CEEA-ACEG 2021 Workshops

All workshops will take place on the conference virtual platform on June 20. Based on the schedule, registrants will be able to attend a maximum of **four** workshops in total. Workshop title, descriptions and the schedules are as follows, please choose four workshops that you have plan to attend. Please note that you they are not allowed and able to switch in and out of workshops as these are very interactive and hands on.

	Workshop A	Workshop B	Workshop C	Workshop D
NDT	1:00 to 2:20	2:30 to 3:50	4:00 to 5:20	5:30 to 6:50
ADT	12:30 to 1:50	2:00 to 3:20	3:30 to 4:50	5:00 to 6:20
EDT	11:30 to 12:50	1:00 to 2:20	2:30 to 3:50	4:00 to 5:20
PDT	8:30 to 9:50	10:00 to 11:20	11:30 to 12:50	1:00 to 2:20
Slot 1	A1	B1	C1	D1
Slot 2	A2	B2	C2	D2
Slot 3	A3	B3	C3	D3
Slot 4	A4	B4	C4	D4
Slot 5	A5	B5	C5	D5

June 20, 2021, 11:30 am - 12:50 pm EDT

A1	**Subject:**
	Call to Action in Canadian Engineering Education! How we can all do our part to make engineering education more equitable and inclusive.
	Abstract:
	As post-secondary education works to become more inclusive and equitable, it's not always clear within our role as engineering educators how to get involved and make a difference. During this session, attendees will hear from engineering staff and faculty on actionable ways they have included equity and inclusivity into their work in engineering education. Participants will have the opportunity to reflect on how they can take action and leave with a new network of people to support them in this work.
	Learning Outcomes:
	At the end of this session participants will: 1. Learn how other engineering educators are incorporating EDI actions into their work. 2. Explore and reflect on actions they can take to incorporate equity, diversity and inclusion into their courses and research programs 3. Define one (or more) EDI actions they will take during the next academic year. 4. Make connections with colleagues to support their EDI action(s).
	Authors/Presenters:
	Cori Hanson and Mikhail Burke.
A2	**Subject:**
	Instructor's Working Model of the Learner's Mind
	Abstract:
	Through the development of a conceptual working model of the learner's mind, the proposed workshop aims to help participants choose teaching strategies and implementations that are well-aligned with the psychological and biological processes occurring within their students' minds during learning, Zull (2002).

Adapted from Mayer (2009), the working model has four essential components: Input/Output of sight and sound, Conceptual Processing Pathways for verbally and visually encoded knowledge, Memory for working and long term storage, and Thinking Systems for reasoning (slow) and intuitive (fast) processing, Kahneman (2011). The focus will be on identifying the essential operating characteristics of each component at the psychological/neurological levels. Links will be noted for teaching strategies aligned with particular operating characteristics, Lang (2016).

This remotely delivered 90 minute workshop will provide an online learning environment that guides participants to develop their working model through a series of concept map sketching activities. For each of the relevant components in their working model, participants will complete a reflective observation of everyday life experiences to identify the essential operating characteristics of the component. There will be a short mini-lesson on the essential neurological processes involved in memory encoding and recall. The closing reflective activity will identify teaching strategies worthy of consideration in participants' courses. The online resources will include an extended bibliography for further study.

Participants will be able to use their conceptual working model to explain why best practice teaching strategies promote student mastery. Their working model will be a useful tool for diagnosing and correcting potential teaching strategy implementation issues. This introductory workshop will provide a foundation for further study in applied cognition in education.

Authors/Presenters:
Gordon Stubley

A3	**Subject:** Teaching in a pandemic: Can we 'Build Back Better?'

Abstract:
Instructors, around the world and at all levels, are now working in an unusual age of teaching and learning. Educators are a different kind of front–line worker – and the work we do in our classrooms (whether on-line or in-person) can have a lasting influence on our students. One educator described the potential impact of the pandemic as a "black swan moment for higher education as we know it" (Blumenstyk, 2020): an unexpected and rare event with serious impacts that have the potential to change everything in society. Today we have the opportunity to "build back better" (António Guterres, the UN Secretary-General, 2020) by adapting our teaching practices to meet our students' needs.

We believe we can choose to re-frame our current crisis into an opportunity to grow our pedagogical practice. While it can feel like a daunting task to begin to meet our students' social-emotional needs amid a global pandemic, instructors can start by "humanizing" our engineering courses in taking a more holistic approach. The first step is to take the time to think about our instructional choices, with the understanding that self-inquiry leads to more successful (and sustainable) classroom experiences.

This workshop will encourage participants to implement reflexive practices and recognize what drives their choices in the classroom. Miller and Seller's (1985) curriculum framework will be used as the theoretical foundation for the workshop, which explains a teacher's instructional purpose as threefold: instruction as content transfer, as transaction, and as transformation.

Most teachers understand the need to transmit content to our students, but for more successful learning, transactional and transformational curricular elements must also be included in our classroom plans. The combination of these three curriculum goals can lead to a more complete and holistic way of understanding our role and influence as educators (Miller, 2019).

This workshop will make the case for finding small but effective ways to change elements in our teaching practices to include transmission (from instructor to student), transaction (interaction between instructor and student), and transformation (curricular immersion with instructor and student), culminating in more holistic and humanistic pedagogical choices. Participants will share some of the experiences of their pandemic-classrooms, and together we will brainstorm small changes we can implement moving forward.

By the end of the workshop, instructors will be encouraged to use metacognitive techniques to positively recast the challenges and opportunities of teaching during a pandemic.

How this workshop will be conducted:
This workshop will be a synchronous session, focused on participatory activities using breakout rooms and

	Google slides (e.g., community field, card sorting, mix/match/exchange) throughout the 90 minutes. We will create a supportive (and candid) environment for participants to share their pandemic experiences/ideas.	
	Authors/Presenters: Rebekah Bennetch and Jillian Seniuk Cicek	
A4	**Subject:** Global Citizenship In Engineering – Engaging Students And Establishing Relevance	
	Abstract: As engineering problems become increasingly international and cross-cultural in nature, it becomes critical to provide engineering students with opportunities to better understand global perspectives and appreciate the complex social and cultural impact of potential solutions. Engineering students need to possess global perspectives and competencies to participate in multi-faceted solutions that address multiple cultures and geographies. Introducing students to global citizenship concepts and connecting the relevance of global citizenship to their career development and sub-discipline interests facilitates the acquisition of these perspectives and skills. Following the United Nations definition, [1] we see global citizenship as involving engineers' participation in sustainable development that involves individuals assuming social responsibility to act for the benefit of all societies, not just their own. Global citizenship requires an understanding that solutions that cross national and cultural borders are multi-faceted, contain multiple levels that are interconnected and may involve social responsibility and action at multiple levels spanning many geographies. During the summer 2020, we created an online global citizenship module designed to provide students with the vocabulary to discuss the impact of engineering projects from a global perspective and articulate how the social impact of engineering projects may differ at local and global levels. Students were also encouraged to articulate their own understanding of global citizenship and how holding a global perspective would make them a better engineer and potential leader. As research indicates teaching Global Citizenship concepts is challenging as students may view the material as irrelevant [2] or as 'unteachable' [3], our module design explicitly linked global citizenship concepts with career development to increase students' engagement. In this workshop we will review our approach to: • Developing and delivering the online module • Conducting a pilot course to refine content • Design changes to accommodate an online class of 220 students • Obtaining feedback from students This session will help other educators develop a similar module which will incorporate subdiscipline-specific learning examples, create associated learning objectives and avoid potential obstacles to success. This workshop will interest participants with an interest in sustainable development, social responsibility in engineering and global citizenship, but others are very welcome to participate. Learning Objectives: 1. Identify opportunities to include global citizenship module within courses 2. Explore potential resources for global citizenship modules 3. Generate possible sub-discipline examples to include within a global citizenship module. Learning Activities: Participants will work with partners to identify a specific example of global citizenship's relevance to their subdiscipline. 1. Describe 2-3 potential examples sharing these with the group to select the most appropriate instance. 2. Generate potential learning objectives for the selected example. 3. Plan an implementation strategy by anticipating potential barriers to success and brainstorming strategies to mitigate these challenges.	
	Authors/Presenters: Juliette Sweeney, Steven Chuang and Freeda Khan	
A5	**Subject:** Class-Sourcing: A strategic way to engage students and their devices in collaborative learning	

	Abstract: The intention of this teaching strategy workshop is threefold, firstly to aim to further incorporate use of student's personal devices as well as the technological tools available in the class to deliver content, activities, and expand the classroom and student capabilities. Secondly, to provide an opportunity for students to contribute in non-traditional ways while engaged in group learning and co-teaching. Thirdly, to utilize technology to preserve student's efforts to support learning outside of the classroom setting.
	Authors/Presenters: Elham Marzi, Kimberley Lau and Oluwatobi Edun

June 20, 2021, 1:00 pm - 2:20 pm EDT

B1	**Subject:** Creating Ethical Space: Decolonizing Engineering Education
	Abstract: Following the Calls to Action by the Truth and Reconciliation Commission of Canada, individual and institutional initiatives have and are being created to include Indigenous Knowledges and awareness in the education of student engineers. A recent study looking at the landscape of Indigenous education in engineering across Canada demonstrate this rich variety of activities [1]. The aims of this workshop are to (1) create an ethical space (Elder Reg Crowshoe, Treaty 7 Territory) for Indigenous Peoples, and Indigenous Knowledges, values, and perspectives in engineering education; and (2) grow the community of practice to help those who want to embark on this journey, and support those who are already engaged in this work. The workshop and dialogues are informed by the Sacred Hoop, to support a sharing circle approach (see attached). Participants will engage in a series of breakout dialogues after common starts and rejoin the larger group to share dialogue highlights. Dialogue facilitators will be members of the Decolonization and Indigenization Engineering Education Network (DIEEN) and those who have knowledge of Indigenous initiatives in engineering education across Canada.
	Authors/Presenters: Alan Steele, Cassandra Polyzou, Kear Porttris, Jillian Seniuk Cicek, Deanna Burgart, Jessica Vandenberghe, Kerry Black, Anne Johnson and Victoria Thomsen
B2	**Subject:** Fostering Integrated Learning: Partnered Assignment Design
	Abstract: Integrated assignments that bring together knowledge and approaches from two or more courses are effective tools for highlighting connections at the curriculum level and encouraging students to transfer and apply their learning from one environment to another. These assignments, however, can be a challenge to implement, requiring thoughtful collaboration with colleagues, flexibility around scaffolded assignment instruction, and careful coordination of shared resources, including grading support. For the past four years we have successfully coordinated an integrated assignment across two Chemical Engineering courses at the University of Toronto: CHE204: Applied Chemistry Lab I and CHE299: Communication. Our shared experience formed the basis for CEEA presentations in 2018 and 2019. In this workshop we will use this experience to help other educators devise a similar assignment for one of their courses, by generating learning objectives and a preliminary assignment design, and troubleshooting potential barriers to success. This workshop will be most valuable for participants who have partnered with a collaborator from their institution, but participants who have not yet identified a partner or whose collaborator is unable to attend are also welcome to participate.
	Authors/Presenters: Lydia Wilkinson and Jennifer Farmer.
B3	**Subject:** EGAD Workshop: Building Evidence from Assessments to Draw Valid Conclusions

Abstract:

In this workshop participants will work to evaluate the validity of conclusions that can be drawn from programmatic assessment, including graduate attribute assessment. It will describe a framework for identifying the kinds of evidence that lead to valid conclusions. Participants will evaluate the validity of conclusions that could be drawn from assessments they have seen or used, and work collaboratively to develop a quality assessment measure.

By the end of the workshop, participants should be able to:

1. Use terminology to enable discussion about drawing valid conclusions from programmatic assessment.
2. Evaluate validity of conclusions drawn from an assessment measure.
3. Identify how multiple assessment measures can lead to meaningful conclusions

Authors/Presenters:

Brian Frank and Peter Ostafichuk

B4	**Subject:** Games as a Pedagogical Tool to Develop Engineering Graduate Attributes

Abstract:

Games, defined as "a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outline" [1], are a useful tool for incorporating specific learning outcomes within engaging experiences [2]. Game-based learning allows students to learn through play beyond learning to play the game itself. This type of learning activity offers various advantages and opportunities for experiential learning and can positively impact learning [3]. Games also provide opportunities for engineering students to develop professional and behavioural skills, such as time management, decision-making, problem-analysis, reflection and resilience. By integrating games within their courses, educators are able to develop engineering graduate attributes such as lifelong learning and teamwork alongside technical domain knowledge. This workshop will demonstrate examples of game-based learning for developing engineering graduate attributes and will provide participants with the opportunity to develop their own classroom games.

A brief overview of game-based learning theory and game mechanics will be presented, along with case studies of games used in recent engineering classroom initiatives. These games include learning outcomes focused around topics such as entrepreneurship, equity and diversity, strategic thinking, and teamwork. Participants will learn to play the example games before working collaboratively to design their own games. Groups will choose from selected engineering graduate attributes and justify the attribute development through the game mechanics. Each group will present their gameplay outline for peer feedback and iteration. Following the workshop, the facilitators will share the final game ideas with all participants as a starting foundation for developing their own game-based learning activities. The outcomes of this workshop will help engineering educators to integrate and develop crucial graduate attributes such as lifelong learning and teamwork in their technical courses.

Authors/Presenters:

Emily Marasco, Wilian Gatti Junior, Beaumie Kim, Laleh Behjat and Marjan Eggermont

B5	**Subject:** Engineering stories we live by: Investigating how ecolinguistics can inform engineering education

Abstract:

Ecolinguistics is a multi-disciplinary field that uses linguistic analysis to understand, critique and challenge the ways in which we use language and narrative—consciously and not—to create and enforce our relationships to each other and to the natural environment. It is also a proactive field. One of its leading proponents, Aaron Stibbe, claims it is a deliberately norm-making field, in which the goals are not just to understand these linguistic phenomena, but also to determine how we might change them for our long term benefit, which of course is difficult to separate from that of the Earth itself.

In this workshop, we will consider examples of engineering design, engineering practice and engineering education. In particular, we will consider how these examples are framed by, flow from and reinforce the language and narratives that provide them with their relevant contexts. What assumptions about our relationship to the Earth can be releveled when we consider existing designs that interact with the natural

environment? How do narratives—from individual narratives to those that inform whole civilizations—provide both conscious and unconscious frameworks that inform how we consider these designs? What narratives do we join into when we frame the relationship between nature and engineering? How are those narratives embedded in what we teach our students? And, how can we pay deep attention to our language, and the narratives it taps into, when addressing these issues with our students? Are there new narratives we might learn, or old narratives we might want to unlearn? What are the cultural roots of these narratives? What narratives, from what cultures, are excluded from our perspective?

This workshop will be divided into subsections, during which groups will first consider concrete examples in which narrative and language frame our approach to all of these concerns. Having critiqued existing practices, we will then turn to the future, and consider what steps we can take to adjust, renew or replace the narratives and language used to mediate and frame the relationship between engineering and the natural environment. We will pay special attention to how this applies to our students now, and in the immediate future. They inherit a world rife with ecological devastation, disruption and risk. We will consider how we help them tell the story of our possible ways of reacting to those dire challenges. We will also consider what existing stories we have access to, if any of those provide a sustainable and just way forward.

Authors/Presenters:
Ted Nolan

June 20, 2021, 2:30 pm - 3:50 pm EDT

C1	**Subject:**
	Decolonizing Engineering Courses
	Abstract:
	Incorporating decolonization concepts and indigenous knowledge into engineering curriculum is important, but it can be difficult to see a tangible connection between the two fields of knowledge. This workshop creates an actionable bridge between the two areas of knowledge.
	UBC faculty and students developed curriculum with a focus on decolonization and Indigenous knowledge in collaboration with student and Tahltan Nation partners. This curriculum's novel approach uses systems thinking to carefully weave decolonization concepts into engineering courses taught across all 14 disciplines at UBC. We utilize quantitative and qualitative feedback tools to measure the impact on students and faculty. The curriculum follows a laddered approach of developing three primary competencies that increase faculty and students' awareness of, and ability to engage with, Indigenous knowledge. The competencies developed are listed in the table below.
	This curriculum is built for faculty who are new to decolonization concepts within the field of engineering. It includes faculty training, lectures, assignments and rubrics that can be directly implemented into your courses. The curriculum is flexible and can be tailored to integrate with any course. This has been piloted in 8 courses across five departments.
	The remainder of the workshop will focus on using the method below to walk through the following process of implementing the SCC into a volunteer's syllabus as a group.
	Authors/Presenters:
	Pamela Rogalski and Debalina Saha
C2	**Subject:**
	Sustaining a network of design education practice and research in Canada

Abstract:

The Canadian Design Workshop (CDW) is a new biennial workshop that aims to investigate and share information on design education and research unique to Canadian institutions, focusing on elevating engineering design education and research within the Canadian context. The stated goals of the CDW are to (1) Help sustain a Canadian community of practice of engineering design educators and researchers, (2) Build a network of faculty and graduate students passionate about engineering design and design education, (3) Share current research, and evidence-based educational practices, and (4) Bring attention to Canadian issues in design. These goals closely align with the three goals of the CEEA-ACEG Design Special Interest Group (SIG): (1) Provide resources to educators to improve engineering design education, (2) Facilitate knowledge transfer from research to practice, and (3) Facilitate a Community of Practice for Engineering Design Educators to share and build upon past experiences.

Further evidence of the connection between CDW and the Design SIG is the theme of the inaugural workshop (CDW1), which was held in a virtual format in December of 2020. The theme of CDW1 was Designing Engineering Design Education in Canada. Submissions were asked to align with at least one of the three topics of: engineering design in the Canadian public post-secondary education system, diversity in engineering design, and design in Canadian industry. These topics and themes have been identified by the Design SIG as valuable directions in design research.

The synergy between CDW and the Design SIG suggest a valuable opportunity for collaboration. One such desired collaboration is a CEEA-ACEG workshop that aims to grow and strengthen the community of Canadian educators and researchers. This proposed workshop will establish stronger infrastructure for collaboration within the Canadian design community.

The objective of the proposed workshop is two-fold. First, the workshop aims to further engage the design community and expand on the topics introduced at CDW1. We wish to host such a workshop at CEEA-ACEG to further build an interconnected network of design educators and researchers and to engage future CDW participants. This aim aligns with the goals of both CDW and the Design SIG. We will present a summary of the major takeaways of CDW1, with special attention on the emerging themes of transdisciplinary education, sustainability, and entrepreneurship.

Second, the proposed workshop will allow participants to shape the future direction of CDW, and more broadly, Canadian design research and education. Both the Design SIG and CDW aim to most effectively contribute to the Canadian design community, thus this workshop will facilitate a conversation on creating more infrastructure for collaborations within the community.

We hope participants leave the workshop with a desire to remain further involved with the Canadian design community and there is better synergy between CDW and CEEA-ACEG.

Authors/Presenters:

Chris Rennick, Ada Hurst, Steve Lambert, Meagan Flus, Grant McSorley, Minha R. Ha and Yang Cao

C3	**Subject:** Managing Academic Integrity

Abstract:

There is a need for increased national dialogue about academic misconduct within Canadian engineering schools and the efforts being made to promote and improve academic integrity among students. The concern about academic integrity in engineering schools is growing; students, educators and administrators can benefit from discussing common problems and effective measures.

We propose a 90-minute workshop that includes delivered content, breakout discussions, and a final concluding discussion. Within each breakout session, one of the facilitators will briefly present a quick overview and then lead the participants in an interactive discussion on relevant topics. The tentative program would be: 1. Introductory Remarks from the Facilitators. (10 minutes) 2. Summary of the engineering school and regulator survey. (10 minutes) 3. Breakout Session A. (30 minutes) 4. Breakout Session B. (30 minutes) 5. Concluding discussion. (10 minutes) Depending on the number of participants and the nature of the software used to host the online workshops, the breakout sessions may be split into smaller groups led by one of the facilitators. In this

	case, the last ten minutes of each session will be reserved to bring the whole group back together for a summarizing discussion.	
	Authors/Presenters: David Demontigny, Marianna Kontopoulou, Carol Jaeger, Peter Ostafichuk and Brian Frank	
C4	**Subject:** Preparing for your upcoming CEAB [virtual?] accreditation visit	

Abstract:
This workshop is designed specifically for the individuals within Engineering Higher Education Institutions (HEIs) who are responsible for preparing for an CEAB accreditation visit. Topics to be covered include:
• an overview of the Canadian Engineering Accreditation Board's (CEAB) accreditation processes and criteria;
• highlights of recent changes to criteria, processes, and documentation requirements;
• tips on how to prepare to receive an accreditation visit;
• approaches to demonstrating compliance with CEAB criteria;
• changes necessitated by the transition to a virtual modality.
Target audience: Senior faculty and others responsible for the oversight of CEAB-accredited engineering programs and/or to prepare for and receive a CEAB accreditation visit.
Learning objectives:
1. Describe the CEAB accreditation processes and criteria at a high-level.
2. Discuss approaches to demonstrating compliance with the CEAB accreditation criteria.
3. Implement a plan to prepare to receive a CEAB site visit.
4. Understand how virtual visits will be conducted.
Learning activities:
1. Small group discussion
2. Case-based discussions

Authors/Presenters:
Pierre Lafleur, Paula Klink, Elise Guest

C5	**Subject:**
	Construction engineering education: teaching Building Information Modeling (BIM) or teaching through BIM

Abstract:
This workshop aims at stimulating a discussion on the methods of teaching construction engineering by answering the question: "Teaching Building Information Modeling (BIM) or teaching through BIM?"
Lately, BIM has positioned itself as a pioneer and a keystone for the digitization of practices in the construction industry. Since 2016, there have been publications listing university BIM programs (Abdirad & Dossick, 2016), which conclude that there is no consensus regarding the teaching strategy for BIM. The constructivist approach (learning by doing) and project-based learning are often preferred (Eadie et al. 2016). A different integration of BIM in practice is proposed by some authors: teaching knowledge or the profession using BIM (Nasir & Bargstädt, 2017). Thus, Turk (2018) proposes a radical paradigm shift in engineering education using BIM, in particular by considering BIM as the new 'language' of building and civil engineering. Other researchers propose a conceptual framework for teaching BIM, which includes, among others, the learning content, the teaching method, the technological environment and the timing (Boton et al. 2018). In addition, in 2016, the GRIDD (a research group on integration and sustainable development, at the ETS-Montreal) organized two workshops on teaching BIM, where we could observe the discrepancy between avant-garde industrial practices and academic teaching.
With the objective to innovate construction engineers' education so that it can better meet the needs of the industry, we propose a teaching methodology where BIM is only the means, a way of communicating, while teaching the core engineering disciplines and soft skills. The central part of the proposed teaching method will be an Interactive Virtual Environment (EVI in French), which will be deployed for all students of the Collaborative Design and BIM courses. The idea is that several platforms and software will be connected for the purpose of fluidity of information between the different tools, but also to allow collaborative work through the cloud. Thus, students will be able to work in a team and simultaneously on their laboratory projects or practical work. This will allow to improve the teaching in BIM and technological innovation of future engineers by reducing the gap

with the skills sought in industry.

Through a set of questions for discussion, the proposed workshop will address two main topics

- What is the relationship between teaching construction engineering and BIM?
- What characteristics should an Interactive Virtual Environment for teaching construction engineering have?

Logistics:

- The workshop will use Miro as interactive platform.
- Recorded video material will be provided before the conference dates
- The participants will be invited to share their experience on the 2 main topics at the beginning of each part of the workshop with visual support on Miro (if needed).
- The precise discussion questions will be given to the participants before the beginning of the workshop (but can evolve during the actual discussion).
- Some of the discussions will be in breakout rooms.
- The results of the workshop will be summarised in an article to be submitted to a journal.

Authors/Presenters:

Ivanka Iordanova and Erik Poirier

D1	**Subject:**
	Indigenous Engineering in Practice and Learning
	Abstract:
	Indigenous engineers by working with the landscape have contributed to altering this across the world for millennia before modern engineering methods developed. These approaches put a great emphasis on sustainability and community well-being. As we restart after the COVID lockdown and face the Climate Change Emergency, we need to reconsider the neglect of the skills these engineers valued and use the expertise of those in our communities to re-introduce this into our teaching
	Many such changes have been highlighted as needing in our Engineering education for many years by women, differently abled and Indigenous groups who are not catered for in many cases by existing engineering designs or university teaching methods. Also, employers are seeking more creativity in students and improved abilities to scope and define a problem before the design stage.
	We are practitioners and lecturers in this space and want to raise awareness about the pervasive quality of the skills we teach and use and the importance of Indigenous perspective as boundary objects to challenge the dominant approach to engineering.
	For non-Indigenous engineers to integrate such learnings in their work, or engage with communities, the first step is to develop personal relations with Indigenous people, a process that has been neglected in both our countries (Australia and Canada) so we bring our networks and experience to the workshop to encourage links to be made. Also we bring our understanding of Indigenous knowledge sharing practices to assist others to work in these spaces. We also have case studies of the disconnect between approaches from the different cultures that we can demonstrate and engage participants in our experiences on the cultural interface.
	Much research has been done on incorporating Indigenous knowledge in the curriculum and we can adapt Indigenous approaches to assist our students grow in awareness of the concerns of Indigenous Peoples and to position them in a critical thinking framework to collaborate with First Nations at the cultural interface. In this way we can move forward as partners in the new normal with a shared comprehension of new values and beliefs that incorporate value of the land, value of community over individual, respect for two-way learning and humility as engineers in entering the public space.
	These teachings apply to engineering work with any community as they provide the case studies and scenarios to enter dialogue about our assumptions, beliefs and values in a way that challenges and creates interesting engagement for our students. Also, through low-tech community projects our engineers can engage in whole-of-project experiences that will introduce them to all aspects of engineering projects in a creative space.
	The workshop will include case studies and exercises to engage with different perspectives around some engineering aspects as an introduction to these teaching strategies. We invite examples from others in teaching that link to this work to develop partnerships around project development to consult, scope, design and implement engineering products with our local communities.
	Authors/Presenters:
	Cat Kutay and Alex Wilson
D2	**Subject:**
	Multiple Perspectives on Accessibility in the Engineering Curriculum – Arriving at an Engineering Design Approach

Abstract:

Principles of universal and accessible design have long been part of the engineering curriculum, particularly in design courses; however, engineering programs have yet to systematically address the challenge of accessibility in their curricula. Multiple ethical and legal frameworks around the country require post-secondary institutions, including professional schools, to provide accessible forms of education, and that appropriate and reasonable accommodations be made in order to facilitate that access. For some disabilities, appropriate accommodations may be relatively easy to find, such as locating note takers or providing extra time for assessments. These standard accommodations are often administrated by University Accessibility offices. For others, however, particularly those students with more severe or challenging sensory or cognitive disabilities, appropriate accommodations can require significantly more consideration and out-of-the-box thinking.

This is especially true for an engineering curriculum, given its specific physical and cognitive requirements, particularly when faced with students with more signifiant challenges. For some courses, it might necessitate a complete rethink of learning objectives and the teaching practices and activities used to meet them. On a course by course basis, this could be addressed by a dedicated instructor redesigning the framework of the course. Yet when instruction needs to be integrated with the rest of the student population, conflicts may arise between established pedagogical practice and accommodations. On a programmatic level, accommodations may require significant administrative support as many of the core experiences for students would require review. Furthermore, there are no standardized approaches, only heuristics for accommodating students in STEM environments. In laboratory courses, for example, one way to approach accommodations might be to turn activities into virtual ones; another might be to provide assistants to perform the required physical manipulations. However, no single approach would work in all class environments, or for all disabilities, demanding a largely course by course, student by student, activity by activity approach.

In this workshop, we will explore the redesign of a first-year engineering design course to address the needs of a student with a significant visual disability and accompanying physical limitations. Participants will engage with multiple stakeholders from the University of Toronto who were present in this redesign process – the student herself, course instructors, and program administrators. In this workshop, participants will explore possible ways to make learning engineering design more accessible through redesigning specific activities from the course to meet the needs of these stakeholders.

Learning Objectives:

Appreciate the nuanced understanding of accessibility necessary to redesign a course

Apply engineering design principles to course and activity design to promote design for accessibility

Explore ways in which design activities can be made more accessible

Analyse the impact on student learning and engineering design education.

In this workshop participants will:

Be introduced to the stakeholders and context of the first-year engineering design course redesign

Work in groups with other educators to redesign two activities from the course

Consult with key stakeholders

Explore and critique the activity redesigns developed over the past year

Engage in a broader discussion of the viability and efficacy of this approach

Authors/Presenters:

Alan Chong, Patricia Kristine Sheridan, Jason Foster, Robert Irish, Penny Kinnear and Amy Van de Mierden

D3	**Subject:** Engineer of 2050 Skills Development **Abstract:** As a community of engineering educators, we have been discussing how engineering education might evolve to prepare our future students for the many opportunities and challenges that society will face in the future. CEEA-ACEG has positioned this in terms of educating the Engineer of 2050. The Junior Engineer of 2050 would start their undergraduate studies in 2040 so we are looking ahead at education 20 years from now. More pressing, engineers entering university in the next decade will be the leaders in their fields by 2050, which gives us only a ten-year time horizon. This SIG has already run a couple of workshops on this topic and this year, will combine imaging the future of engineering education with lessons learned from the teaching and learning experiences during the COVID-19 pandemic. The goal is to advance new ideas for skills development that leverage the opportunities that the pandemic has brought to bear while addressing broader sustainability and societal goals. Inspired by the global community that produced the Sustainable Development Goals (SDGs), and within the framework of the Canadian Engineering Grand Challenges (CEGCs), the objective of this workshop is to engage participants to create teaching activities that develop learners' skills to address and make a connection to the SDGs and the CEGCs. This decade (2020-2030) is the "decade of action" where the engineering community will continue to work together to advance engineering education in new and creative ways that were prompted by the pandemic, and together decide what aspects of remote teaching we are going to keep going forward. Leveraging new opportunities, we can engineer the SDGs and provide innovative ways to teach engineering students to contribute beyond their technical disciplinary expertise. Members of the CEEA-ACEG Engineer of 2050 SIG will facilitate this workshop online. The workshop will start off with highlights from data gathered from colleagues across Canada in previous SIG workshops, and will summarize the SDGs and CEGCs as they relate to engineering education. Participants will then be placed in groups (breakout rooms) representing diverse disciplines and assigned a Grand Challenge! The groups will receive question prompts that will guide breakout room activities as follows: • Identify the new teaching methods and styles you developed during the last year • Collectively create a new learning activity (assignment, project, lab, reflection, extra-curricular) that addresses the challenge and engages students in interdisciplinary thinking • Identify where in the curriculum this new learning activity could/would be located • Map the new learning activity to the SDGs that it contributes to achieving • Describe the learning outcomes and assessments that align with the new learning activity At the end of the workshop, groups will be challenged to creatively share their output with all participants. This workshop is intended to engage CEEA-ACEG members to produce a documented set of learning activities that will be shared on the SIG platform to seed ideas for new curricula that can be utilized by other instructors
	Authors/Presenters: Nadine Ibrahim, Jillian Seniuk Cicek and Chirag Variawa.
D4	**Subject:** A Collaborative Approach to Training Graduate Teaching Assistants
	Abstract: Teaching assistants are integral members of a course delivery team and provide essential support in engineering education [1]. However, many graduate students do not receive adequate training in teaching and learning support, particularly for engineering classrooms that require greater facilitation duties, such as engineering design [2]. International graduate students also face additional classroom challenges through cultural and social adjustment [3]. While some studies have been conducted in recent years to examine the training received by teaching assistants, more work is still needed to develop quality training programs [3]. This workshop will provide collaborative opportunities for participants to create teaching and learning modules that can be used to train future teaching assistants. The workshop facilitators will review the recently updated training material currently offered at their own institution, as well as a critical analysis of the response. Based on this experience and the resulting feedback, the facilitators will present multiple topics and common scenarios that require further training and development.

	Participants will learn how to identify relevant stakeholders and available resources when creating their own training material and they will receive a planning template. Working in groups, the participants will collaboratively create learning outcomes and teaching strategies for a specified TA challenge. Each group will present their module outline for peer feedback and iteration. Following the workshop, the facilitators will formalize and share the draft modules with all participants as a starting foundation for further TA training development. The outcomes of this workshop will assist any engineering institution in preparing their graduate students for teaching assistant duties.
	Authors/Presenters: Emily Marasco and Kim Johnston
D5	**Subject:** Alternative Pathways into Engineering: Developing a summer program to teach high school physics through bioengineering principles.
	Abstract: The ability to achieve gender balance in engineering classrooms is known to be hindered by gender disparity in high school physics classes. The University of Calgary's 4-week bioengineering summer institute is designed to remove structural barriers to engineering education. Our program focus is to engage students who would not have considered engineering, due to factors such as resource limitations in rural and indigenous communities, or scheduling constraints in programs such as International Baccalaureate. The bioengineering summer institute aims to increase our diversity of graduates entering the engineering workforce. Students who opted not to take physics in grade 10 oftentimes take other courses such as biology or chemistry instead. By teaching physics through bioengineering examples, we were able to leverage this background knowledge. Additionally, research shows that some excluded identities are more likely to persist in engineering when they understand how it can be applied to real world contexts [1]. After two years, we have one cohort of students who have demonstrated amazing success, and helped continue improving the future of the program. In this workshop we will share our program design, and we will engage with participants to consider how they can apply elements of learnings from our program approach to their outreach and recruitment activities.
	Authors/Presenters: Katherine Dornian, Miriam Nightingale, Robyn Paul and Qiao Sun.