



Conference 2017



Lassonde School of Engineering: May 11-13 Bergeron Centre for Engineering Excellence



Affective Physics: Harnessing Emotion to Improve Learning

#OAPT2017

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The Edward S. Rogers Sr. Department
of Electrical & Computer Engineering
UNIVERSITY OF TORONTO



Conference Schedule

Bergeron Centre for Excellence

Thursday, May 11

Time	Description	Location
4:30-6:00 pm	Registration	Foyer
6:00-7:30 pm	Dinner	Café
7:30-7:40 pm	Welcome (OAPT and York U)	Café
7:40-9:00 pm	Be the Engineer: Hands-on design process	Foyer
9:00-11:00 pm	Social – Shopsy's Sports Grill (York Lanes Retail Centre)	

Friday, May 12

Time	Description	Location
8:00 - 8:45	Coffee and Exhibitors	Café
8:45 – 9:15	Welcome and Discussion (Shawn Books, OAPT; Richard Hornsey, Interim Dean Lassonde; Marisa Sterling, Assistant Dean Lassonde)	Café

Time	Session Title	Presenter(s)	Location
Session A 9:30 - 10:15	Fusing Physics & Biology, panel discussion – Invited Talk	Tamie Poepping (U of WO), Chris Bergevin (York U), Sara Cormier (McMaster U)	203
	Forensic Blood Analysis	Theresa Stotesbury (Trent U)	211
	Diversity in Engineering	York U - Lassonde	213
	Want to Start a VEX Robotics Team?	Andrew Moffat	217
	Math and Science in House Construction	David Gervais (STAO)	313
10:15 - 10:45	Break and Exhibitors		Café
Session B 10:45 - 12:15	Physics Games	Robert Prior	203
	Harnessing Emotions to Help Students Learn	Chris Meyer	211
	Renaissance Engineering	Franz Newland and Kai Zhuang (York U)	213
	Quantum Interference and Computing – Invited Talk	Martin Laforest (IQC)	217
	Knowledge Building: When Students Ask the Big Questions	Damian Pope and Glenn Wagner (PI)	313
12:15-1:30	Lunch and Exhibitors		Café

Session C 1:30 - 2:45	Explore Engineering Experiences in the Classroom	Rebecca White (Engineers of Tomorrow)	203
	Emotion in Learning and Problem Solving	Chandra Boon	211
	Renaissance Engineering	Franz Newland and Kai Zhuang (York U)	213
	Apps for Astronomy and Space Sciences	Chris Vaughan (RASC)	217
	Hands-on Black Holes and Gravitational Waves – Invited Talk	Vjera Miovic, Matt Russo, Heather Fong	313
2:45 - 3:15	Break and Exhibitors		Café
Session D 3:15 - 4:15	SNAP! POW! BOOM! - Working the (Big) Room, panel discussion – Invited Talk	Sarah Gallagher (U of WO), Joanne O'Meara (U of Guelph), James Fraser (Queens)	313
	Cooperative Groups Improve Problem Solving	Adam Mills	211
	Diversity in Engineering	York U - Lassonde	213
	"Video Conferencing" and "Cosmic Ray Detectors"	Stacy Joyce (VROC), Scott Menary (York U)	217
	Gravitational Waves: The Sounds of Spacetime – Invited Talk	Cliff Burgess (McMaster U)	203
4:30 - 5:15	Passion Project & Capstone Project Displays		sandbox
5:30 PM	Dinner: Schulich Executive Dining Room, extra cost		Schulich Hotel
After Dinner	On-site social		

Saturday, May 13

Time	Session Title	Presenter(s)	
Session E 9:00 - 10:00	Playing Around with Physics	Lisa Cole (DDSB) and Steve Alsop (York U)	211
	Crazy Demos!	John Caranci (OISE) and Steve Fotheringham	213
	Lasers and LEDs! Two Bright Ideas from Quantum Physics	Roberta Tevlin	203
10:00 - 10:15	Break and Networking		2nd floor
Session F 10:15 - 11:15	Affective Teaching for 9 and 10 Science	James Ball and Christine Hudecki	211
	K'Nex in the Classroom 2: Hydraulics	Margaret Scora	213
	Assessment <u>is</u> Learning	Chris Meyer	203
11:30 - 12:00	OAPT General Meeting - We are looking for feedback on the conference and for volunteers to help the organization. Everyone is Welcome!		213



Session Descriptions

Thursday, May 11

Time	Session Title	Presenter(s)
7:40 – 9:00	Be the engineer and make a difference in the world with physics	Marisa Sterling, Franz Newland, Kai Zhuang, Roger, Jackie Zeni)
	This workshop will teach you in a fun and active way how to show your students that any one physics concept can help to change the world for the betterment of society. After 80 minutes of hands-on learning, you will leave with all the tools needed to take back into your classroom and energize your students with how they can make a world of difference with physics. Starting with a societal problem and a physics concept, the Lassonde School leaders will guide you through the engineering design process. At the end, you will have prototyped or modeled your scientific solution with materials typically found in an art classroom. Keep your wits with you along the way as there will be a surprise competition.	

Friday, May 12

Time	Session Title	Presenter(s)
Session A 9:30 - 10:15	Fusing Physics and Biology, panel discussion	Tamie Poepping (U of WO), Chris Bergevin (York U), Sara Cormier (McMaster U)
	It used to be that students studied physics OR they studied biology. Now some of the most exciting science is happening where these two spheres overlap in interdisciplinary fields such as biomaterials, biomechanics, neuroscience, and medical physics. With some exciting examples from current research and undergraduate teaching, we want to demonstrate the power of the methods and principles of physics when applied to biological systems to develop and maintain student interest in both subjects.	Chris Bergevin is a Professor of Bio-Physics in the Department of Physics & Astronomy at York University and teaches in the Integrated Science Program at York. Sara Cormier is an Instructional Assistant in Physics & Astronomy at McMaster University where she coordinates large first-year classes of Physics for the Life Sciences. Tamie Poepping is an Associate Professor in Physics & Astronomy at the University of Western Ontario, where both her teaching and research look at topics at the cross-roads of physics and biology including the biophysics behind blood flow, ultrasound, and microdevices.
	Forensic Blood Analysis	Theresa Stotesbury (Trent U)
	This presentation will feature an example of implementing a forensic-based laboratory that real practitioners conduct into a secondary-level physics class. The students tested their own hypotheses on the effect of dripping height (10 – 150+ cm) on the average size and shape of a passive drip bloodstain. A safe and synthetic forensic blood substitute was used in lieu of whole blood. Our research suggests that this an engaging and effective learning tool as the students communicated enhanced learning in kinematics, particularly the effect of terminal velocity on stain size. We	Theresa is a recent PhD graduate in the Materials Science graduate program at Trent University. Her project focuses on developing synthetic forensic blood substitutes for forensic scientists to use in their crime scene training and research. She has also looked at taking routine experiments that forensic practitioners complete in their training and applying it to the secondary student level. Forensic science can be interesting at all levels of education! This work represents a collaborative effort between members of the forensic science, education and research communities.

	will also highlight cases where the students demonstrated instances of increased depth and breadth of knowledge upon completion of their experiment.	
	Gender Diversity in Physics - how to attract more female students	Marisa Sterling (York U – Lassonde)
	Ontario needs the full participation of both men and women to drive the innovative science and engineering needed help to solve societal issues. However, Ontario statistics show that the number of female students drops significantly between grade 11 to grade 12 physics. This panel of experts will discuss ways to encourage young women to study high school physics and will share best practices in high school physics education.	Marisa Sterling , P.Eng., FEC, Assistant Dean, Inclusivity and Diversity Lassonde School of Engineering With panelists: - Maksim Llupo, Physics-Science Teacher, St. Pope John Paul II CSS - Lisa Lim-Cole, Science & Technology Program Facilitator, Durham District School Board - A representative of the Ontario Ministry of Education - Theresa Nguyen, 3rd year mechanical engineering student at the Lassonde School of Engineering - Milka Lijiam, 3rd year digital media student at the Lassonde School of Engineering
	Want to Start a VEX Robotics Team?	Andrew Moffat
	Andrew has been teaching Physics, Math and Design Technology at BSS (The Bishop Strachan School) in Toronto since 2007. He is particularly interested in teaching through an inquiry and hands-on approach and is always looking for great new demonstrations, activities and projects.	Does your school still not have a robotics team? If not, what's the problem? This session will briefly summarize the various robotics programs in Ontario, but focus on all you need to know to start a VEX robotics program in your school. Participants will get a chance to build and/or program a VEX robot.
	Math and Science in House Construction	David Gervais (STAO)
	What basic measurement skills are required for the construction trades? What force considerations come into play when laminating support beams? What polymer properties need to be considered when insulating beneath piers that will support a cottage? Where should vapour barriers be placed in an attic?	Science teacher from 1980-2010, taught Biology, Chemistry, Physics and Electronics 2010 - present Fernleigh Construction: House and cottage renovations and construction 2011 - present STAO Safety Committee Chair
10:15 - 10:45	Break and Exhibitors	

<p>Session B 10:45 - 12:15</p>	<p>Physics Games</p> <p>Games can be an excellent way to reinforce student learning. In this session, we will play games designed for kinematics, and discuss how they fit into the curriculum.</p> <p>KineCards: A card game that builds position-time and velocity-time graphs of an object's motion. Players must play matching D-T and V-T segments while competing to end at different positions.</p> <p>The Amazing Rally: An orienteering game that sends students around the school following a trail of clues. Players must draw and follow a vector diagram while maintaining a schedule, neither too fast nor too slow.</p> <p>Space Battles: A 2-D space miniatures game. Players pilot spaceships which use realistic vector acceleration and movement. Advanced options add combat and relative velocity.</p> <p>After playing these games we will examine the process of game development, with emphasis on educational games, and look at the work involved in moving a game from concept to playable resource. We will also look at games suitable for other units and non-physics games for other science courses.</p>	<p>Robert Prior</p> <p>Robert Prior has played Traveller since it was first published. He has written for Digest Group Publications, Heliograph, the Canadian Space Agency, and Steve Jackson Games. All this gaming got him interested in physics, which after a detour through communications engineering led to his current occupation: science teacher.</p>
	<p>Harnessing Emotions to Help Students Learn</p> <p>Emotion is a powerful factor that affects the learning of our students, and yet it is often neglected in our daily teaching and course design. In this workshop, Chris will summarize the cognitive science research that helps us understand the role of emotion in our students' memory and motivation. He will also share examples from his classroom teaching where he designs lessons to harness the positive aspects emotion and helps students become more aware of their own emotional states. Remember: we don't teach physics, we teach human beings.</p>	<p>Chris Meyer</p> <p>Chris Meyer leads a reformed grade 11 and 12 physics program at York Mills Collegiate Institute in Toronto. He has presented pedagogical workshops across southern Ontario and his classroom resources are used throughout Canada and the United States. Chris is the winner of the 2016 CAP Award for Excellence in Teaching High School/CEGEP Physics (Ontario) and the 2015 Toronto District School Board Teaching Excellence Award. His most recent article, Group Work Test for Context Rich Problems appeared in the May 2016 edition of The Physics Teacher. Chris serves as OAPT Vice-President of Teaching and Learning.</p>
	<p>Renaissance Engineering</p> <p>This session will explore how engineering education has, since its inception, tended to focus on the tools needed to be an engineer rather than the underlying purpose of that knowledge - society's need for engineering solutions - and how, in the last 1-2 decades, there has been a conscious effort to reverse this trend. We will discuss a number of curricular and co-curricular activities at the Lassonde School of Engineering that helps</p>	<p>Dr. Franz Newland (York U), Kai Zhuang (York U)</p> <p>Franz is an Assistant Lecturer in Earth & Space Science and Engineering at York University. He worked for over 15 years as a Space Engineer in Germany, France and Canada before joining York a couple of years ago. He holds a degree and PhD from Southampton University in the UK, and had the opportunity to do postdoctoral research with the French Space Agency. As a "romantic idealist", Franz became an Engineer to try to make the world a better place. He is now</p>

	<p>students explore how engineering technologies meet societal need and how to develop a greater capacity for socio-technological stewardship. Participants will reflect on how this relates to their current focus in the Physics classroom, and what practical changes might be possible to nurture students in this way.</p>	<p>inspired by the Renaissance Engineers (TM) in his classroom and tries to help them improve the world. Franz is also a husband, a dad and friend to a cockatiel called Hedwig.</p> <p>Kai Zhuang: I am an educator, an engineer, and the Renaissance Engineering instructor and curriculum designer at the Lassonde School of Engineering at York University. I have a wide range of backgrounds in both technical and humanistic fields, including biological engineering, operations research, industrial ecology, evolutionary biology, and leadership coaching and development. I am also student and occasional teacher of martial arts and other body-mind disciplines. My work is centred around helping students, educators, and organizations unleash their minds and hearts in service to the creation of a prosperous, harmonious, and meaningful future.</p>
	<p>Quantum Interference and Computing</p> <p>This hands-on, interactive workshop introduces a novel approach to teach the wave-particle duality. Different than the usual double-slit experiment/photoelectric effect approach, yet it is fully compatible with grades 11 and 12 curriculums. Using a model Mach-Zehnder interferometer (an “unfolded” LIGO) and real experimental data, we will use concepts such as reflection, transmission and interference of waves and coincidence detection, to show that light, and other quantum objects, are definitely made of particles, yet these particles definitely behave like waves.</p> <p>If time permits, we will use the same model to demonstrate a simple quantum algorithm that outperforms the best computers available today.</p>	<p>Martin Laforest (IQC)</p> <p>Martin Laforest is the Senior Manager, Scientific Outreach at the Institute for Quantum Computing, University of Waterloo. Officially, Martin's role is to bring science out of the lab and into people's lives. Unofficially, he is the talkative guy who is passionate about quantum information science and technology and likes to share it with curious minds. He developed several world-renown educational programs and workshops to introduce students and teachers to the wonders of the quantum world and its applications to modern and future technologies. Martin earned a PhD in quantum physics from the University of Waterloo.</p>
	<p>Knowledge Building: When Students Ask the Big Questions</p> <p>What does education look like when students take control of the question-asking, learning and even the assessment in a science classroom? Knowledge Building is a powerful student-centred pedagogical approach for teachers who wish to give students more control and ownership of their learning. By beginning with curiosity-driven questions surrounding their curriculum, students work within communities of like-minded peers to question, research, share ideas and build upon the work of others to deepen knowledge and understanding. At the same time, students naturally develop important competencies such as collaboration, communication and creativity as they build knowledge and learn. This talk will show how students used Knowledge Building in relation to the study of the Universe and the educational outcomes produced as a result of their curiosity. We will also outline how to start a Knowledge Building activity for the Earth and Space unit in grade 9 science.</p>	<p>Damian Pope and Glenn Wagner (PI)</p>
12:15-1:30	Lunch and Exhibitors	

Session C 1:30 - 2:45	Explore Engineering Experiences in the Classroom	Rebecca White and Erica Lee Garcia (Engineers of Tomorrow)
	<p>Engineering is one of the most influential professions in our society even though it is not that well understood. You can help to inspire the next generation of engineers. Join us for an informative & engaging workshop about how you can feel more comfortable "wearing your engineering hat" when teaching STEM! Some highlights include: how to use Storytelling with STEM, proven messaging (how to do it and why it's important!), dispelling the myths & stigmas around Engineering. We want to share our stories with you and get you excited about teaching STEM!</p>	<p>Erica Lee Garcia, Engineers of Tomorrow Venture Lead, worked for over a decade in automotive manufacturing and mining before an international assignment prompted a change in direction. Now an entrepreneur who manages EoT as well as her own consulting firm and a coaching and mentoring practice, Erica loves igniting ideas and encouraging others to reach their potential as change-makers and ambassadors for the engineering profession.</p> <p>Rebecca White, Engineering of Tomorrow Operations Manager, brings over a decade of experience in pharmaceutical and food manufacturing. Her most meaningful career experience dates back to working as a counsellor at the Actua-member camp Science Quest, and as an engineering grad whose parents are both teachers, she has a valuable perspective on how STEM experiences can provide a path to a career in engineering.</p>
	Emotion in Learning and Problem Solving	Chandra Boon
	<p>What is emotion? Physics is a field in which participants must be proficient in reasoned thinking and problem-solving, so how is a discussion of emotion even relevant? It turns out, the previous question is rooted in the false assumption that emotion and reason are separate. In this session, I will present new theories of emotion from neuroscience, and we will discuss the implications of these new understandings to teaching physics and problem-solving. We will also discuss strategies for helping students to persevere through the challenge of learning physics.</p>	<p>Chandra Boon has been teaching for more than 12 years, the last 9 of which have been spent teaching Math, General Science, Physics, and Theory of Knowledge at Branksome Hall, an all-girls school in Toronto. Chandra began teaching after earning a BSc in Physics and an MSc in Biophysics. Insights from neuroscience, along with the mindset framework from social psychology, have helped Chandra shape her approach to teaching physics.</p>
	Renaissance Engineering	Dr. Franz Newland (York U), Kai Zhuang (York U)
	<p>This session will explore how engineering education has, since its inception, tended to focus on the tools needed to be an engineer rather than the underlying purpose of that knowledge - society's need for engineering solutions - and how, in the last 1-2 decades, there has been a conscious effort to reverse this trend. We will discuss a number of curricular and co-curricular activities at the Lassonde School of Engineering that helps students explore how engineering technologies meet societal need and how to develop a greater capacity for socio-technological stewardship. Participants will reflect on how this relates to their current focus in the Physics classroom, and what practical changes might be possible to nurture students in this way.</p>	<p>Franz is an Assistant Lecturer in Earth & Space Science and Engineering at York University. He worked for over 15 years as a Space Engineer in Germany, France and Canada before joining York a couple of years ago. He holds a degree and PhD from Southampton University in the UK, and had the opportunity to do postdoctoral research with the French Space Agency. As a "romantic idealist", Franz became an Engineer to try to make the world a better place. He is now inspired by the Renaissance Engineers (TM) in his classroom and tries to help them improve the world. Franz is also a husband, a dad and friend to a cockatiel called Hedwig.</p> <p>Kai Zhuang: I am an educator, an engineer, and the Renaissance Engineering instructor and curriculum designer at the Lassonde School of Engineering at York University. I have a wide range of backgrounds in both technical and humanistic fields, including biological</p>

		<p>engineering, operations research, industrial ecology, evolutionary biology, and leadership coaching and development. I am also student and occasional teacher of martial arts and other body-mind disciplines. My work is centred around helping students, educators, and organizations unleash their minds and hearts in service to the creation of a prosperous, harmonious, and meaningful future.</p>
	<p>Apps for Astronomy and Space Sciences</p> <p>This workshop, delivered by an outreach and education specialist from the Royal Astronomical Society of Canada and AstroGeo.ca, will focus on mobile apps for teaching and demonstrating astronomy and space sciences. Using live demonstrations, visual and theoretical astronomy will be covered, including: Star colours and spectra, star distances and proper motion over time, motions of the sky, Sun, Moon, and planets (conjunctions, elongations, and retrograde motion), and tracking and observing artificial satellites (ISS and Iridium Flares).</p> <p>Time will be allocated for Q/A, and demonstrations of participants' requests. A resource handout listing the best free and paid apps will be provided.</p>	<p>Chris Vaughan (RASC)</p> <p>Chris Vaughan is a professional Exploration Geophysicist and Astronomer with a passion for education and public outreach. He is the recipient of the 2014 Bertram Topham Award for Observing and the 2013 and 2014 Andrew Elvins Awards for Promotion of Astronomy from the Royal Astronomical Society of Canada Toronto Centre. Since 1996, Chris has visited classrooms, hosted science-themed assemblies, run science clubs, and held Star Parties for schools and other groups around the GTA. He writes a bi-weekly column about astronomy apps for Space.com, the weekly Astronomy Skylights newsletter, and is an operator of the David Dunlap Observatory's 74" Telescope.</p>
	<p>Hands-on Black Holes and Gravitational Waves</p> <p>Vjera Miovic, Heather Fong, and Matt Russo will present some hands-on inquiry-based learning activities in astronomy. Participants will study how light is bent around a miniature model of a black hole to develop a deep understanding of gravitational lensing. There will be exploration of gravitational wave detection methods. The activities we will present are suitable for teaching the Earth and Space Science unit in science courses and for teaching topics in modern physics in senior physics courses with an inquiry-based approach.</p>	<p>Vjera Miovic, Matt Russo, Heather Fong</p> <p>This spring, Vjera will be obtaining the Master of Teaching degree at OISE, getting certified to teach I/S math and physics. Before that, Vjera did research in astrophysics at University of Toronto. Vjera is a long-term judge and a committee member at the Toronto Science Fair. As a beginning teacher, She is always looking for pedagogical ideas. She has an interest in inquiry-based and self-directed learning, as well as in gender-inclusive practices and culturally relevant pedagogy in physics teaching. Matt Russo is a postdoctoral fellow at Canadian Institute for Theoretical Astrophysics (CITA) at U of T. Heather Fong is a graduate student at CITA, and was part of the LIGO experiment that found observational evidence for gravitational waves.</p>
2:45 - 3:15	Break and Exhibitors	
<p>Session D 3:15 - 4:15</p>	<p>SNAP! POW! BOOM! - Working the (Big) Room, panel discussion</p> <p>You have been assigned to teach a class of 200 students in a large lecture hall. How can you work with this space and these numbers to deeply involve your students in the lesson? Is student-centered work impossible? University lecturers will demonstrate an example or two of the activities that they find most successful at dealing with this challenge.</p>	<p>Sarah Gallagher (U of WO), Joanne O'Meara (U of Guelph), James Fraser (Queens)</p> <p>Sarah Gallagher is an astronomer, Associate Professor, and Undergraduate Chair in Physics & Astronomy at the University of Western Ontario who teaches first-year physics to budding scientists and engineers.</p> <p>Joanne O'Meara is the Associate Chair of the Department of Physics at the University of</p>

<p>I. "Oh, SNAP! Using a toy and a document camera to dynamically demonstrate circuits"</p> <p>II. "POW! Using student response systems along with Predict-Observe-Why? activities to turn large lecture rooms into active learning environments"</p> <p>III. Lowering the BOOM! Just-in-time feedback for every student (and teacher) in every class</p>	<p>Guelph and regularly teaches physics to biology students who have tried to avoid it at all costs.</p> <p>James Fraser is an Associate Professor and 3M National Teaching Fellow at Queen's University who still needs all the help he can get to teach 200 students.</p>
<p>Cooperative Groups Improve Problem Solving</p>	<p>Adam Mills</p>
<p>This session discusses how cooperative group problem solving (CGPS) may be used in order to improve the problem solving capabilities of our students. Using the work from Pat Heller and Ken Heller at the University of Minnesota, I will discuss how to create problems that will require students to think beyond what formula to apply and rather think about the appropriate physics to use; what assumptions they are required to make; and what measurements they have to complete. I will then discuss how these types of problems are useful from both an assessment as learning and assessment of learning perspective.</p>	<p>I have been teaching Physics, Mathematics and Chemistry at the Secondary level for the last ten years. Through this time I have been actively involved with the International Baccalaureate Program and the appropriate use of technology in the classroom. Currently I am in the process of changing my physics classroom to a more inquiry based classroom using a flipped technique and cooperative groups. Outside the classroom I coach soccer and run a very active Math Club in which the students write contests for elementary school students and make school visits to help engage students with mathematics and science.</p>
<p>Gender Diversity in Physics - how to attract more female students</p>	<p>Marisa Sterling (York U – Lassonde)</p>
<p>Ontario needs the full participation of both men and women to drive the innovative science and engineering needed help to solve societal issues. However, Ontario statistics show that the number of female students drops significantly between grade 11 to grade 12 physics. This panel of experts will discuss ways to encourage young women to study high school physics and will share best practices in high school physics education.</p>	<p>Marisa Sterling, P.Eng., FEC, Assistant Dean, Inclusivity and Diversity Lassonde School of Engineering</p> <p>With panelists:</p> <ul style="list-style-type: none"> - Maksim Llupo, Physics-Science Teacher, St. Pope John Paul II CSS - Lisa Lim-Cole, Science & Technology Program Facilitator, Durham District School Board - Andrew Moffat, Physics, Math and Design Technology at The Bishop Strachan School - A representative of the Ontario Ministry of Education - Wendy Taylor, Professor, Department of Physics at York University - Maira Zafar, 3rd year mechanical engineering student at the Lassonde School of Engineering
<p>"Video Conferencing" and "Cosmic Ray Detectors"</p>	<p>Stacy Joyce (VROC), Scott Menary (York U)</p>
<p>Introducing Virtual Researcher On Call (VROC) and PIR Live Event, free video calling and webinar programs offered by Partners In Research Canada (PIR). Stacey Joyce, Program Manager, will outline how to connect your class with Canadian STEM experts for interactive video calls and webinars using the free Zoom app for PC/Mac/Android/iOS/ChromeOS. We'll also connect via Zoom with a VROC Expert so you can see #VROCinAction and ask the expert some questions in real time. Optional BYOD to play while you learn!</p>	<p>Stacey Joyce is an Ontario Certified Teacher with experience in academic research and pharmaceutical R&D. This mix of research and teaching experience is put to good use at Partners In Research Canada where Stacey manages the PIR Live Event and Virtual Researcher On Call (VROC) programs, facilitating video connections between K-12 classrooms and STEM researchers/professionals. In recent years, Stacey has developed a new educational program, managed the testing and implementation of new videoconferencing and customer relationship management platforms,</p>

		and delivered numerous professional development workshops to educators.
	SOLTA (Southern Ontario Large-Scale Time-Coincidence Array) is an educational initiative where high school students will construct, make work, and analyze data from, a cosmic ray detector that is to be placed on the roof of their high school. This project will be offered at at least one school in the fall of 2017. The goal is to have a group of schools that will send the data from their school to a central server at York but then have access to the data from the entire array in order to study cosmic rays. The course involves understanding (plus practical experience with) computing, detectors, solar power, cosmology, data analysis, and engineering design.	Scott's main research focus is in the field of High Energy Physics. He is currently working on the ALPHA (Antihydrogen Laser PHysics Apparatus) experiment at CERN's Antiproton Decelerator, and was a Fermilab Associate Scientist on the Neutrinos at the Main Injector (NuMI) project. Previously Scott has worked on the ZEUS experiment at the HERA accelerator located at the DESY laboratory in Hamburg, Germany, BTeV – the hadron collider CP Violation experiment at Fermilab, CLEO experiment at CESR, BaBar Silicon Vertex Detector, Silicon Vertex Detector for the ALEPH experiment at the LEP collider at CERN, and Tagged Photon Spectrometer Collaboration (E691) at Fermilab.
	Gravitational Waves: The Sounds of Spacetime	Cliff Burgess (McMaster U)
	<p>I received my B.Sc. in a co-op programme, with a joint honours in Physics and Applied Math from the University of Waterloo. I did my doctoral work in Theoretical Particle Physics at the University of Texas in Austin under the supervision of Steven Weinberg.</p> <p>After doing a short postdoctoral stint at the Institute for Advanced Study in Princeton, in 1987 I joined the faculty at McGill University, where I was made James McGill Professor in 2003. I am presently a professor with McMaster University's department of Physics and Astronomy and am an Associate Faculty Member at Perimeter Institute for Theoretical Physics. I have spent sabbatical years with the Institute for Advanced Study in Princeton as well as the University of Neuchatel and CERN in Switzerland.</p>	

Saturday, May 13

Time	Session Title	Presenter(s)
Session E 9:00 - 10:00	Playing Around With Physics	Lisa Cole (DDSB) and Steve Alsop (York U)
	Students need opportunities to play in order to discover their own curiosities - to reveal what they know and engage in questions to develop understanding. In this session, teachers will be provided with opportunities to play through sample activities that promotes play, curiosity and experiences that will spark questions for exploration. Engaging students through play helps students to see that physics is more than equations, vocabulary, numbers and word problems - it has possibilities for creativity and innovation. Let's change the physics narrative! Let's play!	Lisa Lim-Cole (Cole) is currently the Science & Technology Program Facilitator at the Durham District School Board supporting Kindergarten to Grade 12 Science teachers. She is the past president of the Ontario Association of Physics Teachers and continues to support physics educators through her work as the Teacher Network Coordinator for Eastern Ontario with the Perimeter Institute for Theoretical Physics. Lisa was a classroom teacher for 14 years and the Head of Science at Uxbridge Secondary School before becoming a program facilitator. She is a passionate educator who continues to work to support classroom teachers in Ontario.
	Crazy Demos!	John Caranci (OISE), Steve Fatheringham
	Many cognitive dissonant and discrepant events. Easy to use and build.	39 Years Physics and Mathematics Teacher and Department Head; Awarded Life Membership for Outstanding Service; Ontario Association Physics Teachers; Published Poet – White Wall Review Literary Journal: Winner of the Raymond Chang Literary Award 2007 – Poetry; Senior Science Fellow - York Seneca Institute of Science, Principal/Physics Instructor Ontario Science

		Centre Science School; Honours Specialist Physics Additional Qualification Instructor OISE; Physics MT Lecture; Physics B. Ed. Lecturer Ontario Institute for Studies in Education; Author/Editor of many mathematics, physics and elementary texts; Scientists in School Elementary School Presenter; Auto racer GT2; Online Rfactor Gamer; fiction writer.
	Lasers and LEDs! Two Bright Ideas from Quantum Physics	Roberta Tevlin
	Lasers and LED's are quantum light sources. Over the past fifty years they have gone from being expensive curiosities to common consumer items and really useful teaching tools. This workshop will have you explore these devices using simulations, models, short videos and the real thing. Each participant will receive a class set of LED's from the Perimeter Institute and learn different ways to use these to determine Plank's constant – including one that is so simple that you could do with grade 9 students in the electricity unit or with grade 10 students in the light unit.	Roberta has been teaching physics in Toronto for 25 years. She is rather fanatical about modern physics and Physics Education Research and spends her spare time looking for ways to combine them to make high school physics more exciting and inviting. She has given workshops to this end around special relativity, general relativity, particle physics quantum uncertainty and entanglement. In her spare spare time she plays New Orleans jazz at Grossman's Tavern in Toronto.
10:00 - 10:15	Break and Networking	
Session F 10:15 - 11:15	Affective Teaching for 9 and 10 Science	James Ball and Christine Hudecki
	Affective education promotes a student's self-esteem and ability to work with others. Creating a classroom that fosters this is crucial for student success. Christine and James will turn this workshop into a simulation of a junior science class. This class will encourage self-esteem, peer instruction and effective group work. While doing so participants will work through activities from the Universe unit of grade nine and the optics unit of grade ten.	James has been teaching science for 29 years. His classroom today looks nothing like what it did when he started teaching. His students are engaged in peer instruction. James' lessons are designed to ensure that the students are active learners. James' varied teaching styles are based on physics education research (PER) and are designed to improve both student understanding and engagement. Christine has been teaching for 20 years now and has 2 children pursuing university degrees and one in grade 11. She has come to realize that it's not just about teaching physics; it's very much about reaching and engaging teens, helping them develop 'learning skills' and then teaching the physics curriculum. She is currently focused on small group peer instruction and the implementation of smart phones as tools in the 2017 classroom.
	K'Nex in the Classroom 2: Hydraulics	Margaret Scora
	This project is aimed at SPH 4C but could easily be adapted to SPH 3U. Using K'Nex students build a complex machine involving hydraulics (syringes) to lift a small object and change its location. It can be built in three classes or less. Measurements can then be made to practice problem solving and concept analysis. In this workshop you will get to "play"	I came to Ontario in 1987 from rural Manitoba to join my husband who was working on his Ph. D in physics at the U of T. With a B.Sc in Honours Physics and newly minted B.Ed in hand I joined the teaching staff at Msgr. Paul Dwyer CHS in Oshawa and have been there ever since! My goal as a physics teacher has always been to give the students a lot of hands on experiences in

	with the K'Nex to make your own syringe arm. I will share the construction outline and a scaffolded assignment that I have created.	physics in order to foster deeper understanding and develop critical thinking skills. I am currently involved with the annual OAPT conference and hope to continue learning along with my students.
	Assessment is Learning	Chris Meyer
	For years I have been frustrated by the seeming failure of my students to improve. No matter how carefully I emphasized or harped on something, the results were always the same. Little did I realize the crucial role assessment plays in determining the behaviours my students choose and how assessment often worked against my teaching goals. Assessment <is> learning because it sets the rules of the learning game. In this workshop I will share how I have changed assessment in my physics courses to promote productive student behaviours that focus on building skills and continuous improvement.	Chris Meyer leads a reformed grade 11 and 12 physics program at York Mills Collegiate Institute in Toronto. He has presented pedagogical workshops across southern Ontario and his classroom resources are used throughout Canada and the United States. Chris is the winner of the 2016 CAP Award for Excellence in Teaching High School/CEGEP Physics (Ontario) and the 2015 Toronto District School Board Teaching Excellence Award. His most recent article, <i>Group Work Test for Context Rich Problems</i> appeared in the May 2016 edition of The Physics Teacher. Chris serves as OAPT Vice-President, Teaching and Learning.
11:30 - 12:00	OAPT General Meeting Rm 213 Everyone Welcome!	



General Information

Directions

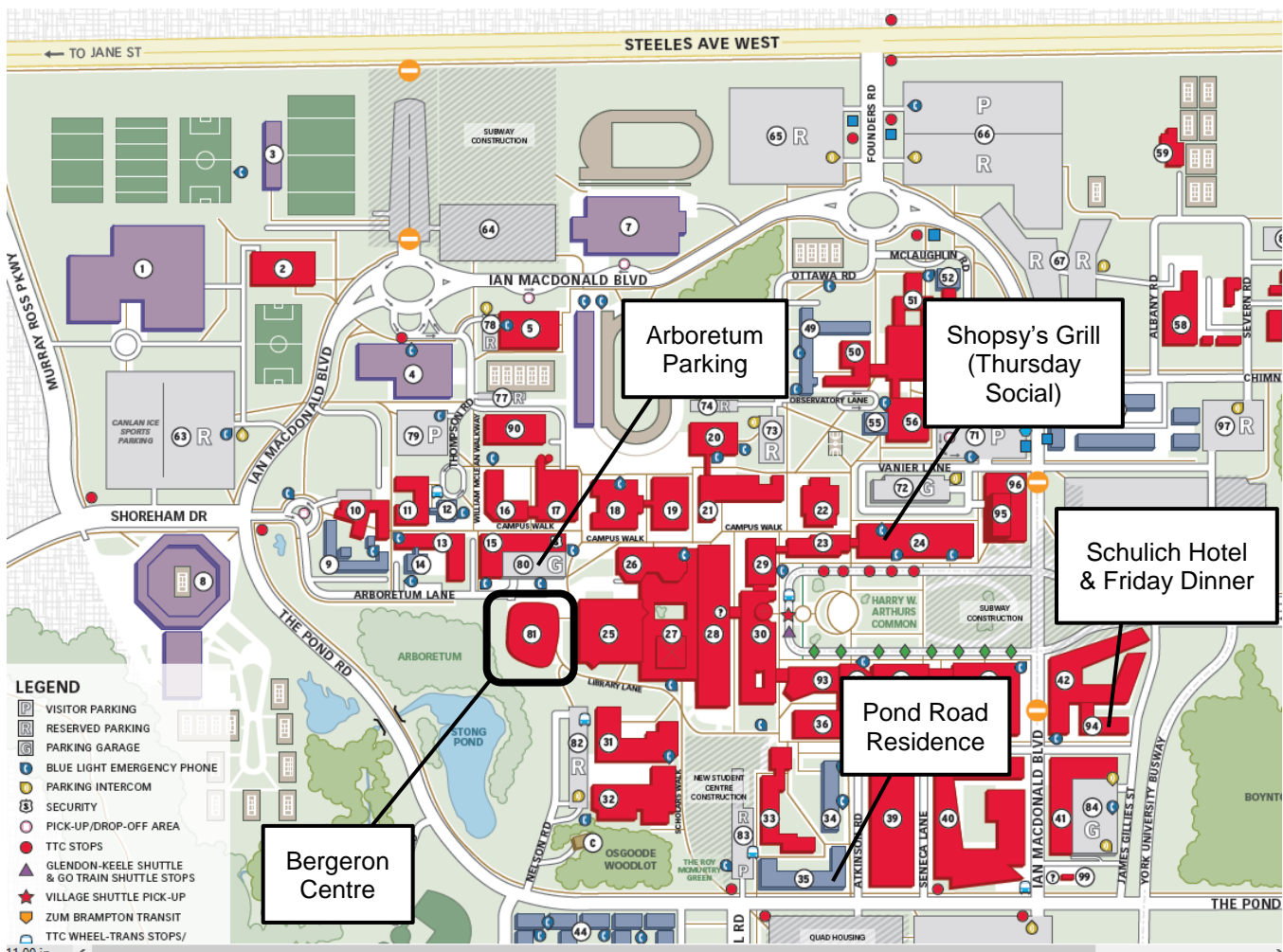
Our conference will take place at the **Bergeron Centre for Engineering Excellence**, building #81 on the [campus map](#).

Campus accommodations are available at the **Pond Road Residences**, building #35.

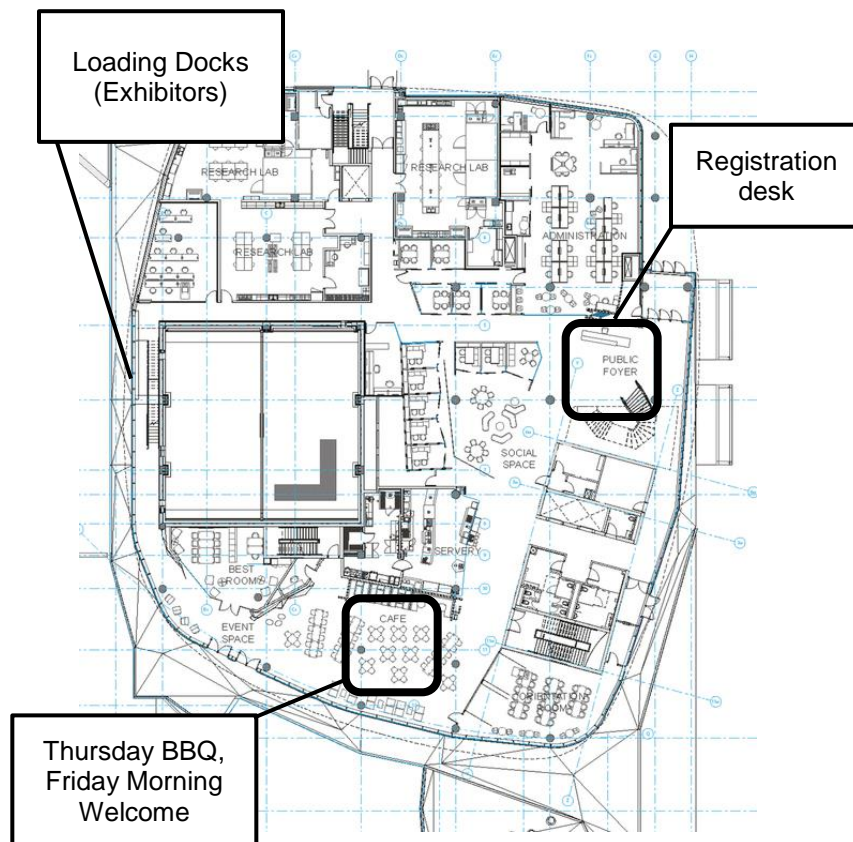
Public Transit: We encourage delegate to take [transit](#) to the conference.

Walking and Cycling: Consider the [environmental](#) way of joining us.

Car and Parking: The Jane Street entrance is recommended if you are arriving by car. The closest parking lot to the Bergeron Centre for Engineering Excellence is the Arboretum Parking Garage, building #80. Find out more about [parking and prices](#).



Our registration desk will be located in the foyer of the Bergeron Centre.



Meals

The Thursday night BBQ, Friday lunch, and coffee breaks will take place in the café located in the main floor lobby of the Bergeron Building for Engineering Excellence. These meals and breaks are included as part of your conference fee. For the exact times, please refer to the conference program.

Friday Night Dinner: An on-site Friday evening dinner is being arranged for interested delegates, at the Executive Dining Room in the Schulich Building..

Accommodations

Do you need a place to stay for Thursday or Friday night? We have two options for you.

Pond Road Residence: \$29.99/night, subsidized by OAPT. Building #35 on the campus map. This residence features 2-person suites, with two single lockable bedrooms and a shared washroom. Wi-Fi access included. Breakfast is not provided. Check-in is between 3pm and 10 pm at the residence, check-out by 11 am. 20 rooms available - first come, first served! Registration is now [open](#).

If for whatever reason, no one is able to help you with keys at Pond Road Residence, please find the OAPT in the foyer of the Bergeron building and we will help straighten things out. We will leave Bergeron for the social shortly after 9 pm on Thursday.

Hot Water Shutdown! Update from York University: "there will be a campus-wide steam & hot water shutdown from 7AM on Saturday, 13 May, 2017 until 1AM on Sunday, 14 May, 2017..... to accommodate the installation of a new boiler in the Central Utilities Building on campus. guests will need to time their showers around this shutdown and either get up early on the morning of the 13th or shower the night of the 12th."

Breakfast options

- Fri AM, York Lanes has several outlets open for breakfast
- Sat AM is more limited. Please refer to the complete list of [food providers](#) for AM start times. Note there is a 'fine dining' option on campus: the Executive Dining Room (Schulich Building) is open daily for breakfast (7 AM), lunch and dinner seven days a week. Reserve your table now by calling 416-736-5342.

Schulich Hotel, Schulich Executive Conference Centre: \$130.00/night. Building #94 on the campus map. This option is for delegates who prefer an executive hotel room over a student residence. This option features 60 executive style guestrooms with complimentary breakfast, free in-room Internet and a spacious work desk. Parking is additional and costs \$20/day located across from the ELC (#84 on map). Cancellation Policy: 24 hrs prior to arrival date. [Register here.](#)

Exhibitors

At the Bergeron Centre there is a loading dock available for exhibitors to use on the west side of the building.

The exhibit area welcomes vendors, non-profit charitable organizations, and academic institutions to showcase science educational resources and services. The exhibit area is located in a central location where coffee and lunch breaks will be held. Break times are extended for teachers to visit exhibitors and vendors (see the schedule above for exact times).

The exhibit area will include one 8' x 2.5' table at a cost of \$250. One extra table can be obtained for an additional \$100. Non-profit, charitable organizations will not be charged a fee. Organizations who are identified sponsors of the OAPT Conference will not be charged a fee. The Exhibit area will be set up for Friday May 12, 2017 only. Set up will be made available by 7:00 am, with participants arriving by 8:30 am. The day ends officially at 5:00 pm. You may stay until 5:30 pm, if desired.

If you wish to obtain an exhibitor table(s), please fill our [exhibitor information form](#). The number of tables is limited by space. Please sign up early to assure availability.