covered is similar to the "Storytelling and One-on-Ones" workshop by McGill.

The worksheet is targeted towards public-minded and activist students, but it requires editing and revision for a larger audience,

This article, Fact or Fiction? Why the Truth of a Brand's Story is in the Doing, which discusses the importance of storytelling in general and in the business world, can be assigned as a reading. It can be accompanied by this PowerPoint presentation, From Storytelling to Storydoing.

15. WWF Canada: Living Planet @ Work

This is a resource hub targeted towards employees and aimed at helping them spearhead sustainability initiatives in their places of work. Additional resources are provided to help employees behave in a sustainable manner in a workplace setting. The resources provided to those who register can perhaps be a useful example of the things that can be accomplished in a workplace setting (e.g. waste reduction, responsible printing, energy conservation), which we can give to the students in our workshop.

16. Sustainability Academy: Diploma on Corporate Sustainability: Foundation Course

This is an online course aimed at giving working professionals an introduction to corporate sustainability, sustainable development and circular economies. The cost of taking the course is $580, and the course spans 5 modules, totalling 20-25 hours of work. Upon completion, students receive a diploma.

Module 1 covers the basics of sustainability, including an overview of the definitions and history of corporate social responsibility. Module 2 covers the SDGs and other international sustainability legislation (i.e. Kyoto Protocol), and makes the business case for sustainability. Module 3 goes into stakeholders and their relationship with businesses. Module 4 reviews the leading guidelines and standards on corporate social responsibility. Module 5 addresses the question of how sustainability can be embedded into individual students' organizations.

17. IEMA — Change Management for Sustainable Development

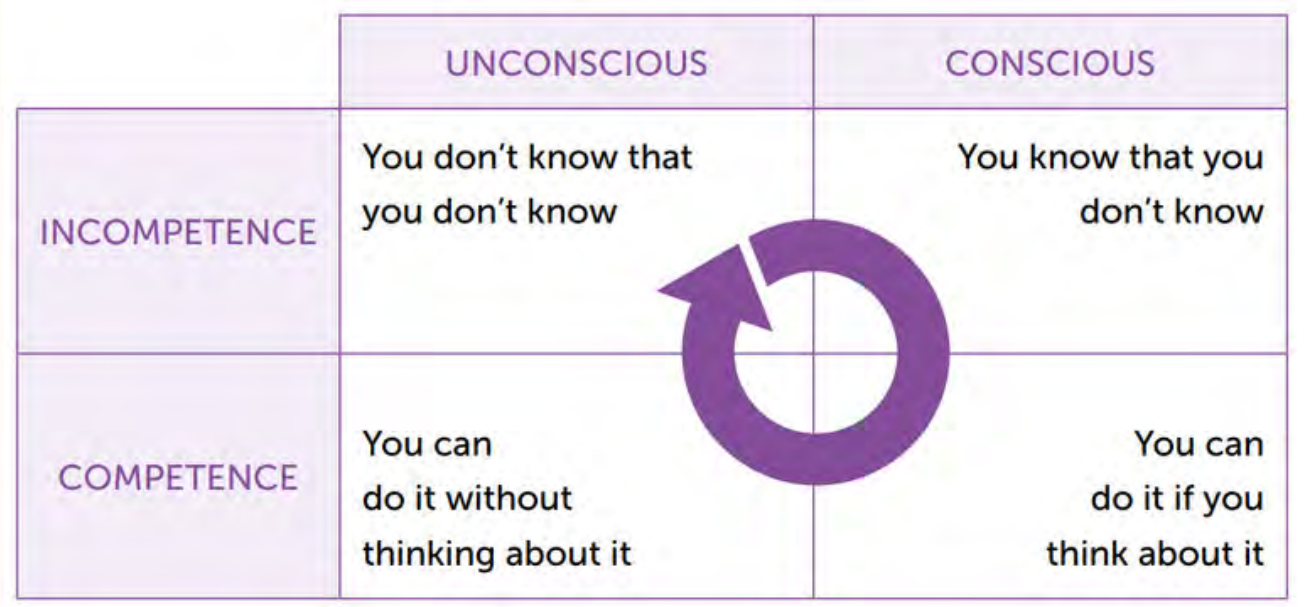
This lengthy book (250 pages) is about creating and managing sustainable change, focusing only on theories when they are practicable as well as practical advice. The book is interactive and allows you to answer questions in the text itself, which could be a useful exercise to do with the planning team. All of the material covered seems relevant to our purposes but the following sections are most relevant:

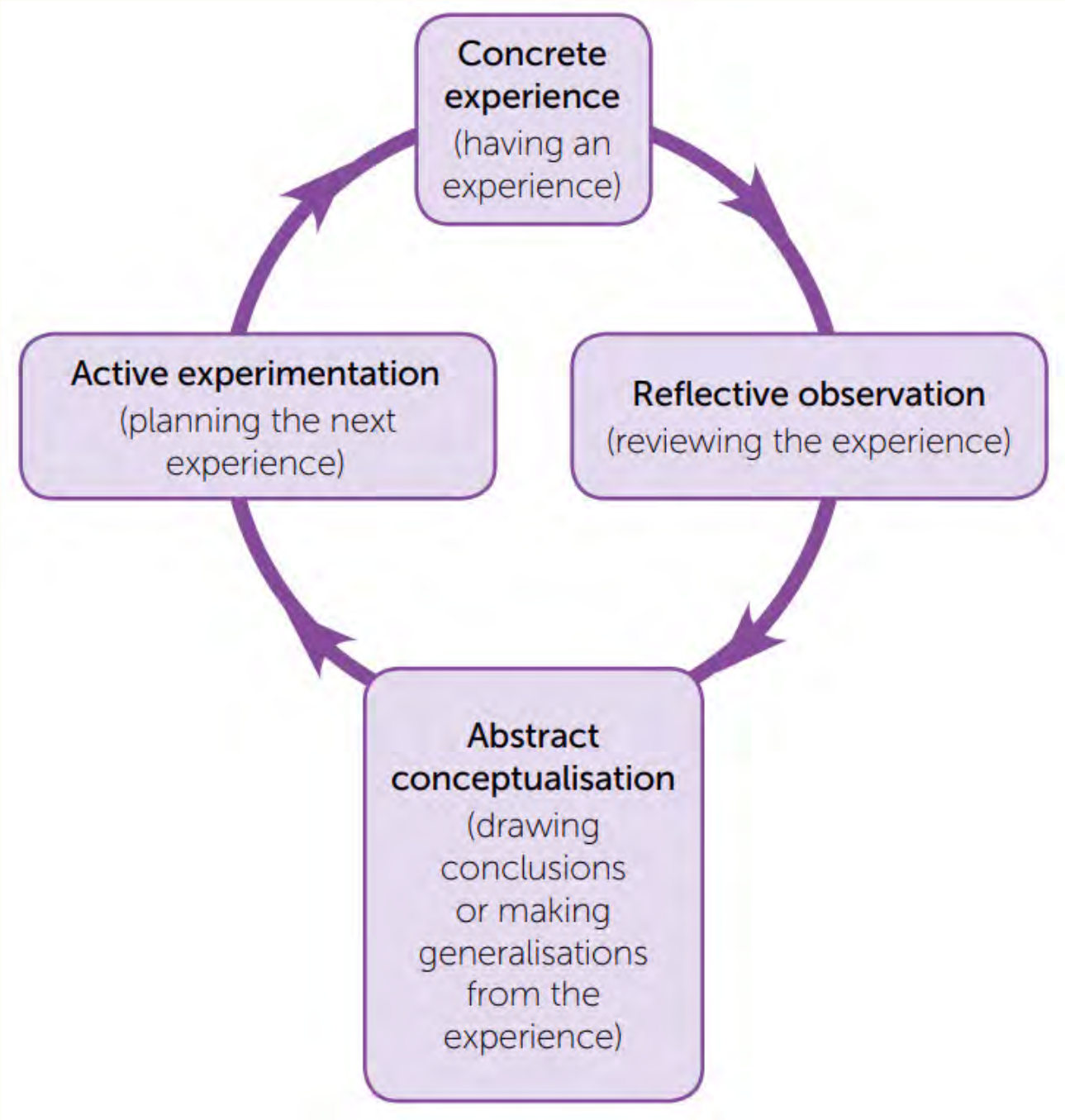
2. Understanding where you are now
3. How does change happen
5. Engaging people
6. Organisational culture, understanding emergence
7. Planned change

Tips:

- Talk to people in their own language
- Identify strategic opportunities for collaboration
- Prioritize systems thinking and long-range strategizing. At the same time, know how to navigate the everyday tasks that come with running an organization.
- Build your social capital: gain the trust and esteem of your peers and boss by doing good or innovative work
- Know whether you are an activist, a diplomat, or an implementer

- Know how to identify and navigate slow-burner change situations or situations where everything is put into flux by a critical moment
- Know your internal (psychological, personality) and external (assets, connections, privilege, formal role) position within the organization so you can play to your strengths
- Do you have formal or material power, or soft power?
- Tempered radical: someone who wants to succeed in the organization but who displays beliefs differing from orthodoxy
- How comfortable are you with doing something that is above or beneath your competency, against your beliefs, not what you signed up for, or detrimental to your career?
- Identify different resources for learning about changemaking: podcasts, videos, books, coaching, live seminars, peer networking
- Know how to recharge with hobbies and support networks
- Figure out which networks, corporations and people your organization is dependent on. If they disappeared, could your organization survive?
- Align yourself with the company mission and stated goals
- Ask people of all levels of the organization what they think of it and its sustainability goals. There will be a variety of answers depending on what level they are at.
- Services are more sustainable than products?




Concrete experience (having an experience)
Reflective observation (reviewing the experience)
Abstract conceptualisation (drawing conclusions or making generalisations from the experience)
Active experimentation (planning the next experience)

Pestle Analysis

P - Political What's on the political agenda? What are politicians trying to do?	
E - Economic What's the local, national and global economy doing?	
S - Sociological What are the trends in society? What are the significant social aspects and impacts?	
T - Technological What's being used? What's on the way out? What's emerging?	
L - Legal What laws are relevant to the organisation? What's on the way in or out?	
E - Environmental What are the significant environmental aspects and impacts? What environmental limits will become an issue soon? And in the longer term?	

	SUBJECTIVE	OBJECTIVE
INDIVIDUAL	1. Individual subjective Personal values, world view, assumptions etc. "Climate change is such a huge issue that there is nothing I can do."	2. Individual objective The limits of one's role or authority, skills, resources, knowledge etc. "I do not have the money to replace my boiler."
COLLECTIVE	3. Collective subjective Group culture, shared mindsets, shared norms, predominant fashion or beliefs. "We can't make money enough on eco homes."	4. Collective objective Political, economic, social, technological, legal, environmental.[34] "Building regulations aren't strong enough."

18. Stanford Social Innovation Review — Engaging Employees to Create a Sustainable Business

This article describes sustainability initiatives at different organisations to demonstrate how small investments in sustainability can be extremely profitable down the line. It details the conflict or "gap" between employees' personal values and organizational behaviour, and how management can bridge that gap by setting an example of "walking the walk" themselves. The article also highlights the importance of thinking about the "social function" of a company and its brands, as doing so can help translate long-term sustainability goals into short-term ones. Also important is to understand that sustainability is economically profitable, through cutting costs and expanding revenues, and to be able to defend this case to company personnel. Analytical valuation systems that track savings from sustainability can help with visualizing the impact of initiatives. To increase buy-in from employees, not only should the CEO themselves be invested in the sustainability agenda, but managers should get employees to co-create sustainability initiatives by providing capital for new projects, and encouraging healthy competition among teams of employees to come up with the best new idea for embedding sustainability in the workplace.

The article is not immediately relevant for our purposes since most of these initiatives must be carried out at the C-Suite level. However, it could be assigned to show attendees at our workshop what kind of management models are needed for sustainability to be embedded holistically across the entire organization they work at, in effect putting up a "gold standard" for them to compare their own corporate cultures to.

19. Harvard Business Review — How to Make Sustainability Every Employee's Responsibility

This article addresses the gap between sustainability talk and "walking the walk" in companies. For employees to care about sustainability, it is important that they feel a sense of ownership over sustainability and are not simply bystanders to the organization's efforts. The article outlines a framework for the creation of ownership in three phases: incubate, launch and entrench. Incubation is the process of staking out a company's sustainability domain and identifying material issues across its value chain. Launching the sustainability plan entails enthusiastically introducing it to stakeholders and setting the idea of ownership in motion, through emotional as well as rational appeals. While appeals to the heart convince some people to take ownership of sustainability, economic reasoning may work better on board members and hard-nosed line managers. Entrenching feelings of ownership makes sustainability routine — something people just do. This can be done by embedding sustainability metrics and reports into daily life at the company.

The article may be assigned as a reading. The idea of psychological ownership is one that could be discussed if we focus on behavioural change as important for sustainable change.

20. Reconciling Ways of Knowing: Indigenous Knowledge and Science Forum

This website has recorded discussions and publications on how to reconcile indigenous and "western" knowledge in order to live sustainably.

This report is particularly relevant and can be assigned as a workshop reading. The concepts covered are more than merely technical; they touch on values important to indigenous peoples in Canada such as "respect, love, courage, honesty, wisdom, humility and truth," (p. 6), and as such emphasize the importance of values and humanity when approaching sustainability issues. The

report also touches on why it is important to integrate this knowledge and to recognize that the Western scientific literature should not be seen as the most authoritative form of knowledge.

21. The Citizen's Handbook

This is a manual for grassroots organizing aimed at citizen's groups working on select issues in their communities. While it is not directly about sustainable changemaking, the manual offers excellent concrete advice about how to form organizations, attract members, retain members, prevent disintegration from infighting or apathy, deal with hostile and friendly groups from the outside, gain media exposure, solicit funding, choose demonstration tactics that best fit the organization's goal, and turn small-scale initiatives into large-scale movements. Several articles are useful to grassroots or underprivileged activists who are seeking to make change against the dominant tide of their community: Arnstein's ladder of citizen participation, Get People, Keeping People, Grassroots Rot, Conflict Resolution, Framing Issues in the Media, Fundraising, Social Movements: a summary of what works, The Tyranny of Structurelessness.

22. Asset-Based Community Development (ABCD)

ABCD is a framework for sustainable community development that categorizes land, labour, property and skills as "assets" and seeks to maximize or put to most efficient use the pre-existing assets of a community. The main idea is to make members of a community aware of what they already possess themselves and what they can do with it, rather than reinforcing social attitudes of dependence wherein external authorities are thought to be the only agents capable of fulfilling the community's needs. In ABCD's own words, "communities can drive the development process themselves by identifying and mobilizing existing, but often unrecognised assets."

This may be assigned as a reading for our workshop as it seems to be a topic addressed in similar workshops at other universities and institutions.

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Appendix 8: Transdisciplinary Knowledge Co-Production (TDCP) Workshop Design — Annotated Bibliography

TDCP Workshop Literature Review
Summary of Papers (working document)
Emily MacCallum, CECCS Research Assistant (July to September 2022)
Faraz Alidina, CECCS Research Assistant (September 2022 to present)

Definition of TDCP:

- Co-production can be understood through a descriptive or normative perspective.
- As a descriptive idiom, co-production recognizes that science and society are mutually-constitutive. As Sheila Jasannof (2004:2) writes, "the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it."
    - Indigenous perspectives on knowledge creation are similarly anathema to the notion that science is simply a transcendent mirror or distilled image of reality. This is because "Indigenous knowledge is inseparable from the socio-cultural, political, legal and other grounded, largely place-based relations and obligations" (Latulippe, et al. 2020:7). All knowledge is situated and embodied (Haraway 1988).
    - TDCP represents a cluster of research processes that can be used to address complex socio-ecological problems (Turnhout, et al. 2020; Chambers, et al. 2020; Trischler, et al. 2022) whose very intractability requires attending to knowledge's situatedness (Polk 2020).
- As a normative goal, co-production is an "iterative and collaborative process" (Norström 2020:183), a "participatory turn" to research (Facer and Enright, 2016), that "brings together diverse groups to iteratively create new knowledge and practices" (Jagannathan, et al. 2020:22).
    - Ideally, co-production occurs at every stage of knowledge production (Latulippe, et al. 2020), including: co-design, co-management, co-implementation, and co-dissemination.
    - The general premise of TDCP is that inclusive collaborative processes are better able to frame relevant societal problems, capture the breadth of knowledge required to solve problems, and elicit the buy-in and legitimacy necessary for the implementation of solutions (Palmer, et al. 2020; Chambers, et al. 2021; Wittmayer, et al. 2018).

    - Co-production also flies under the banner of open science, citizen science, mission-oriented innovation, transformative innovation policy, responsible research assessment, community-based participatory research, and responsible research and innovation.
- A transdisciplinary approach to knowledge production involves, engages and collaborates with stakeholders from academia and practice (e.g., community partners, organizations, private institutions, governments, etc.) (Horne, et al. 2022).
    - This approach requires that the membership of knowledge producers transcend academic disciplines (rather than being an integration of disciplines or a co-existing of them) and the boundaries of the university itself. (Polk 2020).
    - Fundamentally, it is a reshaping of the researcher-society relationship (Hemström, et al 2021) toward a reciprocal and interactive (Polk 2020) model that uses co-production to empower marginalized actors and influence powerful ones (Chambers, et al. 2021).

Synthesis:

- Many studies pointed to the advantages of co-productive models of knowledge creation.
    - Polk (2015) notes that co-production leads to the development of new relationships between practice and research.
        - This, in turn, allows for research to move away from a linear-model of science and toward one in which there is a greater sharing of responsibility for knowledge production between researchers and practitioner groups.
    - Co-production leads to mutual learning and greater insights into the multiple dimensions of sustainability challenges. After all, citizens are closer to the problems research seeks to address (Trischler et al. 2022).
    - In a study comparing the effect of team formation on solution efficacy, Bixler et al. (2022) found that compared to multidisciplinary or interdisciplinary teams, co-production's transdisciplinarity led to more agreeable solutions.
- The secondary literature on co-production emphasised the heterogeneous nature of the process.
    - Co-production efforts can be divided into the various stages of research (e.g., co-design, co-management, co-implementation, co-dissemination).
    - Chambers et al. (2021) argue for "six modes" of co-production: researching solutions, brokering power, navigating differences, empowering voices, reframing power, and reframing agency.

    - Norström (2020) identifies four "principles" that underlie knowledge co-production: it is context-based, it accepts pluralism in ways of knowing/doing, it is goal-oriented, and interactive.
    - Many studies attempted to turn co-production knowledge away from a focus on "products" to one on "process" because this focus allows for more second-order experimentation (Fazey et al. 2018), a recognition that complex problems require iterative, flexible approaches (Norström 2020), and a greater emphasis on adaptive learning (Chambers et al. 2022),
- Studies that evaluated the experiences of participants with knowledge co-production highlight a series of common challenges.
    - These challenges include limitations of time; the variable nature of participants' ability for the requisite skills of self-reflection, patience, and flexibility; institutional mismatches; the tendency to fall back on familiar roles, and communication barriers (Polk 2015; Thapa et al. 2022).
    - Many studies also noted the difficulties in measuring and evaluating the outcomes of co-production that were not immediate (Horn et al. 2022).
        - The link between intermediate and societal effects, and immediate outcomes were not always clear (Jagannathan et al. 2020; Palmer et al. 2020).
    - A further criticism of knowledge co-production is that it is not always truly equal. The rhetoric of depoliticization can sometimes mask the power dynamics inherent to co-production; namely, that elite actors still have an outsized influence in terms of resources, the ability to initiate co-production projects, the intellectual capital required for such projects and the determination of the project scope (Turnhout et al. 2020; Latulippe 2020; Durose et al, 2021).
        - This has given rise to a distinction between researcher-initiated, social movement-initiated, state-initiated, and business-initiated co-production (Polk 2015).
- These challenges, however, are not intractable. The secondary literature has been able to capture some of the good and promising practices associated with TDCP (e.g., NewHoRRizons report).
    - For example, Chambers et al. (2022) highlight the importance of "co-productive agility" in contrast with "co-productive rigidity" to capture the ability for co-production to open multiple pathways to societal transformation.
        - These pathways include elevating marginalized agendas, questioning dominant agendas, navigating conflicting agendas, and exploring diverse agendas.

    - Turnhout et al. (2020) similarly emphasized the need for pluralism to highlight differences and enable the contestation of interests.
        - Norström (2020) notes that stake-holder mapping and network analysis tools can be used to better grapple with the complexities of pluralism.
    - Smit et al. (2015), Fazey et al. (2018), Horn et al. (2022) and Norström (2020) have identified critical reflection and reflexivity at every stage of the research process as a key to success.
- As noted, the evaluation of outcomes is a significant challenge for practitioners and researchers. Some expressed support for narrative forms of evaluation whereas others were in favor of developing indicators (NewHoRRizons). Some studies have provided frameworks for future use.
    - In the context of Indigenous knowledge, principles such as OCAP (ownership, control, access, and possession) have been used to create a framework for evaluating Indigenous control of intellectual property (Latulippe 2020).
    - Palmer (2020) has provided a QME (Quality Monitoring Framework) that evaluates first-, second- and third-order effects through five components: knowledge management, performance monitoring, governance, formative learning, and legitimacy.
    - Grey literature has also captured various methods for evaluating co-production initiatives (NewHoRRizons).

Synthesis of Findings:

- A common thread throughout the literature is scholars writing about the approaches to and/ or problems of methodology and practice. Generally, these papers offer a sort of holistic goal, guidelines, or “rules” the authors find essential to achieve success.
- Many articles discuss the importance of language and communication, especially considering the type of discourse used can create power dynamics, hierarchies, and/or create barriers. An attention to using language to break down these dynamics and barriers can be an effective way to create a more inclusionary environment.
- Some of the research discusses the tension between goals of the project and the desires/ pressures/ constraints of the funding institution or the academy.

- Acknowledgement across much of the scholarship that TDCP can pose challenges for early stage researchers and takes more time and resources to execute effectively.
- Facilitation is essential to successful TDCP. Most of the literature acknowledges that facilitation skills are not inherently achieved through traditional graduate school work and so training for researchers is very useful.
- In relation to facilitation, much of the literature discusses differing approaches to collaboration and a need for the methods and approaches used to be both flexible and allowed to change, but also a joint decision between all parties
- Resources on how to navigate this type of research as a student at the U of T (or in general at an institutional level) would make using TDCP methodologies easier and more successful.

Annotated Bibliography:

1. Thapa, K., Vermeulen, W. J. V., & Deutz, P. (2022). Science with society: Challenges of early-stage researchers engaging with transdisciplinary research in sustainability science. Sustainable Development, 1–11.

Summary:

This article addresses two problems: first, it questions what research challenges transdisciplinary early stage researchers (TD ESR) could face; and second, what can be learned from previous TD ESR experiences in order to understand and navigate these challenges. The authors provide insights for practitioners from sustainability sciences who are interested in TDR and research funding agencies who demand societal impacts. They highlight the need to develop relationships and shared understanding between knowledge holders and conclude that balancing the desired societal impact of TDR without losing academic focus, supporting specific skill sets for TD ESR, and having the adaptability to navigate academia as required by context are all central to TDR practice.

Evaluation:

This article mainly points out common problems, but offers little in ways of solutions.

2. Latulippe, N., & Klenk, N. (2020). Making Room and Moving Over: Knowledge Co-Production, Indigenous Knowledge Sovereignty and the Politics of Global Environmental Change Decision-Making. Current Opinion in Environmental Sustainability, 42, 7–14. https://doi.org/10.1016/j.cosust.2019.10.010

Summary:
This paper's goal is to bring together literature on knowledge co-production (KCP), Indigenous knowledge research, and environmental governance in order to show the necessity for co-production scholars to move away from goals of 'integration' and instead make room for Indigenous research leadership. KCP scholarship commonly upholds the understanding of knowledge as 'something out there' which furthers the notion that research can be separated from the context in which knowledge is cultivated. Indigenous knowledge, however, is inseparable from its spatiality and place, socio-cultural, and political contexts that enable holistic knowledge systems. In order to help navigate this division, the authors propose 'making room' which can enable collaboration and partnership as opposed to extracting knowledge (the current norm), thus fostering a change in current understanding of Indigenous peoples and the way research is conducted. Making room requires decentering the place of western science and institutions and their willingness to give up power and privilege culminating in a wholesale transfer of research resources and authority to Indigenous-led knowledge gathering. This does not mean operating in isolation as Indigenous knowledge holders combine methods from western sciences into their knowledge systems.

Evaluation:
This paper is a great resource for scholars to understand how to ensure Indigenous knowledge is supported effectively and offers an approach for both Indigenous communities and academic institutions to collaborate in a more equal fashion. It offers researchers a model for behaving and collaborating with Indigenous knowledge holders.

3. Turnhout, E., Metze, T., Wyborn, C., Klenk, N., & Louder, E. (2020). The Politics of Co-Production: Participation, Power, and Transformation. Current Opinion in Environmental Sustainability, 42, 15–21. https://doi.org/10.1016/j.cosust.2019.11.009

Summary:
The authors offer a literature review on the political and power dimensions of knowledge co-production (KCP) in order to question why KCP processes often fail. The authors show that depoliticization dynamics in co-production reinforce rather than mitigate existing unequal power relations. The authors therefore emphasise the importance of allowing for pluralism and the contestation of knowledge. KCP models and projects are routinely created with uneven power relations because they are defined, designed, and implemented by, and therefore favour, elite actors (meaning researchers, government, prominent NGOs, for example). This paper explains that depoliticization is a key factor in the reproduction (and justification) of unequal power relations stemming from the 'default' use of the 'depoliticized' discourse of rational/ scientific arguments, ignoring political differences, positions, pressures, and interests of the various participants in the discussion of "best" solutions. Authors suggest understanding KCP as both knowledge-making and a political practice to fully and continually recognize the politics of KCP and to re-politicize the process and to allow for pluralism and the contestation of interests, views, and knowledge claims.

Evaluation:
This paper offers a useful brief on how KCP can uphold political and power imbalances and is a reminder for practitioners to be cognisant of the nature of discourse and language used when organising and participating in KCP.

4. Chambers, J. M., Et al. (2022). Co-Productive Agility and Four Collaborative Pathways to Sustainability Transformations. Global Environmental Change, 72, 9–26. https://doi.org/10.1016/j.gloenvcha.2021.102422

Summary:
This paper focuses on the poor understanding of how to best navigate tensions that emerge in co-production research. The authors analyse 32 initiatives of KCP in order to conceptualise 'co-productive agility,' meaning "the willingness and ability of diverse actors to iteratively engage in reflexive dialogues to grow shared ideas and actions that would not have been possible from the outset," (pg. 18) as a vital KCP feature when dealing with tensions. The authors suggest 4 different pathways that result from co-productive agility: 1) elevating marginalised agendas; 2) questioning dominant agendas; 3) navigating conflicting agendas; and 4) exploring diverse agendas. This paper offers a conceptual and practical framework for navigating tensions and power dynamics among diverse actors to create broad ownership and action for transformative social-ecological change.

Evaluation:
Article offers a valuable discussion of tension within TDCP methodologies and some possible ways of overcoming and/or acknowledging it. A good reading to include for practitioners of TDCP.

5. Norström, A. ., Et al. (2020). Principles for Knowledge Co-Production in Sustainability Research. Nature Sustainability, 3(3), 182–190. https://doi.org/10.1038/s41893-019-0448-2

Summary:
The authors explain how KCP has developed over the past 40 years and the variances between different approaches, such as 'normative' versus 'descriptive.' A set of four general principles that underlie high quality knowledge co-production for sustainability research is proposed. Using these principles, this paper offers practical guidance on how to engage in meaningful co-productive practices, and how to evaluate their quality and success. The definition proposed emphasises that co-production processes produce more than just knowledge; they develop capacity, build networks, foster social capital, and implement actions that contribute to sustainability. The authors suggest that processes should be: (1) context-based (taking into account the different needs, interests and beliefs of the different social groups who are invested in or affected by the challenge at hand); (2) pluralistic; (3) goal-oriented; and (4) interactive.

Evaluation:
The 4 defining features are useful for workshop purposes as setting a 'gold standard' of what kind of KCP methods the U of T would be teaching. Useful reading for scholars who are new to TDCP or those who are setting out their project methodologies.

6. Jakob Trischler, Et al. (2022): Citizens As An Innovation Source in Sustainability Transitions — Linking the Directionality of Innovations With the Locus of the Problem in Transformative Innovation Policy. Public Management Review. Ahead-of-Print. DOI:10.1080/14719037.2022.2062041

Summary:
This paper problematizes how transformative innovation policy (TIP) is ruled by a producer-centric innovation paradigm, which focuses on technological breakthroughs rather than social changes driven by citizens. By drawing on multiple fields of research and by using the example of household food waste,

this article challenges this paradigm and asserts that addressing sustainability challenges requires a policy frame that upholds citizen contributions as a source of innovation. The authors question whether an organisation-led innovation process is sufficient and as an alternative and assert that citizens should be defined as an independent innovation source. The cross-disciplinary approach brings new insights into the citizen's role in sustainability transitions, and as such, contributes to current efforts in broadening the TIP conceptualization. Citizens' contributions to sustainability transitions are important because they are close to problems linked to unsustainable practices and can develop solutions that align with needs many other people are facing. The article concludes by discussing how TIP needs to be further developed so that it successfully includes citizens as a source of innovation, especially in regards to innovations that address problems linked to unsustainable practices. A shortcoming in TIP theory is also noted and called to be addressed in future research: the missing link between the directionality of innovations and the locus of the problem.

Evaluation:
Some elements of this paper show how TDCP could come about in practice, but overall it is more focused on TIP and therefore not a very useful reading for TDCP practitioners.

7. Catherine Durose, Et al. (2021). Leadership and the Hidden Politics of Co-Produced Research: A Q-Methodology Study. International Journal of Social Research Methodology, DOI: 10.1080/13645579.2021.1960738

Summary:
This paper contributes to debates about the hidden politics of the co-production methodology in research, including a number of underlying tensions and debates about the purposes of scientific work, its practices, and how power is negotiated. The authors explain why more attention to leadership is needed and discuss three ways in which these hidden politics play out: divergent purposes, plural practices, and power differentials. Throughout the article, the authors demonstrate the value of centering both questions of politics in debates on co-production and leadership and advancing the understanding of how leadership in co-production is contested. This study was motivated by the authors' experiences working on CP research about participatory urban governance. The goal of the Q-methodology study was used to help reflect on leadership of CP projects, specifically regarding negotiating differences, by placing the authors' experiences in a broader context of the experiences of other CPR projects.

Evaluation:
This article devotes critical attention to uncovering and interrogating how viewpoints on leadership in co-production of research differ and align, which helps open up new avenues for research on co-production in other domains. Through the focus on the politics of co-production, the authors discuss distinct perspectives on leadership in the co-production of research and offer a "heuristic for practice." The authors claim that this debate will assist researchers navigate the complex realities of practice in CPR, but how helpful this will actually be for practitioners of TDCP will be case by case depending on the project.

8. Chambers, J. M., Et al. (2021). Six Modes of Co-Production for Sustainability. Nature Sustainability, 2021(4), 983–996. DOI:10.1038/s41893-021-00755-x

Summary:
This paper analyses the outcomes of 32 sustainable development of ecosystems co-production initiatives across 6 continents, ranging from local to global scales. The authors also found a variety of purposes for implementing co-production, generally centred around the goal of effectively solving a predefined problem and/or to reframe a set of problems. Projects that emphasised reframing often struggled to engage solutions-oriented actors and produce concrete actions while many of the cases didn't actively influence politics of power relations or struggled to navigate the shifting of power. The authors then identified six modes of co-production: (1) researching solutions; (2) empowering voices; (3) brokering power; (4) reframing power; (5) navigating differences and (6) reframing agency. The 6 different modes each show how distinct approaches to purpose, power, politics and pathways are suited to achieving different goals, while also posing different potential risks. The authors conclude that co-production methods require careful facilitation to bridge diverse perspectives, values and identities, and that multi-scalar and long-term engagement is vital for achieving outcomes. Another conclusion the authors found was that the successful production of scientific knowledge was routinely negatively associated with attaining most other outcomes. This suggests that using co-production resources to fill knowledge gaps could hinder the attainment of other outcomes that motivate collective action. While the authors found that co-production efforts showing the largest changes in institution and management practices were ones that directly supported both researchers and diverse societal actors, the overall impact of this methodology for sustainability

remains unclear. They also echo existing concerns that funding paradigms and policy orientations requiring predefined problem definitions and impact pathways may constrain the full range of possible outcomes of co-production.

Evaluation:
This reading is useful for TDCP scholars, especially for considering how to manage disparate goals between the actors involved in KCP. The authors attempt to clarify the connections between co-production choices and differing benefits and risks. They offer a heuristic tool for researchers and societal actors to critically explore this diversity and effectively navigate trade-offs when co-producing sustainability.

9. Bixler, R. P., Et al. (2022). Exploring the Connection Between Transdisciplinary Co-Production and Urban Sustainability Solutions: A Case Study at an Urban Stream Management Symposium. Urban Ecosystems, 25(4), 1207–1216. https://doi.org/10.1007/s11252-022-01226-7

Summary:
This paper focuses on the gap in research about the intersection of co-production and team science by questioning if team formation, specifically, single-, multi- or trans-disciplinary teams, influence the process and perceived efficacy of sustainability solutions. The authors used case study data collected at the 5th Symposium for Urbanization and Stream Ecology (SUSE5), held in February 2020, to explore the impact of creating various types of teams to generate solutions to problems found in urban streams in Austin, Texas. The authors were guided by three broad predictions: (1) disciplinary teams will collaborate easiest; (2) transdisciplinary teams will achieve higher-rated solutions, and (3) quality of team's working dynamics will positively correlate with the rating of their solutions. Each team was equipped with two trained facilitators and the exercise all included both inter team and conference wide reflections. Their surveys and data showed that multidisciplinary teams (rather than disciplinary teams) reported better collaboration and the transdisciplinary team's solutions were rated the highest by non-team member peers. Yet transdisciplinary teams faced the most difficulty in proceeding through the different stages of problem definition to solution design. The authors also found a mixed relationship between intra team ratings and solutions ratings.

In tandem with survey results, the authors explain that the SUSE5 co-production groups were designed for success: research teams included necessary scientific disciplines as well as targeted community members with site specific local knowledge; time was set aside for collaborative team work; and goal-oriented and context- based processes were all available. The transdisciplinary teams' solutions were broader in scope and included social marketing ("brand the creek"), environmental justice, and community engagement, but offered no concrete conclusions as to whether these solutions were "better" by other standards such as economic, ecological health, or engineering standards. The authors hypothesise a "social placebo effect" where community co-produced solutions, regardless of their technical feasibility, are perceived to be beneficial. When compared to team science literature, the inter-team assessments of the co-production process within the transdisciplinary team were similar in that they were variable, and the effectiveness of the collaboration is based on three conditions: composition, culture, context.

Evaluation:
This paper is very useful as it gives a good explanation of how the co-production work was organised and what they learned upon reflection. It offers a useful guide for researchers who are interested in understanding the potential differences between different types of collaboration. The authors conclude that first, co-production leads to more agreeable solutions to urban sustainability challenges and second, co-production team dynamics are likely to be more complicated and variable than disciplinary or multidisciplinary teams. A better understanding of these opportunities and challenges can inform institutions and agencies employing a community-engaged process to solve urban sustainability challenges. Their caution about the "social placebo effect" of TDCP is also beneficial information for researchers who are setting out this work.

10. Jagannathan, K., Et al. (2020). Great Expectations? Reconciling the Aspiration, Outcome, and Possibility of Co-Production. Current Opinion in Environmental Sustainability, 42, 22–29. https://doi.org/10.1016/j.cosust.2019.11.010

Summary:
This paper reviews recent examples and theorization of co-produced research to argue that understanding and reconciling the transformative potential of

transdisciplinary collaborations — within the context of the incremental progress achieved through its current practice — will catalyse a more integrated and actionable scholarship and practice. Very few assessments reveal what co-production produces for either its participants or beneficiaries and there is less clarity on the specifics such as variety, quality, or abundance of its outcomes and how these vary under different conditions. This article proposes two different types of outcomes: Scope 1, referring to outcomes such as creation of relevant knowledge products, facilitating open dialogue across the science and practice communities, and building critical capacity to influence action and Scope 2, referring to outcomes in social, governance or direct policy changes. Throughout TDCP research, the efforts of Scope 1 have not necessarily led to the anticipated Scope 2 outcomes, few projects had explicit aims for Scope 2 outcomes. This paper offers four key areas of improvement that may help improve the broader range of potential outcomes and support for long term and diverse types of engagement. The pragmatic, project-based approach of Scope 1 may undermine the more radical possibilities of co-production. They conclude that to realise the full potential of co-production a "more transparent, conversant, and interactive analysis of co-production efforts is required."

Evaluation:
The authors explain the problems associated with focusing on Scope 1 outcomes and argue for a more critical reporting and explanation of individual efforts to understand what they are intending and are not intending to do, how they are doing it, and what they are and are not achieving. The analyses of the different genres of outcomes will also be helpful for newcomers to TDCP. They also note that more than half the projects undertook co-production through workshops/consultations and that three of the projects used 'novel approaches' which reported slightly broader Scope 2 outcomes. The bibliography is also useful for scholars looking for further reading.

11. Timo von Wirth, Et al. (2020). Urban Living Labs as Inter-Boundary Spaces for Sustainability Transitions? In Handbook on Planning and Complexity (pp. 237–257). Edward Elgar Publishing.
https://doi.org/10.4337/9781786439185.00017

Summary:
Through a focus on large-scale urban sustainability transitions (meaning large-scale disruptive changes in societal systems that emerge over several decades)

this paper shows how urban living laboratories (ULL) function as spaces where multiple different actors involved in developing cities can collaborate and make connections. The different actors involved in sustainable transitions do not meet and understand one another automatically, and this disconnection has been identified as a major obstacle in their work. ULL are sites in cities that have been described as spaces to facilitate experimentation on sustainability solutions. They combine both the physical space and the resources of cities from diverse sectors, allowing for a combination of both collaborative team work with physical urban locations. In short, ULL helps achieve the multi-actor/domain/scale/level setting needed to foster urban sustainability transitions. This chapter conceptualises urban sites of experimentation as "inter-boundary spaces that facilitate learning through co-creation across different perspectives, levels and actor networks" (pg. 240). Inter-boundary activities in ULL were demonstrated in the ULL case study Concept House Village Lab (CHVL) in Rotterdam. The authors used (inter-)boundary activities to actively facilitate knowledge integration, mutual learning, and mobilisation among the multiple actors. They also discuss detrimental actions to CHVL, such as withdrawal of the municipality and uneven power dynamics between the land owners of its primary location. In conclusion, to achieve "a meta-governance role," ULLs need to emphasise specific attributes (e.g. cross discipline participation; skilled facilitation; institutional embedding for policy diffusion; etc…). They can provide a new approach to systematising experimentation for sustainability in cities, but scholars have only started to understand and use their potential in facilitating urban transitions.

Evaluation:
This paper offers many definitions and summary points about the usefulness of knowledge co-creation such as: Co-creation of knowledge for urban transitions is an essential element of experimental transition governance that aims to interweave knowledge of different engaged actors with the aim of developing actions useful to all engaged actors in the respective urban transition (Frantzeskaki & Kabisch, 2016). The authors also highlight some of the pitfalls they faced while working on CHVL which could be helpful for researchers doing similar work, for workshop design, and for scholars new to TDCP.

12. Fazey, I., Et al. (2018). Ten Essentials for Action-Oriented and Second Order Energy Transitions, Transformations and Climate Change. Energy Research & Social Science, 40, 54–68.

Summary:
This paper responds to growing alternative forms of research that are more inclusive, action-oriented and integrate different forms of knowledge by offering ten essentials to help researchers achieve greater impact from their work in relation to energy transformation and climate change. The 10 essentials are: (1) Focus on transformations to low-carbon, resilient living; (2) Focus on solution processes; (3) Focus on 'how to' practical knowledge; (4) Approach research as occurring from within the system being intervened; (5) Work with normative aspects; (6) Seek to transcend current thinking; (7) Take a multi-faceted approach to understand and shape change; (8) Acknowledge the value of alternative roles of researchers; (9) Encourage second-order experimentation; and (10) Be reflexive. When all 10 essentials are applied together, they represent a shift in how research is conducted. It can generate more significant impacts while also legitimising the inclusion of a greater diversity of kinds of knowledge, perspectives, values, imaginations and approaches needed to facilitate transformations to a climate resilient society.

The authors frame their argument through first-order transformation (involves describing and analysing processes of change and publicising results to beneficiaries) and second-order transformation research (action, learning, and knowledge generation are intertwined with more emphasis on collaboration and reflection). This framing is helpful as it helps make explicit underlying assumptions. Out of the ten, the first three essentials relate to the research topics and the following seven start with broader aspects of how research is framed and gradually become more specific about methodologies.

Understanding science as an active process of intervention, either directly in practice or more indirectly through the generation of knowledge, places greater responsibility on researchers to be more explicit about the reasoning behind decisions made throughout the process of scientific inquiry. The authors show a need for researchers to be more explicit about what kind of intervention they engage in, especially in climate change research, where what is researched and where resource allocation is important. Research through practice is generally lacking in the humanities, social sciences and sciences, although it may sometimes emerge in transdisciplinary and action-based research, but it is much more common in the arts. Artists are increasingly finding ways to demonstrate their work has rigour and quality in ways that do not rely on exclusionary methods and by embracing action based knowledge. Thus, in addition to developing more actionable forms of knowledge (essential 2), approaches from the arts can provide more radical and direct approaches to learning about social and environmental change.

Evaluation:
The 10 essentials discussed in this paper are a good starting point for any researcher as key concepts and 'guidelines' to keep in mind when practising TDCP. The paper also offers interesting discussions on different approaches to knowledge. The section about artists being good at research through practice is particularly interesting, especially if researchers are designing a project that will (or should) have multiple types of outcomes. This could be a useful discussion point for the workshop.

13. Palmer, H., Et al. (2020). Evaluative and Enabling Infrastructures: Supporting the Ability of Urban Co-Production Processes to Contribute to Societal Change. Urban Transformations, 2(1), 1–14. https://doi.org/10.1186/s42854-020-00010-0

Summary:
The authors of this article focus on the evaluation of co-production and the challenges it poses to conventional quality, monitoring, and evaluation indicators. This paper uses examples from Mistra Urban Futures projects as it is an active and long standing TDCP research project focused on bridging academic and other practices through city-based institutional partnerships. Many of its initiatives have reached a phase where the effects of projects are becoming distinguishable. The authors present a multifaceted quality monitoring and evaluation (QME) framework used to evaluate the broader societal impact of TDCP. The QME framework is in 5 parts: 1) knowledge management and transfer, highlighting the actions and effects of the centre's research more clearly to its participants and stakeholders; 2) performance monitoring, making it easier to assess the strengths and weaknesses of the centre in relation to its goals and how they are achieved; 3) governance, creating the opportunity to track the effects of the centre's activities, including tangible and intangible outputs and outcomes on the basis of which the centre is accountable to its stakeholders; 4) formative learning, actively enabling the centre to develop reflexively and improve in real time, as an integral part of its process management; and 5) legitimacy, making information available to internal and external stakeholders which enables them to match centre outputs and outcomes against expectations. The five components of this QME framework captures both accumulative and developing outcomes together with structural and societal impacts of the project. Throughout the paper, the authors also differentiate between the first (directly related to research process; immediately usable products); second (impact of the collaborative process); and third (impacts occurring in wider community) order impacts in order to

show how Mistra Urban Futures overcame the initial difficulty of distinguishing between various types of results. While more challenging, measuring second (institutional) and third (societal) effects is important for demonstrating the wider value of TDCP methods. Understanding the three order of effects and their inherently interconnected and mutual influences is helpful.

Throughout the article, other elements of TDCP research and evaluation needed to capture the experiences of capacity building, learning and changed perspectives from current and previous project processes are discussed, including skilled facilitation, neutral physical spaces, and reflection. The authors point out that skilful facilitation enables groups to accomplish tasks that would otherwise be out of reach of each participating individual and this facilitation requires intentional infrastructure support. Their research shows that proper facilitation can also create a certain 'safe-ness', where participants can worry less about misdirected group dynamics, representation, negotiations and group decisions, and can focus on the creativity of the collaborative research process and how to steer outcomes towards societal change beyond the confines of the specific project – in other words, towards generating and recognising second and third order effects. The authors also suggest three spatial criteria in terms of location, capacity of allowing, and dignity. They particularly highlight the move away from University 'owned' locations since institutional spaces are always marked by ownership and inherent power.

Evaluation:
This is a very helpful article for TDCP scholars, especially for information on facilitation, reflection, and the creation of neutral spaces. This is useful reading for any scholar who is interested in improving or learning TDCP facilitation skills. It is also useful at the institutional level as the authors provide insight on what infrastructure is helpful and what the institution can do to help TDCP scholars. The authors provide examples of what this training could include, such as discussions of the theoretical underpinnings of concepts such as conflict, power/knowledge and reflexivity (both in research settings and in programmes that include researchers, practitioners, and policy makers from the public and private sectors). The recommendations about the space TDCP is practised in is also useful. Many scholars have published about how managing results from TDCP or achieving long term progress is challenging, but this paper is especially useful because it discusses how certain initiatives at MUF have been able to achieve results. It also offers a helpful discussion on how to approach evaluation of TDCP methods, which don't comply with traditional approaches. This paper is helpful for the U of T's workshop as it contains a detailed discussion on the skilled facilitation needed for effective TDCP.

14. Polk, Merritt. (2015). Transdisciplinary Co-Production: Designing and Testing a Transdisciplinary Research Framework for Societal Problem Solving." Futures : the Journal of Policy, Planning and Futures Studies 65, 110–22.

Summary:
This article devotes critical attention to uncovering and interrogating how viewpoints on leadership in co-production of research differ and align, which helps open up new avenues for research on co-production in other domains. Through the focus on the politics of co-production, the authors discuss distinct perspectives on leadership in the co-production of research and offer a "heuristic for practice." The authors claim that this debate will assist researchers navigate the complex realities of practice in CPR, but how helpful this will actually be for practitioners of TDCP will be case by case depending on the project.

This article discusses a specific approach to TDCP characterised by an increased collaboration between researchers and stakeholders and involves moving research activities out of the university and into a space that is both embedded in and insulated from research and practice. The promotion of more equal participation is seen as a way to increase the accountability of science by increasing the "responsibilization" of all actors involved, be they scientific, political, industrial, or lay. The authors distinguish five focal areas used to address urban challenges, as well as to support, manage and evaluate the projects; they are: inclusion, collaboration, integration, usability and reflexivity. Inclusion and collaboration ensure mutual responsibility and commitment, integration focuses on sharing different types of knowledge and expertise in order to create common frames of reference, and usability makes explicit the need to capture and integrate the contextual values and different types of scientific and practice-based knowledge that can specifically contribute to solving sustainability related problems. Group and individual reflexivity is central to all parts of this framework.

The two most successful elements regarding collaboration were 1) joint design and formulation of the project, its structure, methods, delegation of tasks and timetable and 2) the overall success experienced in collecting data together, which was also confirmed by participatory observation of the project activities. Project members expressed frustration about collaboration during the analysis of the material and the production of results. The assumption that the in-depth participation of practitioners in research processes would ensure the creation of

usable and relevant results did not ensure contributions to societal change. Overall, the authors found that groups with clear delegation of tasks that were modified as needed throughout the project, and that reflected explicitly on the consequences of this delegation, achieved higher levels of co-production. Distributing tasks throughout the working group and co-leaders also reduced the risk of one approach or perspective taking over the process and outcomes. Creating processes and group dynamics that supported the creation of common frames for discussion and analysis through different types of group reflexivity and task sharing promoted, but did not ensure, the integration of knowledge and expertise from all of the project members.

Relevance:
Useful reading for TDCP practitioners as it outlines how to successfully approach collaboration.

15. Polk, Merritt. (Ed.) (2015). Co-producing knowledge for sustainable cities: Joining forces for change. Routledge.

16.A. Polk, Merritt and Kain, Jaan-Henrik. Co-Producing Knowledge for Sustainable Urban Futures. In Co-producing knowledge for sustainable cities: Joining Forces for Change, 1-23.

This introduction sets out to explain the importance and role of knowledge co-production for urban sustainable development and gives an overview of the many first-hand examples that make up the breadth of the book. The book focuses on the need to include a wider range of actors in research processes in order to create novel forms of urban research that can better grasp the multidimensionality of common problems. The co-production approach developed throughout the book starts from the contested and inherently political nature of sustainable development and shows how researchers can contribute to creating a more equitable political economy of knowledge production through different types of co-production processes. This introductory chapter gives an overview of why co-production is put forward as an important complement to traditional forms of knowledge production given current challenges and conditions of sustainable urban development. It starts by discussing the complexity of urban challenges and how current responses are most often compartmentalised and addressed within separate sectors, decision-making levels, and disciplines.

The authors promote that understanding the “urban now” involves conversations and interpretations spanning a diversity of local specificities, geographies, and histories and thus knowledge about urban challenges. Responses to these challenges are best developed by engaging with the various practices, interactions, and rationalities of policy-makers, planners, developers, activists, and residents. This line of thought forms the foundation for the approach to knowledge co-production outlined throughout this book; namely, that the complexity of urban dynamics, rationalities, values, and power differentials cannot adequately be conceptualised or understood without a broad base of input. Within this discussion, the authors explain the need to move away from only using the linear model of science. Though the linear approach has garnered the most legitimacy from both scientists and non-scientists, it has shown serious weaknesses when addressing complex problems.

The introduction also sets out important definitions: the term ‘transdisciplinary’ is used to describe knowledge production that not only integrates knowledge from different disciplines (interdisciplinary), but also includes values, knowledge, know-how, and expertise from non-scientific sources. The term co-production is used to capture a diversity of collaborative processes where different urban actors share knowledge, experiences, and expertise to create solutions for societal problems. The chapter focuses on the space within research where co-production fits; it stems from a desire of universities to engage with the broader social community, but has faced challenges because of various power dynamics and unequal balance of knowledge holders. The book explains that in order to achieve greater urban sustainable development work and research, co-production is needed.

Further, this book focuses on researcher-initiated co-production, which is defined by its origin in research and education institutions. In researcher-initiated co-production, the outputs of co-production have a dual focus, namely the production of scientific knowledge and input that can feed into both policy-making and societal change processes, and into scientific knowledge production. A distinguishing characteristic of researcher-initiated co-production is therefore the goal of producing both scientific knowledge and usable outputs for societal change.

Evaluation:
This reading is a good introduction to co-production studies and methodologies.

16.B. Smit, Warren, Lawhon, Mary, and Patel, Zarina. Co-Producing Knowledge for whom, and to what end?: Reflections from the African Centre for Cities in Cape Town. In Co-producing knowledge for sustainable cities: Joining Forces for Change, 47-70.

This chapter uses a selection of case studies from ACC (African Centre for Cities) in Cape Town to not only discuss co-production in action, but also to offer some insights into the practice of TDCP more generally. The authors focus on the roles of reflexivity and normativity within co-production to suggest that there is a need for a specific type of reflexivity which is necessary for understanding the particular processes and outcomes of co-production: consideration of the normativity of knowledge and change. Therefore, methodological rigour in a co-production process requires more than just reflexivity. To understand how knowledge is co-produced, including both the process and outcomes, requires not only acknowledging the subjectivity of decisions, but explicitly reflecting on what informs the co-production process. The authors further stress that it is important for scholars to be explicit about normativity in knowledge co- production, where it is intended to grapple with, and impact on, real-world problems, and where people from different disciplines and sectors might have very different norms, values, and ethics. For example, they explain how to be able to begin developing a clearer understanding of how co-production actually happens, we point to the need to be explicit about positionalities, ideologies, values, ontologies, epistemologies, theoretical perspectives, and methodological approaches of participants — something strongly influenced by disciplinary backgrounds.

This chapter offers a reflection and explanation of the experience of using knowledge co-production at the ACC, specifically the CityLab program which consists of a number of interdisciplinary platforms dedicated to thematic research areas based in, and focusing on, Cape Town. The CityLab program brings together researchers and practitioners from different disciplines and professions and works through a variety of open-ended and positivist methods (usually involving seminar series with presentations from academic researchers and practitioners from a range of disciplines and sectors, collaborative research projects, and the production of a book or special issue bringing together contributions from academics and practitioners on a specific topic-but not without its challenges). Also discussed is the more recent Knowledge Transfer Program, a collaboration between the ACC and the City of Cape Town, which began in 2012 as part of the Mistra Urban Futures program. The chapter reflects on the experiences of the ACC researchers and how they have navigated the

ambiguity of the co-production process. Their insights show the importance of explicit normativity and point toward the need for reflexivity throughout the research process. The case studies of the ACC's CityLab Program and Knowledge Transfer Program demonstrate that there is no single approach to the KCP at the ACC and the value of working with multiple partners to generate more appropriate knowledge to shape urban sustainability outcomes.

The authors centre their reflection around four key issues: defining the research question or problem; choosing research methods; identifying the intended impacts; and identifying who is involved and how. Each of these issues are relevant for how TDCP research is conducted. At the ACC, the research questions of a project are defined and framed collectively and the research methods are informed by the diversity of participants and by the kind of knowledge community desired. Further, many CityLabs initiatives are started without a specific impact, as the aim was to explore issues and expose policymakers to a broader range of perspectives in order to stimulate a more holistic view of the problem and potential solutions (the authors found it was beneficial to have participants in TDCP be explicit about the changes they want and about the assumptions and theories that underpin this). A key learning from the CityLab program is that it is important to work with stakeholders to develop an explicit set of shared norms over time. Real co-production ideally needs to involve all partners at all stages of the process (ideally from the problem identification stage onward), which implies a very open-ended and exploratory process at the beginning.

Four conclusions from authors' reflections on normativity and co-production: 1) Finding points of intersection in the rhythms of work can help overcome unsynchronized work processed between participants and institutions; 2) Co-production enables participants to experience a different way of doing research; 3) the most common outcome of KCP was individuals seeking opportunities to incorporate new ways of understanding into their already established views leaving the focus on the methodological process. This resulted in the process of integrating knowledge that is new to individuals becoming more important than creating "new" knowledge; and 4) knowledge is insufficient alone, power is also a critical part of negotiating co-produced solutions.

Evaluation:
This chapter is very helpful for TDCP practitioners as it both contains information about the methodological questions of TDCP as well as detailed

examples of TDCP in action. The authors offer many suggestions for scholars particularly on being specific about the motivations for particular decisions, and to ensure that the normative agendas which motivate and inform decision-making are clear.

16.C. Polk, Merritt. Critical Issues and Challenges for Co-Producing Knowledge for Urban Change. In Co-producing knowledge for sustainable cities: Joining Forces for Change, 166-187.

Summary:
This concluding chapter re-emphasizes the aims of the book: to help academic researchers, urban planners, and policy-makers work together to integrate different types and sources of knowledge in urban areas, thereby making themselves better equipped to solve urban problems. The authors also further explain why the book focuses on researcher-initiated co-production, most importantly to cater to the need to break the dominance of the linear model over more participatory and inclusive science–policy relationships in order to better address the complex and contested nature of sustainability, the hegemony of neoliberal governance and the current segmentation of policy-making and planning. The authors also reflect on their objective of opening up the discussion on the urban problem by bringing together a diverse cohort of voices and approaches, creating a cosmopolitan community of learning. This chapter broadens out from the theoretical approaches and examples offered throughout the book and attempts to capture a more "meta" view of urban knowledge. Overall, four main areas capture the key added values from knowledge co-production that can be identified in these cities. These are the development of new relationships between practice and research; a sharing of responsibility for knowledge production in urban areas; increased local capacity for research; and increased understanding and insight regarding urban sustainability challenges. Some issues of co-production and topics for future research are also mentioned.

Evaluation:
Along with the introduction, this reading is a helpful guide to the field both in its discussion of TDCP methods and theories but also because of the many real-life examples of TDCP it explains and evaluates.

Horn, A, et al., (2022). Training students for complex sustainability issues: a literature review on the design of inter- and transdisciplinary higher education. International Journal of Sustainability in Higher Education, https://doi.org/10.1108/IJSHE-03-2021-0111

Summary:
This paper surveyed 12 different studies on 11 higher education programs for students addressing complex sustainability issues whose approach combined interdisciplinarity (knowledge integration across disciplines) and transdisciplinarity (co-creation of knowledge between academia and societal partners). The paper provides a snapshot of the existing "good practices" of the various stages of knowledge co-creation: co-design, co-production, and co-dissemination. Horn et al. describe the design elements and strategies respective to each of these stages. For example, during the co-design phase when a research question is being defined, meetings between the various actors can be held (design element). The strategies this element can utilize include community events or community interviews where students dialogue with non-academic community partners to guide the prioritization and selection of research questions, or one-on-one or multi-actor meetings where students discuss translating practical needs into research questions. The paper addresses strategies that are used across all stages of knowledge co-creation–a focus on process over outcomes, constant reflection, and scaffolding–and more generally, the approaches of the programs surveyed toward facilitating interdisciplinarity and transdisciplinarity.

Evaluation:
This article is a helpful survey of "good practices" and the examples contained therein can inform the content of the TDCP workshop. A limitation is that the article does not address the relative effectiveness of these practices. The evaluative component is missing. Moreover, the programs surveyed are intended for students (at the undergraduate and graduate level) who are engaging in transdisciplinary and interdisciplinary approaches to sustainability problems. As such, this article might be more relevant to CLL than TDCP. TDCP, further, does not carry an explicit objective of interdisciplinarity (though this may come as a concomitant element). Lastly, the authors themselves admit to a fundamental weakness of their methodology–selection bias. There are a greater number of interdisciplinary and trandisciplinary higher education student sustainability programs than there are articles on these initiatives. This article only considers the latter, and thus there exists the problem of underreporting.

“Changing the Research and Innovation System Through Democratic Experimentation: A Guide to Good Practices for Responsible Research and Innovation,” NewHoRRizon, October 12, 2021.

This resource clearly lays out the good practices associated with RRI (Responsible Research Innovation), a “narrative” on doing sustainable, inclusive research emphasizing co-production and co-creation with society that seeks to align R&I with the values, needs and expectations of society.

The series of lessons are based on lessons learned from the European Commision-funded NewHoRRizon project: four years of tracking how groups of individuals from across the R&I landscape came together in 19 temporary participatory settings (“social labs”) to catalyze RRI implementation. It groups the lessons under four clusters (diagnosing a context, engaging the ‘right’ participants, enhancing agency, and designing and implementing interventions) as practical recommendations, and each contains 1-2 short illustrative examples, which can be useful as pedagogical tools in a workshop setting.

The authors also express their confidence that the lessons learned from RRI’s “social labs” can be applied equally by researchers and innovators working under the banners of Open Science, Citizen Science, Co-design and Co-creation, Mission-oriented Innovation, Transformative Innovation Policy, and Responsible Research Assessment.

Haraway, D. Situated knowledges: the science question in feminism and the privilege of partial perspective. Fem. Stud. 14, 575–589 (1988).

Sheila Jasanoff. The idiom of co-production. In States of Knowledge: The Co-production of Science and Social Order, 1-13.

Appendix 9: Program of the Better Buildings Bootcamp, August 22 to 26, 2022

	Monday 22: Goals	Tuesday 23: Tools	Wednesday 24: Humans	Thursday 25: Workshop	Friday 26: Overcoming Obstacles
8:30–8:45	PLENARY: Welcome to Boot Camp!	PLENARY: Introduction to team project and Shift and Share, Bettina Hoar	PLENARY: SBC presents two-eyed seeing and D+IDEA, Leslie Kulperger	LIVE WORKSHOP: STLC	PLENARY: Morning activity
8:45–9:00	PLENARY: St. Lawrence Centre (STLC) for the Arts building: introduction to the project, Clyde Wagner	PLENARY: IPDA — what is integrated design and delivery, Bill Lett			PLENARY: Obstacles to great buildings, Dan Wicklum
9:00–9:15					
9:15–9:30	PLENARY: Transform TO: goals for Toronto		PANEL: Accessibility panel discussion, Jayde Malam (Kayla Hunte, Carrie Anton, Meryl Evans)		
9:30–9:45		PLENARY: Energy and parametric modelling, Sebastian Carrizo			PLENARY: Solutions to great buildings, Keith Burrows
9:45–10:00					
10:00–10:15					
10:15–10:30	COFFEE BREAK CHAT ROOM	COFFEE BREAK CHAT ROOM	COFFEE BREAK CHAT ROOM	COFFEE BREAK CHAT ROOM	COFFEE BREAK CHAT ROOM
10:30–10:45	PLENARY: High performance settings for buildings, Alex Lukachko	PLENARY: Materials matter — embodied carbon, Ryan Zizzo	BBBC PLENARY: Q&A for Friday's team presentations and Shift and Share	LIVE WORKSHOP: STLC	STUDENT TEAM PRESENTATIONS
10:45–11:00					
11:00–11:15			PLENARY: Inclusion in the built environment, Haley-Rae Dinnall-Atkinson		
11:15–11:30		PLENARY: LCA analysis of STLC, J. Leko and R. Macpherson			
11:30–11:45	TEAM BREAKOUT: Meet your team				
11:45–12:00					

Appendix 9: Program of the Better Buildings Bootcamp

<table>
<tr><th></th><th>Monday 22: Goals</th><th>Tuesday 23: Tools</th><th>Wednesday 24: Humans</th><th>Thursday 25: Workshop</th><th>Friday 26: Overcoming Obstacles</th></tr>
<tr><td>12:00–12:15</td><td rowspan="2">LUNCH</td><td rowspan="2">LUNCH</td><td rowspan="2">LUNCH</td><td rowspan="2">LUNCH</td><td rowspan="2">LUNCH</td></tr>
<tr><td>12:15–12:30</td></tr>
<tr><td>12:30–12:45</td><td rowspan="4">PLENARY: Achieving net positive in both human and environmental terms, John Robinson</td><td rowspan="2">TEAM ACTIVITY BREAKOUT: What are the tools, frameworks, terminology in your industry or field that might be relevant?</td><td rowspan="3">PLENARY: Indoor environmental quality, Liam O'Brien</td><td rowspan="8">LIVE WORKSHOP: STLC</td><td rowspan="3">STUDENT TEAM PRESENTATIONS</td></tr>
<tr><td>12:45–1:00</td></tr>
<tr><td>1:00–1:15</td><td rowspan="4">PLENARY: Building for all three verbs, David Maggs</td></tr>
<tr><td>1:15–1:30</td></tr>
<tr><td>1:30–1:45</td><td rowspan="2">BREAKOUT: What do we know so far?</td><td rowspan="2">TEAM BREAKOUT: Time for group work</td><td rowspan="3">SHIFT AND SHARE</td></tr>
<tr><td>1:45–2:00</td></tr>
<tr><td>2:00–2:15</td><td rowspan="4">SPOTLIGHT: Choice of opaque assemblies (Nicole Parsons), fenestration (Dave Petersen), or mechanical systems (Cara Sloat)</td><td rowspan="4">SPOTLIGHT: Choice of opaque assemblies (Nicole Parsons), fenestration (Dave Petersen), mechanical systems (Cara Sloat), or solar (Adam Jones)</td><td rowspan="4">SPOTLIGHT: Choice of opaque assemblies (Nicole Parsons), fenestration (Dave Petersen), mechanical systems (Cara Sloat), or lighting (Gerry Cornwell)</td></tr>
<tr><td>2:15–2:30</td></tr>
<tr><td>2:30–2:45</td><td rowspan="2">PLENARY: Closing remarks and thanks</td></tr>
<tr><td>2:45–3:00</td></tr>
</table>

Appendix 10: Research Poster on Odd Couples Paper

Odd Couples

Reconciling academic and operational cultures for whole-institution sustainability governance at universities

Andi Darell Alhakim, Grace Ma, Professor John Robinson
President's Advisory Committee on the Environment, Climate Change, and Sustainability (CECCS)
University of Toronto

01 *Introduction*

In recent years, the whole-institution approach has gained traction within the Sustainability in Higher Education (SHE) literature. The approach generally calls for the integration of academic and operational sustainability at universities and is argued to improve on past *waves of sustainability*, which focused on the two sides one at a time.

However, the whole-institution approach at present falls short of identifying how the post-integration governance should look like. We seek to address this question and challenge the notion that further integration between the two organisational sides is the solution to better embedding sustainability at universities.

Figure 1. *The 10 global universities studied.*

02 *Methods*

Our research involves 10 universities around the world (*Figure 1*), each a high-performer in sustainability based on several metrics. The evaluative framework created for the study (*Figure 2*) is anchored on sustainability actors, their bureaucratic position, and their contributions to the governance model – central-coordination or distributed-agency. Sustainability initiatives are analysed through a university's four primary domains of activity.

Figure 2. *Evaluative framework created.*

Throughout the study, a 5-step process is followed for data collection and analysis (*Figure 3*) to ensure the accuracy of narrative accounts and continually update the referenced contexts at the universities as part of a *living document*.

In total, 88 stakeholders were interviewed, consisting of members of senior management, cross-cutting sustainability coordinators, operations staff, academic administrators, faculty members, and student group members.

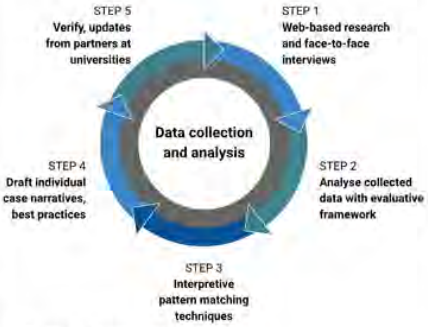


Figure 3. *Analytical approach.*

03 *Findings*

Divergence of cultures and structures

Academic sustainability:
- Culturally distributed-agency.
- Reports to both academic and operational actors, creating a clash of accountability cultures.

Operational sustainability:
- Culturally central-coordination.
- Reports exclusively to operational-administrative leaders, inferring an alignment of accountability cultures.

Different manifestation of governance models

Central-coordination:
- Strategic planning and directed top-down work in operational sustainability.
- The administration's financial support for and enabling of facilitating platforms in academic sustainability.

Distributed-agency:
- Voluntary buy-in from faculty in academic sustainability.
- Mandated wider engagement efforts to established projects in operational sustainability.

Figure 4. *Direct and indirect governance models.*

Distinct necessity and sufficiency of governance models

In operational sustainability, central-coordination is necessary and moderately sufficient for successful work; distributed agency is an encouraged component.

In academic sustainability, distributed-agency is necessary but not sufficient, as central-coordination can facilitate broader engagement.

04 *Suggested Principles*

- Taking an enabling role to embed sustainability throughout the institution.
- Creating a collective-inclusive narrative on sustainability for the institution.
- Appropriate integration of academic and operational sustainability.
- Leveraging community engagement for transdisciplinary research.
- More work needed to embed sustainability across university curricula.

05 *Conclusion*

Effective sustainability governance has to recognise and reconcile different cultures, structures, and manifestations of governance models between academic and operational sustainability. Hence, a whole-institution approach would still require significant tailoring and adjustments toward each side to be successful.

06 *Acknowledgments*

We would like to thank our fellow researchers Nicolas Côté, Rutu Patel, Monisha Alam, Ana Karen Garza, Christina Wong, Hoor Tariq, and Kenneth Sergienko.

Appendix 11: UCAN Poster and Presentation from UC3 Summit

Urban Climate Action Network (UCAN)

Many cities have adopted climate targets that will require "transformational changes in how we live, work, commute and build" (City of Toronto, 2020)

Presents a need for a network of city-university collaboratives

That focuses on contributing **actionable knowledge** to help cities achieve existing climate action goals and targets

UCAN Members:

University of Toronto · The University of British Columbia · The University of Arizona · University of Michigan · Rutgers · Drexel University

UC3 Fellows Pilot Program

PROJECT: UC3 Cities Climate Action Network
LEADS: University of Arizona, University of British Columbia, & University of Toronto

University of Toronto

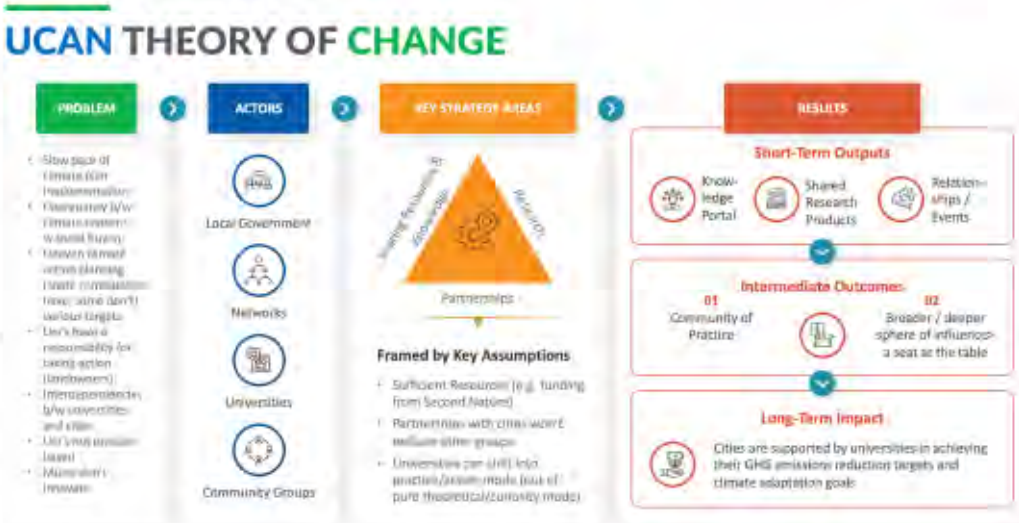
UCAN Results to Date

2021-22

- Theory of Change
- Peer-to-peer support
- Joint research (e.g., Buildings & Cities journal submission)
- Knowledge mobilization workshops (e.g., urban climate action transformation lab at UBC

On the horizon

- Joint projects & funding proposals (SSHRC Partnership Grant, "network of networks")



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