

Skulematters

A FIRST LOOK

The Centre for Engineering Innovation & Entrepreneurship

A HUB FOR COLLABORATIVE RESEARCH

Multidisciplinary teams address pressing issues in health care and energy. Pages 4 & 6

AN ENTREPRENEURIAL SPIRIT

Enterprising students turn great ideas into viable products and services. Page 8

A COMPREHENSIVE EDUCATION

Leadership training prepares engineers for successful, high-impact careers. Page 10



Advisor
Cristina Amon, Dean

Editor
Emily Meyertholen

Managing Editor
Shilpa Gantotti

Feature Writers
Patchen Barss
Marcia Kaye

Art Direction, Design & Illustration
Luke Pauw

Features Photography Art Direction
Raymond Cheah

Photography
Roberta Baker
Mark Balson
Henry Feather (features)
Christopher Lawson
Wayne MacPhail

With Thanks to:
Colin Anderson
Katharine Blanchard
Joan DaCosta
Christina da Rocha-Feeley
Jim Dawson
Sonia De Buglio
Nina Haikara
Madelyn Herschorn
Jennifer Hsu
Steve Miszuk

Marit Mitchell
Megan Murphy
Cynthia Nevins
Luke Y. H. Ng
Sharon Oosthoek
Shannon Osborne
Deborah Peart
Celeste Taylor
Ron Venter
Erin Vollick

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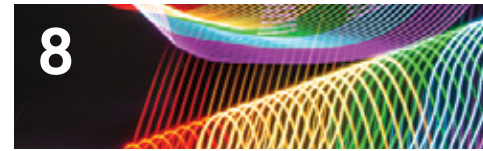
Office of Advancement
Faculty of Applied Science & Engineering
University of Toronto
Galbraith Building
35 St. George Street, Room 116
Toronto, Ontario
Canada M5S 1A4

Tel: +1 416-978-0380
Fax: +1 416-946-3450

www.alumni.engineering.utoronto.ca

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A Message from Dean Cristina Amon



The image on the cover of this issue of *Skulematters* represents a new era for U of T Engineering. The Centre for Engineering Innovation & Entrepreneurship builds upon our strengths. It enables us to further collaborate across fields to address critical global problems, take an entrepreneurial approach in our activities, and create innovative learning environments that inspire a new generation of engineers to achieve impact in the world.

The features in this magazine illustrate how these values are exemplified in the innovative research initiatives and educational programs that will be housed within our new building. The Centre brings together the talents of our entire Faculty and the broader University, and provides the space, facilities and collaborative environment needed to encourage students, researchers, alumni and industry partners to work together to get great ideas off the ground.

This ambitious project is quickly becoming a reality for our Faculty thanks to the generous support of our alumni and friends. To date, hundreds of alumni have contributed in a number of ways, from making generous gifts in support of the project to volunteering time and expertise as mentors in our entrepreneurship programs. I am delighted with the initiative demonstrated by our growing alumni community in Asia-Pacific, raising funds to sponsor classrooms and design spaces. And the Engineering Society's \$1-million commitment shows that our undergraduate students recognize the importance of this new student space.

I am proud to share that Skule rose to become the twelfth-best engineering school in the world, according to this year's Academic Ranking of World Universities.* Transformational initiatives like the Centre for Engineering Innovation & Entrepreneurship will ensure that U of T engineers leverage the Faculty's collaborative culture to create world-class educational experiences. Thank you for your contributions and commitment toward our pursuit of excellence.

Cristina

Cristina Amon
Dean

On the cover: Schematic design of the Centre for Engineering Innovation & Entrepreneurship. Final design is being developed in consultation with the Faculty of Applied Science & Engineering, the University of Toronto, the City of Toronto and their respective representatives. Image courtesy of Montgomery Sisam Architects + Feilden Clegg Bradley Studios.

*Shanghai Jiao Tong Academic Ranking of World Universities, Top Universities for Engineering/Technology and Computer Sciences, 2013

Innovation Lives Here

Inside the Centre for Engineering Innovation & Entrepreneurship (CEIE)

The CEIE is scheduled to open its doors in late 2016 or early 2017, welcoming students, researchers, alumni and industry partners to a new collaborative environment for U of T Engineering.

The Centre will bring together over 50 researchers involved in the **Institute for Sustainable Energy**. See page 4.

The CEIE plans incorporate a **'smart building'** concept, which integrates heating, cooling, electrical and communications systems into a single network, providing greater energy efficiency.

The **Centre for Global Engineering** will continue its groundbreaking cross-disciplinary work in the CEIE. See page 6.

The new building will give **The Entrepreneurship Hatchery** much-needed room to grow. See page 8.

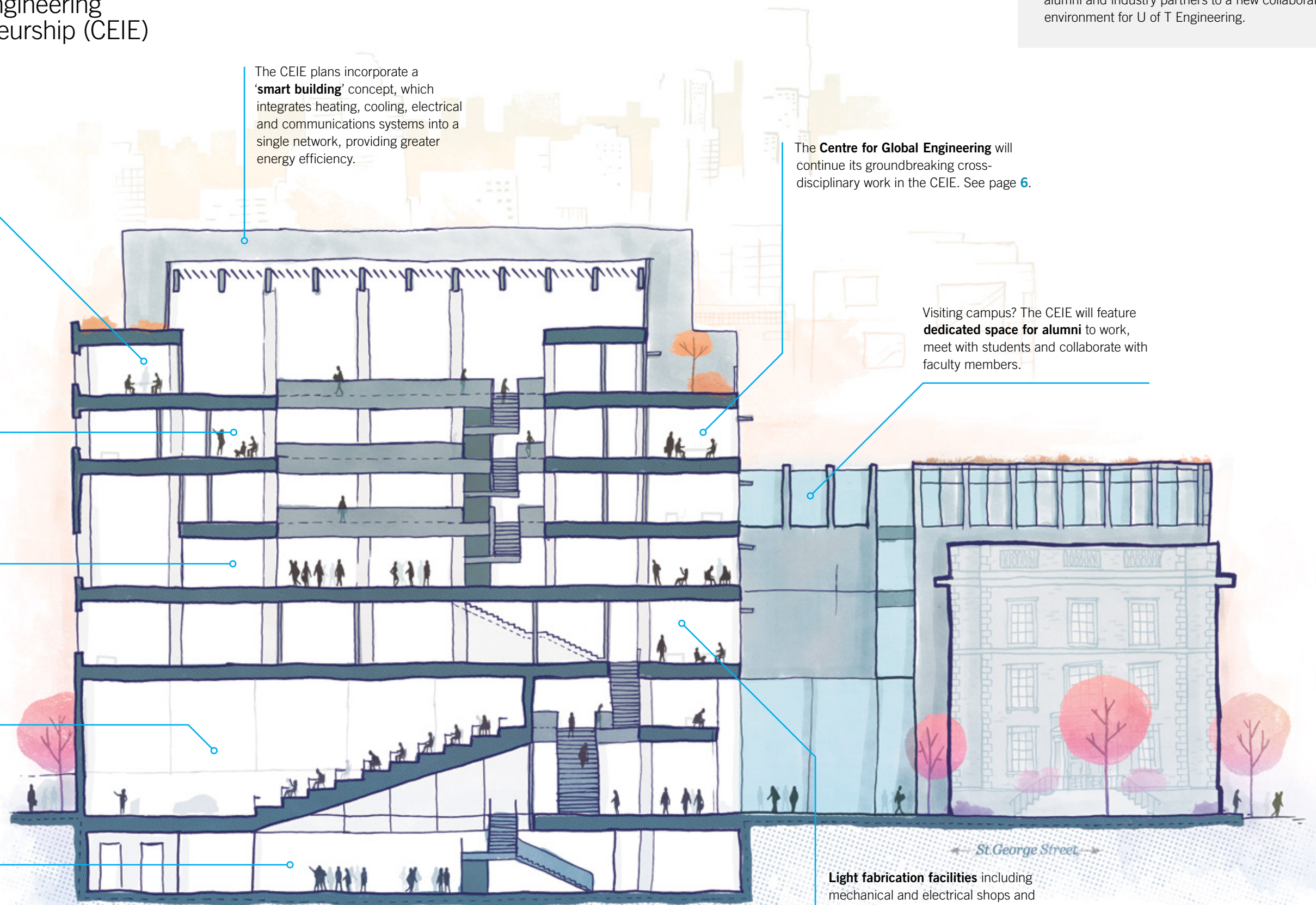
Visiting campus? The CEIE will feature **dedicated space for alumni** to work, meet with students and collaborate with faculty members.

Alumni groups in Hong Kong, Indonesia, Singapore, South Korea and Taiwan have rallied behind the Centre by sponsoring classrooms and design spaces.

The 500-seat **Lee & Margaret Lau Auditorium** will be the only lecture hall of its kind in North America, featuring small-group seating and highly interactive learning and communications technology.

Thanks to a \$1-million commitment from the **Engineering Society**, the 'ARENA' will provide student clubs with unique space to socialize, hold events and collaborate on group projects.

Light fabrication facilities including mechanical and electrical shops and 3-D printers will enable students to create prototypes of new products.



Shedding Light on Our Energy Dilemma



Professors **Heather MacLean** (CivE), **David Sinton** (MIE) and **Deepa Kundur** (ECE) exemplify the Institute for Sustainable Energy's cross-disciplinary approach to solving complex energy problems.

Meet Skule's Next Innovators

"TO TACKLE LARGER PROBLEMS AND HAVE LARGER IMPACT, YOU NEED TEAMS."

Professor **David Sinton's** (MechE 9T8, PhD 0T3) fluid mechanics research may be 'small-scale,' but as director of U of T Engineering's Institute for Sustainable Energy, he's addressing some of the largest challenges facing global society.

"Energy issues are often complicated, involving infrastructure, electrical engineering, mechanical engineering, materials engineering and civil engineering," Professor Sinton says. "To tackle larger problems and have larger impact, you need teams."

The Institute promotes collaboration among researchers and students from across the University, as well as with industry and government.

Professor Sinton's lab explores the small-scale fluid mechanics and optics aspects of using fibre optics to grow algae that produce oils for biofuels. These specialized, 'fat' algae offer more fuel density than other crops. They could provide a sustainable alternative to fossil fuels, and a more efficient alternative to other biomass sources.

Professor Sinton's research is ambitious on its own, but through the Institute, it contributes to something bigger. Transitioning any technology from the lab into the global energy mix requires input from many types of experts. The Institute provides the infrastructure

for such multidisciplinary exchanges. Its members' expertise spans all engineering disciplines.

Among them are Professor **Deepa Kundur** (ElecE 9T3, ECE MAsc 9T5, PhD 9T9), who studies the security and efficiency of smart power grids, and Professor **Heather MacLean** (CivE), who studies the life cycle impacts of energy production, storage, distribution and consumption. Along with about 50 other faculty members, these researchers give the Institute the capacity to address the very largest sustainability questions, and the flexibility to solve new problems as they emerge.

Nothing highlights the vision of the Institute more than its future home — the Centre for Engineering Innovation & Entrepreneurship. This new facility is expressly designed to foster the kind of broad collaboration Professor Sinton values.

"The Institute embodies the spirit of the building, and vice versa," he says. "I'm excited about the idea of cutting across departments and bringing energy researchers together." ■

Learn more at energy.utoronto.ca.

"POSSIBLY THE WORST NAME FOR A TECHNOLOGY. EVER."

Hydraulic fracturing, the oil extraction process commonly known as fracking, has been criticized for everything from exacerbating global warming to triggering earthquakes. Critics might wonder what place it has in an Institute for Sustainable Energy.

"As far as the total amount of energy being produced, it's the biggest mover on the global scene. You can't ignore it," says Professor Sinton. "I'm not a proponent of fracking. I'm not against it either. I feel like I don't know enough."

What he does know is that fracking is transforming the energy sector. That's why the Institute is assembling a team to investigate this technology, help us better understand its implications and lead us toward a more informed and sustainable approach.

Navigating Complex Global Health Challenges



AERO project researchers Professors **Yu-Ling Cheng** (ChemE), **Timothy Chan** (MIE) and **Dr. Laurie Morrison** (Medicine) are combining their diverse expertise to speed up ambulance response and enable time-sensitive medical treatment in the developing world's bustling major cities.

Most of us take for granted that when there's a medical emergency, we can dial a central phone number and have an ambulance at our door within minutes. That's not the case in many cities in the developing world. In Dhaka, Bangladesh's capital with a metropolitan population of 15 million, you must phone a hospital directly and then wait for an ambulance to inch its way through streets clogged with cars, buses, pushcarts and bicycles, not to mention frequent political demonstrations and riots. It can take an hour for an ambulance to travel a single kilometre.

Since time-sensitive illnesses such as heart attack, acute trauma, blood loss and childbirth complications account for more than a third of deaths in low- and middle-income countries, reducing ambulance response times could make a huge difference.

That's the objective of AERO, which stands for Ambulance Emergency Response Optimization. A multidisciplinary project of the Centre for Global Engineering (CGEN), the AERO team includes five researchers representing emergency medicine, transportation engineering, microfinance and optimization, with bases in Toronto and Dhaka.

"The thing I find exciting about AERO is that it brings together people with very diverse but complementary expertise to solve a challenging problem," says lead researcher Professor **Timothy Chan** (MIE).

Partnering with Dhaka's biggest ambulance company, AERO combines GPS-based transportation engineering with optimization methods to accomplish three objectives: determining the best locations to park ambulances, since basing them at hospitals can result in lengthy round trips; creating the first mixed-mode traffic simulator to estimate

travel times; and developing a route optimization method that takes into account the locations of the ambulance, patient and hospital, and can compensate for route disruptions.

Professor Chan, whose expertise involves developing mathematical models to analyze and optimize healthcare systems, worked previously with team member Dr. Laurie Morrison, an emergency medicine specialist at Toronto's St. Michael's Hospital, on improving defibrillator locations to reduce cardiac deaths. Other contributors to the AERO research are **Saifu Li** (IndE IT2 + PEY) and **Justin Boutilier** (IndE MASc IT5).

AERO team member Moinul Hossain, a transportation engineer in Dhaka, has had plenty of firsthand experience with long waits for ambulances and medical treatment: his mother has kidney disease and his father is a cancer patient. He says in addition to reducing ambulance response times, AERO will obtain real-time information about which hospitals have the lowest emergency room wait times. Hossain is confident the AERO system could be rolled out elsewhere. "Although we are using Dhaka as our study area, it represents any megacity in any developing country," he says.

CGEN Director and AERO team member Professor **Yu-Ling Cheng** (ChemE), who has been to Dhaka and brought Professor Chan and Hossain together, says, "This project is beautiful, for three reasons. As engineers, and engineering professors in particular, we want to work on important problems, we want projects that make use of our knowledge, and we want to model for our students how to do this kind of impactful work." ■

Learn more at cgen.utoronto.ca.



Professor Emeritus **Levente Diosady** (ChemE 6T6, MASc 6T8, PhD 7T2) and his research team.

BREWING A LIFE-SAVING TEA

According to the World Health Organization, iron deficiency causes nearly 600,000 perinatal deaths and more than 100,000 maternal deaths each year. Professor Emeritus **Levente Diosady** (ChemE 6T6, MASc 6T8, PhD 7T2) believes these numbers can be reduced by creating an 'iron brew,' or in other words, developing iron-fortified tea leaves for consumption. His idea has been backed by a Grand Challenges Canada grant and has also garnered support from the U.K. government. He hopes to have the tea fully developed within the next five years.

Hatching Bright Ideas

Meet Skule's Next Innovators



Tiange Li (Neuroscience 2016) and Anastasiya Martyts (EngSci 1T6) stand among the effects of Modly, the lighting system they developed at The Entrepreneurship Hatchery. This particular effect is created by tracing the lights along a path during a long camera exposure.

Digital cameras, tablets and smartphones provide more options for creative photography than ever before, except when it comes to lighting. The built-in flashes give only single, fixed bursts of light, so hobbyist photographers who want something more — non-standard colours, creative lighting, dynamic effects for video — must purchase heavy, bulky professional flashes and strobes that can cost thousands of dollars.

That may soon change, thanks to two second-year students. **Anastasiya Martyts** (EngSci 1T6) and **Tiange Li** (Neuroscience 2016) have developed an affordable lighting system that can fit in your pocket. Modly — short for Modular Lighting — is a battery-powered panel of red, blue and green light-emitting diodes (LEDs) controlled by a mobile application and packaged in a slim plastic case that's just slightly bigger than the average smartphone.

Individual Modly units are also stackable, so creative shutterbugs who desire more than a basic setup can create lighting panels of any size or shape to suit their artistic needs and budget. "Modly is mainly for amateur photographers who want to experiment with this art, but it could be for niche professionals, too," says Li. He says Modly could be on the market as early as next year, retailing for about \$60 per unit.

U of T Engineering's Entrepreneurship Hatchery was the catalyst that helped Li and Martyts bring Modly to life. They first met in April 2013, when Li had the idea for a modular lighting system but lacked the technical know-how to pursue it. He asked one of his research supervisors to recommend a partner, and Martyts was up for the challenge. "Neither of us knew what we were doing," she admits, but once their project was accepted into the Hatchery's summer program, they went for it. It was a steep learning curve as they spent the summer studying electronics and hardware programming, researching the market and meeting weekly with mentors Anil

Bhole, an intellectual property lawyer, and **Amy Chong** (IndE 0T2), an MBA candidate at U of T's Rotman School of Management.

In September, the Modly team presented its product at the Hatchery's Demo Day and beat out eight other teams to win the inaugural \$20,000 Lacavera Prize. Telecommunications executive **Anthony Lacavera** (CompE 9T7) established the prize to encourage entrepreneurship among U of T students.

Bhole says the students made a thoroughly researched, well-prepared pitch at the competition. "The images the team shared really blew the audience away. Tiange and Anastasiya learned to work together and recognized each other's strengths early on, which was likely vital to their big win."

The team's market research found broad appeal for Modly. One executive from the national photography retail chain Henry's said, "After meeting with Tiange and Anastasiya, I feel confident in confirming our interest in their LED product. This is the sort of product we seek out in the market to offer our customers new and exciting approaches to their photography."

Now in its second year, the Hatchery boasts a team of experienced volunteer mentors and 48 student entrepreneurs. It will continue to grow in its new home within the Centre for Engineering Innovation & Entrepreneurship, which will include collaborative design space and prototyping facilities. Hatchery executive director **Joseph Orozco** says, "The Hatchery gives young talent the support and skills to lead them not only to a degree, but to a job they've created themselves." ■

Learn more at hatchery.engineering.utoronto.ca.



Anthony Lacavera (CompE 9T7) presented the first-ever Lacavera Prize to the Modly team at the Hatchery's Demo Day.

OTHER GREAT IDEAS THAT EMERGED from the Hatchery this year received the Orozco Prize, named after the Hatchery's executive director, **Joseph Orozco** and sponsored by ECE Professors **Jonathan Rose** (EngSci 8T0, ElecE MAsc 8T2, PhD 8T6) and **Vaughn Betz** (CompE PhD 9T8).

Drones for Cost-effective Aerial Cinematography

AirExposure founders **Denis Loboda** (MechE 1T3), **Neil Sharma** (MechE 1T3) and **Peter Izraelski** (Geography and Communication, Culture & Information Technology 2014) developed an unmanned aerial vehicle that captures high-quality footage for the TV and film industries.

Video Conferencing for Therapists and Patients

Jane Guo (EngSci 1T2) and **Benjamin Slater** (EngSci 1T3) created Sonar, an easy-to-use, online video conferencing service that puts mental health practitioners in touch with those in need of counselling services.

Social Rewards Platform for Retailers

Satyam Merja (EngSci 1T5) teamed up with **Michael Zhang** (Pharmacy 2014) to create DealsHype, a loyalty platform that rewards customers for interacting with brands on social media.

Building Skilled Engineers and Strong Leaders



Meet Skule's
Next Innovators

PICTURED ILead researchers Drs. **Cindy Rottmann** and **Robin Sacks** bring expertise in educational leadership, psychology and human development to the Engineering Leadership Program, led by Professor **Doug Reeve** (ChemE). Their work is helping U of T Engineering define the leadership training required to prepare the next generation of engineers for successful, high-impact careers.

As technology becomes ever more pervasive and sophisticated, engineers are being called to leadership positions like never before.

Modern engineers must know not only how things work, but also how people work. They require self-awareness, conflict resolution abilities, active listening skills and other leadership qualities — qualities not traditionally emphasized in an engineering curriculum.

A groundbreaking initiative at U of T Engineering has changed that tradition. With direction from Chemical Engineering Professor **Doug Reeve** (ChemE MSc 6T9, PhD 7T1), the Institute for Leadership Education in Engineering (ILead) is helping to produce great engineers who are also great leaders.

Throughout his career as an entrepreneur, educator and mentor, Professor Reeve has championed the idea that leadership skills are fundamental to the success of an engineer. “Whether you are CEO, or are at the bottom rung of a company, you have a responsibility to conduct yourself as a leader,” he says. “Leadership development for engineers is critical to entrepreneurship and to innovation.”

The seeds of ILead were sown more than a decade ago, when Professor Reeve established a summer program that taught ‘success skills’ to about 30 students. Over the years, this initiative expanded organically into a year-round, Faculty-wide collection of courses and educational activities. In 2010, it was formalized as an institute that provides training to hundreds of students each year.

Professor Reeve is now looking forward to finding a physical home for ILead within the new Centre for Engineering Innovation & Entrepreneurship. There, ILead will continue the Engineering Leadership Project (ELP), an interdisciplinary research initiative that aims to better understand key leadership qualities within the engineering profession.

Professor Reeve’s ELP collaborators include ILead researchers Drs. **Robin Sacks** and **Cindy Rottmann**, neither of whom come from an engineering background. “Robin and Cindy are social scientists,” Professor Reeve says. “They have scholarly backgrounds in leadership. They bring wonderful capabilities in creating a theoretical framework for the research.”

The team used rigorous social science methodology to collect data through focus groups and interviews, analyze hundreds of pages of transcripts, theorize engineering leadership and present findings to professional and academic audiences. Most recently, they have used findings from the first phase of their study to generate a theoretically informed survey.

Professor Reeve is particularly enthusiastic about the survey, which will be released to companies in 2014. The researchers hope it will provide a new, deeper understanding of the roles engineers play in the workplace. Four industry partners have jumped on board to date, providing both financial and organizational support: Google Canada, Vale, Hatch Ltd. and ERCO Worldwide.

“It will provide extremely valuable information about engineering leadership,” says Professor Reeve. “We think it will aid companies in recruitment, professional development and retention.”

It will also help ILead instructors create an evidence-based curriculum to ensure they are providing what engineering students truly need to succeed as leaders. Professor Reeve acknowledges that such skills don’t always come naturally to engineering students, but he says that makes the lessons all the more rewarding. “It’s really wonderful to watch the lights go on,” he says, “and to see how much students are gratified to find out how they can make meaning in their work.” ■

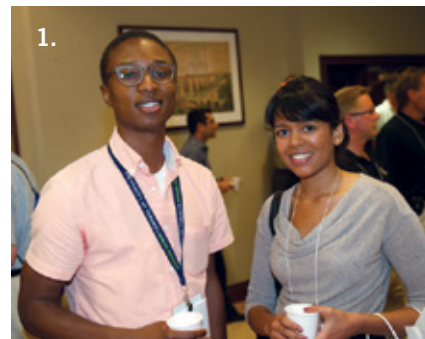
Learn more at ilead.engineering.utoronto.ca.

Events

Spring Reunion

June 1, 2013

Honoured years: 3T8, 4T3, 4T8, 5T3, 5T8, 6T3, 6T8, 7T3, 7T8, 8T3, 8T8, 9T3, 9T8, 0T3 and 0T8.



1. **Yoan Kagoma** (MechE 0T8) and **Varuna Prakash** (MSE 0T8, BME MHSc 1T0).

2. The Lady Godiva Memorial Band [sic] makes an appearance.

3. Father and son **William Chackeris** (ElecE 5T3) and **Peter Chackeris** (CivE 8T3).

4. Current members of the Skule Cannon Guard with past members **Donald Studney** (ElecE 6T3) and **Zissis Haritos** (ElecE 6T3).



CATCH UP WITH YOUR CLASSMATES

We're reinstating the 'class notes' section in the next issue of *Skulematters*. Please keep us updated on developments in your life — career news, marriages, births and more.

Send news and photos to skulealumninews@ecf.utoronto.ca throughout the year.

Entries are already rolling in. View them online at alumni.engineering.utoronto.ca/classnotes.

Visit alumni.engineering.utoronto.ca to learn about upcoming alumni events and opportunities.

BizSkule

June 11, 2013

Big League Sports, Entertainment & Media



5. Moderator **Paul Godfrey** (ChemE 6T2), President and CEO, Postmedia Network; Former President and CEO, Toronto Blue Jays.

6. Panelists **Marc Boyman** (IndE 7T1) President, Boyman Productions Inc., Progress Developments Ltd. & Reveille Inc.; **Nick Di Donato** (IndE 8T1) President and CEO, Liberty Entertainment Group; and **Steve Mirkopoulos** (EngSci 7T4) President and co-founder, Cinespace Film Studio.



7. **Frank Protomanni** (CivE 8T2) and Philip Protomanni.

8. **Julie Hommik** (MechE 1T0 + PEY) and **Chris Siemienuch** (MechE 1T0 + PEY)



9. **Sam Sebastian** (CompE 9T7), **Antonio Cancellieri** (CivE 0T4), Kevin Hanna and **Sophia Hanna** (ElecE 9T7).

Awards & Honours

SELECTED ALUMNI AWARDS

Congratulations to the following Skule alumni for their accomplishments in 2012–2013.

American Helicopter Association

Igor I. Sikorsky Human-Powered Helicopter Prize
Todd Reichert (EngSci 0T5, AeroE PhD 1T1) and
Cameron Robertson (EngSci 0T8, AeroE MAsc 0T9)

Canadian Academy of Engineering

Fellow
Bill Buckley (MechE 7T1)
Tongwen Chen (ElecE MAsc 8T9, PhD 9T1)
Thomas Darcie (AeroE MAsc 7T9, PhD 8T3)
Savvas Hatzikiriakos (ChemE MAsc 8T8)
Suong Van Hoa (MechE MAsc 7T3, PhD 7T6)
Chris Twigge-Molecey (MechE MAsc 6T9, PhD 7T2)
James Wilcox (MechE 5T9)

City of Toronto

International Student Excellence Award: Entrepreneurship
Hargun Suri (CompE 1T3)

Engineers Canada

Award of Journalism Excellence
Tyler Irving (ChemE MAsc 1T0)

Ernst & Young

Entrepreneur of the Year Ontario — Emerging Entrepreneur
Somen Mondal (CompE 0T2)

Government of Canada

Order of Canada
Anne Sado (IndE 7T7, Honourary Doctorate 1T1)

Professional Engineers of Ontario and Ontario Society of Professional Engineers

Young Engineer Medal
Terence Michael Branch (CompE 0T3)

Entrepreneurship Medal

Carlos de Oliveira (CivE MAsc 0T6)

TIME Magazine

100 Most Influential People in the World
Donald R. Sadoway
(EngSci 7T2, MSE MAsc 7T3, MSE PhD 7T7,
Honourary Doctorate 1T3)



Learn about the science behind the Sikorsky Prize win on page 31



Anne Sado is also a member of U of T Engineering's Hall of Distinction.



Donald R. Sadoway was recognized with an honorary doctorate from U of T Engineering at 2013 Spring Convocation.

SELECTED FACULTY AWARDS

American Association for the Advancement of Science Fellow

Alberto Leon-Garcia (ECE)
Andreas Mandelis (MIE)
Doug Perovic (MSE)

Canadian Aeronautics and Space Institute

McCurdy Award
David Zingg (UTIAS)

Canadian Association of Physicists National Optics Institute

Medal for Outstanding Achievement in Applied Photonics
Andreas Mandelis (MIE)

Canadian Academy of Health Sciences Fellow

Molly Shoichet (ChemE, IBBME)

Canadian Science and Engineering Hall of Fame

Ursula Franklin (MSE)

Canadian Society for Mechanical Engineering

Robert W. Angus Medal
Javad Mostaghimi (MIE)

Engineering Institute of Canada

K.Y. Lo Medal
Chul Park (MIE)

Engineers Canada

Young Engineer Achievement Medal
Goldie Nejat (MIE)

Humboldt Foundation

Alexander von Humboldt Research Award
Andreas Mandelis (MIE)

Institute of Physics (U.K.) Fellow

Harry Ruda (MSE)

International Academy of Food Science and Technology Fellow

Levente Diosady (ChemE)

International Congress on Durability of Concrete

V.M. Malhotra Award
Doug Hooton (CivE)

MIT Technology Review

Top 35 Innovators Under 35
Joyce Poon (ECE)

Natural Sciences and Engineering Research Council

Steacie Prize
Edward (Ted) H. Sargent

Steacie Fellow

Yu Sun (MIE)
Warren Chan (IBBME)

Synergy Award for Innovation

J. Paul Santerre (IBBME)

New Jersey Center for Biomaterials

Biomaterials Achievement Award
Michael Sefton (ChemE, IBBME)

Royal Society of Canada

Fellow
Elizabeth Edwards (ChemE)
Frank Kschischang (ECE)
Jonathan Rose (ECE)

Society of Industrial Microbiology and Biotechnology

Young Investigator Award
Radhakrishnan Mahadevan (ChemE)

Sir John Kennedy Medal

Andrew Goldenberg (MIE)

Women of Influence Magazine

Canada's 25 Most Influential Women
Cristina Amon (MIE)

SELECTED GRADUATE STUDENT AWARDS

AUTO21 Poster Competition First Place

Aaron Guan (MIE) and
Reza Rizvi (MIE)

Banting Postdoctoral Fellowships

Jin Young Kim (ECE)
Benoit Lessard (ChemE)

Claudette MacKay-Lassonde Scholarship

Beverly Bradley (ChemE)

IEEE Photovoltaic Specialists Conference

Best Poster Award
Kitty Kumar (MSE)

Vanier Canada Graduate Scholarships

Mathew Carias (IBBME)
Rhea Liem (UTIAS)
Matthew Ooms (MIE)
Nika Shakiba (IBBME)
Kim Tsoi (IBBME)

SELECTED UNDERGRADUATE AWARDS

Electro-Federation Canada Scholarship

Muhammad Kazim Ali (CompE 1T3)
Alison Ma (ElecE 1T5)

Trinity College Dublin

Undergraduate Award in Engineering & Mechanical Sciences
Sami Khan (ChemE 1T1 + PEY)

Wharton Undergraduate Consulting Competition

Second Place
Tarek El Fedawy (IndE 1T3 + PEY),
Huda Idrees (IndE 1T2 + PEY),
Kazem Kutob (IndE 1T3) and
Layan Kutob (IndE 1T2 + PEY)

2013 Engineering Alumni Association Awards

Engineering Alumni Hall of Distinction Award

The Engineering Alumni Association (EAA) is proud to present this assembly of extraordinary alumni selected by their peers for their lifelong accomplishments. Commemorated in a display in the Sandford Fleming Building, Hall of Distinction members are a familiar daily presence in the lives of students and serve as examples to future generations of U of T engineers.



Anne Dunets Wills
(CivE 7T6)

Dunets Wills applies her civil engineering skills to areas of great need across the globe. As a senior manager with planningAlliance and as a volunteer, she has worked on projects throughout Canada and in several African countries. She has also lent her expertise to engineering students at the Faculty's Gull Lake Survey Camp.



Anthony Lacavera
(CompE 9T7)

Lacavera and several fellow alumni saw the potential of the newly deregulated telecommunications industry and created Globalive Communications in 1998. Its services quickly expanded to include the wireless service now known as Wind Mobile. He continues to invest in technology and telecom ventures and also established a foundation that helps charities optimize their fundraising efforts.



Lee Lau
(ElecE 7T7)

As a co-founder of ATI Technologies Inc., Lau was instrumental in bringing the company to new levels of success in the area of special-purpose microelectronic chips. Since selling the company, Lau has become a strong proponent of entrepreneurship, as both an investor and a supporter of initiatives like The Entrepreneurship Hatchery at U of T Engineering.



Donald R. Sadoway
(EngSci 7T2, MSE
MAsc 7T3, MSE
PhD 7T7, Honorary
Doctorate 1T3)

Named one of the *100 Most Influential People in the World* in 2012 by *TIME Magazine*, Professor Sadoway is a leading researcher in the area of materials engineering for energy-storage technologies. His illustrious career includes 35 years as a brilliant educator at MIT and an innovative researcher.



David Wilkinson
(EngSci 7T2)

Dr. Wilkinson has made prolific research contributions in materials engineering, particularly ceramics and metallurgy, while building an impressive career in academic leadership at McMaster University. As Dean of Engineering since 2008 and current Provost and Vice-President (Academic), he has positively influenced many young engineers through his teaching, work and example.

Engineering Alumni Medal

As the Engineering Alumni Association's highest honour, this award recognizes outstanding achievement, superior accomplishments and flair and excellence in response to challenges.



Paul Cadario
(CivE 7T3,
Honourary
Doctorate 1T3)

Dr. Cadario's 37-year career with the World Bank had a profound impact on international development. This Rhodes Scholar currently holds many leadership roles across U of T, including serving on the Dean's Advisory Board and the Faculty's Boundless Campaign Executive. This is Dr. Cadario's fourth award of distinction from the EAA.



Claire M.C. Kennedy
(ChemE 8T9)

A leading Canadian tax lawyer, Kennedy has been a thoughtful, dedicated and effective champion for her alma mater. Among her many achievements, she founded BizSkule, served as president of the EAA and chaired ChemE's Advisory Board. In 2012, Kennedy was appointed director of the Bank of Canada.



Samantha Espley
(MinE 8T8)

Espley has published and presented more than 60 papers, reports and publications since graduation. She is a founding member of Women in Science and Engineering (WISE) and has also served on boards and held leadership roles with many organizations including PEO. She currently serves as General Manager at Vale.



Terence Michael Branch
(CompE 0T3)

In less than 10 years, Branch has turned Inovex, a company he co-founded, from a home-based operation to a vibrant business that develops software applications for the healthcare, energy and environmental sectors. He stays connected to U of T through the EAA, serving as a member since 2007 and president from 2011 to 2013.



Ryan Alafriz
(IndE 1T2 + PEY)

Alafriz found many ways to satisfy his enthusiasm for music as a director and performer while at U of T. He co-directed the Skule Jazz Combo, directed the Skule Stage Band Blue Combo and served as musical director of Skule Nite 1T2, all while earning grades that put him on the Dean's List for four terms.



Thineshan Kathirchelvan
(EngSci 1T2 + PEY)

As a result of his research in shape optimization through a PEY internship, Kathirchelvan was invited to present at the International Symposium on Room Acoustics (ISRA) 2013. He won Best Student Paper and will receive the Ernest Walton Medal from the President of Ireland in recognition of his undergraduate dissertation, which won the Undergraduate Award for Engineering.

The growing successes of Skule are due in no small part to the generosity of our alumni and friends around the world. We offer deep thanks to all those who contribute.

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The following donors have made new gifts and pledges to the Faculty of \$25,000 or more between May 1, 2012 and April 30, 2013.

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LEGACY GIFTS

Planned gifts fund the work of our students, scholars and researchers through will bequests, insurance gifts, trust agreements and charitable annuities.

King's College Heritage Society

The King's College Circle Heritage Society recognizes and honours alumni and friends who have thoughtfully made a provision for the University. As of April 30, 2013, the following individuals have remembered the Faculty of Applied Science & Engineering in their estate plans.

Adeniyi Akanni	Pierre Lassonde
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Annual fund gifts from alumni, parents and friends are at the heart of philanthropy at U of T Engineering. These gifts — whether unrestricted or designated to a department, program or initiative — provide the Faculty with a base of support upon which it builds.

Skule Society Donors

The Faculty of Applied Science & Engineering is grateful to the following members of the Skule Society for their generous and ongoing support. Their annual gifts of \$1,000 to \$24,999 (or of \$250 and above for current students and young alumni of the last decade) provide an enhanced student experience, contribute to Faculty excellence and improve our labs and classrooms. Donors listed below have made leadership gifts or pledges to the Faculty between May 1, 2012 and April 30, 2013.

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"It's exciting that many of our newest initiatives, including the Centre for Global Engineering, will be located together, so that faculty and students can learn from what's going on down the hall or across the atrium. Great universities are where new ideas rub shoulders."

Paul Cadario (CivE 7T3, Honourary Doctorate 1T3)
University of Toronto Distinguished Senior Fellow in Global Innovation
Former Senior Manager, World Bank

Dean Cristina Amon presented Dr. Cadario with an honorary doctorate at Spring Convocation. He also received the Engineering Alumni Medal from the Engineering Alumni Association this year. See his bio on page 16.

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The Faculty of Applied Science & Engineering is grateful for the support and counsel of dedicated volunteers. These leaders give generously of their time and remarkable expertise to enhance advancement activities across the Faculty, including alumni relations and development. We thank them for their time and service.

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"My engineering degree has been the foundation of my career. Contributing to the Faculty through the Boundless Campaign and volunteering through the EAA board are the most meaningful ways I can give back to ensure future generations of engineering students experience an equally rewarding education."

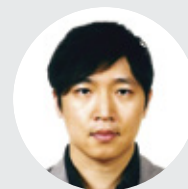
Teo Dechev (MinE 9T6)
CEO & President, Director,
Mundoro Capital Inc.

Pictured here during a recent visit to a copper and gold mine in Bor, Serbia.

Meet the leaders of our Asia-Pacific fundraising efforts in support of the Centre for Engineering Innovation & Entrepreneurship.



Hong Kong
John Lo
(ChemE 9T1 + PEY)



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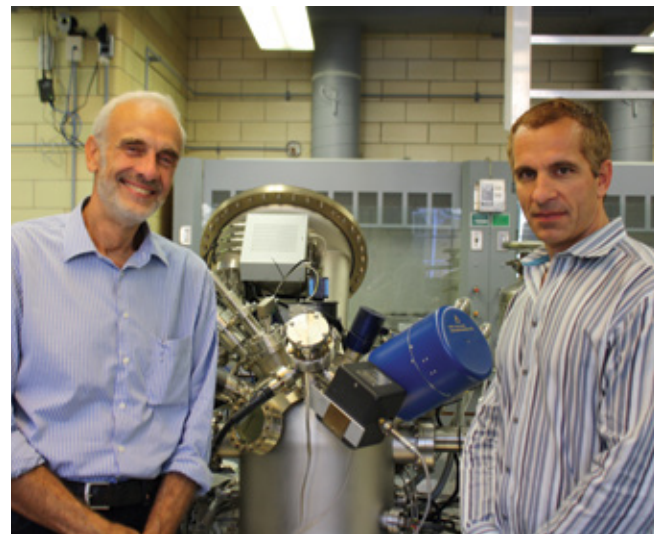
Not Pictured:
Indonesia
Aris Utama
(IndE 0T2)

Department of Chemical Engineering & Applied Chemistry

THE POWER OF COLLABORATION

When the talents, skills, expertise and knowledge of many are combined, the output is often more impressive than an individual effort. This is certainly the case within the Department of Chemical Engineering & Applied Chemistry.

For example, Professors **Charles Mims** (ChemE) and **Doug Perovic** (MMS 8T6, MSc 8T8, PhD 9T0) have teamed up to lead the Ontario Centre for Characterization of Advanced Materials (OCCAM). The centre is exploring new materials with positive qualities related to health, energy and environmental applications with the goal of stimulating Canada's economic competitiveness.



Professors **Charles Mims** (ChemE) and **Doug Perovic** (MMS 8T6, MSc 8T8, PhD 9T0).

Also looking to the strength of partnerships is Professor **Greg Evans** (ChemE 8T2, MSc 8T4, PhD 8T9) who runs the Southern Ontario Centre for Atmospheric Aerosol Research. He is working closely with Dr. **Krystal Godri Pollitt** (ChemE 0T5, MSc 0T8) and the Dalla Lana School of Public Health to launch an exposomic research program. Many chronic diseases are believed to stem from a combination of an individual's genome and exposome, the measurement of their cumulative environmental exposure. The exposomic research program will help to position U of T as a leader in this emerging field.

In another intersection of engineering and health, Professors **Milica Radisic** (ChemE, IBBME) and **Axel Guenther** (MIE, IBBME) have been gaining recognition for their work on a 3-D skin printer. Last fall, their team created a technology that produces human skin quickly and efficiently. They hope to do the same with organs one day. This achievement was made possible through collaboration with MaRS Innovation and Sunnybrook Hospital's Health Sciences Centre in Toronto.

Collaborative forces lead to innovation. Last year, Professors **Yu-Ling Cheng** (ChemE), **Mark Kortschot** (EngSci 8T4, ChemE MASc 8T5), **Elizabeth Edwards** (ChemE), **Yuri Lawryshyn** (MechE 8T9, MASc 9T3, ChemE PhD 9T7) and **Levente Diosady** (ChemE 6T6, MASc 6T8, PhD 7T2) received a major grant from the Bill & Melinda Gates Foundation for their continuing work on designing a waterless, hygienic toilet that is safe and affordable.

PULP & PAPER CENTRE CELEBRATES 25 YEARS OF INDUSTRIAL PARTNERSHIPS

Professor **Honghi Tran** (ChemE PhD 8T2), the Centre's director, has received a \$1.86-million NSERC Collaborative Research Development Grant to fund a four-year research program that focuses on the impact of pulp and paper mill operations. Accompanying this grant was \$1.4 million cash and \$660,000 of in-kind support from ten industrial partners.

BIOZONE BRANCHES OUT

From its humble beginnings in 2010, BioZone is now home to nine principal investigators and includes 90 graduate students, post-doctoral fellows and research associates working together to provide viable solutions to urgent societal needs in energy, the environment and health. Its newly renovated and expanded space on the fourth floor of the Wallberg Building officially opened in December 2012. The diverse research at BioZone includes bioremediation, biofuels and life cycle and policy analysis.

Department of Civil Engineering

SMART LIGHTS

Think traffic in the world's major cities is bad and getting worse? Confused about the myriad of transit solutions debated in the media? You are not alone. People around the world are struggling with the challenge of moving people and freight more efficiently, safely and economically.

The Department of Civil Engineering is working on innovative technologies that will help do just that, and surprisingly, they could look like your average traffic light. Meet MARLIN, a Multiple-Agent System Reinforcement Learning Integrated Network: in other words, a traffic light that learns adaptively.

Developed by Professor **Baher Abdulhai**, Director of Toronto Intelligent Transportation Systems (ITS), MARLIN manages traffic congestion with artificial intelligence that adapts based on its experiences and the activity around it. Through feedback, MARLIN develops strategies for managing traffic flow. If congestion reduces due to its actions, then MARLIN knows it has done a good thing. If its decisions create an impasse, it knows not to use that tactic again.

MARLIN represents not just a singular traffic light, but rather a full network. By harnessing game theory concepts, the software allows traffic lights to communicate with one another and collectively ensure optimal and timely management of traffic conditions in order to avoid gridlock. On average, the system will reduce delay at intersections by 40 per cent, and in some areas, as much as 75 per cent. By alleviating congestion, MARLIN enhances automotive transportation while helping to reduce vehicle emissions by 30 per cent.

MARLIN is currently making the transition from U of T's ITS laboratory to the streets of the world. The software was recently licensed by PEEK, a U.S. traffic light manufacturer, and will soon be uploaded to the hardware on city streets, alleviating our congested traffic.



Professor **Baher Abdulhai** (CivE), Director of Toronto Intelligent Transportation Systems, is developing an adaptive stoplight that helps manage traffic congestion.

LASSONDE MINERAL ENGINEERING STUDENTS LAUNCH CIM STUDENT CHAPTER

Students in the Lassonde Mineral Engineering Program recently hosted an event to mark the creation of the University of Toronto Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Student Chapter. The CIM Student Chapter will further enhance the strong connections between U of T's Lassonde Mineral Engineering Program and industry thought leaders. It will also offer students more opportunity to network with industry professionals in both business and academic settings.

NEW MASTER OF ENGINEERING PROGRAM IN CITIES ENGINEERING AND MANAGEMENT

Cities are the economic engines of the world. With more than 50 per cent of the world's population now living in cities, the health and wealth of nations depend strongly on how well cities function. The world needs more professionals with technical expertise and a fundamental understanding of the complex and cross-disciplinary issues facing cities.

To respond to that need, the Department of Civil Engineering has created a new opportunity within the Master of Engineering Program: the Master of Engineering in Cities Engineering and Management (MEngCEM). Visit uoft.me/mengcem for details.

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

ECE ALUMNI LAUNCH WORLD'S FIRST WEARABLE AUTHENTICATION DEVICE

How many passwords and PINs do you keep locked in your mind every day? ECE graduates **Karl Martin** (ElecE BASc OT1, MASc OT3, PhD IT0) and **Foteini Agrafioti** (ElecE MASc OT9, PhD IT1) want you to forget them all, and still keep your data secure.

Martin and Agrafioti have been grabbing international headlines with the release of their product Nymi, the world's first wearable biometric authentication device. Nymi launched in September 2013 to much fanfare from *The New York Times*, *Popular Science*, *TechCrunch*, *CNET*, the U.K.'s *Daily Mail* and many others.

Martin and Agrafioti met as graduate students in ECE's Communications Group. Agrafioti was working on designing algorithms for identifying people based on their electrocardiograms (ECGs) — technology that's been incorporated into Nymi. Martin was working on security- and privacy-related technology. The two co-founded their company, Bionym, in 2011.

Nymi is a bracelet embedded with an ECG sensor that recognizes the unique and unchanging electronic signal of your heart. Once it has recognized you, Nymi communicates with all your registered devices to log you in, eliminating the need for passwords and PINs. It keeps you logged in until you remove the wristband.

To date, Bionym has received more than 5,000 pre-orders for Nymi, which begins shipping in early 2014. The company is growing — they now have 10 employees, all U of T graduates, and are looking to hire more engineers and computer scientists.

"We are really affiliated with U of T, even today," says Agrafioti. The team participated in the inaugural 2012–2013 cohort of U of T's Creative Destruction Lab, and received support from MaRS Discovery District. The Innovations and Partnerships Office helped them file for patents and decide whether to license or incorporate. "I think we met the right people that have helped us shape Bionym into what it is today," says Agrafioti.



Bionym founders **Karl Martin** (ElecE BASc OT1, MASc OT3, PhD IT0) and **Foteini Agrafioti** (ElecE MASc OT9, PhD IT1).

ALUMNI'S BUSINESS DATA INTEGRATION SYSTEMS FINDING BROAD APPEAL

Since launching CoursePeer in September 2012, brothers **Hadi Aladdin** (CompE 1T2) and **Marwan Aladdin** (CompE 1T1) have forged partnerships worldwide with corporations, academic institutions and federal governments. They've just moved into new headquarters in Mississauga, opened 11 international locations, and launched 24-7 support for their products in multiple languages. CoursePeer integrates data across disparate areas of large businesses — its innovative Learning and Knowledge Management System, Social Collaboration Intranet and Intelligent Decision-Making Collaborative Network let executives monitor the whole institution in an accessible way.

INVESTORS BACK PORTABLE BLOOD TESTING DEVICE

ChipCare Corporation, a start-up company co-founded by ECE's Professor **Stewart Aitchison** and PhD candidate **James Dou** secured one of the largest-ever angel investments in Canada's healthcare sector. This \$2-million investment will support ChipCare's continuing development and commercialization of its unique handheld blood analyzer over the next three years. "This technology has the potential to save and improve the lives of millions around the world by bringing state-of-the-art blood testing to patients, instead of asking the sick to travel to labs that are often difficult to reach," says Dou.

Division of Engineering Science

ENGINEERING SCIENCE PLANS ITS NINTH EDUCATION CONFERENCE

The ninth annual Engineering Science Education Conference (ESEC) is planned on January 17, 2014. It's the Division's most anticipated and significant gathering of researchers and professionals. The conference provides first- and second-year students with a better understanding of what lies ahead within EngSci and beyond graduation.

Comprised of upper-year students, this year's Executive Committee is enthusiastic about bringing some of the world's thought leaders to EngSci's doorstep. Led by **(Tom) Tongbin Wu** (EngSci 1T4 + PEY), ESEC's Executive Committee members are **Sharon Ravindran** (EngSci 1T5) and **Wendy Xiang** (EngSci 1T5).

"There are significant connections to make here," says Wu. When he attended ESEC in his first year, he met Professor **Jonathan How** (EngSci 8T7) from MIT's Department of Aeronautics and Astronautics. "I was intrigued by his research, and was awarded an internship at MIT in my second year. I want to give back by creating the same kinds of opportunities for other EngSci students."

Beyond making career-enhancing connections, the conference allows EngSci students the opportunity to learn more about their options for majors once they reach third year. "ESEC is the platform that brings EngSci's options to life," says Xiang.



Members of ESEC's Executive Committee. From left, **Sharon Ravindran** (EngSci 1T5), **Wendy Xiang** (EngSci 1T5) and **(Tom) Tongbin Wu** (EngSci 1T4 + PEY).

That was definitely the case for Ravindran, who attributes her selection of the Biomedical Engineering major to an inspiring ESEC lecture she attended by Professor Pamela Silver from Harvard Medical School.

Professors Silver and How are just two of many world-renowned speakers who make ESEC such an important event each year. And this year's presenters are no exception. Of the eight scheduled speakers, four are EngSci alumni and three are former TedX presenters. This year's speakers include:

- Dr. **Todd Reichert** (EngSci OT5, AeroE PhD 1T1) and **Cameron Robertson** (EngSci OT8, AeroE MASc OT9) who made aeronautical history by winning the coveted Igor I. Sikorsky Human-Powered Helicopter Prize in June 2013.
- **Ali Khademhosseini** (ChemE 9T9, MASc OT1), Associate Professor of Harvard Medical School and recipient of the Presidential Early Career Award for Scientists and Engineers.

ALUMNI AWARDS

Alumnus, entrepreneur and founder of NuMat Technologies **Chris Wilmer** (EngSci OT7) won the U.S. Department of Energy National Clean Energy Business Plan Competition. He was also named "top solver" by InnoCentive for his innovative solutions. Wilmer is a co-founder of The Earth Team, a think-tank that participates in global health innovation competitions. He recently became an assistant professor at the University of Pittsburgh.

Ben Ouyang (EngSci 1T3 + PEY) won the 2013 National Sunnybrook Prize competition for creating a novel drug delivery system. He is one of the researchers named on the patent application filed on the biomaterial research and was an author on the article recently published in the scientific journal *Advanced Materials*. Last August, Ouyang entered medical school at the University of Toronto in the MD/PhD program.

Institute of Biomaterials & Biomedical Engineering

MULTIDISCIPLINARY RESEARCH AND COLLABORATION LEAD TO GROUNDBREAKING TECHNOLOGY TRANSFER PIPELINES

The Institute of Biomaterials and Biomedical Engineering (IBBME) has long been a bastion for engineering ingenuity and entrepreneurial spirit. In the past decade of its 50-year history at the University of Toronto, IBBME faculty filed nearly 350 disclosures and patents. At last count there were 19 active companies operating among the Institute's faculty and students.

One of those companies is the brainchild of Professor Emeritus **Richard S. Cobbold** (ECE), cross-appointed faculty member Dr. Howard Ginsburg (Medicine) and third-year PhD student **Amir Manbachi** (EngSci OT8, BioMedE MSc 1T0). SpineSonics Medical, Inc. has received \$140,000 in start-up funds to ready its first product, the PedicProbe, for market. Consisting of a sensor on the end of a surgical drill kit, the probe uses ultrasound technology to give surgeons a clearer picture during delicate spine surgeries.

DIAGNOSING FUTURE NEEDS

Imagine microscopic substances designed to target and light up cancer or malaria DNA — and cell phone technology by which to read the results anywhere. This is the kind of forward-thinking technology dreamed up by Professor **Warren Chan**, whose company, Cytodiagnosics, has commenced licensing its diagnostic platform products for applications in medical devices for the developed and developing worlds.

Manbachi embodies the success of the program's emphasis on collaborative and multidisciplinary research — with a side dish of entrepreneurship. Students in the program draw one supervisor from the engineering discipline and one from health sciences, ensuring breadth of skills. MHS candidates, meanwhile, complete internships with private companies as well as health agencies such as the World Health Organization. These students are able to rapidly turn real-world, applied experience into market-ready healthcare products.

Biomedical engineering graduates are likewise active. **Michael May** (ChemE 9T1, PhD 9T8) is Chief Executive Officer at the Centre for the Commercialization of Regenerative Medicine, just one of IBBME's technology transfer partners that brings regenerative medicine technologies into the marketplace.

BROKEN HEARTS IN BUSINESS

xCellPure is the newly incorporated company from 'broken hearts' researcher Professor **Milica Radisic** and postdoctoral researcher **Dario Bogojevic**. The company will bring unique cell separation technology to the marketplace that will enable heart and tissue engineering researchers to overcome some of the major challenges related to the study of beating heart cells.



Amir Manbachi (EngSci OT8, BioMedE MSc 1T0) demonstrates a spinal surgery device he is developing with Professors **Richard S. Cobbold** (ECE) and Dr. Howard Ginsburg (Medicine).

But it was while a PhD candidate at IBBME that May founded his first company, Rimon Therapeutics Inc. with University Professor **Michael Sefton** (ChemE 7T1).

Marrying research across disciplines and lab benches, the Institute rivals the top biomedical engineering programs in the world as it strives to transform Toronto into the biomedical engineering hub of North America.

OPEN SOURCE ENTREPRENEURS

Kapplex, Inc., Associate Professor **Aaron Wheeler's** company, recently won a 'market readiness' award from the Ontario Centres of Excellence. But it's his PhD student, **Ryan Fobel**, who may just spark a microfluidics revolution with his invention, the DropBot. Fobel published the code for this digital research device in hopes that other researchers will create their own.

Department of Mechanical & Industrial Engineering

MIE GOES GLOBAL WITH GLOBEX

Seven MIE undergraduates were part of an international group of students taking part in courses this summer at the College of Engineering at Peking University (PKU) in Beijing, China. Joining them to teach MIE courses were Professor **Shaker A. Meguid** (MIE) and Adjunct Professor **Mike Munro** (MIE).

The Global Educational Exchange — Globex — is an initiative for educational exchange and research collaboration between PKU and foreign schools of engineering. The Department of Mechanical & Industrial Engineering is the first Canadian partner.

For undergraduate **Xiangyu Luo** (MechE 1T6), the program was a way to get a jump-start on courses for the next academic year, while visiting home.

"I've been studying overseas since 2008, and have always wanted to return to Beijing for study. Peking University is the 'dream school' in China, so enrolling in Globex was the perfect opportunity."

An accomplished researcher, Professor Meguid was the instructor of Luo's Mechanics of Solids course. The course's students traveled to PKU from universities in China, Hong Kong, Japan and Korea.

"As an academic, I see the benefits on two fronts," said Professor Meguid. "First, we are showcasing the quality of our Canadian engineering education to the rest of the world. Second, these learning opportunities abroad develop lifelong friendships and experiences that ultimately shape our world for years to come."

Further to the two courses offered by MIE, faculty from the University of Delaware, University of Pittsburgh and the Institute of Fluid Mechanics Toulouse, France, among others, were also teaching at PKU.

Increasing student and faculty participation, in addition to adding courses in Industrial Engineering, are goals of MIE's participation in Globex in 2014 and beyond.



MIE students and faculty members joined engineering students from across the globe for a summer exchange program at Peking University in Beijing, China.

ON THE ROAD TO SAFER DRIVERS

Driver error contributes to more than 90 per cent of vehicle crashes. Operator feedback systems may help drivers improve their behind-the-wheel habits and make our roads safer. Professor **Birsen Donmez** (MIE), in partnership with Toyota's Collaborative Safety Research Center, is investigating driver feedback systems. A newly acquired driving simulator facility enables the testing of drivers' reactions as well as cognitive and physiological responses to various situations in a controlled environment.

SPOTLIGHT ON INDUSTRY & RESEARCH

In addition to the weekly MIE Seminar Series featuring distinguished academics, the department launched two new speaker series. The Industry Spotlight brings alumni back to campus to share insights with fourth-year capstone design students. **Nick Di Donato** (IndE 8T1), president & CEO of Liberty Entertainment Group, and **Tom Halpenny** (MechE 7T8), principal and senior manager at H. H. Angus, kicked off the series. The first Research Spotlight featured Professor **Michael Carter** (MIE), who shared insights on healthcare engineering research. To learn more, contact alumni@mie.utoronto.ca or 416-978-5450. For details on Winter 2014 Spotlights, visit uoft.me/mie-events.

Department of Materials Science & Engineering

WALTER CURLOOK MATERIALS CHARACTERIZATION & PROCESSING LABORATORY OPENS

On September 5, 2013, the Walter Curlook Materials Characterization & Processing Laboratory was opened and unveiled to members of the Curlook family and the U of T Department of Materials Science & Engineering (MSE) community.

The lab, established with the support of a \$1-million gift from alumnus Dr. **Walter Curlook** (MMS 5T0, MAsc 5T1, PhD 5T3), enables advanced materials characterization techniques such as X-ray diffraction (XRD) and X-ray fluorescence (XRF).

Housed in the Wallberg Building, the lab is split into two facilities for characterization and processing. The new equipment will benefit materials engineering research and teaching innovation at both the undergraduate and graduate levels across the entire department.

“This department, my alma mater, was the top institution in the world for metallurgical engineering research and teaching under the leadership of then Chair, Professor Lloyd Pidgeon,” said Dr. Curlook. “It is my hope that this gift will give us a boost to meet modern challenges and continue to keep our whole department on par with the rest of the best.”

“The establishment of the Walter Curlook Materials Characterization & Processing Laboratory helps us solidify our strengths in process and extractive metallurgy, which are critical areas in the continuing development of Canada’s natural resources economy,” said Professor **Jun Nogami** (EngSci 8T0), Chair of the Department of Materials Science & Engineering. “Thank you, Walter, for helping us take a big step toward the next 100 years of materials innovation.”



Professor and MSE Chair **Jun Nogami** (EngSci 8T0), Dean **Cristina Amon** (MIE), Dr. **Walter Curlook** (MMS 5T0, MAsc 5T1, PhD 5T3) and Associate Professor **Mansoor Barati** (MSE) at the opening of the Walter Curlook Materials Characterization & Processing Laboratory.

ANNIVERSARY CELEBRATION

100 Years of Materials Innovation 1913–2013

On October 23 and 24, 2013, the Department of Materials Science & Engineering celebrated its centenary at the University of Toronto. Over 300 alumni, current students, faculty and staff gathered to celebrate this historic occasion.

This year’s Winegard Visiting Lectureship, held as part of the centennial events, featured Professor Michael F. Ashby of the University of Cambridge as the distinguished guest speaker. Professor Ashby gave two talks, one titled “What is Sustainable Technology? A Materials Perspective for Teaching Complexity in Engineering,” and a second public lecture titled “Why Should Engineering Students Care About Industrial Design?” Lectureship benefactor, the Honourable Dr. William C. Winegard (MMS 4T9, MAsc 5T0, PhD 5T2) provided the introduction at the public lecture.

A leadership panel titled “Nanotechnology... Revolution or Evolution?” was hosted by Professor **Doug Perovic** (MMS 8T6, MAsc 8T8, PhD 9T0) and brought together alumni at the top of their respective fields to discuss challenges and opportunities for the future of materials science and engineering in both academia and industry.

The two-day celebrations closed with a gala held at Hart House. For more highlights and photos, visit www.mse.utoronto.ca.

University of Toronto Institute for Aerospace Studies

THE SCIENCE BEHIND UTIAS GRADUATES’ \$250,000 SIKORSKY PRIZE WIN

“We decided to go after the Sikorsky Prize because it looked like an exciting engineering challenge that many regarded as impossible, and we wanted to show how, with innovation and creativity, any challenge can be tackled.” It was with this entrepreneurial spirit that Dr. **Todd Reichert** (EngSci 0T5, AeroE PhD 1T1) and **Cameron Robertson** (EngSci 0T8, AeroE MAsc 0T9) approached the design of their human-powered helicopter, Atlas, which won the elusive Sikorsky Prize.

Initiated in 1980 by the American Helicopter Society, the \$250,000 Sikorsky challenge was thought by many to be impossible. Many teams tried and failed over the years, but recently a team from the University of Maryland was getting close. Dr. Reichert and Robertson had a friendly but competitive relationship with the other team. “Their helicopter was a very exciting re-hash of a decades-old challenge and really got our creative juices going and encouraged a radical approach to problems.”

Reichert and Robertson built on a progression of research that began at UTIAS with their supervisor, Professor Emeritus **James DeLaurier**, designer of the first piloted ornithopter. DeLaurier explains, “Reichert built upon the unsteady vortex-lattice model by Tom Veitch and the nonlinear structural modeling by Cameron Robertson for

NEW HIRES

With the addition of Professors **Angela Schoellig** and **Jonathan Kelly** to the robotics group, UTIAS has become a world leader in vision-based navigation, learning, state estimation, sensor fusion, auto-calibration, multi-robot systems and field testing. It is one of the few departments in the world to focus its robotics efforts on aerospace applications, particularly planetary exploration.

NEW FACILITIES

Courtesy of the Canada Foundation for Innovation and the Ontario Research Fund, construction was completed on the \$10-million Microsatellite Science and Technology Centre, a state-of-the-art facility housing the Space Flight Lab, a world-leading developer of microsatellites. Construction has also begun on a \$5-million, world-class, high-pressure, high-temperature, blow-down combustion wind tunnel.

NEW CENTRE

UTIAS is leading the way in reducing the environmental footprint of aviation through the new Centre for Research in Sustainable Aviation. The Centre’s mandate is to conduct research toward new technologies that reduce noise and emissions and to educate a new generation of students with a unique breadth of expertise in sustainable aviation.



Todd Reichert (EngSci 0T5, AeroE PhD 1T1) during the historic flight.

the history-making [human-powered ornithopter] Snowbird flight. A helicopter rotor differs from an ornithopter wing, [but] the shape of the rotors, the twist of the blades and the structure that was just strong enough and light as can be all came about because of this high level of analytical refinement. These elements resulted in the stunning success of this aircraft.”

Dr. Reichert and Robertson explain further, “Atlas was designed and built on an incredibly fast timeline, with eight months from conceptual design to first flight. This was only possible given our multi-year development program on the Snowbird, and the research, background knowledge and experience that had been gained there.”

Back to Skule



Wondering if it's time to come back to Skule to further your career? Meet **Swati Shrivastava** (MSE OTS + PEY), a Special Process Quality Engineer at Messier-Bugatti-Dowty who is complementing her day job with a part-time Master of Engineering (MEng) degree in the Department of Materials Science & Engineering. She is tailoring her study with an emphasis on Entrepreneurship, Leadership, Innovation & Technology in Engineering (ELITE).

Swati chose to pursue an MEng after four years of working in the mining and aerospace industries to further her academic and technical expertise — something she felt would help her excel in her current job and advance her career overall. While a career advantage played a big part in her decision to go back to school, Swati admits she also returned because of her passion for learning. “I’ve always loved school — from lectures and taking notes to making new friends,” she says. “And U of T Engineering has a very distinct and positive environment. It’s nice re-living those good-old school days as a graduate student.”

Through her more technically focused courses, Swati is building upon her MSE undergraduate foundations in a way that links directly to her industry experience. She is also taking a wide range of entrepreneurship and leadership courses through the ELITE certificate. Courses like Project Management, Operations Research and New Product Innovation are giving her the tools to upgrade her business and managerial skills. “It’s a highly effective program that allows me to combine technical, management and business-related courses, giving me a broader perspective.” She adds, “I find myself referencing my lecture notes constantly.”

Juggling a full-time job with part-time study has been a challenge for Swati. “It takes a lot of dedication and determination, not to mention time management. But at the end of the day, this program is helping me learn and participate more efficiently in the technical, managerial and high-level dealings in my work environment.”

You can achieve your MEng in one, two or three years and tailor your study with specialized certificates. They include entrepreneurship and leadership, global engineering, energy studies, financial engineering, healthcare engineering, sustainable aviation and advanced water technologies. Or consider our new groundbreaking Master of Engineering in Cities Engineering & Management (MEngCEM), which includes an integrative practicum.

In addition to the MEng, we offer MAsc, MHSc and PhD programs. Learn more at: gradstudies.engineering.utoronto.ca.

Stay Connected

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Keep up with fellow Skule graduates from your area through our regional LinkedIn sub-groups. Learn more and join groups at alumni.engineering.utoronto.ca/stayconnected, and send us a LinkedIn message to suggest a new group.

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UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

Office of Advancement
Faculty of Applied Science & Engineering
University of Toronto
Galbraith Building
35 St. George Street, Room 116
Toronto, Ontario M5S 1A4 Canada

Tel: +1 416-978-0380
Fax: +1 416-946-3450
engineering.advancement@utoronto.ca
www.alumni.engineering.utoronto.ca
www.engineering.utoronto.ca