



## IMPACTING INNOVATION

From high-tech wearables to social media giants and premium electric vehicles, Carleton graduates are emerging as leaders in a booming tech industry





## Shaping the future

The goal of Ingenious has always been to highlight and share stories about exciting research, student initiatives and alumni activities. Our desire is to showcase the myriad of ways Carleton's engineers, architects and innovators are serving our community and shaping the future.

This edition demonstrates how Carleton's faculty, students and graduates across all engineering and design disciplines are impacting industry and working towards a better tomorrow for all.

The magazine's cover story describes how Carleton alumni have emerged as leaders in a booming tech industry. Having established themselves with major industry players such as Fitbit, Instagram, Tesla Motors, IBM, Bombardier and Shopify, our graduates are applying their expertise in engineering and industrial design towards supporting well-being, fostering connections between people, and driving change.

Our Faculty continues to be actively engaged with the community. This year, our Virtual Ventures program was recognized by Actua for its Science, Technology, Engineering, and Mathematics (STEM) programming for young girls. Carleton also remains an integral part of the global community, with our students having recently travelled to Tanzania with researcher Dr. Onita Basu in order to develop clean drinking water solutions.

As we wrap up another academic year, we are proud to celebrate the accomplishments of our students and wish them tremendous success in their future ventures. We hope that they, like you, stay connected with us to share how our graduates are impacting industry and serving our communities through new products, designs, applications, solutions and innovations.

In regards to staying connected, I would like to share how Carleton University's homecoming, commonly known as Throwback, is a celebration of all that was, is and is yet to be from the brilliant minds that make up the Carleton community. It serves as both a look back to a storied past and a peek into a limitless future. As part of the 2016 Throwback celebration, the Faculty of Engineering and Design will be hosting a panel discussion on September 14 featuring three Carleton graduates who are at the forefront of innovation in information technologies. I invite you to join your fellow alumni and current students as special guests Shane Booth (Instagram), Derek Burney (Microsoft) and Richard Stanton (Amazon) share the inside track on upcoming trends in IT.

Dr. Rafik A. Goubran, P.Eng, IEEE Fellow, FCAE  
Dean, Faculty of Engineering and Design



carleton.ca/engineering-design/ingenious  
Editor: Adam Landry

### On the cover

Carleton Engineering and Design graduates are making their mark on a booming tech industry, finding success with major industry players such as Fitbit, Instagram, Tesla Motors, IBM, Bombardier and Shopify.  
Photo: iStock



### Newsletter Mission Statement

Ingenious is published for alumni, faculty, staff, friends, and partners of the Faculty of Engineering and Design. The newsletter is intended to communicate the Faculty's goals, strategic direction, and activities in order to connect alumni to each other and the university.

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A team of students from Carleton's Faculty of Engineering and Design and Sprott School of Business recently completed a site visit to Longido, Tanzania as part of their Fourth Year Capstone project, led by Professors Onita Basu, Bjarki Hallgrímsson, and Troy Anderson.

## Interdisciplinary Capstone Team Takes Action in Tanzania

An interdisciplinary group of students and professors from Carleton's Faculty of Engineering and Design and Sprott School of Business recently completed a site visit to Longido, Tanzania as part of their final year Capstone project. Commonly known as From Buckets to Rain Barrels, the project involves a multi-year, multi-discipline team that includes Carleton University, the Tanzanian Education and Micro-Business Organization (TEMBO) and local community leaders in Tanzania.

Led by Dr. Onita Basu (Department of Civil and Environmental Engineering), Professor Bjarki Hallgrímsson (School of Industrial Design) and Professor Troy Anderson (Sprott School of Business), the overall project is aimed at addressing chronic water shortage issues within the rural community of Longido, Tanzania. This year's focus was to develop prototypes for testing based upon the feedback that was received from the community and students involved in last year's iteration of the project.

Having travelled to Tanzania in previous years, Dr. Basu has seen first-hand why projects like From Buckets to Rain Barrels are so important to the region.

"Traditional houses don't have access to centralized water, nor do many of the schools in the district," she explains. "Women and children are primarily responsible for collecting water for daily use, which is often located several kilometers away."

After developing their prototypes over a four month period, students were given the opportunity to bring them to Tanzania for site-specific testing and feedback from members of the community. This year's additions and enhancements to the project included a small scale solar still design, the introduction of drip irrigation as a water savings measure, improvements to brick

making, a ceramic filter for water treatment, and the development of a local weather app for the community (assisted by Professor Cheryl Schramm, Department of Systems and Computer Engineering).

Students were provided the opportunity to engage with the local community in a meaningful manner and to experience daily life in the village. Activities included visiting the traditional houses (Boma Village) and schools, walking for water (a four kilometer round trip), and hiking to the one of the few year round water sources located on Longido Mountain.

Dr. Basu notes that one of the greatest challenges faced by her students was the limited selection and quality of materials available for use.

"In Canada, we often take for granted that most materials we need are just one store or click away," she explains. "Since we knew their projects would be used in rural Tanzania, students had to ensure that their prototypes could also be built with local materials."

Having to work under such constraints offered a unique opportunity for students to engage in real-world learning. With an abundance of materials lacking dimensional regularity and no power tools available to be used in construction, innovative thinking became the key to solving problems. Despite the adversity, Dr. Basu feels such an experience can have a tremendously positive effect on an engineer's growth and development.

"It's important that tomorrow's engineers and designer be given the opportunity to contribute in a real-world environment," she says. "Working in a low technology setting and facing the challenges associated with finances, cultural difference and language barriers helps students discover how engineers and designers can make a difference in this world."

# Co-op leads to Silver Screen Success

Third year Interactive Multimedia and Design (IMD) student Taryn Laurendeau has found her way onto the big screen – in a manner of speaking.

Having recently completed a total of 16 months at the Moving Picture Company (MPC) in Montreal as part of Carleton's co-op program, Taryn has experienced first-hand what it's like to be involved in the magic of feature film production. After first joining MPC as a software developer, Taryn landed the role of effects department coordinator for the 2015 film *Fantastic Four*.

"In high school I started getting into digital media and information classes, as well as photography," she explains. "I had a real interest in computer graphics at that time and when *Avatar* came out in 2009 I was so mesmerized that I wanted to pursue that as a career."

That interest in film production led Taryn to Carleton and the IMD program, offered by the Faculty of Engineering and Design as part of its Bachelor of Information Technology (BIT). The program aims to provide a broad overview of IMD, allowing students to experience its different areas and discover the specialty that suits them best.

"It's important to have the freedom to explore your creativity and see where your career takes you," says Taryn. "Some people know what they are looking to do right away, but I think for the majority of people, myself included, their career path develops more organically as their interests shift."

While she began the IMD program looking to pursue 3D graphics, her exploration of different pathways led her to a co-op position in programming. As her interests continued to transform, Taryn found herself drawn to a project management role.

"At first it was a bit overwhelming," she notes in describing what takes place behind the scenes. "You walk around the studio and see all kinds of cool things on people's screens from different films that are in various stages of post-production."

Her effects team for *Fantastic Four* was largely responsible for animations involving several of the film's central characters, including Johnny Torch and The Thing.

"It's amazing to see just how much of a film is generated in post-production," she explains. "Everyone knows that elements are added to create the final cut of a film, but when you get to see the raw shots that are sent in after the cameras stop rolling, you realize just how much the industry has come to rely on green



screens and CGI (computer generated images)."

After wrapping up post-production on *Fantastic Four*, Taryn spent her last five months at MPC working on Disney's *The Finest Hours* as a Show Coordinator.

"Working on both films was an unforgettable experience," she says. "A lot of effort is put into these projects, but it's definitely all worth it when you see your name in the credits on the big screen."

Taryn attributes much of her early career success to the flexibility of Carleton's IMD program.

"I think I was able to take on these kinds of roles because IMD gives you an overview of how everything works and enables you to become sort of a jack of all trades," she says. "You can definitely focus more on a specific pathway, but having a general knowledge of the internal workings of the industry can be an incredible asset and can give you an edge on those who may not have that technical knowledge."

Given the secrecy that surrounds the film industry, Taryn's future projects at MPC remain a mystery for the time being. While she will have to wait to find out what's next, she's keeping her fingers crossed to be involved in the next big blockbuster.

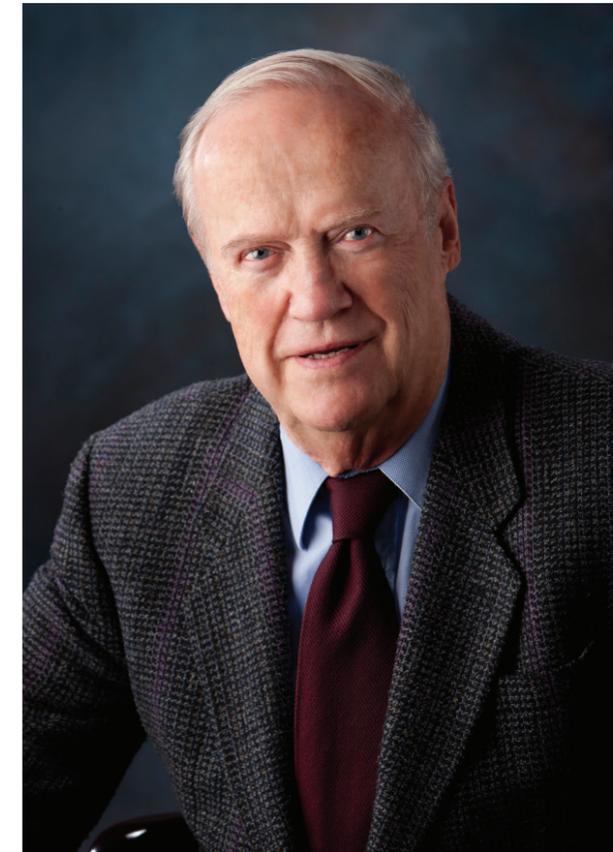
"Since the first *Avatar* film really sparked my interest in IMD, I'd love to work on one of the upcoming sequels," she says. "My father's also a huge *Star Wars* fan, so it would really be special if I got the chance to work on one of the new films."

## In Memorium: Dr. Miles Copeland

On April 27, 2016, Dr. Miles Alexander Copeland, former chair of the Department of Electronics and Professor Emeritus in the Faculty of Engineering and Design, passed away suddenly, but peacefully at the age of 81. Many Carleton graduates will remember Dr. Copeland for his passion for teaching and research innovation.

In addition to educating two and a half generations of electrical engineers, Copeland established Carleton's research capacity in the area of analog and radio frequency integrated circuit design, including the development of computing techniques to enable and reinforce research and learning.

"Professor Copeland's illustrious career has proven him to be a distinguished engineer, researcher, innovator and educator," said Rafik



Dr. Miles Alexander Copeland

Over his distinguished teaching career, Copeland supervised nearly 50 masters and PhD students. Former student, Dipak Roy (MEng/74, PHD/77), like many others, came to Carleton to work with Copeland.

"Every student has at least one professor who changes the way we think, inspires us to do better, or passes along such enthusiasm for a topic that it becomes our passion too," said Roy. "For me, that professor was Miles Copeland. Working with and learning from Miles set me on the career path I still follow today."

In recognition of his achievements, Copeland recently received the 2016 Institute of Electrical and Electronics Engineers (IEEE) Donald O. Pederson Award in Solid-State Circuits. For nearly a century, the IEEE has paid tribute to technical professionals whose

exceptional achievements and outstanding efforts have made a lasting impact on technology and society. He was named a fellow of the IEEE in 1989.

Copeland was presented with the prestigious award on February 1, 2016 at the International Solid-State Circuits Conference in San Francisco. While accepting the award, he reflected back on his time in the Faculty of Engineering and Design.

"This award recognizes Carleton's leadership in engineering research and innovation," noted Copeland. "I appreciate the acknowledgement of my hard work and that of Carleton graduate students, whose research helped Nortel establish itself early on as a dominant company in the telecommunications market."

Dr. Copeland will be missed by many colleagues and friends in the Faculty of Engineering and Design at Carleton as well as hundreds of former students. A scholarship was recently established in Dr. Copeland's name to support outstanding Electronics students. To make a contribution to the fund, please visit [futurefunder.ca](http://futurefunder.ca) and type Copeland or contact Corrie Hobin, Assistant Director of Faculty Advancement, Engineering and Design at [corrie.hobin@carleton.ca](mailto:corrie.hobin@carleton.ca) for more information.

*“Every student has at least one professor who changes the way we think, inspires us to do better, or passes along such enthusiasm for a topic that it becomes our passion too.”*

Goubran, Dean of the Faculty of Engineering and Design. "His outstanding contributions to solid-state circuits have significantly impacted technology and the engineering profession itself."

Copeland was actively involved in consultation and research collaboration with industry, notably at Nortel, Bell Northern Research and General Electric. His widely used research innovations include groundbreaking work that enabled the design of fully integrated radios. His research was also key to the design of modern telecommunications circuits that are used in today's personal communications devices and wireless data communication.

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**Chad Harber (BID/07)**  
Lead Industrial Designer, Fitbit

Chad Harber (BID/07) displays a few of his product designs, along with numerous Fitbit wearables.

While an exciting career was always in the cards for Carleton graduate Chad Harber (BID/07), the road that would inevitably lead him there was anything but set in stone. Perhaps fittingly, his path to landing the role of Lead Industrial Designer at Fitbit materialized as organically as one of his sketches.

"I originally thought I wanted to become a mechanical engineer," Chad explains. "I always excelled in the creative fields and building things with my hands, but I eventually realized that the thing I enjoyed most was

envisioning what things could be."

Having shifted his sights from engineering, Chad chose to remain in his hometown of Ottawa to pursue Industrial Design at Carleton. Proving himself to be an enthusiastic and ambitious student, he engaged with the co-op program to secure a position with Mitel, followed by Carleton's first-ever student internship with Burton Snowboards. After designing a special helmet fit system for the latter, Chad set his post-graduation sights on moving to Vermont to work with the company full-time.

With his mind set on the American Northeast and his career trajectory all but determined, Chad's plans would take an unexpected detour after a discussion with one of his fourth year professors, Bjarki Hallgrímsson. Recognizing Chad's potential in design, Prof. Hallgrímsson recommended that he instead head to California to pursue his career. After giving the matter some thought, Chad heeded his instructor's advice and redirected his destination to San Francisco.

After moving to the City by the Bay, Chad joined NewDealDesign as a junior designer. Five years on, having progressed to a design manager position, he accepted an offer from an up-and-coming start-up known as Aether Things, where he would design an intelligent learning speaker.

Later recognizing that the start-up would be unable to sustain its momentum, Chad moved on to join Fitbit in July of 2015. Now the company's Lead Industrial Designer, he has no regrets about his decision to stake his claim in the Golden State.

"It's amazing to think how that conversation at Carleton would end up defining so much of my career," he says. "I still pinch myself today when I'm at work in a place like this, sketching out and conceptualizing something that I'm passionate about and that others can benefit from."

Along with a team of designers, Chad is frequently tasked with visualizing new ideas for Fitbit. In order to solve problems from a design point of view, he collects feedback from principle designers, executives, engineers, marketers and consumers. While gathering input is essential to the design process, Chad notes that bringing everything together can often be the design team's greatest challenge.

"We're responsible for creating a vision, but also for executing that vision to ensure it can be developed into a tangible and functional mass market product," he explains. "It's different than designing for a client because a company this large has so many layers that each product, as an idea, has to be sold internally many times over before it gets the green light."

Chad also highlights the importance of keeping everything in perspective in an industry where the majority of concepts don't end up seeing the light of day.

"It's easy to get excited about a design that you've done yourself because you've put so much into it that you're obviously going to love it," he notes. "If you can translate that excitement and passion to everyone around you, you've hit the mark because that's likely how the public will react as well."

Fortunately, many of Chad's early designs did make it off the drawing board, ultimately helping him to secure his position with the tech giant. While he feels he was fortunate to have so many products reach the market, Chad notes that his experience at Carleton was an essential component of his success.

"Compared to other schools, the Industrial Design program at Carleton was more of a blend of technical and creative learning," he explains. "I feel that helped me to produce designs that were more practical and realistic. I was able to find that balance between conceptualization and real-world application early on

and apply it throughout my career."

Chad also emphasizes the importance of taking risks as you learn, noting that it can help young designers discover and cultivate their talents and interests.

"At Carleton I had a tremendous amount of freedom and support, which allowed me to really go out and push boundaries in a manner which is not always feasible in a corporate setting," he says. "Having an opportunity like that can help determine what kind of a designer you truly are by helping you embrace the intricacies of your personality that led you to design in the first place."

While he admits that his career path could have pulled him in any number of directions, Chad notes that he was drawn to Fitbit in part because of its mission statement to help people to live happier, healthier and more active lives.

"When you look out at the world, you see so many people who are trying to live better," he says. "Fitbit has the potential to transform how we think about being active and healthy and if I can be a part of something that impacts someone's quality of life, for me, there is no better calling."



**Shane Booth (BID/02)**  
Product Design Manager,  
Instagram

"It's all about collaboration," says Carleton Industrial Design (ID) graduate Shane Booth (BID/02) as he walks along the outdoor promenade that stretches across Facebook's picturesque California headquarters. "It's truly remarkable what you can achieve when you're surrounded by people that inspire you every day."

Such a mentality is clearly visible throughout Facebook's Menlo Park campus. Its open-air environment resembles a small town more than a corporate hub and its overtly customized, open concept indoor offices convey a relaxed and socially engaging atmosphere that is uncharacteristic in the business world.

At first glance, you could be forgiven for mistaking Facebook employees to be socializing more than working, but a closer look reveals a professional aura hiding in plain sight. Listening more intently, it becomes apparent that staff are discussing strategy while sitting together or enjoying a meal in an outdoor courtyard, while others are holding walking meetings as they leisurely stroll down path lanes dedicated to just such a purpose.

It's no coincidence that Facebook has found a way for its employees to remain productive regardless of their whereabouts or activity. It's a level of innovation you'd expect from one of the largest tech giants on the planet - and it's that type of thinking that attracted Shane to be part of the experience.

"After I became established in California, I was



Shane Booth (BID/02) at Instagram (Facebook) headquarters in Menlo Park, California.

interested in exploring a number of opportunities," he says. "When I saw how much emphasis Facebook placed on supporting and enabling its employees, I knew this is where I wanted to be."

Having been at Facebook for just over a year, Shane leads a team that focusses on designing experiences that help businesses share their unique point of view on Instagram, the popular photo and video sharing network acquired by Facebook in 2012.

"Businesses have been a part of the Instagram community since the beginning," he explains. "The trick is designing experiences that businesses love which will also benefit the community as a whole".

When it comes to understanding user experience, Shane discovered early on that listening to your audience is fundamental to any discipline. While at Carleton, his Capstone Fourth-Year Project, focused on bicycle paramedic identification, evolved from that responsibility to understand user needs.

"Rather than simply designing something that people want, it's important to consider how design should be driven by necessity," he says. "Capstone really demonstrated how research is needed to help frame a project's direction and ultimately determine its goals."

During his final year at Carleton, Shane also produced an innovative design that would, in turn, ignite his career. In entering a technology competition put on by Samsung Electronics, he submitted a drinking glass which glowed when detecting increases in heart rate, providing a visual translation of how our bodies react to changes in mood. Shortly after being awarded third place for his design, Shane learned that Mitsubishi Electric was developing a similar concept.

"I decided to call up the executive who was running that project to tell him about my design," he explains. "He invited me to be an intern at Mitsubishi and two weeks

after I graduated I moved to Boston to do just that."

What was initially supposed to be a three month internship would instead continue for three years. Following his extended stay at Mitsubishi, Shane began working with Mage Design in Los Angeles creating sunglasses, watches, and snow goggles for Spy Optic.

He later followed his wife to San Francisco, where he would join NewDealDesign before becoming an independent contractor. He eventually made the transition to interaction design, finding success at companies such as Tapjoy and LiveRail before ultimately joining Instagram.

"Even though my degree was in Industrial Design, it allowed me to build a portfolio and develop the expertise that opened the door to digital ventures," he says. "When the time came, I found myself equipped to transfer that skillset over."

In regards to his career, Shane highly credits his studies at Carleton for teaching him how to solve problems creatively.

"The ID program offered a transition from theory to practice, which really took me out of the comfort zone of academia," he explains. "You need that experience if you want to succeed. That's a big reason why there are all these amazing graduates from Carleton in amazing places and I will always be proud of that."

Having garnered an insider's perspective at Facebook and Instagram, Shane now looks to emphasize the positive impact social networks can have on a global scale.

"The phones in our pockets have become a tool that can be greatly empowering," he says. "It's all about bringing people together and I think that sense of community is expanded when you look at some of Facebook's goals in developing countries. I want to help make the world more open and connected and Facebook is leading in this mission."



## Quinn Murphy (BEng /10) Aerodynamicist, Tesla Motors

"Right now it seems the ceiling for electric vehicles is endless," says aerospace engineering alumnus Quinn Murphy (BEng /10). "They're only getting better and they're only getting more efficient."

As an Aerodynamicist at Tesla Motors, the Carleton graduate is working to shift an industry towards sustainable transportation. While he accepts that change doesn't occur overnight, Quinn hopes that including aerodynamicists at the earliest stages of design will help to accelerate the transformation.

"You're truly embracing what's best for a vehicle when you involve aerodynamicists at the point of conception," he says. "Rather than being handed a schematic and having to work backwards to improve a design and make it functional, we can ensure that everything serves a purpose from the outset."

As part of a specialized team at Tesla, the California based auto maker which essentially established the premium electric vehicle market, Quinn focuses on shaping vehicle exteriors to eliminate inefficiencies. From specially designed mirrors and spoilers to devices incorporated within a vehicle's undercarriage to direct airflow, every decision is by design.

"Even slight design adjustments can significantly affect the range of an electric vehicle," he says.

"Whenever we can reduce or eliminate drag, it boosts vehicle efficiency."

While incorporating aerodynamics into design is standard practice throughout the auto industry, Quinn notes that air flow is emphasized even further when it comes to electric vehicles, giving his team a little more say at the design table.

"Companies that have traditionally focused on internal combustion vehicles tend to be more willing to sacrifice some degree of aerodynamic performance in order to accommodate an aesthetic need," he explains. "We want to show the industry that making choices just because they look good is outdated. There's no reason why we can't design vehicles that are as efficient as they are eye-catching."

Quinn began his studies at Carleton in civil engineering, but after two years discovered his true passion was aerospace. Despite adding an extra year to his studies, Quinn feels that changing gears in his third year was the right decision.

"As soon as I began that new path I knew it was exactly what I wanted to do," he says. "It was a challenging but ultimately rewarding experience."

He also speaks highly of his engineering professors, noting how their methods and insight proved invaluable in establishing his professional career.

"The level of engagement from the aerospace faculty at Carleton has been unparalleled in my experiences," he says. "They were so knowledgeable and there was so much emphasis on how first principles and fundamentals can be used to solve anything, which really spoke to me."

While at Carleton, Quinn also worked on the conceptual design of a new multi-mission uninhabited aerial vehicle



Quinn Murphy (BEng/10) showcases a Tesla Model X, first released in 2015.

(UAV) as part of his Capstone Fourth-Year Project. While it would be a number of years before the inaugural flight of the UAV, known as Corvus, Quinn recounts the pride he felt in seeing the craft finally take to the skies.

"It was pretty exciting to see something that I had drafted up and did the initial calculations for actually fly," he says. "It's exhilarating to see your ideas transform into reality."

Quinn notes that his desire to directly impact production also played a vital role in attracting him to Tesla.

"I wanted to be part of something where I could actually see my work out in the real world," he explains. "That's why

the automotive sector really caught my attention, because the turnaround cycle is usually around three years or less."

While Quinn notes that his next vehicle will be a Tesla model, he believes the rapid growth of electric vehicles throughout the industry will significantly benefit us all.

"We're seeing more companies starting to produce electric vehicles in all classes, which is great for the industry," he explains. "By getting more electric vehicles on the road, not only will we worry less about fluctuations at the pump – we'll see cleaner cities, a dramatic drop in carbon emissions, and we will have adopted sustainable practices for the future." 🌟



## Virtual Ventures Recognized for Supporting Girls in Engineering

Over the last few decades, women have played an increasingly large role in science, technology, engineering and math (STEM) fields, but full gender equality remains elusive.

Carleton's Virtual Ventures program is helping to close this gap through its technology and engineering programs for girls. On January 21, the non-profit organization, run by Carleton's Faculty of Engineering and Design, was recognized for its effort and success when it was presented with the 2015 Actua Experience Award – National Girls Program.

"What makes us successful is the model we follow – youth teaching youth," said Mawuena Torkornoo, director of Virtual Ventures, which has

been offering summer camps, fall and winter clubs, and outreach sessions for children at schools, community centres and libraries since 1994.

"The Carleton students we hire to teach were elementary and high school students not that long ago," said Torkornoo, "so they can really relate."

Youth in grades 1 through 10 can enroll in Virtual Ventures' programs, including computer coding and game design camps. Girls are encouraged to sign up for co-ed sessions, but Torkornoo explains that some feel more comfortable in an all female setting.

"We put them in an environment with like-minded girls, where they can be themselves and not worry

about making mistakes. Learning is all about experimentation."

Actua is an Ottawa-based national charity that engages youth in STEM experiences and encourages girls to become innovators and leaders. Its selection committee was impressed by Virtual Ventures' dedication to providing high-quality, impactful programming to the girls they reach.

"Virtual Ventures' commitment to the all-girls club and camp format, ensuring there are female role models – both through mentors and well-trained instructors – and their dedication to sustaining girls' programming with the new girls outreach coordinator position resonated greatly," noted Actua.

While Grade 12 physics is a mandatory prerequisite for an undergraduate degree in engineering, female enrolment in high school physics courses stands comparatively low. The Faculty of Engineering and Design hopes programs such as Virtual Ventures will encourage more girls to pursue science and mathematics courses in high school.

"At Carleton, our goal is to encourage young women to explore their potential in engineering and design and to discover the exciting career opportunities that are open to them," said Rafik Goubran, dean of the Faculty of Engineering and Design.

"We are extremely proud of our Virtual Ventures program. For more than two decades, this tremendous initiative has been inspiring youth with a wide assortment of engaging engineering and technology programs at Carleton."

# Water for Life— New Research Chair in Water and Global Health



Water is our most precious resource. It sustains life, offers a source of energy, a means of transportation, habitat for marine wildlife, hydration for agriculture, and moderation for climate and temperature. It is essential for the survival of not only humans, but all life on this planet.

The responsible management of water and public health will be paramount for the 21st century. In less than 25 years, two-thirds of the global population is expected to be living in water-stressed conditions, faced with periodic shortage. Already, hundreds of children die every day because of unsafe drinking water and poor sanitation.

On March 22nd, 2016, Carleton University announced a new Research Chair in Water and Global Health, funded in partnership with a \$2 million investment from the Jarislowsky Foundation. The generosity of the Jarislowsky Foundation has made possible more than 25 research and teaching chairs at universities across Canada in support of a cross section of academic areas, including religion, medicine and business.

The interdisciplinary position, which will sit with the Department of Civil and Environmental Engineering, will

strive to improve and optimize the performance of existing treatment processes, develop new technologies and ensure these solutions are exported and utilized worldwide.

Dr. Rafik Goubran, dean of the Faculty of Engineering and Design, expressed his gratitude towards the tremendous investment of Jarislowsky and his foundation. "This position will complement existing strengths in the research-intensive Faculty of Engineering and Design," he said. "It will catalyze a team of water and public health professionals who will work collaboratively across disciplines for the public good."

Carleton will be launching an international open search for candidates in the near future. Additional Carleton research projects in this area currently include: real-time monitoring of the quantity of microorganisms present in drinking water, educating communities on the use of UV light as a chemical-free method of disinfecting drinking water, and using polymers and advanced oxidation processes to remove water contaminants.

## Making Sense out of Sensor Data

Smart sensor systems are quickly becoming an integral part of our everyday lives. At Carleton, these systems have now become the focus of cutting-edge research.

After joining the Department of Systems and Computer Engineering as an associate professor this past July, Dr. Sreeraman Rajan's was recently announced as a Tier II Canada Research Chair in Sensor Systems, funded at \$500,000 over the next 5 years.

As the data collected by sensors continues to evolve, the quality and accuracy of information has become essential to our understanding and decision-making. In order to ensure that we get the most out of what we collect, Dr. Rajan looks to improve the value of information extracted from sensor data.

As an emerging world-class expert in signal processing and sensor systems, Dr. Rajan will implement compressive sensing in his research, an approach which significantly increases the efficiency and affordability of sensor systems by focusing only on relevant data.

"When it comes to implementing sensor systems, more is not always better," he explains. "An overload of data or 'noise' can actually prove to be an obstacle."

Dr. Rajan's novel approach will focus on utilizing dynamic sensors in an intelligent fashion, in order to ensure greater accuracy and enhanced levels of verification. His focus on non-contact sensors holds great promise for security and defense industries, offering improved situational assessment through the use of thermal sensors and radars.

Dr. Rajan's research will also directly impact the health and well-being of all Canadians. His innovative solutions in biomedical sensing have the potential to vastly improve patient welfare, as non-intrusive sensors can be employed to monitor heart rate and breathing patterns while patients go about their daily activities. Preventative medicine will also benefit from the implementation of active and passive sensing to assess potential precursors to heart-attacks and similar events.

The Canada Research Chairs Program is designed to attract the best talent from Canada and around the world. Its goal is to improve Canadians' depth of knowledge and quality of life, strengthen the country's international competitiveness, and help train the next generation of highly-skilled people.

# GM Canada President Steve Carlisle Talks Auto Innovation at Carleton

GM Canada President and Managing Director, Steve Carlisle, visited Carleton University on Wednesday, March 30 as part of the company's efforts to find and drive innovation for the future of the automobile.

Carlisle spoke with engineering students about the auto sector's rapid move towards an automotive future where vehicles are electric, connected, autonomous and shared – changes that present tremendous benefits for improved safety, greenhouse gas reduction and economic benefit in Canada.

Before presenting, Carlisle met with students to observe and discuss innovative projects in software engineering, active safety, human-computer interaction, communications, cybersecurity and vehicle infotainment. He also met with several of Carleton's UAV (Uninhabited Aerial Vehicle) teams, as well as members of the Ravens Racing Formula SAE team, which recently unveiled its brand new vehicle at the Ottawa Gatineau International Auto Show.

Carlisle expressed great interest in the student showcase, even climbing into the new racer to get a first-hand experience.

"The impressive talent and innovation happening at Carleton University can help support the new range of advanced engineering and technical skills our industry needs as it transforms," he said.

He also met with faculty to assess opportunities to support GM's expanding engineering and research and development work in Canada in emerging areas of automotive technology.

"Carleton's research-intensive Faculty of Engineering and Design continues to expand and adapt to meet emerging needs," said Rafik Goubnan, dean of the



Faculty of Engineering and Design. "We look forward to establishing a long-term partnership with GM Canada to create new co-op placements and career opportunities for our students, and initiate joint research projects."

Roseann O'Reilly Runte, president and vice-chancellor of Carleton University and Malcolm Butler, dean of the Faculty of Science, also delivered remarks.

GM's Canadian Engineering Centre is in the process of hiring more than 100 software and controls engineers to support a new mandate related to "connected car" systems, environmental and urban mobility solutions.

Following the talk, representatives from GM Canada hosted a formal session to promote how emerging needs in the auto industry have created new and exciting career opportunities for Carleton students and new graduates.

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