

The Civilian

One Department, Two Great Programs: Civil and Mineral Engineering / Issue 20 / December 2015

**Rebuilding
Engineering at U of T**
*About the Centre for
Engineering Innovation and
Entrepreneurship*

Alumni Volunteerism
*Civ/Min/Geo Alumni talk
about giving their time to
the Department*



The Civilian

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Cover Photo: Image of Civil Engineering Lab Technicians, Momo Sun and John MacDonad in front of the future site of the Centre for Engineering Innovation and Entrepreneurship

17 Class Notes 6T5



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Engineers work in groups as well as alone. Social interactions are critical to success, as most good ideas grow out of discussions with colleagues.

—MIT iCampus

Chair Chat



For the past several months, right outside my window at the intersection of St. George St. and Galbraith Road, there has been a constant hum of activity. In June, the Faculty broke ground for the newest Engineering building on campus. Unlike many other engineering buildings that tend to cater to one or two specific departments, the building being constructed is for everyone in the U of T engineering community. This issue features a series of articles that explore the Centre for Engineering Innovation and Entrepreneurship from a few different perspectives and other changes happening to the structures and infrastructure on campus.

Turning attention to current events, Prof. Amer Shalaby, an expert in crowd management, was called upon by national and international media to shed light on what occurred on September 24, 2015, in Mecca, Saudi Arabia. Between 700 and 2,000 lives were lost and many more people were injured where two streets merged and there were suddenly too many people occupying a small space.

The Faculty's 2015 *Skulematters* theme of 'women in engineering' continues to resonate as we welcome Prof. Lesley Warren, the second female professor to join the Department in the past year. Prof. Warren will hold the Claudette MacKay-Lassonde Chair in Mineral Engineering. The Department of Civil Engineering is proud that a quarter of our faculty members are women and that the number of women undergraduates has been increasing.

We're also sharing with you some updates from our last issue, particularly on how two PhD students placed at the Toronto 2015 PanAm Games, as well as the results from the largest experiment ever conducted on shear resistance. I am excited to report that a team of Lassonde Mineral Engineering students placed first in the recent World Mining Competition!

We also acknowledge the incredible contributions of some of our alumni to the Department and celebrate some recent alumni award winners. We feel that we don't hear from our alumni often enough, so we are launching a new section of the magazine entitled 'Class Notes', where we will publish and share the stories and photos that you send to us. As our inaugural Class Notes, we profiled the Class of 6T5 Souvenir Album that was produced on the occasion of their 50-year reunion.

I invite you to attend the talks by world-renowned scholars from around the globe in our new Civil Engineering Distinguished Lecture Series and the Lassonde Institute of Mining's Leaders in Mining Series Speakers Series.

I hope to see many of you at the CIV/MIN/GEO reception on February 5, 2016.

Season's greetings and happy 2016!

Brent Sleep
Professor & Chair
Department of Civil Engineering

4 WAYS FOR ALUMNI TO GIVE BACK TO THE DEPARTMENT

CONTACT CHAIR.CIVIL@UTORONTO.CA FOR SPECIFIC DETAILS

Volunteer

Opportunities include mentorship, guest speaking and the Chair's Advisory Board.



Job Opportunities

Help us to identify job opportunities in your organization for new graduates.



Relationships

We are always looking to grow our industry network to help us ensure our research is relevant.



Donate

Support through financial or gift-in-kind donations help us to meet our funding needs.



From the Editor

When I was younger, my dad, a civil engineer, always joked that my sister or I would end up marrying an engineer. He gave up on that many years ago, but I couldn't help but hear the pride in his voice when I told him that I would be joining the Department of Civil Engineering as Communications Coordinator.

Since I began in August 2015, it has been a challenging and rewarding experience to familiarize myself with the names and stories that help to define the character of the Department. The passion, intelligence and sincerity have been evident to me as I have met colleagues and interviewed faculty. The support I have received in adjusting to this role has been phenomenal and I only hope that this issue of *The Civilian* does justice to all members of the community.

This is my first issue of *The Civilian* and I know I have much to learn. I welcome all of your comments and feedback and I look forward to planning the next issue.

Keenan Marie Dixon

Addendum: Shortly before going to print, Sasha Gollish (written about on page 16 of this issue) was named one of eight Academic All-Canadians by the Canadian Interuniversity Sports Organization. Congratulations, Sasha!
FOR THE FULL STORY SEE, CIVIL.ENGINEERING.UTORONTO.CA/NEWS

SEND YOUR LETTERS TO
CIV.COMMUNICATIONS@UTORONTO.CA
LETTERS MAY BE EDITED FOR CLARITY AND LENGTH.

Awards



World Mining Competition

FIRST PLACE

Matthew Hart (Year 3 MinE)
Daryl Li (Year 4 MinE)
Seung Young Baek (Year 4 MinE)
Peter Miszkiel (Year 4 MinE)

The multidisciplinary World Mining Competition challenges teams—composed of business, engineering and geology students—to solve a strategy case centring on issues facing the international mining industry. U of T's team placed first among 13 teams and 11 schools from Canada, Germany, India and the United Kingdom.

Canadian Academy of Engineering

HONORARY FELLOW

Norbert Morgenstern (CivE 5T6)

Morgenstern has led a distinguished career in Geotechnical engineering. A distinguished professor emeritus at the University of Alberta, he is a member of the Order of Canada and won the Killam Prize in Engineering in 2001. He also received the EAA Engineering Alumni Medal in 1995.

Ontario Professional Engineers Awards

MANAGEMENT MEDAL

Michael Butt (CivE 6T3)

Butt has committed over 50 years to the construction engineering industry. He founded Buttcon Limited in 1979. He is a fellow of the Canadian Society for Civil Engineering and the Canadian Design Build Institute. Butt was inducted into the Engineering Hall of Distinction in 2011.

Engineering Alumni Association (EAA) Awards

FIND OUT MORE ABOUT THE EAA AWARDS AND ALUMNI SERVICES AT ALUMNI.ENGINEERING.UTORONTO.CA

Engineering Alumni Hall of Distinction Award

ALUMNI SELECTED BY THEIR PEERS FOR LIFELONG ACHIEVEMENT

Emil Frind (CivE 6T6, MASc 6T7, PhD 7T1)

Frind's background in engineering and his interest in water resources put him on the leading edge of quantitative groundwater science. Frind collaborated with the Regional Municipality of Waterloo to develop a plan for the sustainable use of local groundwater as a drinkable water source. Frind remains active as a distinguished professor emeritus at the University of Waterloo.



Malcolm F. McGrath Alumni Achievement Award

RECOGNIZING CONTRIBUTIONS TO THE FACULTY OR UNIVERSITY

Christopher Hinde (CivE 5T0, MASc 5T3)

Hinde has been an active member of the 5T0 Engineering Alumni Committee for more than 60 years. Hinde co-chaired the Ajax Remembered Campaign, raising \$400,000 for Ajax House. He later assisted in the creation of the 5T0 Leadership Award and actively participates in monthly Skule™ Lunch & Learn speaker series.



2T5 Mid-Career Achievement Award

ATTAINED INDUSTRY RESPECT WITHIN 25 YEARS OF GRADUATION

Suneet Singh Tuli (CivE 9T0)

Tuli is the co-founder and CEO of DataWind Inc., a leader in low-cost internet connectivity for emerging markets. With 25 years of experience as an entrepreneur, DataWind's TSX listing is the third IPO of Tuli's career. DataWind was recognized by the *MIT Technology Review* as one of the world's 50 smartest companies of 2013.



L.E. (Ted) Jones Award of Distinction

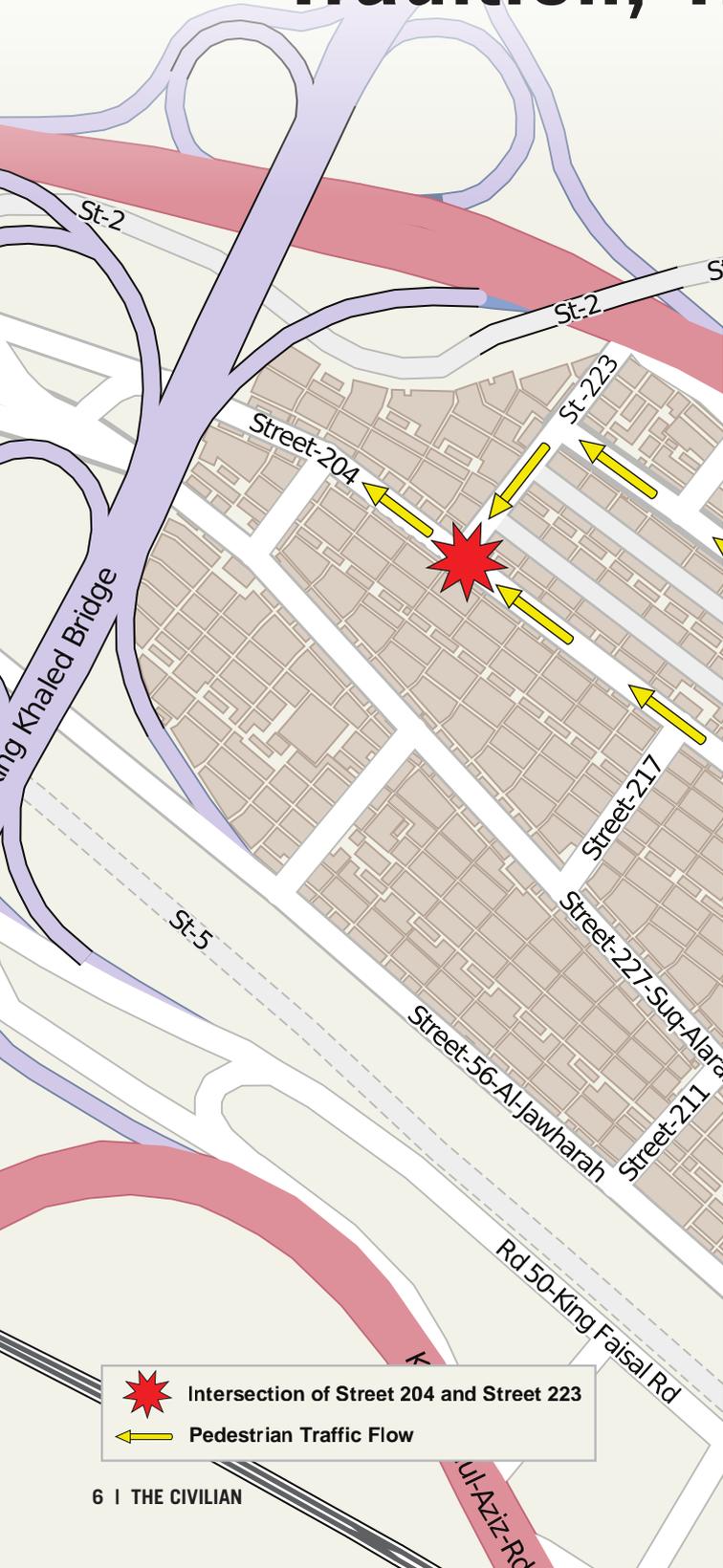
HONOURS STUDENTS WITH LOVE FOR THE ARTS AND MUSIC

Haruna Monri (CivE 1T4 + PEY)

Monri was a member of the Skule™ Orchestra in her first year, and later became first violinist in other campus ensembles. She brought music to the wider U of T community by performing with the Appassionata Music Group at charity events and at Faculty functions. Monri was also deeply involved with various school clubs and associations, and earned Dean's List recognition throughout her degree.



Tradition, Transit & Tragedy



 Intersection of Street 204 and Street 223
 Pedestrian Traffic Flow

Beyond the streets of Mecca, Saudi Arabia, lie the Islamic holy sites of Mina, Jamarat, Arafat and Muzdalifa. These sites are the destinations on an annual pilgrimage, called the Hajj, which all able Muslims are called to complete once in their life.

The sites and surrounding areas remain unused for much of the year, but during the Hajj, as many as two million people visit during the five-day pilgrimage period.

Tragedy struck on September 24, 2015, when a crowd collapse caused the death of between 700 and 2,000 pilgrims, according to varying reports. The crush happened at an intersection where two streets merged into one. The confluence of people from both streets increased crowd density to five or six people per square metre. People were suffocated and trampled as the crowd swelled in size.

“Densities of two people per square metre allow people freedom to change direction and speed, but at densities of four or more people per square metre, you lose that freedom,” said Prof. Amer Shalaby, a crowd management expert. “You become a water droplet in a flow of water; you can’t choose your path, stop or change direction—you must keep moving with the crowd.”

For the people who found themselves at that intersection, they could not escape and were forced onward by the crowd behind them. By that time, there was nothing that could be done to prevent this tragedy.

Although Saudi officials use various measures to manage the flow of people, including video cameras, on-site crowd control staff, timed schedules and alert systems, they were not sufficient to prevent this tragedy.

In order to avert a similar calamity at future Hajjes, officials are exploring technological innovations and smartphone apps for more individualized alert systems.

Photo by OpenStreetMap & Carl Henderson Licensed Under CC BY-SA 2.0 Generic via Wikimedia Commons
Photo (Opposite): “Masjid al-Haram panorama” by Bluemangoa2z Licensed under CC BY 3.0 via Commons

MANAGING THE CROWD DURING THE HAJJ PILGRIMAGE CAN BE MEAN LIFE OR DEATH



“Apps that alert visitors to potential problems in their own language could provide visual, actionable cues,” said Shalaby. “For example, when a particular area is busy, the app could use a colour scale to indicate crowd density at a given time, similar to the way mapping apps provide live traffic data.”

While effective and timely communication with visitors can help to prevent future tragedies, it is not a failsafe solution. Changes to transportation and infrastructure, developed over the past few decades in response to past crowding tragedies, need to continue to accommodate the influx of pilgrims.

The tent city surrounding the Hajj sites, for example, is now built with fire-resistant tenting material, a change implemented due to fire outbreaks in pilgrim tents.

The renovations to Jamarat and its three pillars are the most recent improvements to a Hajj site. They were built in response to annual crushes and stampedes at the site. Pilgrims now throw stones at three oblong walls (formerly pillars) to complete one of the Hajj rituals, a symbolic act for stoning the devil. Visitors access these walls from five different levels; access points to the walls vary depending on which direction the visitors are coming from, alleviating congestion and bottle-necking. Since the completion of the Jamarat Bridge as it is called in 2006, there have been no major incidents at the site.

Not all improvements are permanent fixtures; organizers have been improving mass transportation by using more than 15,000 buses to help manage the flow of visitors. These buses can also contribute to congestion in and around the Hajj sites, and the streets and routes connecting the sites—some as long as 20 kilometres—have not yet undergone improvements in engineering. This year’s crush happened on these roads.

The issue of congestion and crowd density will only continue; after 2015, officials will no longer enforce annual quotas on the number of pilgrims allowed at the sites during the Hajj. An estimated five million pilgrims will descend on Mecca for the 2016 Hajj and that number is expected to increase to 30 million annually over the next five years.

• The crush on September 24 was not the only fatal incident in Mecca that garnered international attention this year. On September 11, as the city was preparing for the Hajj, a crane collapsed in the Haram Al-Masjid (the Grand Mosque), killing more than 100 people.

• The Grand Mosque is the greater focus of Shalaby’s recent work in the region.

• Unlike the Hajj sites, the Grand Mosque experiences steady use throughout the year, with peak periods during the Hajj and Ramadan. The Grand Mosque is now undergoing an extensive expansion to increase its capacity from 500,000 to 1.6 million visitors.

• The quotas in place for the number of Hajj pilgrims are based on the expansion and its capacity for each year of its construction. The quotas will be lifted when construction is complete.

• Shalaby’s work looks at crowd flows in and out of the mosque, as well as public transportation to and from the centre of Mecca.

SPIRIT OF SERVICE ALIVE IN ALUMNI VOLUNTEERS

As a Civil Engineering student in the late '70s, Arun Channan's involvement ran the gamut from the Brute Force Committee and the Engineering Society, to the Concrete Canoe Competition, Cannon Guard, and Civil Club. One of his fondest memories is affixing giant Mickey Mouse ears to the SAC dome at three o'clock in the morning as a prank.

Now, as an alumnus, Channan (CivE 8T0) has volunteered his time to the Department of Civil Engineering for more than 20 years, organizing five-year reunions, as well as fundraising on behalf of CAMP Campaign and Skule Society. He believes his volunteerism is a direct extension of his student activities.

different career paths, showing how civil engineering opens up many doors."

It's this real-world experience and familiarity with the Department that makes alumni contributions so valuable.

"Alumni volunteers are among the University's best spokespeople," explains Paul Cadario (CivE 7T3). "In Civil Engineering, they share a common commitment to the Department and our different backgrounds offer valuable outside perspective on the Department's different initiatives."

In addition to teaching, funding scholarships and creating the Cadario

one of the Board's current priorities, between Civil Engineering and the Munk School of Global Affairs, where he sits on the Master of Global Affairs external advisory board.

Alumni also get involved in causes that demonstrate their interests and skills. Sue Joel (CivE 6T5) began volunteering with the Department in 2010, when it established five scholarships in honour of the first five women to graduate from Civil Engineering, of which Joel was one. "I felt very honoured that the Department would do this," she said. "It has been a real pleasure to renew my acquaintance with the Department through this initiative."

Since then, Joel spearheaded the creation of a Class Album yearbook in celebration of her class's 50-year anniversary in 2015, and she has recently joined the Engineering Alumni Association's Alumni Awards Committee.

Engineering education is a key focus for Indi Gopinathan (CivE 9T6), who currently teaches a mineral economics class in the Lassonde Mineral Engineering Program. She draws on her mining industry connections to bring in guest speakers and deepen the level of expertise.

"Being involved has given me the opportunity to reflect on the value of engineering education to my career and to consider its role more broadly within our industry," she said.

No matter the activity, alumni volunteerism fosters a lifelong attachment to the Department and its students.

"Once you get engaged, it's really easy to ask, 'How else can I help?' and stay engaged," said Cadario.

FOR FURTHER INFORMATION ABOUT VOLUNTEER OPPORTUNITIES, OR TO GET INVOLVED, CONTACT: CHAIR.CIVIL@UTORONTO.CA

Being involved has given me the opportunity to reflect on the value of engineering education to my career and to consider its role more broadly within our industry.

"Influencing the quality of education and student experiences in the Department of Civil Engineering is important to me," Channan says. "I remember my own positive associations and I get a charge from seeing the Department's achievements."

Channan's participation reflects alumni enthusiasm for the Department and is an example of the range of volunteer opportunities open to alumni and how these opportunities enrich the University of Toronto's Civil Engineering community.

"We can make a difference in many ways, from running committees and projects to teaching," says Channan. "Students and the Department benefit from our real-world experiences. We can share our

Facility for Integrated Learning, Cadario serves on several University boards and the Boundless campaign committee for the Faculty of Applied Science & Engineering. He has chaired the Civil Engineering Chair's Advisory Board for the past three years and is quick to highlight the benefit of similar alumni involvement.

"We are a sounding board for the Department's campaign and priorities," he said. "We act as consultants for the Department Chair, bringing our day jobs' perspective to teaching, research and advancement. Our knowledge of the Department is invaluable for the university in improving connections and building its profile."

For example, Cadario facilitated the creation of a course on water issues,

CEIExSKAM

All photos of CEIExSKAM mural by Roberta Baker.



The hoarding along St. George Street north of the Galbraith Building keeps pedestrians and students safe — and also serves as the canvas for Toronto’s longest mural.

The 276 foot graffiti mural—a notably edgy choice for the University—has been very well received because it includes depictions of the Faculty of Applied Science and Engineering’s past, present and future. Civil and Mineral highlights of the mural include the Structures Lab, Survey Camp and images of public transportation.

The social media hashtag #CEIExSKAM—a combination of the Centre for Engineering Innovation and Entrepreneurship’s abbreviation and the graffiti artist’s street name—has been adopted to allow students and visitors alike to share their photos and tweets about the mural.

The mural will be up throughout construction.

EXPLORE THE WHOLE DESIGN AT CIVIL.ENGINEERING.UTORONTO.CA/CEIEXSKAM



Rebuilding Engineering at U of T

HOW THE CENTRE FOR ENGINEERING INNOVATION AND ENTREPRENEURSHIP IS CHANGING THE CONCEPTIONS OF ACADEMIC BUILDINGS

The Faculty of Applied Science & Engineering (FASE) continues to advance its mission to: encourage students and faculty to spearhead research, enhance teaching and learning methods, and create a diverse, thriving community. The physical spaces that FASE occupies, however, have remained relatively static since 2002, when the Faculty opened the Bahen Centre for Information Technology on St. George Street.

In need of a space that reflects the changing needs of its research and education, the Faculty will unveil the Centre for Engineering Innovation and Entrepreneurship (CEIE)—a building designed to foster collaboration, innovation and entrepreneurship—in the autumn of 2017.

Mechanical and Industrial Engineering's Prof. Ron Venter, chair of the CEIE Project Planning Committee, gives us a glimpse into the CEIE's genesis.

CHOOSING A SITE

The ideal spot for the new building had to balance cost and convenience with approval from both the University and the City of Toronto. Initial considerations for the location included the Engineering Annex, but as a developed site with a network of underground pipes and utilities, construction would have been too expensive. Site 17, located behind the Mechanical Engineering Building, posed construction access challenges.

The final choice: Site 10, a surface-level parking lot located just north of the Galbraith Building and west of Simcoe Hall on St. George Street. The location was chosen for ease of construction and its proximity to public transit.

DEFINING THE PURPOSE

The building will combine technology, community, and efficiency for the benefit of the Faculty and the University of Toronto.

The CEIE will not be a conventional academic building; it will catalyze innovation in engineering, and encourage people to rethink how they learn, work, teach and communicate. The building's open concept was designed to encourage cross-disciplinary community and research, one of the Faculty's goals. Programs and institutes will not be isolated from each other. Faculty, staff and students will inhabit the same areas to enhance research and interdisciplinary networking.

After assessing the space requirements of the Faculty and auditing the use of its existing space, the CEIE Project

Décor inside the CEIE will be clean and elegant, mainly using white concrete with Douglas fir and bronze accents.

Planning Committee determined the optimal allocation of teaching, research, and administrative space for the new building.

By balancing these needs with resources and funds, the CEIE will maximize space in several ways:

- 1) The CEIE will have a series of dry labs but no wet labs; this reduces the construction costs by about \$50 million, since a wet lab building requires additional exhaust and drainage systems.
- 2) Other faculties, schools, and departments across the University will be able to use the building's classroom space; this will allow U of T's Academic and Campus Events – who manage space on campus- to reconfigure other University spaces for different uses, creating room for new labs and offices.
- 3) It will be a place that cultivates excitement about the new approach to space design and use.

DESIGNING AND PLANNING

The design conforms to the St. George Campus master plan to balance classroom, meeting, research, office and communal space needs.

The floorplan allocates the lower four floors for teaching and student space and the upper floors for innovation activities, including The Entrepreneurship Hatchery. The building's basement (free space not included in master plan considerations) has a larger footprint than the floors above, maximizing space for utilities without infringing on student clubs and common areas, which will also occupy the basement.

The CEIE meets the Toronto Green Standard, a two-tier set of performance measures for sustainable site and building design. The goal is to reach Tier 2, a voluntary, higher level of energy efficiency. To meet this standard, the architects chose to forego glass facades, because they are not energy efficient, in favour of intelligent design. The façade panels will have angled siding to allow ample natural light to enter the building and deflect direct sunlight, ensuring more consistent energy needs.

However, this means that the CEIE will not blend in as well aesthetically with the surrounding Bahen Centre, Galbraith Building, Simcoe Hall and Physical Geography Building, but it does demonstrate the Faculty's commitment to sustainability. Despite the design elements of its exterior, the cube-shaped, eight-storey building will fit harmoniously into the University's skyline; it will not dwarf surrounding buildings or obscure views across the campus.

CONSTRUCTING THE BUILDING

After two years of planning and gaining approvals from the University and the City of Toronto, construction of the CEIE began on June 24, 2015 with a groundbreaking ceremony. By late August, steady progress was being made and the CEIExSKAM mural (named after the street artist who created it) was unveiled.

Erection of the building will begin in 2016, and although clearing and foundational work has been smooth, there have been challenges. Pile drivers had to work around a protected tree on Galbraith Road and builders needed to relocate a high-voltage powerline that hindered construction on the site. A series of soil analyses indicated a higher than permitted level of manganese in the groundwater, so the contractors have been working with a manganese-processing facility to decrease levels during construction. The long-term solution will see manganese processing capacity installed inside the building.

A protected pedestrian walkway was installed on the south side of Galbraith Road, a busy pedestrian thoroughfare. The University continues to explore ways to increase safety during construction.

USING THE BUILDING

The CEIE's state-of-the-art features will nurture innovation. The Technology Enhanced Active Learning (TEAL) classrooms facilitate hands-on learning and the interactive, 500-seat auditorium is fitted with tables on tiers to promote discussions and group activities. The building lobby will accommodate a diverse range of functions, from product launches to exam prep sessions.

Nearly all of the space in the CEIE is designed to be shared. The open-concept design allows for greater interaction between students, staff and faculty, as well as between the departments, institutes and centres housed within the CEIE's walls.

The upper floors will also feature raised floors, modular furniture and flexible space that can be changed to fit the needs of the users of the space as time goes on. This kind of flexibility will allow the physical space to match the evolution, growth and changing nature of research priorities.

FOR MORE INFORMATION AND DETAILED FLOORPLANS, VISIT UOFT.ME/CEIE

TECHNOLOGY ENABLED ACTIVE LEARNING ROOM

THE CLASSROOMS OF THE 21ST CENTURY



Traditional Classroom



TEAL Classroom

Even with a charismatic and engaging instructor, students' attention and attendance in lectures can wane as the term progresses. In the social media age, learning environments have begun to adapt to students who are always connected to technology.

In the Centre for Engineering Innovation and Entrepreneurship (CEIE), the Faculty will adopt the Technology Enhanced Active Learning (TEAL) classrooms to engage modern students and inspire curiosity and creativity.

TEAL rooms offer an innovative approach to education that facilitates collaboration and experiential learning assisted by technology and strategic design. Clustered tables serviced by multiple flat-panel screens allow for a variety of configurations.

Media-rich lectures can be easily interspersed with demonstrations, desktop experiments, discussion and group problem solving. Using the built-in technology, instructors are able to combine lectures with lab work, and simulations with presentations. Each screen in the room can display different content, or they can be synchronized to display the same content. Students can also share their laptop screen from their workstation. The movable workstations and bar-height swivel chairs encourage more active and engaged learning. They also discourage napping.

The CEIE will include five TEAL rooms. The Faculty is exploring various working groups to implement and leverage the full range of possibilities TEAL classrooms offer. A pilot TEAL classroom is already in use in the Sandford Fleming Building. Some instructors have already begun to explore the possibilities that a TEAL room can offer and students are embracing the format.

This past summer, a pedestrian-only zone was put in place to increase the accessibility and safety around Convocation Hall.

Inspired by the circular form of front campus, the playful circles that dot the pavement in signature U of T blue and white, make a fun and functional addition to the campus. Students can use the space to chat with friends after class and check their phones out of the path of motor vehicles.

The zebra striped-crosswalks create clear paths for students, faculty and visitors, and defines a clear intersection for drivers.



Changes on Campus

SMALL AND LARGE CHANGES AT ICONIC PLACES ON THE ST. GEORGE CAMPUS



An expansion and facelift at One Spadina Crescent clears the way for the John H. Daniels Faculty of Architecture, Landscape and Design, which moves in next year.

The historic southfacing stone facade received a cleaning and restoration. The addition to the north side will reflect a more modern design.

The revitalization of the property will greatly expand the teaching and faculty space, and breathe renewed life into the western edge of the St. George campus.

READ MORE AT [DANIELS.UTORONTO.CA/ALUMNI](https://www.daniels.utoronto.ca/alumni)

The University recently announced a high-profile design competition to revitalize King's College Circle.

Four design concepts were showcased to the public at an event on September 28. Ideas included an elevated walkway, vehicle-free circle, skating rink and multi-use plaza.

Eight principles will guide future development: 1) improve the pedestrian experience; 2) enhance green space; 3) create public spaces that animate the campus; 4) support events; 5) remove surface parking from front campus circles; 6) limit traffic on front campus circles; 7) wayfinding; and 8) allow for discreet servicing and access to all infrastructure.

LOOK AT ALL FOUR SUBMISSIONS AT [LANDMARK.UTORONTO.CA](https://www.landmark.utoronto.ca)



Faculty Profile

Introducing Prof. Lesley Warren

In January 2016, Prof. Lesley Warren will join the Department of Civil Engineering as the new Claudette MacKay-Lassonde Chair in Mineral Engineering.

“As an applied scientist who combines geochemistry with molecular and experimental microbiology to identify the processes that affect water quality and waste/reclamation context stability for the minerals and energy sectors, this position seems like the perfect fit for me,” said Warren.

Prof. Warren, currently a professor at the School of Geography & Earth Sciences at McMaster University, specializes in sustainable mining research. Her new chair position will focus on furthering the initiatives of the Lassonde Institute of Mining, which promotes and facilitates cross-disciplinary research related to challenges facing the mineral and energy sectors.

Prof. Warren said of her appointment:

“I believe the key to sustainable mining is in thinking of mines as bioreactors and that engineers working together with biogeochemists and microbiologists will enable translation of breakthroughs into new tools and approaches that can change mining practices for the better. There is no better place to foster such research than here at the U of T, where so many bright minds are as interested in mining, water, and environment as I am. The opportunities for research, education and outreach are exciting and I am looking forward to being a part of the department.”



Introducing Prof. Marianne Hatzopoulou



Prof. Hatzopoulou joined the Department’s transportation research section this fall.

Hatzopoulou investigates how emissions are generated by on-road vehicles, how they disperse in urban environments and who is exposed. She tries to understand how traffic patterns, road design and the characteristics of built environments can be modified to improve air quality in urban areas.

“U of T is a vibrant, diverse and inspiring place to do research,” said Prof. Hatzopoulou. “I can collaborate with a wide range of researchers in transportation, environment and health. The City of Toronto is an ideal test bed for my research and provides a great environment for knowledge transfer and developing tools to help vulnerable individuals reduce their exposure to urban emissions.”

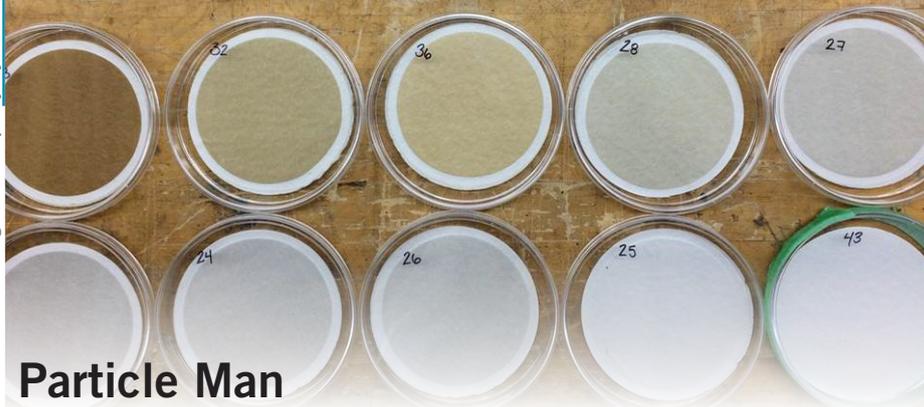
Research Update

SHEAR BRILLIANCE: RESULTS FROM EXPERIMENT ON SHEAR RESISTANCE

In our last issue, we featured the upcoming experiment by U of T Civil Engineering faculty and students to discover the effect of extreme size on shear resistance.

A shear failure is one of the ways a structure can collapse catastrophically with little to no warning.

“When we’re dealing with design



Particle Man

PROF. JEFF SIEGEL STUDIES PARTICLE POLLUTION IN LANDMARK INDOOR AIR QUALITY STUDY

Prof. Jeffrey Siegel likens engineers to “people who practice medicine without licenses,” and his research on particle pollution highlights the intersection between civil engineering and health. Prof. Siegel, a cross-appointed faculty member at the Dalla Lana School of Public Health, has been studying particle pollution since the late 1990s. He is currently part of a research study by the University of Toronto, the Toronto Atmospheric Fund and Health Canada examining indoor air quality and energy use in seven Toronto Community Housing (TCH) buildings, which will undergo retrofitting by 2018.

“Indoor air quality is remarkably understudied,” said Siegel. “Particle pollution is our biggest environmental hazard. We know categorically that when particles in the air increase, people get sick and die. There is no safe threshold.”

Particle pollution, or particulate matter, is an airborne mixture of miniscule solid particles and liquid droplets that are less than 10 micrometers in diameter. It is composed of various materials, including organic chemicals, acids, and metals created by different mechanical and chemical processes. Particle pollution causes a host of health effects, such as cardiovascular and respiratory problems, cancer and even genetic defects in unborn children.

The study looks at indoor air quality and energy use together with the aim of optimizing both. Prof. Siegel’s group monitors the air quality in the TCH buildings pre- and post-retrofits, which are slated for completion in 2018. The team focuses on filter forensics. They have installed air filters in a selection of apartments and will complete dust analyses of the filters for size distribution of the particles and their chemical constituents.

“We are looking at the filters in a qualitatively formalized way,” said Siegel. “They’ll tell a story that can lead to greater public knowledge about the localized effects of particle pollution and how retrofits can mitigate these effects.”

FOR THE FULL STORY, VISIT: CIVIL.ENGINEERING.UTORONTO.CA/PARTICLE-MAN

Eight Ways to Limit Your Exposure to Particle Pollution

IT’S ALL ABOUT LIMITING THE EFFECTS OF COMBUSTION AND CREATING VENTILATION!

1. Avoid burning candles indoors. You may love the smell of your scented candles, but combustion creates particles that compromise your health.
2. Always cook in well-ventilated areas. Buy an overhead vent fan for your oven and keep it on while you’re preparing meals.
3. When walking on the sidewalk, keep close to the building side rather than the roadside to lessen the effects of particles from vehicle exhaust fumes.
4. Limit the amount of cleaning products you use in your home. Even if a product is labeled “green” or “natural,” the fewer chemicals you can use to get the job done, the better.
5. Keep windows open and turn fans on while vacuuming.
6. Avoid buying furniture made of particle board; it often contains formaldehyde-releasing components. Yet another reason not to shop at IKEA!
7. If you’re in the market to buy a house or condo, steer clear of properties along major roadways. Vehicle exhaust can more easily make its way into your indoor air supply.
8. If a baby is on the way, put down that paint roller and sledge hammer! Pregnant women should avoid home renovation projects.

structures, we have one chance to get it right,” said Prof. Evan Bentz. “We have to make sure we know the behaviour of the materials.”

The propensity of reinforced concrete to crack and susceptibility to shear failure limits the relevance of scale model testing; as different sizes of concrete slabs will behave differently under stress.

The experiment expanded on a previous series of shear strength tests. Surpassing the largest concrete slab in the world tested

for shear, the team doubled the size of its previous experiment by creating a four by 20 metre-long slab that was reinforced longitudinally throughout and transversely in only one half.

The results were significant. They validated the current provisions in the Canadian design code and allow for thicker slabs as modern construction slabs increase in size. The results find failures in current American building codes; the study will be key to updating safe design practices.

The team engaged academic research groups and engineers worldwide to predict the strength of the slab, given the variables. Responses varied widely in accuracy.

“The fact that the predictions have been so mixed shows us that inconsistencies in global building codes are a big problem,” said Bentz.

FOR THE FULL STORY, VISIT: CIVIL.ENGINEERING.UTORONTO.CA/SHEAR-BRILLIANCE

Student News

Civil Engineering Student Competes in the Modern Pentathlon at PanAm 2015

A FOURTH-PLACE FINISH QUALIFIES HER FOR THE 2016 OLYMPIC GAMES IN RIO DE JANEIRO

Donna Vakalis, a PhD candidate studying the impact of indoor building environments on public health and productivity, competed in the modern pentathlon for Team Canada.

The sport includes competition in fencing, swimming, show jumping, and running and shooting. Vakalis won the running and shooting combined event to place fourth overall; qualifying her for the Olympic Games.

“We look forward to cheering on Donna at the 2016 Rio de Janeiro Olympic Games,” said Prof. Brent Sleep, chair of Civil Engineering.

Before the TO2015 Games, Vakalis commented on how being an engineer affects her life as an athlete.

“There are so many connections for athletes to think analogically,” said Vakalis. “For example, an athlete can start to see connections between the structural properties of materials and the way the body works.”

Recovering from an injury earlier this year, Vakalis said her engineering studies were helpful for understanding the mechanics of the body in order to heal smarter and faster.

Sasha Gollish takes Bronze

Sasha Gollish, PhD candidate, took third place in an exciting 1500 metre meet at the Toronto2015 PanAm Games.

After almost losing a shoe and speeding past her competitors, she stood proudly on the podium holding her Pachi (the Toronto 2015 PanAm mascot) plush toy and wearing her medal.

Congratulations, Sasha!



June 2015 edition of The Civician

Vakalis also believes the skills she gained in competition will benefit her academic career.

“Being a pentathlete who has to execute moves perfectly when an Olympic berth will be on the line, it helps to be able to think clearly under tremendous pressure,” said Vakalis. “That’s helpful for standing up and teaching a class, or being able to answer a challenging question in front of your thesis defence committee.”



Jumping photo by: Andrew Bailini. Inset portrait by: Winston Chow



Civil Class of 6T5 50th Reunion.
(Back to front, left to right)
Barry Martin, Fred Claridge,
John Inshaw, David Sefton,
Vic Lenius, Robert Smith,
Larry Lavigne, Ron Sanderson,
Nick Walker, Don McKinnon,
Sue Joel, Ron Adamcyk, John
MacInnis & Ian Tracy.

Skule Days, 1961-1965

THE CLASS OF 6T5 PRODUCED A SOUVENIR ALBUM ON THE OCCASION OF THEIR 50TH REUNION

Construction on the Berlin Wall began in 1961 as the CivE Class of 6T5 prepared for its first day at the University of Toronto.

During their four years of study, these students witnessed the height of the Cold War, the Cuban Missile Crisis, the assassination of President Kennedy and three Stanley Cup wins by the Toronto Maple Leafs!

These experiences bonded the Class of 6T5 and helped to create lifelong friendships.

The Class of 6T5 highlighted these special connections in souvenir album, which was distributed to all classmates in celebration of the 6T5 50-year reunion.

Sue Joel (CivE 6T5) with Nick (CivE 6T5) and Marg Walker wrote, edited and compiled the album.

Sections in the album include:

- Skule Days, 1961-1965: includes photos, memories and overviews of what happened in their four years of study, including Survey Camp
- Recaps and reminiscences of past reunions
- Highlights of the 50th reunion
- Dedicated individual pages where each class member contributed personal memories, photos and updates about family and career.

The nearly 75-page album is clearly a labour of love. Thank you to the Class of 6T5 for sharing your cherished memories with the Department.

“The Cold War, a period of enmity, distrust and sabre-rattling between the Soviet Union and the West, was at its height. The Berlin Wall was just three weeks old when we began our first year of Civil Engineering.”



WE WANT TO CELEBRATE YOUR MILESTONES WITH YOU!

Share your updates about your new job or business, wedding, new home or baby, and we'll share your news with our alumni community.

Starting in our next issue, we will dedicate a section of our magazine to sharing your stories and marking your milestones.

Email civ.communications@utoronto.ca with your updates and be sure to include a photo.

You can also tweet us @civmin.

HOW DOES ROOFTOP FARMING GROW BETTER ENGINEERS?



 Manulife

mbna



FROM THE CLIMATE

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What exactly are affinity products? Value-added services provided by our financial and insurance partners. The revenue generated supports initiatives like Sky Garden—an organic vegetable farm atop a U of T engineering building. Local food banks benefit from the produce and engineering students take their learning outside, where they can develop creative new tools. Sky Garden is one of many extracurricular opportunities supported by the U of T affinity program. More than 120,000 alumni and friends now purchase affinity products, helping U of T students take their education to new heights.

www.affinity.utoronto.ca



BOUNDLESS



Do you remember where you made your mark on CAMP at Gull Lake?

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UPCOMING EVENTS

Distinguished Lecture Series

Lectures are in Galbraith Building 120, unless noted.

FOR MORE DETAILS, VISIT:

CIVIL.ENGINEERING.UTORONTO.CA/LECTURES

“A Sanitary Engineering Perspective on the Characterization and Control of Bioaerosol Traffic in Our Atmospheric Environment”

Thursday, January 27, 2016

“Challenges for Concrete”

Thursday, February 11, 2016

“Green Stormwater Infrastructure Research in North Carolina”

Thursday, February 25, 2016

“The Interplay Between Chemicals and Microbiomes: An Environmental Biotechnology Perspective”

Wednesday, March 16, 2016

Wallberg Building, Room 116

Alumni Reception

Friday, February 5, 2016

GB202

5 p.m. Guest Lecturer

6 p.m. Reception

TO RSVP CALL 416-978-0235 OR VISIT

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