CEEA2015-McMaster

Hamilton, Ontario, Canada

May 31st-June 3rd, 2015

McMaster University

Inspiring Innovation and Discovery

CEEA ACEG

CANADIAN ENGINEERING EDUCATION ASSOCIATION

ASSOCIATION CANADIENNE DE L'ÉDUCATION EN GÉNIE

A Message from the General Chair

I would like to welcome you all to the Canadian Engineering Education Association's annual conference held this year at McMaster University. I hope that you will enjoy an engaging and fruitful conference. CEEA2015-McMaster offers a venue for exchanging ideas and experiences in the area of Engineering Education and research between attendees from across Canada and other parts of the world. You will also get a chance during your stay to become acquainted with McMaster University and its efforts for achieving excellence in engineering education and research.

This year we have asked each of you to classify your papers into Discovery, Application, and Integration. It is our hope that this will make it easier to identify topics of interest and also communicate the different types of work we do as engineering educators. The preparations for this conference started a year ago with input and effort from the local steering committee, CEEA executive, and our assistance staff in the Faculty of Engineering, McMaster University. I would like to thank them all for their efforts. Special thanks to my colleagues in the local steering committee Dr. Kim Jones, Dr. Timber Yuen, Dr. Robert Fleisig, Dr. Mohamed Bakr, Dr. Lisa Romkey, and Mr. Kevin Dunn. I am particularly grateful for the efforts of Kelton Friedrich, Minha Ha, Janet Delsey, and Arlene Fajutrao Dosen from the Faculty of Engineering for their experienced assistance and dedication. It was a pleasure working with you all!

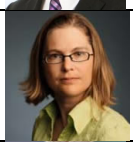
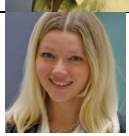
In addition to attending the activities of the CEEA2015-McMaster conference, I hope that you will have a time to see some of the many attractions in Hamilton.

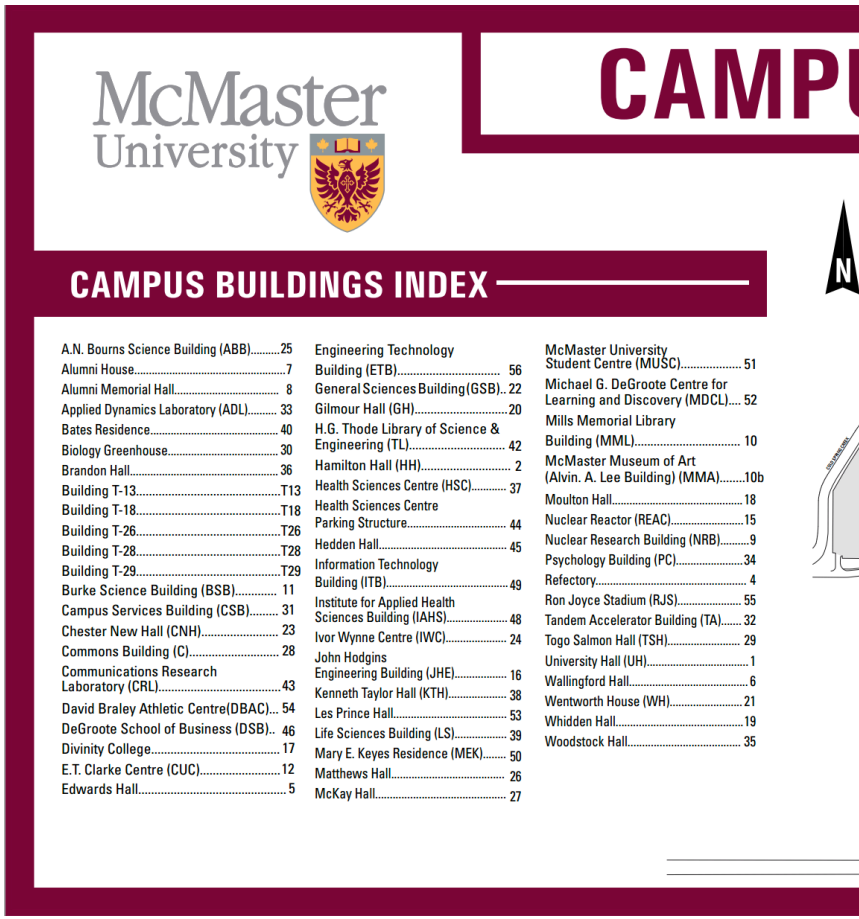
I wish you all the best. We look forward to meeting you again in future conferences in McMaster.

Sincerely,

Dr. Thomas E. Doyle

CEEA2015-McMaster Steering Committee

	Dr. Mohamed Bakr Professor	McMaster University Dept. of Electrical and Computer Engineering
	Mr. Kevin Dunn Assistant Professor	McMaster University Dept. of Chemical Engineering
	Dr. Robert Fleisig Assistant Professor	McMaster University Walter G. Booth School of Engineering Practice
	Mr. Kelton Friedrich Project Coordinator	McMaster University Hatch Centre for Engineering Experiential Learning
	Dr. Clifton Johnson Associate Professor	Dalhousie University Dept. of Industrial Engineering
	Dr. Kim Jones Associate Professor	McMaster University Dept. of Chemical Engineering
	Ms. Lisa Romkey Senior Lecturer	University of Toronto Curriculum, Teaching and Learning, Division of Engineering Science
	Dr. Timber Yuen Assistant Professor	McMaster University B. Tech. Automotive & Vehicle Technology

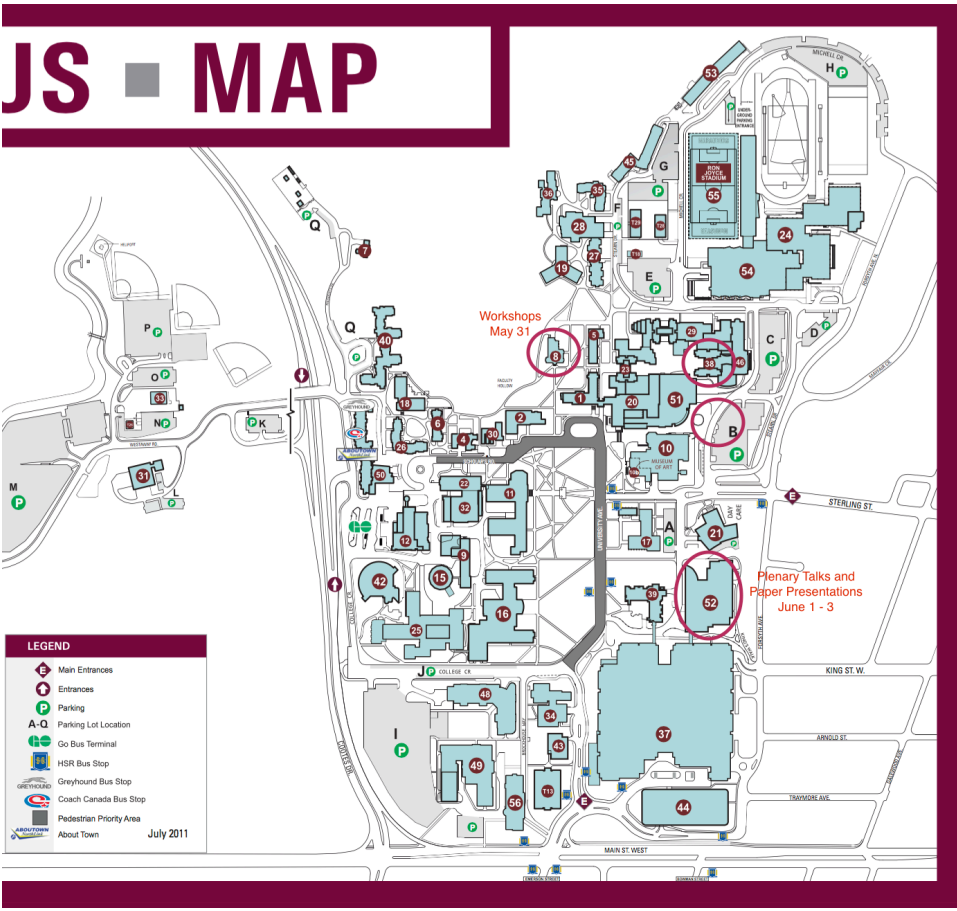


CEEA2015-McMaster Locations of Note:

- **Workshops @ University Club (Building 8)**: Registration Desk (Sunday only), Workshops, and Reception. (http://ucmcmaster.com/)

- **Michael DeGroote Centre for Learning and Discovery (MDCL - Building 52)**: Registration Desk (Mon-Wed), Plenary Sessions, Breakout Sessions, and Coffee Breaks

- **Celebration Hall within Kenneth Taylor Hall (Building 38)**: Monday and Tuesday Lunches

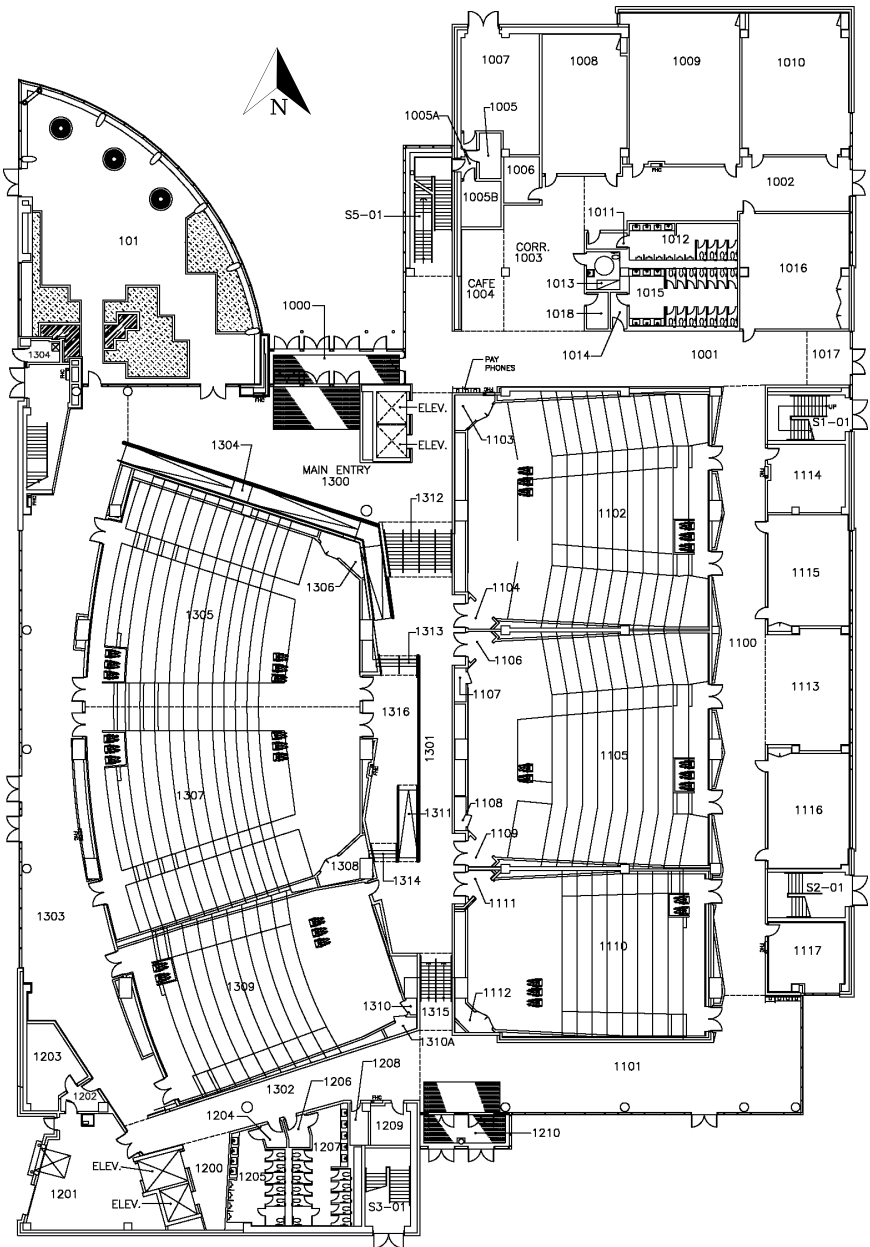


- **Pickup and Drop Off for Banquet (Road between Building 51 and Lot B)**: Bus to banquet hall (leaves at 5:30 pm, 6:00 pm, and 6:30 pm on Tuesday June 2nd to Liuna Station Banquet Hall)

- **Parking** - Lots for CEEA2015 parking pass: B, C, D, E, G, H, I. A four day CEEA2015 Conference Parking Pass is available for $40 with in and out privileges for all gated lots on the main campus. These passes can be purchased with CASH ONLY at the Registration desk on Sunday morning and Monday morning (May 31 and June 1).

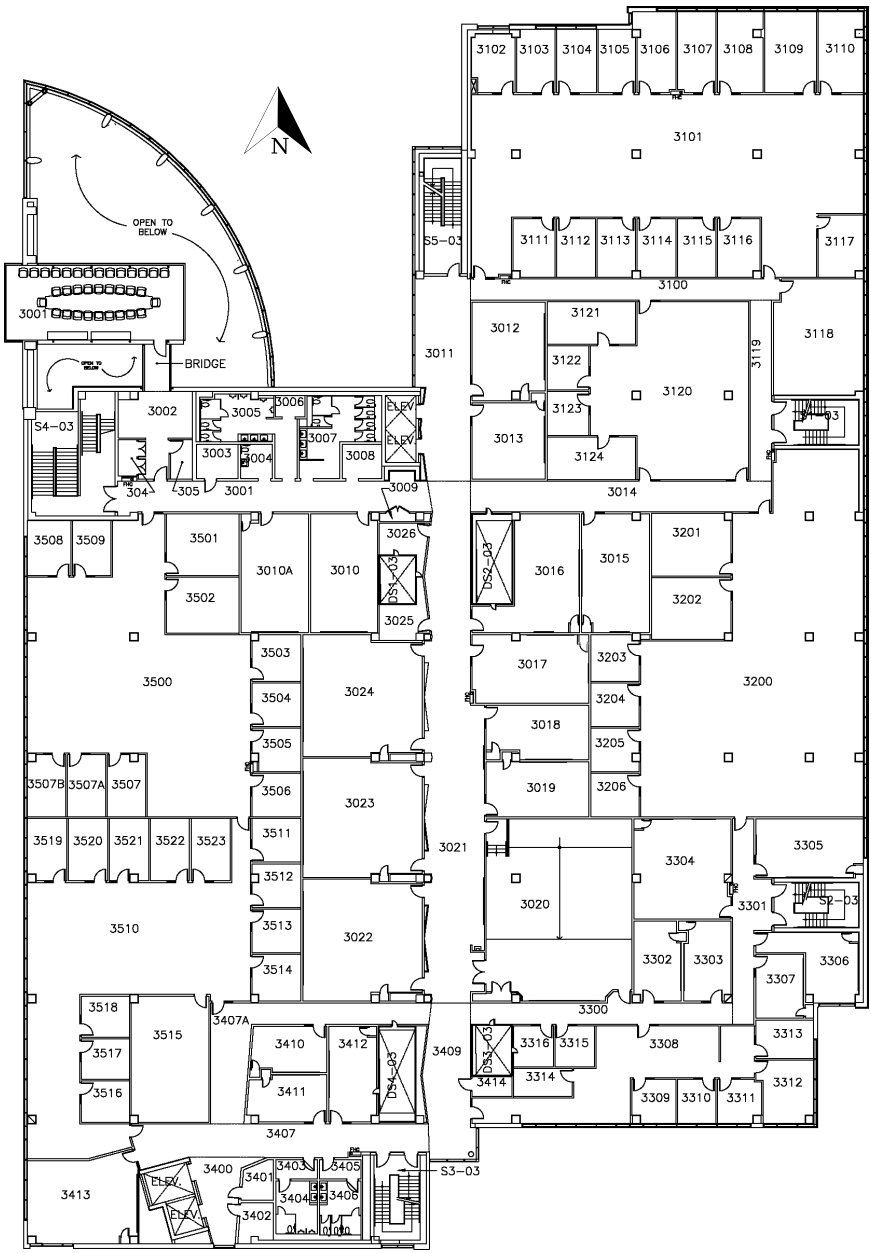
Michael DeGroote Centre for Learning and Discovery (MDCL) – Building Map for First Floor

(http://www.mcmaster.ca/uts/maps/mdcl1.html)



Michael DeGroote Centre for Learning and Discovery (MDCL) - Building Map for Third Floor

(http://www.mcmaster.ca/uts/maps/mdcl3.html)



Program Summary

Registration desk open every day 8:00 am-3:00 pm. On Sunday May 31st, the registration desk will be in the McMaster University Club. For all other days, registration desk will be in the lobby of the MDCL building. Registration desk will be closed for lunch.

Sunday May 31st (Workshops)

	Dining Room (120)	Great Hall (100)	West Room (35)
9:00-10:30	Active Learning Spaces (part 1) *Yaser Haddara, David Kidney and Walter Peace*	Teaching Engineering Students to Design Solutions to Wicked Problems *Stefanie Blain-Morae Robert Gorbet and Christopher Moraes*	A Time for Self-Reflection: How Can Engineering Educators Bring Lifelong Learning to Life? *Richard J. Aleong and David S. Strong*
10:30-12:00	Using a Murder Mystery to Cultivate Graduate Attributes *Libby Osgood and Clifton Johnston*	Active Learning Spaces (part 2) *Yaser Haddara, David Kidney and Walter Peace*	Professional Career Planning Curriculum in Engineering Programs *John Fagan and Kin F. Li*
12:00-1:00	LUNCH (at University Club for Workshop Registrants)		
1:00	Introduction to Graduate Attribute Processes *Jake Kaupp and Brian Frank*	Panel: The Importance of a Sustainability Thrust in an Undergraduate Engineering Program *Art Heidebrecht*	Designing a Successful Capstone Project Course *Philippe Kruchten and David Strong*
2:00	Data-Informed Improvement *Jake Kaupp and*	Defining the Ideas Clinic™ for Canadian Engineering	

	Brian Frank	Educators *S. Bedi, A. Trivett, C.C.W. Hulls, K. Karim, W. Bishop, J. Grove, C. Rennick, J. Rathlin, J. Baleshta, A. Hurst, M. Robinson, S. Mohamed and M. Bristow*	
3:00	Alignment of Assessments, Course Learning Outcomes and Program Learning Outcomes *John Donald, Erin Aspenlieder, Julie Vale, Karen Gordon and Ryan Clemmer*	Active Learning in the Engineering Classroom *Nancy Nelson*	
4:00	Support Technical Learning Using Short Audio/Video Tutorials *Fabio Campi and Atousa Hajshirmohammadi*	Collaborative Testing: How it Works, Why it Works, Working to Make it Better, and How to Apply it in Your Class. *Kevin Dunn and Terry McCurdy*	Student Workshop: Meet & Greet and Formalizing a Student Society *Elizabeth Kuley and Robyn Paul*

Sessions in the Dining Room from 10:30-4:00 are all Accreditation workshops

Reception, 5:30 pm, Sunday, University Club

All conference registrants are encouraged to attend the reception that will be held following the adjournment of the workshops in University Club. Hors d'oeuvres will be served. Registrants will receive one complimentary drink ticket, a cash bar will be available for further purchases. Please come, meet and share ideas with others in the field.

Conference Overview

Date	Start	Duration	Activity	All presentations are 20 minutes (incl. question time)			[N] = number of papers in the session
Mon, 1 June, 2015	8:00 AM	1:00	Registration and Coffee	App = Application Papers			
	9:00 AM	0:30	Introductory Remarks	Dis = Scholarship of Discovery			
	9:30 AM	1:00	Keynote 1	Int = Scholarship of Integration			
	10:30 AM	1:40	Paper Session, 3 Parallel Sessions	App-M1 [5]		App-M2 [5]	Dis-M1 [4]
				Experiential and Lab-Based Learning	*Design 1*	*Assessment and Teaching Practices*	
	12:10 PM	1:30	Lunch	Celebration Hall			
	1:40 PM	1:40	Paper Session, 3 Parallel Sessions	App-M3 [5]	Int-M1 [5]		Dis-M2 [4]
				Blended and Online Learning	*Integrative Approaches to Engineering Education*		*Teamwork and Communication Skills*
	3:20 PM	0:15	Coffee Break				
	3:35 PM	2:00	Paper Session, 3 Parallel Sessions	App-M4 [3]	Int-M2 [6]		Dis-M3 [5]
				Multidisciplinary Contexts and Activities	*Interdisciplinary Opportunities*	*Graduate Attributes*	
	5:45 PM	1:00	Sponsors Receptions and Presentations				
Tues, 2 June, 2015	9:00 AM	1:00	Keynote 2				
	10:00 AM	0:30	Coffee Break				
	10:30 AM	1:40	Paper Session, 3 Parallel Sessions	App-T1 [5]	App-T2 [5]		Dis-T1 [5]
				Innovative Approaches to Enhance Student Learning	*First Year Design*	*Experiential Education*	
	12:10 PM	1:30	Lunch	Celebration Hall			
	1:40 PM	1:40	Paper Session, 3 Parallel Sessions	App-T3 [5]	App-T4 [5]		Dis-T2 [5]
				Assessment	*Flipped Classrooms*		*Student Perspectives on Engineering Education*
	3:20 PM	0:15	Coffee Break				
	3:35 PM	2:00	Paper Session, 3 Parallel Sessions	App-T5 [6]	Int-T1 [6]		Dis-T3 [6]
				Experiential Curriculum Design	*Industry, Professionalism and Design*		*Recruitment and Retention*
	5:35 PM		Adjournment				
	7:00 PM		Banquet	Lluna Station			
Wed, 3 June 2015	9:00 AM	1:00	CEEA Annual General Meeting				
	10:00 AM	0:30	Coffee Break				
	10:30 AM	1:40	Paper Session, 3 Parallel Sessions	App-W1 [4]	App-W2 [5]		Dis-W1 [5]
				Design 2	*Accreditation and Quality Assurance*		*Student Confidence and Performance*
	12:10 PM	1:30	Lunch	Michael DeGroote Centre for Learning and Discovery			
	1:40 PM	1:40	Paper Session, 3 Parallel Sessions	App-W3 [5]	App-W4 [5]		Dis-W2 [4]
				Innovative Approaches to Curriculum and Assessment	*Experiential and Professional Skills*		*Life-long Learning and Industrial Perspectives*
	3:20 PM	0:15	Coffee Break				
	3:35 PM		Adjournment				

SUNDAY, MAY 31

All Sunday workshops takes place in McMaster's University Club

Workshop 1a: Active Learning Spaces (part 1)
Workshop 2b: Active Learning Spaces (part 2)

Room: University Club Dining Room

Time: Sunday May 31st, 9:00 am -10:30am; 10:30 am – 12:00 pm

Presented by: Yaser Haddara, David Kidney and Walter Peace, McMaster University

Abstract: This is a half day workshop exploring Active Learning Spaces. The entire workshop will involve a series of active learning exercises, including ones designed by the participants during the workshop. The primary themes that we will explore will be:

The wide range of pedagogical practice that may be termed active learning; and

The dependence of active learning exercises on the constraints of physical space.

Secondarily, we will explore other constraints, including subject matter, class size, and time constraints on the design and use of active learning exercises.

The first half of the workshop will be a series of active learning exercises including game scenarios, group discussion, group presentation, and physical modeling. The pedagogical subject matter of the different exercises will cover topics from electrical engineering, engineering education, geography (also applicable to crystallography), group dynamics, and learning technologies. But in each case, the discussion will focus on aspects of the physical space

that allow the implementation of particular kinds of activities and will explore the impact of other constraints as mentioned above.

The second half of the workshop will involve activities designed by the participants working in the same groups that they would have formed during the first half. We will then explore more fully the issues that arise in adapting active learning exercises to different physical spaces.

Workshop 1b: Teaching engineering students to design solutions to wicked problems

Room: University Club Great Hall

Time: Sunday May 31st, 9:00 am -10:30am

Presented by: Stefanie Blain-Moraes, Robert Gorbet and Christopher Moraes, University of Waterloo

Abstract: Engineering design is a critical component of engineering education. Many prescriptive and descriptive models of engineering design exist and are used in higher education to teach students design skills and competencies. However, while these traditional pedagogies are suited for addressing well-defined problems, most neglect elements of design that are necessary to address the real-world "wicked" problems that engineers are increasingly called to face (e.g. climate change, childhood obesity, quality of life in vulnerable populations). We have developed a new design pedagogical framework, called the "W-model", to enable engineering students to more effectively engage with complex problems. Pilot testing has indicated that novice design students who use the W-model to tackle a wicked problem perform at the level of an "informed designer", whose level of competence is between that of a novice and expert designer. Specifically, students using the W-model:

1) continue to refine their understanding of the problem from project onset to project end; 2) practice idea fluency; 3) use higher order criteria to weigh benefits and tradeoffs of all ideas; 4) build knowledge of a problem throughout the design process through research and prototyping; 5) understand where they are in the overall design process and modify their design strategies accordingly; 6) go through multiple design cycle iterations; and 7) allow themselves to 'backtrack'. This workshop is intended for engineering educators interested in using the W-model as a framework for design projects that address real-world problems. Using a combination of brief lectures, whole-group discussions and interactive exercises, we will introduce the elements of the W-model, compare and contrast it to existing design pedagogical frameworks, review evidence of its effectiveness, and provide workshop attendees with material that will enable them to implement the W-model as a framework for engineering design in their classrooms.

Workshop 1c: A time for self-reflection: How can engineering educators bring lifelong learning to life?

Room: University Club West Room

Time: Sunday May 31st, 9:00 am - 10:30 am

Presented by: Richard J. Aleong and David S. Strong, Queen's University

Abstract: Lifelong learning has been widely identified by engineering accreditation boards in Canada, the United States, and internationally, as one of the attributes to be developed in students enrolled in undergraduate engineering degree programs. Additionally, there is a strong call from industry for graduates with the skills of lifelong learning to face complex and creative challenges. While previous research studies have investigated lifelong learning

skills development and assessment, there is a continuous need for pedagogy that promotes lifelong learning in the current engineering curriculum. This workshop offers a professional development opportunity for CEEA 2015 conference attendees to explore themselves and their understanding of lifelong learning. How might an understanding of oneself as a lifelong learner transfer to one's teaching and research practice? How might that, in turn, potentially enhance students' capacity for lifelong learning? Knowledge about the self and the skills for self-reflection are important elements to identify one's individual learning needs, motivation, and personal assessment methods. This workshop will provide an experiential learning opportunity for participants to explore how they position themselves as lifelong learners and how they may bring these values and attitudes to the classroom. Workshop participants will engage in self-reflection and discussion about their own engineering careers, pathways, research and teaching practice, and future goals. Participants will explore their self-knowledge about who they are and how they see themselves in their engineering education careers as lifelong learners. Theories of metacognition, self-regulation, and intrinsic motivation will be presented as a theoretical basis to ground participants' exploration. Based on participants' experiences, practical strategies and future opportunities for enriching one's personal growth and teaching practice towards lifelong learning will be discussed.

This CEEA 2015 workshop is part of a current research project being conducted to support undergraduate engineering students in building capacity for lifelong learning. With participants' consent, the data collected in this CEEA 2015 workshop will be collected and analyzed to support the current research project.

Workshop 2a: Accreditation - Using a Murder Mystery to Cultivate Graduate Attributes

Room: University Club Dining Room

Time: Sunday May 31st, 10:30 am - 12:00 pm

Presented by: Libby Osgood and Clifton Johnston, Dalhousie University

Abstract: The list of graduate attributes, those skills that the Canadian Engineering Accreditation Board (CEAB) has determined are necessary for all engineering graduates to have, includes concrete skills, such as knowledge base and problem analysis, and intangible skills, such as lifelong learning and professionalism. Giving a lecture on the attribute of life-long learning could certainly expose students to the skill, and we can then hope that they see the value and incorporate it in their daily life. However, letting them experience the benefits of these skills will increase the potential for regular practice.

Mock scenarios are used in other professional programs such as medicine, nursing and business, often involving actors, to put the students into situations they are likely to experience in professional practice. In engineering, we can use a similar live-action case study where clues are distributed to characters who simulate a real event to let the students experience the chaos of an engineering crisis. In November 2014, the excitement of the Rosetta satellite sending the lander Philae to a comet provided an excellent opportunity for the students to learn about lifelong learning, interpersonal skills, teamwork, history of engineering, and provide a real-life engineering experience. Entitled the 'Comet Caper', students in 2 first-year and 1 second-year engineering class selected engineering roles such as program manager and systems, structural, and electrical engineers, each with a prescribed personality. They then received scripts, clues,

and evidence, distributed over time in order to make decisions about the fate of Philae. The excitement during each of the three enactments of the caper was palpable, and students concluded with a reflection about the applicability to the real world.

In the workshop, participants will be provided with all necessary materials to administer the Comet Caper in their class, experience the excitement of the activity, and discuss ways to refine and adapt the caper to address the more intangible graduate attributes.

Workshop 2c: Professional Career Planning Curriculum in Engineering Programs

Room: University Club West Room

Time: Sunday May 31st, 10:30 am - 12:00 pm

Presented by: John Fagan and Kin F. Li, University of Victoria

Abstract: The University of Victoria's Engineering program includes a mandatory Co-operative Education component, which sees graduates undertaking at least 16 months of relevant work experience before graduating. Through work with new graduates planning for their Engineer In Training (EIT) we identified the need for an arena where integration of experiential learning and academic learning could be facilitated.
Engineering 330: Professional Career Planning and Engineering Leadership is a course offered to UVic Engineering students for the first time in Spring 2014 as a complementary elective with full course credit towards their program. Integrating career development elements into program curriculum involves faculty engagement and collaborative efforts with an open mind and a long view. This course included an embedded mentoring program with senior students mentoring first year students, thus developing

leadership skills while also contributing to program retention. Other elements were strategic volunteering and network building, including active interaction with professional engineers from local companies. A fundamental objective of this course is for the students to learn how to apply career management skills learned through co-op work terms to leverage engineering education into career success after graduation.
This workshop will share the strategies used in bringing this course to life, and will facilitate discussion of the broader faculty engagement, student engagement, and industry collaboration required when preparing near/new graduates for the transition to EIT positions in Industry.

Workshop 3a: Accreditation - Introduction to graduate attribute processes

Room: University Club Dining Room

Time: Sunday May 31st, 13:00 - 14:00

Presented by: Jake Kaupp and Brian Frank, Queen's University

Abstract: This is an overview of using learning outcomes, and tools like curriculum mapping, course planning tables, and rubrics for data-informed curriculum improvement processes. Participants will work in teams on case studies to plan where, when and how to assess outcomes. Participants will also develop an assessment and development plan for particular indicators, including collecting the data, and how might it be used for program improvement.

Workshop 3b: Panel - The importance of a sustainability thrust in an undergraduate engineering program

Room: University Club Great Hall

Time: Sunday May 31st, 13:00 - 14:00

Presented by: Art Heidebrecht, McMaster University

Abstract: Four panelists have been selected to address the question of whether or not is important that there be a sustainability thrust in an undergraduate engineering program. The four panelists comprise a current senior undergraduate engineering student, an engineering faculty member and two practicing professional engineers who deal with sustainability-related issues. Following a brief introduction by the panel moderator, each panelist will address the topic for 5 minutes. Panelists will then be asked to respond to several questions from the moderator after which panelists will respond to questions or comments from the audience.

Workshop 3c: Designing a successful capstone project course (3 Hours)

Room: University Club West Room

Time: Sunday May 31st, 13:00 - 16:00

Presented by: Philippe Kruchten and David Strong, University of British Columbia and Queen's University

Abstract: A successful and effective engineering capstone project course is year-long, in teams, solving a concrete problem, for an industrial partner, resulting in deliverables that can be assessed, and with plenty of feedback from a competent mentor. In this workshop, we'll offer a set of "best practices", templates, guidelines, and examples issued from the collective experience of a group of Canadian NSERC design engineering chairholders. For engineering capstone design project courses, one size does not fit all, but for most

of the course design choices you'll have to make, we lay out and discuss possible alternatives, provide pointers to background research, and give you criteria to make your own choices. Among these criteria are the constraints and demands of the CEAB graduate attributes, as many of these attributes are measurable in such capstone courses.

A series of small presentations followed by small group discussions

Outline:

Overall course parameters
- learning objectives
- graduate attributes
- duration

Industry involvement
- industry partners
- project definition
- role of the partner
- IP issues
- fees or no fees
- budget

Student team
- team size and formation
- team dynamics
- reflection and team dynamic evaluation
- self- and peer-assessment

Design process
- Life-cycle, milestones
- Artifacts, project portfolio
- Tools

Communication
- Written report
- Presentation
- other media literacy: videos, web based tools

Supervision
- mentors, TAs
- evaluation, rubrics
- teaching load

Complementary classes
- Guest speakers, case studies,
- Professional practice
- Ethics, economics and regulatory compliance
- project management

Putting it together

Workshop 4a: Accreditation - Data-informed improvement

Room: University Club Dining Room

Time: Sunday May 31st, 14:00 - 15:00

Presented by: Jake Kaupp and Brian Frank, Queen's University

Abstract: This workshop focuses on how administrators and instructors can use data, drawn from a variety of assessment approaches and tools, to improve the student learning environment. Participants will work in teams on a realistic case study drawn from actual student data, reviewing indicators, assessments, curriculum maps and student performance presented through different visualizations. Teams will be responsible for suggesting potential improvements, discussing alternative ways of interpreting assessment data, and talk about the use of different and varied tools, methods and approaches for assessing graduate attributes.

Workshop 4b: The Engineering Ideas Clinic Experience

Room: University Club Great Hall

Time: Sunday May 31st, 14:00 - 15:00

Presented by: W. Bishop, S. Mohamed, A. Trivett, J. Grove, J. Baleshta, A. Hurst, B. Mantin, C. Rennick, C. Hulls, M. Robinson, S. Bedi, University of Waterloo

Abstract: Experiential learning is a degree-level expectation of the undergraduate curriculum at the University of Waterloo. Experiential learning is currently accomplished through co-operative education and labs in undergraduate courses. This presentation examines another model for implementing experiential learning that introduces some of the benefits of co-operative

education into workshops in an undergraduate course. This model is referred to as an Ideas Clinic Experience.

An Ideas Clinic Experience delivers both horizontal integration (i.e., integration across disciplines) and vertical integration (i.e., integration across program years). Such experiential learning activities have the potential to leverage the advantages of a co-operative education experience in the context of an undergraduate course. Students are given an opportunity to face challenges outside of their discipline while also interacting with students, staff, and faculty from other disciplines. An Ideas Clinic Experience prepares students to work effectively in a multi-disciplinary setting.

This session presents an ambitious project by the Faculty of Engineering to introduce an Ideas Clinic Experience into every undergraduate engineering program. First, the general philosophy of the Ideas Clinic Experience will be introduced. Next, the essential elements of an Ideas Clinic Experience will be described. This will be followed by a brief demonstration of pilot projects implemented in September 2014:

1. Disassembling a Coffee Maker
2. Exploring Products in the Repair Café
3. Manufacturing a Key Chain
4. Assembling a Remote-Control Car
5. Building an Electric Motor
6. Measuring venturi pressure in a carburetor

For each activity, the instructors will present an introduction, the expected learning outcomes, the resource requirements, and student feedback on the activity. Attendees will have an opportunity to interact with the designs created by the workshops. Lessons learned from each of the pilot projects will be highlighted. This session will conclude with reflection and discussion on the role of clinic activities in engineering education and the potential to introduce an Ideas Clinic Experience into your own courses.

Workshop 5a: Accreditation - Alignment of Assessments, Course Learning Outcomes and Program Learning Outcomes

Room: University Club Dining Room

Time: Sunday May 31st, 15:00 - 16:00

Presented by: John Donald, Erin Aspenlieder, Julie Vale, Karen Gordon and Ryan Clemmer, University of Guelph

Abstract: At the program level, an outcomes-based curriculum improvement process relies on the deliberate assessment of key course level learning activities. In order to identify the most appropriate learning activities to assess in courses for the purposes of program level assessment, course activities must be constructively aligned to program level learning outcomes (Biggs, 1999). This alignment can prove challenging, as it requires that instructors and administrators not only apply constructive alignment within courses and within the program as a whole, but also consider what and how to assess at each level.

In response to this challenge, the University of Guelph's Open Learning and Educational Support (OpenEd) and School of Engineering (SOE) developed a six-step process that guides faculty in linking course level learning activities with the assessment of program level outcomes for the purposes of continuous improvement/accreditation.

This hands-on session will introduce participants to this process by inviting participants to align course activities and assessments with program outcomes. Participants will discuss how this process balances instructor autonomy in course administration and assessment with program level data acquisition and reporting. Participants will further reflect on how such a process could be adapted and/or applied in their unique institutional and departmental settings.

Reference: Biggs, J. (1999). What the student does: Teaching for

enhanced learning. Higher Education Research & Development 18(1), 57-75.

Workshop 5b: Active Learning in the Engineering Classroom

Room: University Club Great Hall

Time: Sunday May 31st, 15:00 - 16:00

Presented by: Nancy Nelson, Conestoga Institute of Technology and Advanced Learning

Abstract: In our traditional classrooms we seem to encourage surface and strategic learning instead of the deep learning required for true mastery of our discipline. This workshop explores active learning strategies where, by challenging beliefs about the tried-and-true roles of the teacher and the student, you can increase student accountability, engage them in a dynamic learning environment, and improve their depth of learning.

Workshop 6a: Support Technical learning using short Audio/Video Tutorials

Room: University Club Dining Hall

Time: Sunday May 31st, 16:00 - 17:30

Presented by: Fabio Campi and Atousa Hajshirmohammadi, Simon Fraser University

Abstract: Several Electronic and Computer Engineering courses in higher education involve practical or computer-aided labs, where students engage in specific design activities (e.g. board design or mounting, measurement labs, embedded systems design, circuit or

computer architecture design). Such activities are often strictly related to the students' future careers, so they invariably find the activities engaging and exciting. On the other hand, before "the fun part" can begin, they need to build specific competence, not only on the subject, but in the usage of the lab tools, that can be complex and feature specific rules and syntax to be followed.
Especially in large classes, many students lament the use of written how-to guides and tutorials in labs as boring and not engaging. Few may even give up understanding tutorials at all, limiting to passive application of instructions that gives no added value to the understanding of the topic or to their life-long learning perspectives.
A possible idea is to develop and offer students You-Tube – like Video Tutorials demonstrating the usage of lab tools and equipment: While not substituting written instructions, A/V Tutorials may complement them easing the impact with the lab environment: hopefully the video will lower students initial resistance making the transition from the "passive" learning phase to the "active" design phase easier and quicker. This may make their approach to the Lab environment easier and more engaging.

This workshop proposes to share the experience of developing and offering video tutorials for a 4th year electronic circuits design course in SFU:
Describe the design process utilized in structuring the educational videos, introduce the impact of A/V tutorials on students engagement and performance, explore which educational contents appear more suitable to be included in short videos, discuss with the audience how to use videos to develop design skills in various engineering contexts.

Workshop 6b: Collaborative testing: how it works, why it works, working to make it better, and how to apply it in your class.

Room: University Club Great Hall

Time: 16:00 - 17:00

Presented by: Kevin Dunn and Terry McCurdy, McMaster University

Abstract: Evaluation and assessment in post secondary education tends to be on an individual basis, despite the fact that having to express and explain reasoning, and reach consensus with colleagues are valuable team-based skills. As instructors we can develop these additional skills by introducing collaboration into evaluation. In addition, we can introduce peer learning, which is a technique that engages the student more fully (Mazur). Combining peer learning with assessment, right after a conventional test or exam has been shown to be tremendously successful at many levels, (Gilley and Clarkston).
In this workshop we will show evidence collected in a variety of programs (Nursing and Chemical Engineering), with a variety of courses (theoretical, analytical, mathematical, conceptual), and at all levels (from first year to final year), and class sizes (50 to 400). In every case there has been overwhelmingly positive qualitative student reviews.

The procedure, when first described to instructors can appear overwhelming to coordinate, from a logistical point of view. The process is rather simple, and always works out in a classroom environment. In this 1-hour proposed workshop we will demonstrate the procedure by engaging participants in a collaborative setting. We will provide detailed logistical steps for implementation in your classroom. After the demonstration we discuss the pros and cons of various protocol decisions that can be used to fine-tune this practice.

We have also started work on a new addition: providing immediate feedback to students. Using the Immediate Feedback Assessment Technique (IF-AT), answers to questions are revealed using scratch cards. Self-assessment and self-learning are promoted with immediate feedback, important facets of metacognitive skill development that can lead to improved individual academic performance (Carvalho). We hypothesize that providing feedback at a moment when students are most receptive for the guided answer promotes retention, and substantially overcomes drawbacks from mark inflation due to collaborative testing without feedback (Molsbee).

Mazur, E (1997). Peer Instruction. Prentice Hall.

Gilley, B. & Clarkston, B. (2014). Collaborative Testing: Evidence of Learning in a Controlled In-Class study of Undergraduate Students. Journal of College Science Teaching, 43(3) 83-91.

Carvalho, M. (2010). Assessing changes in performance and monitoring processes in individual and collaborative tests according to students' metacognitive skills. European Journal of Cognitive Psychology, 22(7) 1107-1136.

Molsbee, C. (2013). Collaborative Testing and Mixed Results. Teaching and Learning in Nursing, 8, 22-25.

Workshop 6c: Student Workshop: Meet & Greet and Formalizing a Student Society

Free workshop for students; registration not required

Room: University Club West Room

Time: 16:00 - 17:00

Presented by: Elizabeth Kuley and Robyn Paul, University of Saskatchewan

Abstract: The CEEA member network has been steadily growing since its first conference in 2010 and as this network has grown, an increasing number of students have committed to engineering education, both as a research area and a profession. The primary goal of this workshop is to provide students attending the CEEA conference with an opportunity to network with one other. Participants will engage in a meet and greet activity followed by round table discussions of some successes and challenges that they have experienced in their education, or engineering education research. The secondary purpose of the workshop is to connect CEEA members, particularly student members, who may be interested in creating a Canadian Engineering Education Students' Society. This part of the workshop will include a brainstorming session that will inform the possible goals, vision/mission statement, and future activities of a formalized students' society, and will serve to gauge interest in the idea. This workshop is designed to build a network of students and other CEEA member supporters, aligning with CEEA's goals of encouraging and supporting the development and sharing of best practices between Canadian engineering institutions as well as engaging students.

MONDAY, JUNE 1st

Plenary Talk #1

Who: William (Bill) Oakes

What: Preparing Professionals and Leaders Using Community Engagement

When: 9:30 - 10:30

Where: MDCL 1105

Abstract: Success and leadership in today's global economy requires a sound foundation of disciplinary knowledge as well as a broader set of professional skills. As educators we seek to create learning environments where students can develop the needed knowledge and skills. Increasingly, research is pointing to experiences as a key to both deepen and broaden learning within our curricula. Community engagement offers many exciting opportunities for creating such learning experiences while students apply engineering knowledge and skills to develop solutions to meet compelling needs of the underserved. It can also help address other issues such as diversity and retention. These kinds of experiences have been shown to prepare students for leadership in industry and develop innovation and entrepreneurial skills. They also offer a way to leverage the resources within our universities and colleges to address needs of the underserved within our communities locally and globally. One of the successful programs in engineering community engagement is the EPICS Program founded at Purdue University. Lessons learned from the program will be highlighted along with how the program is used to meet programmatic outcomes across many disciplines. Researching findings from program will also be shared.

Biography: William (Bill) Oakes is the Director of the EPICS Program and a Professor and a founding faculty member of the School of Engineering Education at Purdue University. He is a registered professional engineer. He has been active in the dissemination of service-learning and community engagement for university pre-university students. He has received numerous awards for his efforts at Purdue including being elected as a fellow of the Teaching Academy and listed in the Book of Great Teachers. He was the first engineer to receive the U.S. Campus Compact Thomas Ehrlich Civically Engaged Faculty Award. He was a co-recipient of the U.S. National Academy of Engineering's Bernard Gordon Prize for Innovation in Engineering and Technology Education, recipient of the U.S. National Society of Professional Engineers' (NSPE) Educational Excellence Award and the American Society for Engineering Education's (ASEE) Chester Carlson Award for Innovation in Engineering Education. He is a fellow of the ASEE and the NSPE.

Session App-M1: Scholarship of Application

Experiential and Lab-Based Learning

Time: Monday, June 1st, 10:30 am to 12:10 pm

Room: MDCL 1105

Time	Paper	Title/Authors
10:30 am-10:50 am	**App-M1-1 #119**	"Teaching Network Technologies that Support Industry," Ishwar Singh, Nafia Al-Mutawaly, and Tom Wanyama
10:50 am-11:10 am	**App-M1-2 #54**	"Integrating a short simulation project into an introductory transport phenomena course," Jan Haelssig and Devin O'Malley.
11:10 am-11:30 am	**App-M1-3 #97**	"Industrial Automation in Unit Operation Labs," Konstantinos Apostolou and Ishwar Singh
11:30 am-11:50 am	**App-M1-4 #8**	"Integrated Hands-on and Remote PID Tuning Laboratory" Martha Kafuko and Tom Wanyama
11:50 am-12:10 pm	**App-M1-5 #10**	"Constructing a DC Brushless Motor- an Experiential Engineering Clinic Activity for Mechanical Students,"Samar Mohamed, Neil Griffett, and Sanjeev Bedi

All abstracts can be found online; for example, abstract for paper #119 is available at `http://yint.org/119` (together with all other abstracts in this session)

Session App-M2: Scholarship of Application

Design 1

Time: Monday, June 1st, 10:30 am to 12:10 pm

Room: MDCL 3022

Time	Paper	Title/Authors
10:30 am-10:50 am	**App-M2-1 #168**	"The Use of Engineers in Residence for Student Design Mentorship," Clifton Johnston, Sandra MacAulay-Thompson, Georgeta Bauer, Colin Dickson, Peter Gregson, Andrea Doncaster, and Kathy Lea
10:50 am-11:10 am	**App-M2-2 #96**	"Closing the Loop: Integrating 3D Printing with Engineering Design Graphics for Large Class Sizes," James Baleshta Peter Teertstra, and Benny Luo
11:10 am-11:30 am	**App-M2-3 #150**	"Capstone Projects with Limited Budget as an Effective Method for Experiential Learning." Lucian Balan, Dan Centea, Timber Yuen, and Ishwar Singh
11:30 am-11:50 am	**App-M2-4 #11**	"Using Rubrics in a Capstone Engineering Design Course," Richard Zytner, John Donald, Karen Gordon, Ryan Clemmer, and Jason Thompson
11:50 am-12:10 pm	**App-M2-5 #35**	"Use of ePortfolios for Reflection in Engineering Design," Ryan Clemmer, Bahram Gharabaghi, Jonathan Vandersteen, Dale Lackeyram, Jennifer Spencer, Richard G. Zytner, John R. Donald, Jason Thompson

Session Dis-M1: Scholarship of Discovery

Assessment and Teaching Practices

Time: Monday, June 1st, 10:30 am to 12:10 pm

Room: MDCL 3023

Time	Paper	Title/Authors
10:30 am-10:50 am	**Dis-M1-1 #20**	"Engineering Elective Course Re-design to Promote Student Engagement," Gordon Stubley
10:50 am-11:10 am	**Dis-M1-2 #148**	"Teaching Teachers to Teach Creativity in an Engineering Context," Ken Tallman
11:10 am-11:30 am	**Dis-M1-3 #154**	"Using Student Focus Groups to Support the Validation of Rubrics for Large Scale Undergraduate Independent Research Projects," Lisa Romkey, Alan Chong and Lobna El Gammal
11:30 am-11:50 am	**Dis-M1-4 #38**	"Measuring the impact of student led tutorials on first year students' learning outcomes" Sohad Kadhum, Brad Buckham and Ben Nadler

All abstracts can be found online; for example, abstract for paper #20 is available at `http://yint.org/20` (together with all other abstracts in this session)

Session App-M3: Scholarship of Application

Blended and Online Learning

Time: Monday, June 1st, 1:40 pm to 3:20 pm

Room: MDCL 1105

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**App-M3-1 #84**	"Teaching an Advanced Engineering MOOC: Lessons Learned." Jeffrey Harris, William Heikoop, Allison Van Beek, and James Wallace
2:00 pm-2:20 pm	**App-M3-2 #109**	"Get a Head Start! Experiences of Running a Summer Online Calculus Course for Incoming First Year Students," Micah Stickel and Shai Cohen
2:20 pm-2:40 pm	**App-M3-3 #130**	"Teaching Electronics for non Electrical Engineers Using Blended Learning and Experiential Learning," Mohamed Bakr
2:40 pm-3:00 pm	**App-M3-4 #151**	"Implementation of a Blended Instruction-Based and Problem-Based Learning Strategy in a Second-Year Engineering Curriculum." Timber Yuen, Lucian Balan, Dan Centea, Kostas Apostolou, and Ishwar Singh
3:00 pm-3:20 pm	**App-M3-5 #64**	"Effectiveness of Various Supplemental Teaching Approaches in Education of Engineering Mathematics." Yang Cao

Session Int-M1: Scholarship of Integration

Integrative Approaches to Engineering Education

Time: Monday, June 1st, 1:40 pm to 3:20 pm

Room: MDCL 3022

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**Int-M1-1 #87**	"Reflecting on written communication as an embedded component in undergraduate engineering curricula," Arun Moorthy and Warren Stiver
2:00 pm-2:20 pm	**Int-M1-2 #41**	"Engineering Student Retention and Attrition Literature Review," Elizabeth Kuley, Terry Fonstad, and Sean Maw
2:20 pm-2:40 pm	**Int-M1-3 #15**	"The Canadian Engineering Education Association Research Collaboration (CEEA-RC) National Survey," Jake Kaupp, Sylvie Doré, Sue Fostaty Young, Brian Frank, Susan McCahan, Susan Nesbit, and Peter Ostafichuk
2:40 pm-3:00 pm	**Int-M1-4 #89**	"Cultivating High School Student Leaders Through Engineering and Science," Joel Mieske, Martin Scherer, and Mary Wells
3:00 pm-3:20 pm	**Int-M1-5 #143**	"Meaning-making and Lexicogrammatical Accuracy Relationships on Multilingual Engineering Teams," Penny Kinnear

Session Dis-M2: Scholarship of Discovery

Teamwork and Communication Skills

Time: Monday, June 1st, 1:40 pm to 3:20 pm

Room: MDCL 3023

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**Dis-M2-1 #24**	"Factors Influencing Conflict Management Style in Engineering Teamwork," Peter Ostafichuk, Navid Shirzad, Agnes d'Entremont, Stephen Mattucci, and Carol Naylor
2:00 pm-2:20 pm	**Dis-M2-2 #114**	"An exploration of communication and knowledge application in multidisciplinary undergraduate engineering capstone design teams," Mario Milicevic, Narges Balouchestani Asli, Deborah Tihanyi, and Kamran Behdinan
2:20 pm-2:40 pm	**Dis-M2-3 #58**	"Team-forming and its Impact in First Year engineering clinic activities," Andrew Trivett, Christopher Roy, and Yash Sewlani
2:40 pm-3:00 pm	**Dis-M2-4 #23**	"Self-Perception Differences Based on Gender and Personality Type in Team Projects," Peter Ostafichuk, Stephen Mattucci, Agnes d'Entremont, Navid Shirzad, and Carol Naylor

All abstracts can be found online; for example, abstract for paper #24 is available at `http://yint.org/24` (together with all other abstracts in this session)

Session App-M4: Scholarship of Application

Multidisciplinary Contexts and Activities

Time: Monday, June 1st, 3:35 pm to 5:15 pm

Room: MDCL 1105

Time	Paper	Title/Authors
3:35 pm-3:55 pm	**App-M4-1 #152**	"A case-based debate approach and CEAB outcomes assessment in a first year Engineering Biology course at University of Waterloo," Katharina Hassel, Patrick Quinlan, and Christine Moresoli
3:55 pm-4:15 pm	**App-M4-2 #82**	"EPICS: Meeting Outcomes with Multidisciplinary Student Teams," Maeve Drummond, Carla B. Zoltowski, and William C. Oakes
4:15 pm-4:35 pm	**App-M4-3 #65**	"ElectrizArte: Combining engineering education, arts and social outreach in an extra-curricular activity." Teodoro Willink, Gustavo Núñez, and Lochi Yu

Extra time is available in this session group discussion after the final talk.

All abstracts can be found online; for example, abstract for paper #152 is available at `http://yint.org/152` (together with all other abstracts in this session)

Session Int-M2: Scholarship of Integration

Interdisciplinary Opportunities

Time: Monday, June 1st, 3:35 pm to 5:35 pm

Room: MDCL 3022

Time	Paper	Title/Authors
3:35 pm-3:55 pm	**Int-M2-1 #19**	"Engineering in Medicine," Amy Hsiao and Andrew Smith
3:55 pm-4:15 pm	**Int-M2-2 #160**	"A Proposed New Graduate Program in Technical Product Innovation at UBC," Antony Hodgson and Mike Van der Loos
4:15 pm-4:35 pm	**Int-M2-3 #136**	"An Intervention-Based Active Learning Strategy Employing Principles of Cognitive Psychology," Gaganpreet Sidhu and Seshasai Srinivasan
4:35 pm-4:55 pm	**Int-M2-4 #175**	"Empathy as an engineering leadership virtue for creating sustainable prosperity," Robert Fleisig, David Potter, Dustin Garrick, Vladimir Mahalec, and Richard Allen
4:55 pm-5:15 pm	**Int-M2-5 #39**	"Pathways Between Engineering and Education Faculties: Efforts to Establish an Engineering Education Graduate Program at the University of Manitoba," Sandra Ingram, Richard Hechter, Jillian Seniuk Cicek, and Doug Ruth
5:15 pm-5:35 pm	**Int-M2-6 #118**	"A framework proposal for engineering education through the development of projects that support performing arts," Teodoro Willink and Lochi Yu

Session Dis-M3: Scholarship of Discovery

Graduate Attributes

Time: Monday, June 1st, 3:35 pm to 5:15 pm

Room: MDCL 3023

Time	Paper	Title/Authors
3:35 pm-3:55 pm	**Dis-M3-1 #78**	"Industry Perceptions of Graduate Attribute Competencies," Donald Petkau
3:55 pm-4:15 pm	**Dis-M3-2 #79**	"Industry Perceptions of Graduate Attribute Requirements for the Workplace," Donald Petkau
4:15 pm-4:35 pm	**Dis-M3-3 #124**	"The Faculty Attribute Assessment Process at the University of Manitoba: Suggestions for Closing the Loop," Jillian Seniuk Cicek, Sandra Ingram, and Nariman Sepehri
4:35 pm-4:55 pm	**Dis-M3-4 #34**	"Co-op employer evaluation of the graduate attributes: a comparison of two approaches," Margaret Gwyn and Rishi Gupta
4:55 pm-5:15 pm	**Dis-M3-5 #116**	"Engineers as Life-long Learners: Pedagogical Tools for Engineering Graduate Attribute Development," Shermeen Nizami, Mohamed Abdelazez, and Adrian Chan

All abstracts can be found online; for example, abstract for paper #78 is available at `http://yint.org/78` (together with all other abstracts in this session)

Sponsor Reception and Presentations

Each event is catered by the Sponsor.

Time: 5:45 pm

Room: MDCL 1105

Time: 5:45 pm

Room: MDCL 3023

TUESDAY, 2nd JUNE

Plenary Talk #2
Who: Dr. Joseph Kim

What: Cognition and Learning

When: 9:00 -10:00

Where: MDCL 1105

Abstract: Instructors and students both face daunting challenges. Instructors are under pressure to sufficiently cover course materials and teach important skills. Students are expected to learn a great deal of information and primarily guide their own learning outside of class. Thus, both instructors and students could benefit from easy-to-use strategies that support durable and efficient learning. Cognitive scientists have been systemically studying processes such as attention, memory and learning for more than 150 years. This rich resource of knowledge has been only recently applied to developing evidence-based interventions in education. In this talk, I'll explore how cognitive principles can inform instructional design and critical issues in education to bridge the gap between the lab and classroom.

Biography: Dr Joe Kim is an Associate Professor in Psychology, Neuroscience and Behaviour at McMaster University. Dr. Kim is actively involved in all aspects of the scholarship of teaching and learning. He co-ordinates the innovative McMaster Introductory Psychology program which combines traditional lectures with interactive online resources and small group tutorials. The program has been prominently featured in Maclean's, Globe and Mail, Toronto Star and several education media outlets.

Dr. Kim directs the Applied Cognition in Education Lab (www.science.mcmaster.ca/acelab) and is a core member of

the new Large Interactive Virtual Environment Lab facility (www.livelab.mcmaster.ca). Dr. Kim's research program aims to understand how cognitive principles such as attention, memory and learning can be applied to develop evidence-based interventions in education and training. The research program uses a variety of tools including cognitive and behavioural testing, eye tracking and EEG.

In 2010, Dr. Kim received the Innovator of the Year Award (McMaster VPR) and also led his development team to receive the 2010 President's Award for Excellence in Course and Resource Design. With an active interest in curriculum and education, Dr. Kim has consulted on several policy groups including the Council of Ontario Universities Online workgroup and the Innovation and Productivity Roundtable for the Ontario Ministry of Training, Colleges and Universities.

Session App-T1: Scholarship of Application

Innovative Approaches to Enhance Student Learning

Time: Tuesday, June 2nd, 10:30 am to 12:10 pm

Room: MDCL 1105

Time	Paper	Title/Authors
10:30 am-10:50 am	**App-T1-1 #110**	"Using an Online Personality Assessment Tool to Optimize First-year Engineering Design Teams," Chirag Variawa, Julie Murphy, and Albert Wong
10:50 am-11:10 am	**App-T1-2 #21**	"Ethics 2.0: An introspective approach to understanding and taking ownership of your actions," Karim S Karim
11:10 am-11:30 am	**App-T1-3 #86**	"Where does social responsibility fit into undergraduate perception of the engineering profession?," Lauren Jatana Vathje, Robert Brennan, and Marjan Eggermont
11:30 am-11:50 am	**App-T1-4 #55**	"Seeing into your Teams: An Instructor Interface to Support Team Learning," Patricia Kristine Sheridan, Aidan Malone, Greg Evans, and Doug Reeve
11:50 am-12:10 pm	**App-T1-5 #71**	"Enhancing Learning Experiences of Graduate Students in the Faculty of Engineering and Applied Sciences at Memorial University of Newfoundland," Susan Caines and Leonard Lye

All abstracts can be found online; for example, abstract for paper #110 is available at `http://yint.org/110` (together with all other abstracts in this session)

Session App-T2: Scholarship of Application

First Year Design

Time: Tuesday, June 2nd, 10:30 am to 12:10 pm

Room: MDCL 3022

Time	Paper	Title/Authors
10:30 am-10:50 am	**App-T2-1 #57**	"Hands-on Explorations as Background Research for First-Year Design Projects," Andrew Trivettand Jen Rathlin
10:50 am-11:10 am	**App-T2-2 #28**	"The Use of an Open-Ended Project to Improve the Student Experience in First Year Programming," Carol Hulls, Chris Rennick, Sanjeev Bedi, Mary Robinson, William Melek
11:10 am-11:30 am	**App-T2-3 #36**	"Integrating Engineering Science and Design: Case Study Development for a First Year Engineering Science Course." Lyndia Stacey, Andre Unger, Marios Ioannidis, Steve Lambert
11:30 am-11:50 am	**App-T2-4 #68**	"Experience with a Small UAV in the Engineering Design Class at Capilano University - A Novel Approach to First Year Engineering Design," Mark Wlodyka and Margaret Dulat
11:50 am-12:10 pm	**App-T2-5 #90**	"First Year Engineering Design – Guelph's Teddy Bear Wheel Chair Experience," Warren Stiver

Session Dis-T1: Scholarship of Discovery

Experiential Education

Time: Tuesday, June 2nd, 10:30 am to 12:10 pm

Room: MDCL 3023

Time	Paper	Title/Authors
10:30 am-10:50 am	**Dis-T1-1 #98**	"Implementation of PBL in Engineering Education: Conceptualizations and Management of Tensions," Angela van Barneveld and Johannes Strobel
10:50 am-11:10 am	**Dis-T1-2 #146**	"Co-Curricular Activities and their Role in Supporting Experiental Learning," Medhat Shehata and Michelle Schwartz
11:10 am-11:30 am	**Dis-T1-3 #108**	"Engagement with the Inverted Classroom Approach: Student Characteristics and Impact on Learning Outcomes," Micah Stickel and Qin Liu
11:30 am-11:50 am	**Dis-T1-4 #174**	"Does Access to Rapid Prototyping Enhance Student Visionization?," Thomas E. Doyle

All abstracts can be found online; for example, abstract for paper #98 is available at `http://yint.org/98` (together with all other abstracts in this session)

Session App-T3: Scholarship of Application

Assessment

Time: Tuesday, June 2nd, 1:40 pm to 3:20 pm

Room: MDCL 1105

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**App-T3-1 #72**	"Assessing Process Skills in Undergraduate Engineering Education," Darlene Spracklin-Reid, Susan Caines, and Andy Fisher
2:00 pm-2:20 pm	**App-T3-2 #81**	"Using Micro-Video Projects in Large Engineering Classes to Differentiate Assessment," Jeffrey Erochko
2:20 pm-2:40 pm	**App-T3-3 #40**	"Development and use of rubrics in engineering assessment," Juan Salinas and Jeffrey Erochko
2:40 pm-3:00 pm	**App-T3-4 #27**	"Successes with Two-Stage Exams in Mechanical Engineering," Markus Fengler and Peter Ostafichuk
3:00 pm-3:20 pm	**App-T3-5 #105**	"Development of Analytic Rubrics for Competency Assessment," Nikita Dawe, Gayle Lesmond, and Susan McCahan

All abstracts can be found online; for example, abstract for paper #72 is available at `http://yint.org/72` (together with all other abstracts in this session)

Session App-T4: Scholarship of Application

Flipped Classrooms

Time: Tuesday, June 2nd, 1:40 pm to 3:20 pm

Room: MDCL 3022

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**App-T4-1 #60**	"Using Textbook Readings, YouTube Videos, and Case Studies for Flipped Classroom Instruction of Engineering Design," Craig Merrett
2:00 pm-2:20 pm	**App-T4-2 #112**	"Biotechnology labs reinvented through experiential learning: Enhancing student outcomes through the 'flipped lab'," Fei Geng and Faiez Alani
2:20 pm-2:40 pm	**App-T4-3 #125**	"I flipped my tutorials: a case study of implementing active learning strategies in Engineering," Jonathan Verrett, Anne-Marie, Kietzig Maria, and Orjuela-Laverde
2:40 pm-3:00 pm	**App-T4-4 #170**	"The challenges of launching a MOOC and reusing that material in a blended campus class: things you might not have known about flipped and blended learning," Kevin Dunn
3:00 pm-3:20 pm	**App-T4-5 #93**	The University of Alberta Chemical Engineering Capstone Design Course Goes Flipped!," Marnie Jamieson, Frank Vagi, and Len Church

Session Dis-T2: Scholarship of Discovery

Student Perspectives on Engineering Education

Time: Tuesday, June 2nd, 1:40 pm to 3:20 pm

Room: MDCL 3023

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**Dis-T2-1 #48**	"First-year engineering student assumptions on diversity in the classroom," Chirag Variawa
2:00 pm-2:20 pm	**Dis-T2-2 #32**	"Examining Fourth Year Mechanical Engineering Student Perceptions of Graduate Attribute Competencies: Year Three," Jillian Seniuk Cicek, Paul Labossiere, and Sandra Ingram
2:20 pm-2:40 pm	**Dis-T2-3 #49**	"Training Versatile Engineers: A Historical and Present Perspective on the Place of the Humanities and Social Sciences in the Canadian Engineering Degree," John Donald, Sofie Lachapelle, Jacqueline McIssac, Tara Abraham, Ryan Clemmer, Karen Gordon, Stuart McCook, and Richard Zytner
2:40 pm-3:00 pm	**Dis-T2-4 #121**	"Students' Perspective on Engineering Leadership," Robyn Paul and Lynne Cowe Falls
3:00 pm-3:20 pm	**Dis-T2-5 #163**	"The calling of an engineer: High school students' perceptions of engineering," Scott Compeau and David S. Strong

All abstracts can be found online; for example, abstract for paper #48 is available at `http://yint.org/48` (together with all other abstracts in this session)

Session App-T5: Scholarship of Application

Experiential Curriculum Design

Time: Tuesday, June 2nd, 3:35 pm to 5:35 pm

Room: MDCL 1105

Time	Paper	Title/Authors
3:35 pm-3:55 pm	**App-T5-1 #147**	"Practical Elements of Mechanical Engineering – An Enrichment to University Engineering Education," Anthony Straatman
3:55 pm-4:15 pm	**App-T5-2 #29**	"Incorporating experiential learning in lower division engineering courses," Atousa Hajshirmohammadi and Nilgoon Zarei
4:15 pm-4:35 pm	**App-T5-3 #141**	"A framework of the Bachelor of Technology concept and its significant experiential learning component," Dan Centea, Ishwar Singh, and Timber Yuen
4:35 pm-4:55 pm	**App-T5-4 #75**	"Ipsative learning: a personal approach to a student's experience of PBL within an integrated engineering design capstone module," Emanuela Tilley and John Mitchell
4:55 pm-5:15 pm	**App-T5-5 #142**	Developing a Model for Innovation in Undergraduate Engineering Education – The Systematic Integration of Human Centred Design," Patrick Neumann, Judy Village, Michele Bristow, and Fillipo Salustri
5:15 pm-5:35 pm	**App-T5-6 #117**	"Redesigning a Course in Software Development for First-year Software and Computer Systems Engineering Students," Donald Bailey

All abstracts can be found online; for example, abstract for paper #147 is available at `http://yint.org/147` (together with all other abstracts in this session)

Session Int-T1: Scholarship of Integration

Industry, Professionalism and Design

Time: Tuesday, June 2nd, 3:35 pm to 5:35 pm

Room: MDCL 3022

Time	Paper	Title/Authors
3:35 pm-3:55 pm	**Int-T1-1 #94**	"Challenges in Engineering Design Education: Vertical and Lateral Learning," Alex Czekanski, Maher Al-Dojayli, and Tom Lee
3:55 pm-4:15 pm	**Int-T1-2 #33**	"HIRED – Helping Industry Reach Engineering students Directly, An Initiative of Engagement – for Students and Employers," Carolyn Geddert, Lynda Peto, and Mathew Riesmeyer
4:15 pm-4:35 pm	**Int-T1-3 #30**	"Shedding Light on Customer Requirement Specifications, Functional Specifications and Requirements Lists - How Engineers Learn the Correct Documentation of Requirements," Ilyas Mattmann, Sebastian Gramlich, and Hermann Kloberdanz
4:35 pm-4:55 pm	**Int-T1-4 #9**	"Design of a Robotic Arm for Teaching Integrated Design," Martha Kafuko, Ishwar Singh, and Tom Wanyama
4:55 pm-5:15 pm	**Int-T1-5 #172**	"Expanding the body of knowledge concept for professional practitioners," Witold Kinsner

All abstracts can be found online; for example, abstract for paper #94 is available at `http://yint.org/94` (together with all other abstracts in this session)

Session Dis-T3: Scholarship of Discovery

Recruitment and Retention

Time: Tuesday, June 2nd, 3:30 pm to 5:35 pm

Room: MDCL 3023

Time	Paper	Title/Authors
3:35 pm-3:55 pm	**Dis-T3-1 #85**	"Gendered Words in Canadian Engineering Recruitment Documents," Agnes d'Entremont, Kerry Greer, and Katherine Lyon
3:55 pm-4:15 pm	**Dis-T3-2 #5**	"Developing systems thinking skills: A High-school course on engineering design," Aharon Gero and Ofer Danino
4:15 pm-4:35 pm	**Dis-T3-3 #62**	"Diversity in Engineering Undergraduate Education: A Case for Noncognitive Variables in Engineering Admissions," Bob Brennan, Amanda Deacon, Marjan Eggermont, Nicole Larson, Thomas O'Neill, and Bill Rosehart
4:35 pm-4:55 pm	**Dis-T3-4 #155**	"Investigation of the Causal Factors for Enrollment and Satisfaction in Engineering Programs," Jake Armstrong and David S. Strong
4:55 pm-5:15 pm	**Dis-T3-5 #43**	"Engineering Education: Does Our Training Reflect Student Employment Trajectories?," James Hewlett, Carolyn Hoessler, and Sean Maw

All abstracts can be found online; for example, abstract for paper #85 is available at `http://yint.org/85` (together with all other abstracts in this session)

CEEA Conference Banquet
Time: Tuesday, June 2nd, 7:00 pm
Liuna Station, Hamilton, Ontario

Buses will pick conference registrants up on campus to shuttle them to the Liuna Station Banquet Hall, starting at 5:30pm, with additonal pick ups at 6:00 pm, and 6:30 pm.

Starting at 6:00pm, hors d'oeuvres will be served for the banquet reception. Registrants will receive one complimentary drink ticket, a cash bar will be available for further purchases.

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WEDNESDAY, 3rd JUNE

CEEA Annual General Meeting

Time: Wednesday, June 3rd, 9:00 am to 10:00 am
Room: MDCL 1105

Session App-W1: Scholarship of Application

Design 2

Time: Wednesday, June 3rd, 10:30 am to 12:10 pm
Room: MDCL 1105

Time	Paper	Title/Authors
10:30 am-10:50 am	**App-W1-1 #169**	"Encouraging empathy in engineering design," Holly Algra and Clifton Johnston
10:50 am-11:10 am	**App-W1-2 #66**	"Teaching design to first-year engineering students," Michael McGuire, Kin Fun Li, and Fayez Gebali
11:10 am-11:30 am	**App-W1-3 #53**	"Short design projects for an introductory thermofluids engineering course," Michele Hastie and Jan Haelssig
11:30 am-11:50 am	**App-W1-4 #164**	"Teaching design patterns in a real-time interfacing of embedded systems course," Witold Kinsner

All abstracts can be found online; for example, abstract for paper #169 is available at `http://yint.org/169` (together with all other abstracts in this session)

Session App-W2: Scholarship of Application

Accreditation and Quality Assurance

Time: Wednesday, June 3rd, 10:30 am to 12:10 pm

Room: MDCL 3022

Time	Paper	Title/Authors
10:30 am-10:50 am	**App-W2-1 #107**	"A Management Framework for Graduate Attributes Assessment," Abdelwahab Hamou-Lhadj, William Lynch, and Ali Akgunduz
10:50 am-11:10 am	**App-W2-2 #167**	"Evolution of graduate attribute assessment and continuous program improvement in the Faculty of Engineering at McGill University," Amber Saunders and Laurent Mydlarski
11:10 am-11:30 am	**App-W2-3 #16**	"Evaluation of software tools supporting outcomes-based continuous program improvement processes: Part 3," Jake Kaupp and Brian Frank
11:30 am-11:50 am	**App-W2-4 #132**	"An expert-follower approach to enhance graduate attributes in laboratory courses," Salim Ahmed, Darlene Spracklin-Reid, and Yan Zhang
11:50 am-12:10 pm	**App-W2-5 #46**	"Activity Based Learning: Overcoming problems in implementing OBE in Engineering Education during transition phase," Sujata Wadhwa, Audrey Barlow, and Siddharthsinh Jadeja

Session Dis-W1: Scholarship of Discovery

Student Confidence and Performance

Time: Wednesday, June 3rd, 10:30 am to 12:10 pm

Room: MDCL 1009

Time	Paper	Title/Authors
10:30 am-10:50 am	**Dis-W1-1 #126**	"The Self-Reported Confidence and Proficiency Levels of Undergraduate Students in a Communications Course," Anne Parker and Kathryn Marcynuk
10:50 am-11:10 am	**Dis-W1-2 #138**	"The positive benefits from the observation that test and exam duration is mostly uncorrelated with student grade performance," Kevin Dunn
11:10 am-11:30 am	**Dis-W1-3 #153**	"Curriculum Design According to Students' Cognitive Workload," Yong Zeng and Ali Akgunduz
11:30 am-11:50 am	**Dis-W1-4 #137**	"Developing a New Tool for Engineering Education: By Students For Students," Dorothy Missingham

All abstracts can be found online; for example, abstract for paper #126 is available at `http://yint.org/126` (together with all other abstracts in this session)

Session App-W3: Scholarship of Application

Innovative Approaches to Curriculum and Assessment

Time: Wednesday, June 3rd, 1:40 pm to 3:20 pm

Room: MDCL 1105

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**App-W3-1 #77**	"Bridging Research and Education through the Case Method," David Effa, Eihab Abdel-Rahman, and Steve Lambert
2:00 pm-2:20 pm	**App-W3-2 #22**	"Towards improved learning of fluid mechanics via integration of a commercial software package into an undergraduate course," David Latulippe and Scott Campbell
2:20 pm-2:40 pm	**App-W3-3 #52**	"Introduction of Gamification in Common Core Engineering, Matt Tolman, Marjan Eggermont, and Ron Hugo
2:40 pm-3:00 pm	**App-W3-4 #140**	"Evaluation of Individual Members in Engineering Design Teams," Michel Couturier and Guida Bendrich
3:00 pm-3:20 pm	**App-W3-5 #113**	"Integrating UCD within an Agile Software Development Process in an Educational Setting," Olga Ormandjieva, Kristina Pitula, and Cherifa Mansura

All abstracts can be found online; for example, abstract for paper #77 is available at `http://yint.org/77` (together with all other abstracts in this session)

Session App-W4: Scholarship of Application

Experiential and Professional Skills

Time: Wednesday, June 3rd, 1:40 pm to 3:20 pm

Room: MDCL 3022

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**App-W4-1 #61**	"Experiential learning and career development: Applied learning and results in a undergraduate coop engineering technology program," Allan Mackenzie
2:00 pm-2:20 pm	**App-W4-2 #166**	""My Studying Stops When??": Addressing Delivery and Assessment of Lifelong Learning and Professionalism at the University of Regina," Doug Wagner, Esam Hussein, and David Demontigny
2:20 pm-2:40 pm	**App-W4-3 #80**	"Implementing Experiential Education on Engineering and Society," Matthew Harsh, Brandiff Caron, Deborah Dysart-Gale, Govind Gopakumar, and Ketra Schmitt
2:40 pm-3:00 pm	**App-W4-4 #70**	"Teaching wisdom and other soft skills within engineering curricula," Michael Piczak and Arthur Heidebrecht
3:00 pm-3:20 pm	**App-W4-5 #104**	"An Experiential Learning Activity to Promote Skill Development in First Year Engineering Students," William Bishop, Ada Hurst, Benny Mantin, and Sanjeev Bedi

Session Dis-W2: Scholarship of Discovery

Life-long Learning and Industrial Perspectives

Time: Wednesday, June 3rd, 1:40 pm to 3:20 pm

Room: MDCL 1009

Time	Paper	Title/Authors
1:40 pm-2:00 pm	**Dis-W2-1 #156**	"Evaluating Engineering Career Resources Available to Ontario, University-bound High School Students," Allison Chong and David S. Strong
2:00 pm-2:20 pm	**Dis-W2-2 #92**	"Engineering ethics education: More than a CEAB requirement," Cindy Rottmann, Doug Reeve, Robin Sacks, and Mike Klassen
2:20 pm-2:40 pm	**Dis-W2-3 #158**	"The development of lifelong learning competencies: Positioning students for self-regulation," Richard J. Aleong and David S. Strong
2:40 pm-3:00 pm	**Dis-W2-4 #120**	"Measuring Engineering Career Success," Robyn Paul and Lynne Cowe Falls

All abstracts can be found online; for example, abstract for paper #156 is available at `http://yint.org/156` (together with all other abstracts in this session)

Notes

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