ONTARIO ENGINEERING COMPETITION 2016

JANUARY 29-31, 2016

DELEGATE PACKAGE

UNIVERSITY OF WATERLOO
FACULTY OF ENGINEERING

PARTICIPATING UNIVERSITIES

Carleton University

Conestoga Connect Life and Learning

Lakehead University

Laurentian University / Université Laurentienne

McMaster University

Queen's University

Ryerson University

University of Guelph

University of Ontario Institute of Technology

uOttawa

University of Toronto

University of Windsor

Western University · Canada

York University / Université York

University of Waterloo

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HATCH

Welcome to the 2016 Ontario Engineering Competition! Hatch is once again delighted to sponsor and partner with such a wonderful event.

We at Hatch believe it is important to encourage Ontario's university students to excel technically, as well as contribute to their communities. While Hatch is a global company with 65 offices on six continents, Hatch has deep roots in Ontario. We have offices in Mississauga, Oakville, Niagara Falls, Sudbury, and Hamilton, and many of our professionals, working locally and around the world, received their professional degrees from Ontario's outstanding universities. It's in our interest as a company, and as members of the engineering profession, to support both the technical and social development of our engineering students to develop engineers that are technically proficient, committed to finding innovative solutions, and environmentally conscious. This is why Hatch sees great value in participating in events like the OEC.

The University of Waterloo is hosting the 37th Ontario Engineering Competition. Waterloo Engineering prides itself on being a 'pipeline for engineering talent for the world's leading companies'. Hosting OEC is an avenue through which they can offer this opportunity to engineering students across the province.

This OEC will challenge you with new problems while giving you the opportunity to measure yourself against your peers and engage in friendly competition. I am sure the experience will add significantly to the richness of your university life.

As a long-standing sponsor of the event, I encourage you to not only enjoy the competition but also connect with the industry representatives you will meet. Best of luck to you in the competition and all your future endeavours.

John Bianchini
Chief Executive Officer
Hatch

ONTARIO ENGINEERING COMPETITION 2016

Welcome to the 37th annual rendition of the Ontario Engineering Competition (OEC)!

On behalf of the entire OEC2016 organizing committee, it is with great pleasure that we welcome you to the University of Waterloo. Aptly nicknamed "Silicon Valley of the North", Waterloo is a pipeline for unique start-up ideas and creative talent. We take great pride in this contemporary spirit, and from this, take on the theme of "Simple Innovation" for OEC2016. We encourage all teams to think outside the box and bring your individualities to each aspect of your competition solutions.

We would like to express our immense appreciation to all our sponsors for their generous contributions and continuing partnerships with OEC. Their support and guidance has been one of the primary reason OEC has successfully grown for the past 37 years, and will continue to do so for future years.

This delegate package is intended to be an all-encompassing guide for what to bring, where to go, when to show up, and who to contact in case of questions or emergencies. We're more than happy to address any other questions or concerns along the way!

Best of luck to all competitors! We can't wait to see what you do.

Janna Henzl
OEC2016 Chair
Chemical Engineering 2017

Helena Diao
OEC2016 Vice-Chair
Geological Engineering 2017

WHAT DO I BRING?

OPENING GALA

When: Friday, January 29, 5pm-7pm
Dress: Casual, but nice!
Junior, Senior, Consulting, Programming - bring all your competition stuff with you! You head straight to the build after dinner.

COMPETITIONS

When: Friday, January 29, 7pm-1:30am
Dress: Casual (ie. what you wore to dinner!)
Bring what you need to complete your competitions, including laptops, USBs, pencils, spare paper, water bottles, etc.

PRESENTATIONS

When: Saturday, January 30, 9am-5pm
Dress: Business Casual
Dress to impress! Bring presentation materials and your A-game.

AWARDS GALA

When: Saturday, January 30, 7pm-9pm
Dress: Semi-formal
Now's your chance to dress up. All eyes are on you!

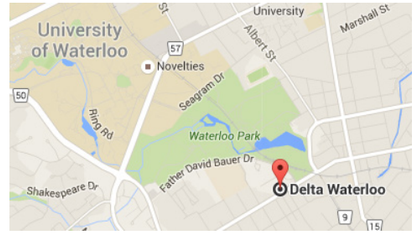
SOCIAL

When: Saturday, January 30, 10pm-midnight
Dress: SWAG
Showcase your school spirit with as much as swag as you can! Trading is encouraged.

WHERE DO I GO?

ACCOMMODATIONS

We're staying at the **Delta Waterloo** both Friday and Saturday night.
110 Erb St W, Waterloo, ON N2L 0C6
519-514-0406



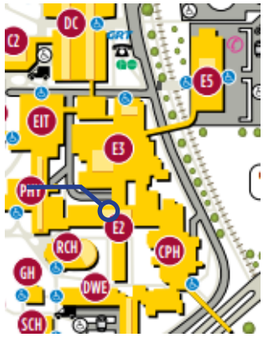
DINNER VENUES

Opening Gala
Fed Hall, University of Waterloo
200 University Ave W, Waterloo, ON N2L 3G1

Awards Gala
Concordia Club
429 Ottawa St S, Kitchener, ON N2M 3P6

UNIVERSITY OF WATERLOO CAMPUS

Competitions will take place in:
JR Coutts Engineering Lecture Hall (aka RCH)
Engineering 5 (aka E5)
Davis Centre (aka DC)



JUNIOR DESIGN

DESCRIPTION

Given a short four hours and a confining budget, junior engineering students are tasked with designing and constructing a prototype that demonstrates an innovative and practical solution to a previously undisclosed problem.

PRESENTATION SCHEDULE

	E5 5106	**E5 5128**
9:00 – 9:20	QUEEN'S UNIVERSITY	ROYAL MILITARY COLLEGE
9:25 – 9:45	LAURENTIAN UNIVERSITY I	CARLETON UNIVERSITY I
9:50 – 10:10	UNIVERSITY OF WINDSOR	UOIT
10:15 – 10:35	UNIVERSITY OF TORONTO	UNIVERSITY OF WATERLOO B
10:40 – 10:55	*BREAK*	*BREAK*
10:55 – 11:15	RYERSON UNIVERSITY	WESTERN UNIVERSITY
11:20 – 11:40	McMASTER UNIVERSITY	LAURENTIAN UNIVERSITY II
11:45 – 12:05	CONESTOGA COLLEGE	YORK UNIVERSITY
12:10 – 12:50	*LUNCH*	*LUNCH*
12:50 – 1:10	CARLETON UNIVERSITY II	UNIVERSITY OF OTTAWA
1:15 – 1:35	UNIVERSITY OF GUELPH	LAKEHEAD UNIVERSITY
1:40 – 2:00	UNIVERSITY OF WATERLOO A	
	RCH 101	**RCH 101**
2:10 – 3:50	TESTING – ALL TEAMS	TESTING – ALL TEAMS

SENIOR DESIGN

DESCRIPTION

Given a short six hours and a confining budget, senior engineering students are tasked with designing and constructing a prototype that demonstrates an innovative and practical solution to a previously undisclosed problem.

PRESENTATION SCHEDULE

	E5 3101	**E5 3102**
9:00 – 9:20	UNIVERSITY OF WATERLOO A	YORK UNIVERSITY
9:25 – 9:45	UNIVERSITY OF WINDSOR	CONESTOGA COLLEGE
9:50 – 10:10	QUEEN'S UNIVERSITY	CARLETON UNIVERSITY
10:15 – 10:35	UNIVERSITY OF GUELPH	UNIVERSITY OF WATERLOO B
10:40 – 10:55	*BREAK*	*BREAK*
10:55 – 11:15	UOIT I	RYERSON UNIVERSITY
11:20 – 11:40	UNIVERSITY OF OTTAWA	McMASTER UNIVERSITY
11:45 – 12:05	LAKEHEAD UNIVERSITY	ROYAL MILITARY COLLEGE
12:10 – 12:50	*LUNCH*	*LUNCH*
12:50 – 1:10	LAURENTIAN UNIVERSITY I	UOIT II
1:15 – 1:35	UNIVERSITY OF TORONTO	WESTERN UNIVERSITY
1:40 – 2:00	LAURENTIAN UNIVERSITY II	
	E5 3101	**E5 3102**
2:10 – 3:50	TESTING – ALL TEAMS	TESTING – ALL TEAMS

CONSULTING

DESCRIPTION

Given a short six hours, engineering students are tasked with developing a practical solution to a previously undisclosed problem that demonstrates social, environmental, technological, and economical resourcefulness.

PRESENTATION SCHEDULE

	E5 5047
9:00 – 9:30	UNIVERSITY OF TORONTO
9:35 – 10:05	WESTERN UNIVERSITY
10:10 –10:40	UOIT
10:45 – 10:55	*BREAK*
10:55 – 11:25	UNIVERSITY OF WATERLOO B
11:30 – 12:00	LAURENTIAN UNIVERSITY
12:05 – 12:35	RYERSON UNIVERSITY
12:35 – 1:05	*LUNCH*
1:05 – 1:35	UNIVERSITY OF WATERLOO A
1:40 – 2:10	UNIVERSITY OF GUELPH
2:15 – 2:25	*BREAK*
2:25 – 2:55	QUEEN'S UNIVERSITY
3:00 – 3:30	UNIVERSITY OF OTTAWA
3:35 – 4:05	CARLETON UNIVERSITY
4:10 – 4:40	MCMASTER UNIVERSITY

FRIDAY			Event		Competitions, Room Numbers, and Briefing information						
Time period					Feds Hall Room Number			On Campus Room Number			
			Hotel	Feds Hall	Feds - MPA	Feds - MPB	Feds - Meeting	RCH 307	RCH 101	E5 (2nd floor	E5 (2nd floor
2:00 PM	TO	2:30 PM	Registration & Check in								
2:30 PM	-	3:00 PM									
3:00 PM	-	3:30 PM									
3:30 PM	-	4:00 PM									
4:00 PM	-	4:30 PM									
4:30 PM	-	5:00 PM			Bus: Junior Design, Senior Design, Consulting, and						
5:00 PM	-	5:30 PM		Opening Ceremony							
5:30 PM	-	6:00 PM			Bus: Debates, Innovative and Communications						
6:00 PM	-	6:30 PM		Openina Speech							
6:30 PM	-	7:00 PM		Opening Ceremony		Programming	Junior Design	Bus: Senior and Consulting			
7:00 PM	-	7:30 PM			Bus: Programming and Junior			Senior Design		Consulting	
7:30 PM	-	8:00 PM			Debates Briefing	Innovative	Communications	Senior Design Competitions 6 Hours Build Time	Junior Design Competitions 6 Hours Build Time	Consulting Competitions 6 Hours	Programming Competitions 6 Hours on Campus
8:00 PM	-	12:00 AM			Bus: Debates, Innovative and Communications						
12:00 AM	-	12:30 AM									
12:30 AM	-	1:00 AM									
1:00 AM	-	1:30 AM									
1:30 AM	-	2:00 AM						Bus: Junior Design, Senior Design, Consulting, and Programming			

SATURDAY			Event	Competitions & Room Number										
				Junior	Senior			Communications	Innovative	Consulting	Programming	Debate	Debate	Debate
7:00 AM	TO	7:30 AM		E5 5106										
7:30 AM	-	8:00 AM		Testing: RCH 101										
8:00 AM	-	8:30 AM	Bus											
8:30 AM	-	9:00 AM		Breakfast										
9:00 AM	-	9:05 AM	Breakfast at SDC	Queen's University	Royal Military College	University of Waterloo A	York University	University of Ottawa	UOIT	University of Toronto	Presentation Preparation	University of Waterloo A - University of Ottawa	Carleton University II - Laurentian University	University of Waterloo B - York University
9:05 AM	-	9:10 AM		Grading	Grading	Grading	Grading	Grading		Grading				
9:10 AM	-	9:15 AM		Laurentian University I	Carleton University I	University of Windsor	Conestoga College	Lakehead University I		Western University				
9:15 AM	-	9:20 AM		Grading	Grading	Grading	Grading	Grading		Grading				
9:20 AM	-	9:25 AM		University of Windsor	UOIT	Queen's University	Carleton University	Western University	University of Waterloo B	UOIT	Ryerson University	McMaster University - Carleton University I	University of Toronto - Ryerson University	UOIT - Queen's University
9:25 AM	-	9:30 AM		Grading	Grading	Grading	Grading	Grading		Grading				
9:30 AM	-	9:35 AM		University of Toronto	University of Waterloo B	University of Guelph	University of Waterloo B	Break	Break	Break	Grading			
9:35 AM	-	9:40 AM		Grading	Grading	Grading	Grading				McMaster University			
9:40 AM	-	9:45 AM		Break	Break	Break	Break	Carleton University II	University of Toronto I	University of Waterloo B	Grading	University of Waterloo A - Carleton University I	Carleton University II - Ryerson University	University of Waterloo B - Queen's University
9:45 AM	-	9:50 AM									Break			
9:50 AM	-	9:55 AM		Ryerson University	Western University	UOIT I	Ryerson University				University of Ottawa			
9:55 AM	-	######		Grading	Grading	Grading	Grading	Grading		Grading	Grading			
######	-	######		McMaster University	Laurentian University II	University of Ottawa	McMaster University	University of Waterloo B	Carleton University	Laurentian University	University of Toronto	University of Ottawa - McMaster University	University of Toronto - Laurentian University	UOIT - York University
######	-	10:10 AM		Grading	Grading	Grading	Grading	Grading		Grading	Grading			
10:10 AM	-	10:15 AM		Conestoga College	York University	Lakehead University	Royal Military College	Lunch	Lunch	Ryerson University	Lunch	Lunch	Lunch	Lunch
10:15 AM	-	10:20 AM		Lunch	Lunch	Lunch	Lunch			Lunch	Grading			
10:20 AM	-	10:25 AM						University of Waterloo A	University of Ottawa	University of Waterloo A	University of Waterloo B	University of Waterloo A - McMaster University	Carleton University II - University of Toronto	UOIT - University of Waterloo B
10:25 AM	-	10:30 AM		Carleton University II	University of Ottawa	Laurentian University I	UOIT II	Grading	Grading	Grading	Grading			
10:30 AM	-	10:35 AM		Grading	Grading	Grading	Grading	Lakehead University II			Carleton University			
10:35 AM	-	######		University of Guelph	Lakehead University	University of Toronto	Western University	Grading	University of Toronto II	University of Guelph	Grading	University of Ottawa - Carleton University I	Laurentian University - Ryerson University	York University - Queen's University
######	-	10:45 AM		Grading	Grading	Grading	Grading	Break		Grading	Break			
10:45 AM	-	######		University of Waterloo A	Break	Laurentian University II	Break	University of Toronto			Western University			
######	-	10:55 AM		Grading	Walk over to RCH for testing	Grading		Grading			Grading			
10:55 AM	-	11:00 AM		Walk over to RCH for testing	Royal Military College	Break	York University	Grading			Break	Judges Deliberation	Judges Deliberation	Judges Deliberation
11:00 AM	-	11:05 AM	Career Fair at SDC Please attend during your lunch or when you're not presenting!	Queen's University	Carleton University I	University of Waterloo A	Conestoga College	Carleton University I	Western University	Queen's University				
11:05 AM	-	11:10 AM		Laurentian University I	UOIT	University of Windsor	Carleton University	Grading		Grading				
11:10 AM	-	11:15 AM		University of Windsor	University of Waterloo B	Queen's University	University of Waterloo B	Break		Break				
11:15 AM	-	11:20 AM		University of Toronto	Western University	University of Guelph	Ryerson University	Ryerson University		Ryerson University				
11:20 AM	-	11:25 AM		Grading	Grading	Grading	Grading	Grading		Grading				
11:25 AM	-	11:30 AM		Ryerson University	Laurentian University I	UOIT I	McMaster University	McMaster University	Ryerson University	Laurentian University				
11:30 AM	-	11:35 AM		Grading	Grading	Grading	Grading	Grading		Grading				
11:35 AM	-	11:40 AM		Laurentian University II	University of Ottawa	Lakehead University	Royal Military College	Carleton University II	University of Waterloo A	University of Waterloo B				
11:40 AM	-	11:45 AM		Grading	Grading	Grading	Grading	Grading	Grading	Grading				
11:45 AM	-	11:50 AM		Lakehead University II	Laurentian University I	University of Toronto	Western University	University of Toronto	University of Ottawa	University of Guelph				
11:50 AM	-	11:55 AM		Grading	Grading	Grading	Grading	Grading	Grading	Grading				
11:55 AM	-	12:00 PM		Laurentian University II	UOIT I	University of Ottawa	McMaster University	Ryerson University	Western University	Carleton University				
12:00 PM	-	12:05 PM		Grading	Grading	Grading	Grading	Grading	Grading	Grading				
12:05 PM	-	12:10 PM		Ryerson University	York University	Lakehead University	UOIT II	Lakehead University II	Western University	Laurentian University I				
12:10 PM	-	12:15 PM		Grading	Grading	Grading	Grading	Grading	Grading	Grading				
12:15 PM	-	12:20 PM		Carleton University I	Laurentian University II	University of Waterloo A	Conestoga College	Carleton University I	Western University	Queen's University				
12:20 PM	-	12:25 PM		Grading	Grading	Grading	Grading	Grading	Grading	Grading				
12:25 PM	-	12:30 PM		Queen's University	UOIT	University of Waterloo B	Carleton University	Break	Break	Break				
12:30 PM	-	12:35 PM		Grading	Grading	Grading	Grading							
12:35 PM	-	12:40 PM		Ryerson University	Laurentian University II	UOIT I	McMaster University	Ryerson University						
12:40 PM	-	12:45 PM		McMaster University	York University	University of Ottawa	Royal Military College							
12:45 PM	-	12:50 PM		Conestoga College	University of Ottawa	Lakehead University	UOIT II	UOIT						
12:50 PM	-	12:55 PM		Carleton University II	Lakehead University	Laurentian University I	Western University							
12:55 PM	-	1:00 PM		Laurentian University I	Carleton University II	University of Windsor	Conestoga College							
1:00 PM	-	1:05 PM		University of Windsor	Western University	Queen's University	University of Waterloo B							
1:05 PM	-	1:10 PM		University of Toronto	Western University	University of Guelph	Ryerson University							
1:10 PM	-	1:15 PM		Grading	Grading	Grading	Grading							
1:15 PM	-	1:20 PM		Ryerson University	Laurentian University II	UOIT I	McMaster University							
1:20 PM	-	1:25 PM		McMaster University	York University	University of Ottawa	Royal Military College							
1:25 PM	-	1:30 PM		Conestoga College	University of Ottawa	Lakehead University	UOIT II							
1:30 PM	-	1:35 PM		Carleton University II	Lakehead University	Laurentian University I	Western University							
1:35 PM	-	1:40 PM		University of Guelph	Lakehead University	University of Toronto	Laurentian University II							
1:40 PM	-	1:45 PM		Grading	Grading	Grading	Grading							
1:45 PM	-	1:50 PM		Break	Break	Break	Break							
1:50 PM	-	1:55 PM		Break	Break	Break	Break							
1:55 PM	-	2:00 PM		Judges Deliberation	Judges Deliberation	Judges Deliberation	Judges Deliberation							
2:00 PM	-	2:05 PM		Walk to DC for Bus	Walk to DC for Bus	Walk to DC for Bus	Walk to DC for Bus							
2:05 PM	-	2:10 PM	Bus											
2:10 PM	-	2:15 PM												
2:15 PM	-	2:20 PM												
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5:00 PM	-	5:30 PM												
5:30 PM	-	6:00 PM	Dinner Prep											
6:00 PM	-	6:30 PM												
6:30 PM	-	7:00 PM	Bus											
7:00 PM	-	7:30 PM	Awards Dinner at Concordia Club											
7:30 PM	-	8:00 PM												
8:00 PM	-	8:30 PM												
8:30 PM	-	9:00 PM												
9:00 PM	-	9:30 PM	Bus											
9:30 PM	-	######												
######	-	12:00 PM	Social Event - Chainsaw; Delta Waterloo											
SUNDAY														
######	-	11:00 AM	CHECK OUT											

Day	Where am I going?	What am I going to?	When is the bus leaving?	Who is taking this bus?
Friday	Delta Hotel To Feds Hall	Opening Ceremony	4:30 PM	Consulting Teams and Senior Design Teams; The Judges and Directors for those competitions
			4:45 PM	Junior Design and Programming Teams; The Judges and Directors for those competitions
			5:00 PM	Innovative, Communications, and Debate Teams; The Judges and Directors for those competitions
	Feds Hall To Davis Center	Friday Competitions	6:30 PM	Consulting Teams and Senior Design Teams; The Judges and Directors for those competitions
			7:00 PM	Junior Design and Programming Teams; The Judges and Directors for those competitions
	Feds Hall To Delta Hotel	Rest	7:30 PM	Innovative, Communications, and Debate Teams; The Judges and Directors for those competitions
	Davis Center To Delta Hotel	Back to Hotel	1:30 AM	Consulting Teams, Junior Design, Programming Teams, and Senior Design Teams;
Saturday	Delta Hotel To Davis Center	Presentations	8:15 AM	Everyone whose presentation is *before* 10:45; All Judges; All Competition Directors
			8:40 AM	Everyone whose presentation is *after* 10:45; All Other Committee Members
	Davis Center To Delta Hotel	Change to formal cloths	4:30 PM	Junior Design, Senior Design, and Communication Teams; The Judges and Directors for those competitions
			5:00 PM	Innovative, Consulting, Programming, and Debate Teams; The Judges and Directors for those competitions
	Delta Hotel To Concordia Club	Awards Ceremony	6:15 PM	Junior Design, Senior Design, and Communication Teams; The Judges and Directors for those competitions
			6:45 PM	Innovative, Consulting, Programming, and Debate Teams; The Judges and Directors for those competitions
	Concordia Club To Delta Hotel	Change for Social Event	9:20 PM	Junior Design, Senior Design, and Communication Teams; The Judges and Directors for those competitions
			9:40 PM	Innovative, Consulting, Programming, and Debate Teams; The Judges and Directors for those competitions

PROGRAMMING

DESCRIPTION

Engineering students are asked to construct industry-quality software that provides a solution to a previously undisclosed problem.

PRESENTATION SCHEDULE

	E5 6002
10:00 – 10:30	RYERSON UNIVERSITY
10:35 – 11:05	MCMASTER UNIVERSITY
11:10 – 11:20	*BREAK*
11:20 – 11:50	UNIVERSITY OF OTTAWA
11:55 – 12:25	UNIVERSITY OF TORONTO
12:30 – 1:00	*LUNCH*
1:00 – 1:30	UNIVERSITY OF WATERLOO B
1:35 – 2:05	CARLETON UNIVERSITY
2:10 – 2:40	WESTERN UNIVERSITY
2:45 – 3:00	*BREAK*
3:00 – 3:30	UOIT
3:35 – 4:05	LAKEHEAD UNIVERSITY
4:10 – 4:40	UNIVERSITY OF WATERLOO A

PARLIAMENTARY DEBATES

DESCRIPTION

Engineers are often required to evaluate design proposals and convince key stakeholders of the associated benefits or drawbacks, often with little notice. This category asks competitors to defend or refute a previously undisclosed subject in the style of parliamentary debates.

PRESENTATION SCHEDULE

	E5 6004	E5 6006	E5 6008
9:00 – 9:50	UW A vs. UOTTAWA	CARLETON II vs. LAURENTIAN	UW B vs. YORK
9:50 – 10:40	MCMASTER vs. CARLETON I	U OF T vs. RYERSON	UOIT vs. QUEEN'S
10:40 – 11:30	UW A vs. CARLETON I	CARLETON II vs. RYERSON	UW B vs. QUEEN'S
11:30 – 12:20	UOTTAWA vs. MCMASTER	U OF T vs. LAURENTIAN	UOIT vs. YORK
12:20 – 1:05	*LUNCH*	*LUNCH*	*LUNCH*
1:05 – 1:55	UW A vs. MCMASTER	CARLETON II vs. U OF T	UOIT vs. UW B
1:55 – 2:45	UOTTAWA vs. CARLETON I	LAURENTIAN vs. RYERSON	YORK vs. QUEEN'S
2:45 – 2:55	JUDGES DELIBERATION		
2:55 – 3:45	SEMI FINAL		
3:50 – 4:40	SEMI FINAL		

INNOVATIVE DESIGN

DESCRIPTION

Developed outside of the competition, teams bring their creative and unique solutions to an identified engineering technology gap of their choosing to be assessed by the judges.

PRESENTATION SCHEDULE

	E5 2004
9:00 – 9:45	UOIT
9:45 – 10:30	UNIVERSITY OF WATERLOO B
10:30 – 10:40	*BREAK*
10:40 – 11:25	UNIVERSITY OF TORONTO I
11:25 – 12:10	CARLETON UNIVERSITY
12:10 – 12:40	*LUNCH*
12:40 – 1:25	UNIVERSITY OF OTTAWA
1:25 – 2:10	UNIVERSITY OF TORONTO II
2:10 – 2:55	WESTERN UNIVERSITY
2:55 – 3:10	*BREAK*
3:10 – 3:55	UNIVERSITY OF WATERLOO A
3:55 – 4:40	RYERSON UNIVERSITY

INNOVATIVE DESIGN SUMMARIES

UOTTAWA
Isaac O'Beirn
Jeff Robinson
Nick Burgel
Jacky Wu

Juniper by JIN Advanced Systems

Modern commercial 3D printers require much supervision and maintenance during the print cycle. An autonomous 3D printer was designed by adding closed loop control features to increase reliability and a mechanism allowing the machine to remove completed parts itself. Closed loop control was obtained by adding encoders to all motors and a control circuit which can be retrofitted on any printer. The part removal mechanism was constructed using three plates: the print bed, with an array of holes; a moveable plate, with a matched array of pins; and the bottom plate. A completed print can be ejected from the print bed when the pins on the moveable plate rise through the holes in the print bed. To raise the movable plate, a pneumatic systems was designed consisting of a pump, and a bladder between the bottom plate and moveable plate. In conclusion these added features make for an autonomous 3D printer..

UOFT I
Rahul Goel

Tennsor

A new technological revolution is about to take the world by storm. It has been brewing quietly for the last several years, and a few clever companies and innovators are already on track to define the way this revolution pans out. This revolution has been called the Internet of Things (IoT). IoT encompasses the deceivingly simple concept that every single object around us will be connected to the internet, to us, and to each other, in some meaningful way. IoT devices will form a layer of technology that will build smarter homes, schools, hospitals, farms, factories, cities, and eventually a smarter world. It is predicted that by 2017 the IoT market will surpass the PC, tablet, and phone market combined.

Currently less than 1% of "things" which could be connected to the internet are, and with estimates put at over 50 billion devices being connected to the internet by 2020, a huge opportunity awaits. It was stated earlier by Techcrunch that the ultimate IoT prize "is to become the software platform upon which all vertical applications in the Internet of Things will be built." This is where Tennsor comes in. Tennsor aims to be that platform, but so much more as well.

Tennsor is both a hardware and software platform currently in the prototype/beta stages which enables simpler IoT development, deployment, and end user experiences. It is designed from the ground up to be the easiest and most scalable approach for companies large and small to build their connected products around. In the presentation, live demonstrations will show how easy it is to connect any sensor, actuator, or other piece of developed hardware to Tennsor's hardware and software stack, and the power that small commitment grants users of Tennsor as a result.

UOFT II
Yuqing Zhou
Tian Yuan Zhao
Kevin Lipiec
Reza Boushehri

Climadjust

Problem to Solve: "Not comfortable enough." There are many times when we study in the labs or classroom, and feel too hot or too cold compared with our desire temperature. The room temperature is usually fixed during the entire day, but people's desired temperature fluctuates throughout the day. Furthermore, the desire temperature of one person usually differs from the other's. Therefore, in the public property, where the room temperature cannot be easily customized, we want a solution to make us more comfortable.

Solution: The Climadjust is a wearable technology to make user feel comfortable in various indoor environment. It contains three main functions to achieve the goal: Control, Track, and Optimize.

UW B
Laura Bahlmann
Eric Beauregard
Wenbo Cui
Stuart Murray

GraFET: Graphene Based Nano-Electronic Harmful Gas Sensor

With urban and industrial development at an all time high, it is more important now than ever to monitor exposure to toxic gases. GraFET is a sensor that uses a graphene based field-effect-transistor and a dipole detection method to achieve both rapid and sensitive detection of chemical vapour molecules. With a sensing element smaller than the size of an HDTV pixel, GraFET is capable of being incorporated into smartphones or wearable electronics. Apart from providing personal exposure levels, individual devices could communicate with each other to create the first dynamic high resolution air quality map of our cities. The applications of such a technology are wide-ranging and will revolutionize how air quality is monitored. GraFET; the power for pollution change in the palm of your hand.

WESTERN
Jolien van Gaalen
Pieter van Gaalen
Richard Lacroix
Tyler Lacroix

Home Health Care (HHC) - Palliative Care Home Assistant

End of life can be a vulnerable time for both the terminally ill patient and their family. There is only one chance to make this time meaningful; there are no do overs. When given a choice, the majority of people would choose to die peacefully in their homes surrounded by their loved ones. Not only does improving home-based care increase the quality of life for terminally ill patients, but also cuts health care costs. Despite this overwhelming preference, over 70% of people die in a hospital. Why? Home care requires a lot coordination between healthcare providers, the patient, and their family. A well-managed death at home is rarely achieved using the current system. The goal of this project is to use software to improve palliative care. We are developing an iPad application that centralizes communication between health care providers, family caregivers, and/or the palliative patient.

ENGINEERING COMMUNICATIONS

DESCRIPTION

Competitors are asked to prepare a presentation detailing the various societal impacts of an engineering process or issue in a manner that can be easily understood by an audience of various technological backgrounds.

PRESENTATION SCHEDULE

	E5 3052
9:00 – 9:25	UNIVERSITY OF OTTAWA
9:30 – 9:55	LAKEHEAD UNIVERSITY I
10:00 – 10:25	WESTERN UNIVERSITY
10:30 – 10:50	*BREAK*
10:50 – 11:15	CARLETON UNIVERSITY II
11:20 – 11:45	UNIVERSITY OF WATERLOO B
11:50 – 12:35	*LUNCH*
12:35 – 1:00	UNIVERSITY OF WATERLOO A
1:05 – 1:30	LAKEHEAD UNIVERSITY II
1:35 – 1:50	*BREAK*
1:50 – 2:15	UNIVERSITY OF TORONTO
2:20 – 2:45	CARLETON UNIVERSITY I
2:50 – 3:05	*BREAK*
3:05 – 3:30	RYERSON UNIVERSITY
3:35 – 4:00	UOIT

ENGINEERING COMMUNICATION SUMMARIES

CARLETON I
Gabrielle Genereux
Patrick Perron

Rocket Reusability – The Future of Spaceflight

Since humanity first reached into space, rockets have always been the sole method of transportation to get there. But while they contain some of the world's most advanced technology, today's rockets are wasteful, expensive, and completely expendable.

Rocket Reusability is the ideal solution to this problem. Several private space companies are currently working on reusable launch systems that allow the recovery and reuse of vital components after launch. They could then rebuild their rockets and launch them at a fraction of the price of a new one. This concept could reduce worldwide launch prices tenfold, and bring a multitude of positive implications along with it.

Cheap and reliable transport to orbit is the gateway to expanding humanity's presence in space, and not only is reusability a strategy for launch companies to offer competitive prices, it opens a realm of possibilities for the overall development of mankind into an interstellar species.

CARLETON II
Lucas Brewster

3D Printing and the Aerospace Industry

Have you ever broken a small household object that required unnecessary costs to replace because it was an odd item? Or as an Engineer, had a great design that you wanted to quickly prototype and share with your peers? The answer to solve both of these problems is the quickly growing industry of 3D printing. The concept is simple; model an object with a CAD software, convert it to gcode (manufacturing machine language), select print, and watch your conceptual designs quickly become a reality. With commercial materials ranging from plastics, to ceramics, to metals, to resigns, the limits of 3D printing stop at your level of imagination.

LAKEHEAD I
Jaelim Jeon

Sustainable Building through HVAC System Design

Jaelim Jeon believes in improving the world by improving efficiency and the availability of homes in local communities. She would like to present to people who have different educational levels and backgrounds including members of the general public demonstrating how buildings are impacting our environment and our society and how a properly planned HVAC system design in buildings can save energy and money by reducing the amount of resources including energy required.

LAKEHEAD II
Andreas Zailo

Net-zero Geothermal Greenhouses for Isolated Communities in Northern Canada

In Northern Ontario, there are 38 remote communities, of which 25 are largely inhabited by First Nations peoples. These communities total 14,236 and represent some of the poorest & hungriest people in the province. Unfortunately, due to the remote location and the difficulty of transporting goods, these communities experience food security issues during the winter; where they cannot procure fresh fruits and vegetables or if they do, they can pay up to 11 times as much as metropolitan areas.

To combat this cost and food security issue, a net-zero Geothermal Greenhouse was conceptualized and has been designed to be capable of providing a thermally stable growing environment and cost effective solution to providing food for a northern community. In short, this Communications Presentation will cover the processes and design decisions taken to provide Canada's northern communities with a viable source of fresh fruit and vegetables throughout the year.

RYERSON
Urooj Siddiqui
Matthew Smith

Technology should be used to find habitable planets

Space exploration started in the mid-20th century when the first rocket, Sputnik, was launched into orbit. Since then, many rockets, satellites, probes and landers have been launched into space in the quest to find other planets that can sustain life. We should be using the technology we have to find other habitable planets, as there are far more technological, social, environmental and economic benefits in space exploration and looking outwards from the Earth than there are in simply focusing on this one planet.

UOFT
Sharon Ravindran

Mobile Privacy and Security: The Spy in Your Pockets

Smartphones today are constantly transmitting data between users and multiple sources allowing us to message, email, and communicate all from one device increasing the convenience for the user. The transmitted data is constantly recorded by service providers, governments, and third parties and can be intercepted easily through legal and illegal means without consent, creating privacy and security concerns. However, studies have shown that 73 percent of mobile phone users1 are not aware of these security and privacy issues and do not take any proactive security measures.

UOIT
Cristina Mazza

Hydrogen Fuel Cell Vehicles: A Game Changer for Sustainable Energy

Clean energy consumption is essential to Ontario's residents and environment. Our transportation energy consumption is the primary source of greenhouse gas emission, comprising 37% of the total in 2010. Gasoline, oil and diesel fuels comprise 87% of transportation fuels in 2010, with a notable increase for diesel fuel consumption compared to other fuels. To significantly reduce greenhouse gas emissions in Canada, there must be a dramatic reduction in the composition of automotive fuels. Several alternatives to conventional gasoline and diesel engines for automobiles are in development, including; battery electric vehicles, natural gas vehicles, and hydrogen fuel cell vehicles. Hydrogen can be an environmentally superior energy carrier. This presentation brings attention to the advantages and challenges of hydrogen fuel cell vehicles. It also compares and contrasts fuel cell vehicles with other alternative automotive propulsion options. Issues and challenges dealing with feasibility, fuel production and storage, infrastructure, and affordability will be explored.

UW A
Andrew Andrade

Mankind's Greatest Challenge

The greatest minds of our time, Elon Musk, Stephen Hawking and Carl Sagan all agree that: Mankind's only guaranteed future and survival lies in space travel.

Through the Ancient History of Easter Island, we can draw startling correlations of human behaviour on an isolated paradise. NASA and other space agencies face ever greater challenges so humanity will not suffer the same fate; included as one of the major challenges is the ability to exercise in microgravity, which will be discussed in depth during the presentation.

Today, support for space exploration is at an all time low, humankind has proven the ability to push our limits and accomplish extraordinary feats if there is support from the general public. With growing interest from society and progressive innovation from engineers, we can achieve the goals of tomorrow, and inhabit another world.

WESTERN
Jacob Green
Mitchell Morrison

The Salvage of the Costa Concordia

The Costa Concordia was an Italian cruise ship built in 2004 for a grand total of $570 Million USD. On January 13th 2012, she began what would become her final voyage. The captain deviated from the planned route and the ship's hull was breached after hitting a rock. The ship was ordered to be abandoned, and of the 4,252 aboard, 32 tragically lost their lives.

Starting in February 2012, over 2,300 tonnes of heavy fuel oil was removed from the ship. The Costa Concordia was then parbuckled, an act in which a ship is righted using rotational leverage. The ship was ultimately floated to Genoa, and is in the process of dismantling for material recycling. This innovative process addressed a number of issues: environmentally economically, and socially. We believe that the process completed was appropriate and exemplary for the disaster at hand.

SOCIAL VENUES

Looking to explore town? Or celebrate an OEC victory?
Try checking out some of these local hotspots!

LAIDBACK

Sweet Dreams Tea Shop
Close to campus, plenty of board games and bubble tea!
14-170 University Ave W, Waterloo

Crossroads Board Game Café
So many board games!
(2nd Floor) 258 King St N, Waterloo

CLUB SCENE

Phil's Grandson's Place
A Waterloo must!
Cheap drinks, but don't look up nor down…
220 King St N, Waterloo

Beta
24 King St N, Waterloo

Brixton Social
140 University Ave W, Waterloo

Starlight
47 King St N, Waterloo

Pearl
341 Marsland Dr, Waterloo

COLLEGE BARS

Chainsaw
Popular last stop on pubcrawls! Live bands, pool tables, and live karaoke!
28 King St N, Waterloo

Dallas
Located in Kitchener - a good country vibe!
312 King St W, Kitchener

INFAMOUS

Cheeses Murphy
Ask a Waterloo delegate!

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Department of Mechanical & Mechatronics Engineering

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