

**SCHULICH SCHOOL OF ENGINEERING**

# Energizing Engineering Leadership

**STRATEGIC PLAN  
PROGRESS REPORT 2018**

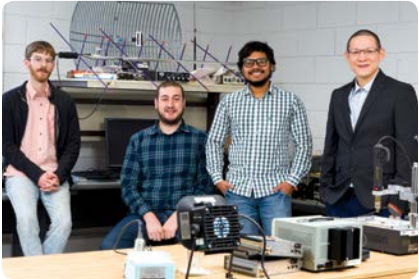


In the fall of 2015, the University of Calgary’s Schulich School of Engineering launched its strategic plan *Energizing Engineering Leadership*. Under the direction of Dean Bill Rosehart, the school has focused its efforts on supporting student success, fostering diversity and research that makes a difference in the world — efforts which also align to the University of Calgary’s *Eyes High* strategic vision. This progress report outlines our activities and achievements in 2018 — the third year of our plan.

# Values

As a community defined by energy, enterprise and excellence, the shared values of our school — collaboration, creativity, kindness — are having a positive impact and changing lives.

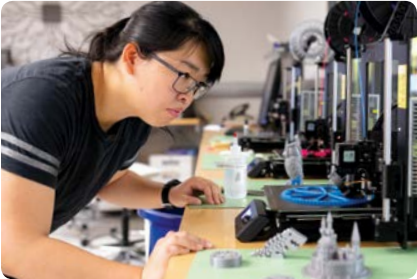
## COLLABORATION



### Bringing WiFi to Indigenous communities

Graduate student **Tushar Sharma** (electrical and computer) partnered with fellow engineers **Bruce Buffalo**, **David Garrett** and **Anis Ben Arfi** to help address disparity in internet access in Indigenous communities. Their efforts to bridge the digital divide in rural Alberta aligns with the UCalgary Indigenous Strategy *ii’ taa’poh’to’p* and its efforts to transform ways of knowing.

## CREATIVITY



### Maker Multiplex (M²)

We launched a new maker space, complete with 40 3D printers, soldering irons, electronics equipment, robotics materials and more. The space, which will expand to include places for prototype development and engineering musicians and artists, is designed to inspire creativity and ingenuity across campus.

## KINDNESS



### Ronald McDonald House

Families whose children were undergoing treatment at the Alberta Children’s Hospital received home-cooked meals from our faculty and staff supporting Ronald McDonald House’s Home for Dinner program. We also donated science and engineering-themed toys for patients going home after treatment and participated in the Hustle for the House fundraiser.

# DEAN’S MESSAGE



The Schulich School of Engineering is energized by our clear strategic vision. Since 2015, our continued focus on supporting student success, fostering diversity and high-impact research has inspired success stories across our school.

In the past year, we launched the Maker Multiplex (M²), helping us spark an entrepreneurial mindset with a place to build prototypes, test designs and grow problem-solving skills. We recruited an Indigenous Engineer-in-Residence. And we transformed our mechanical engineering building — upgrading vital research and lab spaces.

Responding to the needs of our economy, our Department of Electrical and Computer Engineering launched a new Master of Engineering program with a focus on software engineering this fall. The 12-month program, where students develop advanced software engineering skills, was immediately overwhelmed with applicants. This is just a hint of the demand for technical talent in Calgary — and our ability to meet it.

In the coming year, we are developing a new graduate employment initiative to ensure our students have support transitioning to meaningful engineering work. We are focused on expanding our industry partnerships to enable our researchers to grow their high-impact research. And, we will promote new diversity initiatives to welcome everyone into our profession.

The Schulich School of Engineering continues on a trajectory of success thanks to the students, faculty, staff and community champions who support our vision. We know we can’t do it alone. We are always seeking new ways to work with community leaders to meet the changing needs of our society. We encourage you to join us as we find new ways of *Energizing Engineering Leadership* — together.

**Dr. Bill Rosehart, PEng, PhD**  
Dean, Schulich School of Engineering

### DEAN

**Dr. Bill Rosehart, PEng, PhD**

### SENIOR ASSOCIATE DEAN

Academic and Planning  
**Dr. Anders Nygren, PEng, PhD**

### ASSOCIATE DEANS

Equity and Diversity, Teaching and Learning, International  
**Dr. Qiao Sun, PEng, PhD**  
Student Affairs and Student Professional Development  
**Dr. Arindom Sen, PEng, PhD**  
Research and Graduate Studies  
**Dr. Gopal Achari, PEng, PhD**

### DEPARTMENT HEADS

Chemical and Petroleum  
**Dr. Anil K. Mehrotra, PEng, PhD**  
Civil  
**Dr. Jocelyn Hayley, PEng, PhD**  
Electrical and Computer  
**Dr. David Westwick, PEng, PhD**  
Geomatics  
**Dr. Emmanuel Stefanakis, PEng, PhD**  
Mechanical and Manufacturing  
**Dr. Robert Brennan, PEng, PhD**

### STAFF

Director of Business Operations  
**Bethe Andreassen**  
Director of Development and Alumni Engagement  
**Matthew Burns**  
Associate Director, Student Services  
**Jenny Cruickshank**  
Finance Partner  
**Jane Gao**  
Manager, Strategic Projects  
**Barbara Ball**  
Manager of Marketing and Communications  
**Sarah McGinnis**



# Building our new home

Enhancing our teaching, learning and research spaces continues to be a focus as we position our engineering school to meet the challenges of the future.



## Modernizing the Mechanical Engineering building

This fall, we re-opened the Mechanical Engineering building after extensive renovations. This modernization project primarily included upgrades to research labs. It also improved graduate student and administrative spaces, and re-established a permanent home for our Department of Mechanical and Manufacturing Engineering.

## Optimizing student design labs

Spaces that support hands-on learning and collaboration enhance the student experience. Over the summer, we invested more than \$500,000 to modify some large design labs. They now provide even more flexible learning spaces — allowing us to further expand our design-based and experiential learning approach with hundreds more students at a time.



## Upgrading ICT

Renovations to our Information and Communications Technologies building, including research labs, have helped ensure our Electrical and Computer Engineering Department has the space it needs to investigate and develop the technologies of tomorrow.



## Expanding our efforts

Late in 2018, we began updating our E Block. This construction project, which is expected to be completed in early 2020, will include renovations in both the Geomatics and Civil Engineering departments. Geomatics students will be offered modern lab spaces and collaborative homerooms that can better accommodate the innovative teaching and learning practices of the future. The renovations will also provide state-of-the-art research and teaching facilities for civil engineering with an emphasis on clean technologies. With significant renovations to water, wastewater technologies, soil remediation research and new facilities for materials design and innovation, we are also providing an interdisciplinary collision space around environmental, soils and materials engineering.

After successfully transforming six separate buildings into a cohesive teaching and learning facility, we officially opened the Canadian Natural Resources Limited Engineering Complex in 2016. Our renovations kept going, expanding into the Information and Communications Technologies building and our Mechanical Engineering building. Spaces designed to meet the needs of modern students and forward-focused researchers are already enabling our students, faculty and staff to reach their potential.



# Committed to student success

From their first class to graduation day, and throughout their careers, students' success is nurtured by the Schulich School of Engineering. Supporting student success is one of three foundational pillars in our strategic plan. By providing enhanced student support, teaching and learning excellence, and real-world experiences, we are ensuring our students have rich learning opportunities inside and outside the classroom.

**16%**

increase in student work placements with 487 students on internship in 2018

NEARLY  
**450**

students enrolled in our engineering leadership program, 3X more than last year

**\$4.4M**

in scholarships and bursaries awarded to engineering students



## Engineering Olympian

Alex Gough (civil) earned Canada's first medal in luge — a bronze in women's singles at the Olympic Games in PyeongChang — before also winning a silver medal in luge in the team relay. We support athletes like Alex so they can reach their full academic and athletic potential.

**60**

students in our new master's program with a focus on software engineering

OVER  
**\$500K**

invested in new, flexible learning spaces

**3**

new engineering teaching innovation chairs



# GOAL: STUDENT SUPPORT

## New software engineering master's

In response to labour market demands for more tech talent, we launched a new course-based Master of Engineering in Electrical and Computer Engineering with a focus on software engineering. It's designed to provide engineering graduates with advanced-level software skills — even those with non-software backgrounds. After three weeks of recruitment, the program was oversubscribed.

## Scholarships key to student success

Our engineering students received \$4.4 million in scholarships, awards and bursaries last year. Funding from community donors enables our students to focus on their studies and take advantage of student professional development opportunities instead of worrying about how to pay for their degrees.



### Vanier Scholars

Graduate students **Breanna Borys** (biomedical) (*left*) and **Leanne Dawson** (electrical and computer) (*right*) were both named Vanier Canada Scholars. Receiving a Vanier scholarship is a significant achievement as it supports highly skilled and innovative graduate students who take on extraordinary leadership in their research and the community. Breanna's research is focused on developing engineering protocols to grow stem cells safely and efficiently. Leanne's work is in using actual weather conditions to increase the capacity of existing power lines so that new lines don't have to be built to accommodate new power generation.



### Schulich Leader Scholarship

Schulich School of Engineering first-year student **Maria Baclic** of Edmonton is the latest winner of the prestigious Schulich Leader Scholarship. The \$100,000 scholarship is awarded to the most promising incoming engineering student each year. It is part of a nation-wide effort to create the next generation of technology innovators made-possible by the Schulich Foundation.

## Energy Engineering homeroom

A philanthropic gift from Teine Energy Ltd. will create a dedicated homeroom for Energy Engineering students, providing collaborate breakout rooms, quiet study spaces, and multimedia presentation equipment for enhanced experiential teaching and learning. The company has also provided support to launch the Teine Energy Ltd. Energy Engineering Scholarship.



### 3M National Student Fellow

Master's student **Alexandra Meikleham** (mechanical and manufacturing) was named as one of 10 national student fellows for creating project-based learning experiences that develop engineering students' professional skills in tandem with technical acumen. She is also an advocate for the advancement of responsible and ethical practices in engineering, having collaborated with institutions across Canada to establish and implement the Global Engineering Initiative in partnership with Engineers Without Borders.

## Guaranteed program placement

We implemented guaranteed program placement for all students completing a full first year with a B average or better. High school students entering our program with a 90 per cent average in pre-requisite courses are also now eligible for guaranteed placement into the program of their choice upon the completion of a full first year and maintaining a B- average. This change was designed to reduce stress and attract top students by making program placement more predictable.



## Graduation success

After being involved in a car crash which claimed the lives of her parents and sister, **Sara Elkady** (chemical and petroleum) completed her engineering degree from her hospital room thanks to her own perseverance, and support from faculty and staff. "They were behind me 100 per cent," she said.





# GOAL: TEACHING AND LEARNING EXCELLENCE



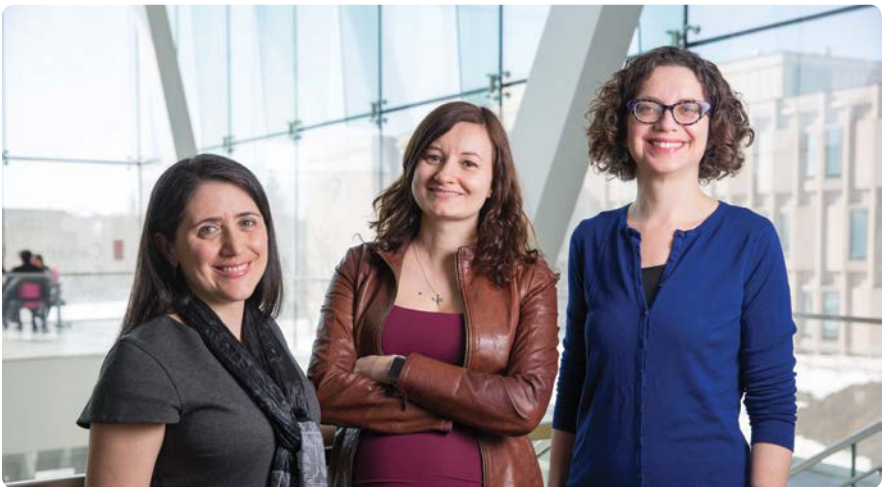
## Lecture of a Lifetime

By demonstrating engineering principles with famous childhood literature, professor emeritus **Dr. Lynne Cowe Falls, PhD** (civil) gave an inspiring lecture on how engineering is everywhere with her presentation, *“Oh the places you’ll go: Engineering Lessons from a Childhood Muse.”*



## Geomatics accreditation

In addition to being accredited by the CEAB, our Department of Geomatics has also been awarded the highest level of accreditation from the Canadian Board of Examiners for Professional Surveyors.



## Team teaching award

(Left to right) Professor **Dr. Laleh Behjat, PhD**, (electrical and computer), associate professor **Dr. Milana Trifkovic, PhD**, (chemical and petroleum), and professor **Dr. Elise Fear, PhD**, (electrical and computer) were awarded the 2018 University of Calgary Teaching Award for their team teaching efforts, which involved collaborating across departments to provide graduate students with essential professional skills development by redesigning a seminar course.

## Engineering Education Forum

In May 2018, we hosted an engineering education forum where our faculty members and graduate students presented their work in engineering education. Participants shared teaching activities and innovations. Topics included student-centred tutorials, threshold concepts, creativity, leadership and hands-on experimental labs.

## Engineering accreditation

All of our undergraduate programs are accredited by the Canadian Engineering Accreditation Board under its national accreditation process. Our school earned the top result in the accreditation process for all of our traditional four-year programs. This is a testament to the year-round hard work of our faculty and staff to support student success through high-quality teaching and hands-on learning experiences.

## Engineering teaching innovation chairs

Instructors **Dr. Mohammad Moshipour, PhD**, (electrical and computer) and **Dr. Elena Rangelova, PhD**, (geomatics) and professor **Dr. U.T. Sundararaj, PhD**, (chemical and petroleum) were selected as the first teaching innovation chairs. Their three-year terms, which extend until June 2021, will focus on new approaches for improving teaching and learning effectiveness and supporting teaching development across the school.





## GOAL: REAL-WORLD STUDENT EXPERIENCE

### London Stock Exchange

Students in our new program with the Haskayne School of Business, where they can earn an engineering degree and a business degree in as little as five years, travelled to London to learn more about the London Stock Exchange and network with business and engineering leaders.



### Record number of internship placements

Expanded engagement with companies locally and globally, as well as innovative career support services for students, has resulted in 487 students placed on internship — 70 more than last year, an increase of 34 per cent in two years. The number of postings seeking skilled engineering interns also hit an all-time record in 2018.



### Student advisor drop-in sessions

The Alka and Sanjeev Khanna Engineering Career Centre launched advisor drop-in sessions to help increase the opportunities for students to meet face-to-face for career supports.

### Ten Thousand Coffees

The Engineering Career Centre partnered with RBC Future Launch and Ten Thousand Coffees on a new program to increase networking and mentoring opportunities for undergraduate and graduate students. The initiative matches students with industry mentors who can share insights on how to reach their career goals.

### Eliminating student job-posting fees

With strong support from our Engineering Career Centre, the \$130 posting fee was removed for employers seeking to hire UCalgary students. This is part of ongoing efforts to provide our students with critical career-building opportunities throughout their degrees.

### Enhancing professional development

Nearly 450 students registered for our Engineering Leadership Program in 2018, more than three times as many as in 2017. The program teaches entrepreneurial thinking, effective work habits and professional skills to help prepare students to seamlessly join highly effective engineering teams upon graduation.

### Silicon Valley

Electrical and Computer Engineering students travelled to the global centre for technology and innovation to engage with top companies like Google, building vital networks and discovering the potential of a high-tech career. This trip is part of our ongoing efforts to cultivate the tech talent our province needs.



### Student competition teams

Schulich continues to support its nine competitive student teams. This year, our student-built Formula One racecar impressed judges at the Lincoln 2018 competition with its data-driven decision-making design, placing the team 16<sup>th</sup> out of 80 entries from across North America.

### Guatemala

Professor **Dr. Hamidreza Zareipour, PhD**, (electrical and computer) led a group of 12 students from electrical and computer, mechanical and civil engineering to Guatemala in February. The trip, held in partnership with Light Up the World Foundation, saw students install solar energy systems in remote communities. The journey provided our students with a meaningful international experience, hands-on training, and an opportunity to use their skills to help address a global problem.

### National recognition

Several chemical and petroleum students won national awards at the annual CSChE Conference, including winning The Hatch Plant Design Competition Award. **Keith Cleland**, **Laura Fader**, **Alina Kutniskaya** and **Anh Nguyen** earned the top prize based on their capstone design project. **Caleb Tong** was awarded second place at the Robert G. Auld student paper competition and **Laura Fader** was awarded first place at the Reg Friesen Oral Paper competition.



# Fostering diversity

Engineering at its core is a call to serve humanity. For this creative field to thrive, we need to cultivate an environment where people with a variety of backgrounds, genders, interests and talents feel welcome and included. Fostering diversity is the second of our foundational pillars. By promoting inclusion, health and wellness, we are striving to make everyone feel at home at the Schulich School of Engineering.

## *ii' taa'poh'to'p*

We are proud supporters of the University of Calgary's Indigenous strategy, developed in collaboration with our Indigenous community and under the direction of Provost and Vice-President (Academic) Dr. Dru Marshall, PhD.

**1400+**

youth engaged in STEM outreach activities

**95**

engineering students attended the Grace Hopper Celebration since 2015 — the world's largest gathering of women in tech

**650+**

high school students experienced classroom visits, tours or events with engineering student ambassadors

**96**

participants in a new Female Graduate Student Leadership Circle

**95+**

faculty and staff involved in our first Step Challenge

**\$120K**

in new funding for STEM outreach activities



# GOAL: INCLUDING ALL

## New STEM scholarships

De Beers Canada announced six new UCalgary scholarships — including four for engineering. The scholarships are for female students and are part of De Beers Canada’s national effort to support women in STEM (science, technology, engineering, mathematics.) The initiative also aims to engage Indigenous women from the Northwest Territories and Northern Ontario in STEM fields, and is part of De Beers’ commitment to the United Nations “HeforShe” effort.

## Lunch Hour Diversity Sessions

More than 50 participants attended the Lunch Hour Diversity Sessions throughout the school year, which were organized by the Diversity and Inclusivity Action Committee.

## Faculty leadership training

Nine female faculty members participated in a Schulich School of Engineering-sponsored Leadership Workshop Series provided by the Canadian Centre for Women in Science, Engineering, Trades and Technology (WinSETT). Topics included Becoming Leaders; Effective Communication; Negotiating for Success; Navigating Politics at Work; Networks, Mentors, and Sponsors; and Emotional Intelligence.

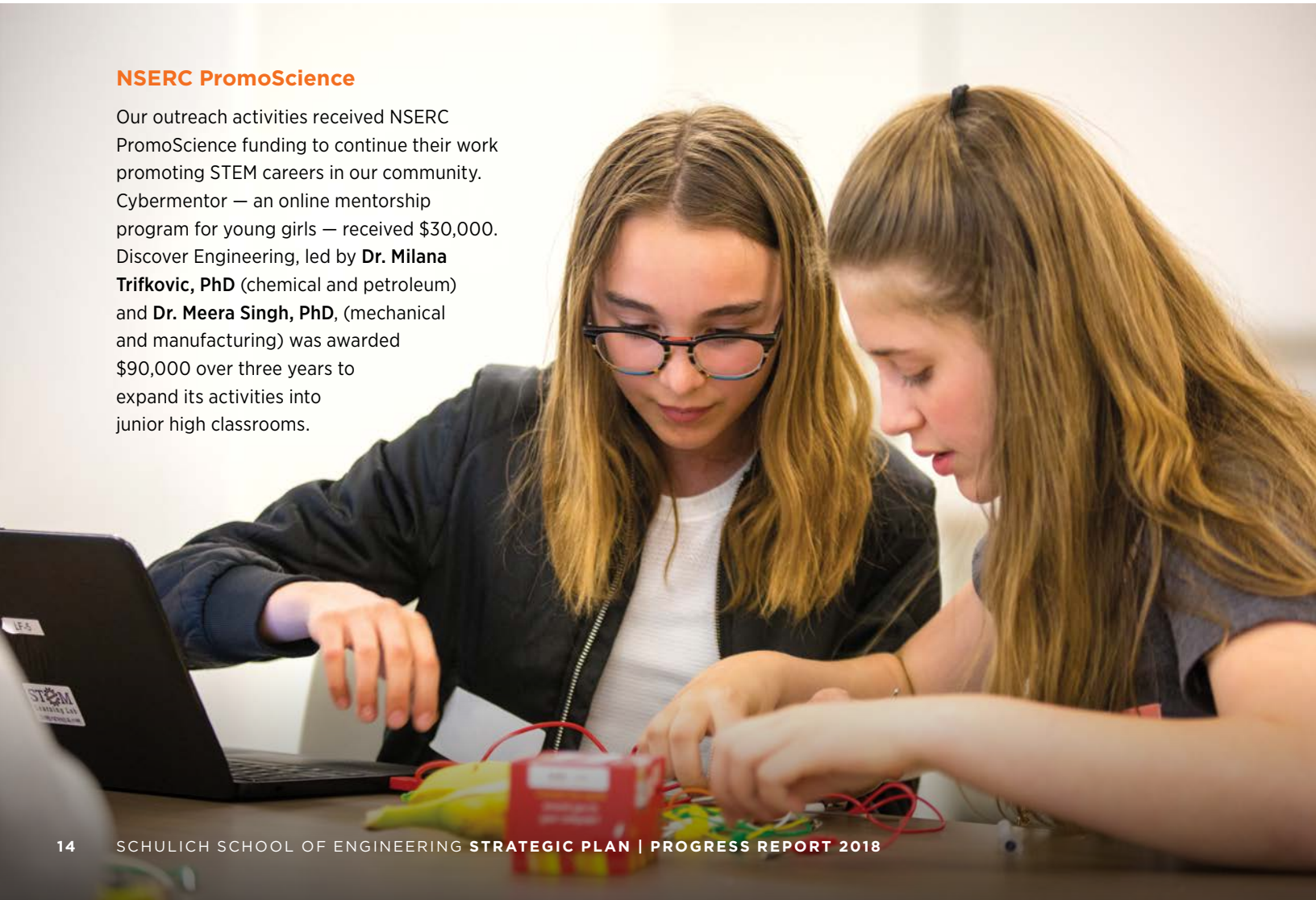
## ‘She Leads’ workshop

A lesson in electronics soldering was hosted by engineering as part of efforts to support Women in Work Week at the University of Calgary. The workshop is part of ongoing efforts to encourage all women to see themselves as welcome in STEM.



## NSERC PromoScience

Our outreach activities received NSERC PromoScience funding to continue their work promoting STEM careers in our community. Cybermentor — an online mentorship program for young girls — received \$30,000. Discover Engineering, led by **Dr. Milana Trifkovic, PhD** (chemical and petroleum) and **Dr. Meera Singh, PhD** (mechanical and manufacturing) was awarded \$90,000 over three years to expand its activities into junior high classrooms.



## Leadership communications award

The Schulich School of Engineering’s marketing and communications team won the International Association of Business Communicators’ 2018 Gold Quill Award of Merit in Leadership Communications for its three-year effort to support our strategic vision *Energizing Engineering Leadership*.

## Women in Data Science Conference

We co-hosted a one-day conference in conjunction with Stanford University’s Women in Data Science (WiDS) Conference. More than 90 researchers and data practitioners descended on campus to listen to local speakers, student poster presentations, as well as presentations livestreamed from Stanford University, joining 75,000 people from 75 countries around the world.

## Indigenous Engineer-in-Residence

We welcomed our very first Indigenous Engineer-in-Residence **Deanna Burgart (centre)**. A self-proclaimed ‘Indigeneer,’ Deanna has dedicated her career to combining engineering principles with an Indigenous respect for Mother Earth. She will spend the next year working with us to expand our connections between engineering and Indigenous wisdom.





### Immigrants of Distinction Awards

At the 22<sup>nd</sup> annual Immigrants of Distinction Awards, professor emeritus **Dr. Tom Brown, PhD (civil)** won the Lifetime Achievement award, associate dean **Dr. Gopal Achari, PhD (civil, CEERE)** won the Science, Technology, Engineering and Math award, and teaching professor **Dr. Marjan Eggermont, PhD (mechanical and manufacturing)** won the Arts and Culture Award.

### Women in Engineering Day

There were around 350 Calgary-area young women who joined in a day of hands-on activities and inspiring panel discussions on campus as part of our annual Women in Engineering Day.

### Women in engineering student awards

Graduate student **Rachel L'Orsa** (electrical and computer), and undergraduate students **Sheliza Kassam** (chemical and petroleum) and **Adanna Stephanie Isilebo** (civil) were recognized by the Canadian Engineering Memorial Foundation. Rachel won the Claudette MacKay-Lassonde Graduate Award. Sheliza received the Rona Hatt Ambassador Award. Adanna was named the CEMF Ambassador for the Prairies.

### Minds in Motion

A summer camp program operated in partnership with Active Living received \$150,000 over two years in new funding from Actua, Canada's largest STEM outreach organization.



### Science Rendezvous

Cybermentor and Schulich hosted STEAM (Science, Technology, Engineering, Arts and Math) — a youth program for kids ages 11 to 18 — to encourage an interest in science and engineering. This event was part of Science Odyssey — NSERC's nation-wide celebration of Science, Technology, Engineering and Math.

### Taking center stage on diversity research and best practices

Schulich researchers presented six papers and posters at the international Gender Summit 2017 and Canadian Coalition of Women in Engineering, Science, Trades and Technology (CCWESTT 2018). The Schulich School of Engineering is a proud sponsor of the Youth Program held in conjunction with the CCWESTT 2018 in Edmonton.

### Female Graduate Student Leadership Circle

Led by professor **Dr. Laleh Behjat, PhD**, (electrical and computer) and sponsored by the Faculty of Graduate Studies, a new leadership circle is providing leadership growth and training to 96 graduate and postdoctoral scholars from six faculties. The leadership circle includes six formal workshops, two industrial speaker panel sessions, and 10 networking sessions with female faculty members from engineering and science. Laleh won the AWSN Minerva Mentoring Award for her work to support young engineering leaders and diversity in STEM.



### Calgary Pride Parade

We continued to show our support for the LGBTQ2+ community by marching in the Calgary Pride Parade. Our team included faculty, staff and students, as well as some of our student-designed vehicles. We are proud to continue to celebrate inclusion as a community.



# GOAL: PROMOTING HEALTH AND WELLNESS



## Schulich Stampede breakfast

For the first time, we encouraged our alumni and community champions to join us for our annual engineering Stampede breakfast. More than 700 people, including our new UCalgary Chancellor Deborah Yedlin, came out to the event, which featured a live country band, a petting zoo and world-class flapjacks.



## Expanded internal recognition

We have launched a series of new internal awards including the staff “Shout Out” awards, teaching and research awards to acknowledge our faculty and staff who are working tirelessly to help our school meet and exceed our *Energizing Engineering Leadership* goals.

## Retreat space

We opened a new retreat space for faculty and staff to gather and unwind. Calming elements, including fish tanks, long library-style work tables and a kitchen area, allow employees to escape to a coffee-shop setting when working on a major project or when needing a break.

## Certificate of Recognition safety audit

Our engineering school was a successful part of the University of Calgary’s Certificate of Recognition (COR) safety audit. The COR designation is issued by the Alberta Ministry of Labour. This is a tremendous testament to our commitment towards ensuring a safe work and learning environment for all students, faculty and staff.

## Yoga, meditation and steps challenge

Launching a series of free yoga and meditation classes provided faculty and staff with a regular chance to unwind and practice personal wellness during their workday. A fall-term, 100-day steps challenge also encouraged our school community to keep moving even as the temperatures dropped.

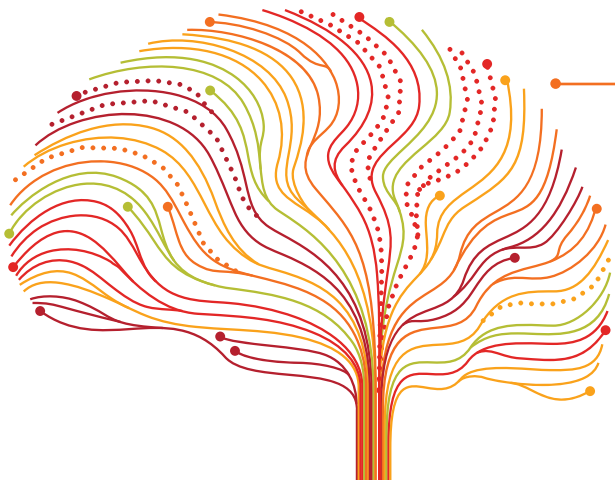


## Puppy room

With midterms around the corner, we partnered with PALS Calgary to help students lower their stress levels by visiting with some four-legged friends. Our first puppy room saw dozens of students laughing and cuddling with dogs over lunch hour — smiles all around.

## Student wellness counselor

To help students who are experiencing stress or other mental health concerns, the Engineering Students Centre welcomes a university wellness counselor once a week to meet with engineering students in our space.





# Research that makes a difference

We are committed to promoting research that has a real, measurable and lasting impact on the lives of people — both down the street and around the globe. Research that makes a difference is our third foundational pillar. By supporting leading researchers, increasing collaboration and focusing on innovations that improve lives, we are demonstrating the best of what engineers can be.

3

prestigious NSERC  
Discovery Accelerator  
Supplements awarded to  
our researchers

33

new research partnerships  
with industry, supported  
by NSERC Engage Grants  
in 2017-18

\$1M

awarded this year to  
our faculty members  
for new research  
equipment

3

Canada Research Chairs  
awarded: 1 new (BioMEMS);  
2 renewed (High-Sensitivity  
Radiometers and Receivers,  
and Geomechanics of  
Gas Hydrates)

6

national fellowships  
awarded to engineering  
researchers

\$4.95M

for innovative new  
graduate research training  
programs, including  
\$1.65M for research in  
integrated infrastructure for  
sustainable communities

## Revolutionizing tissue engineering

Assistant professor Dr. Amir Sanati Nehzad, PhD (mechanical and manufacturing, Centre for Bioengineering Research and Education) was named the new Canada Research Chair in Bio-micro electromechanical (BioMEMS) for his work engineering microscale models of skin, liver and vasculature tissues with integrated sensors.



# GOAL: LEADING RESEARCH



## Prestigious fellowships

(Left to right) Professor **Dr. Josephine Hill, PhD** (chemical and petroleum) and professor **Dr. Naser El-Sheimy, PhD** (geomatics) were elected as fellows of the Canadian Academy of Engineering (CAE). El-Sheimy was also elected as a fellow of the US Institute of Navigation (ION).

Professor **Dr. Nader Mahinpey, PhD** (chemical and petroleum) and professor **Dr. Uttandaraman (U.T.) Sundararaj, PhD** (chemical and petroleum) were elected as fellows of the Chemical Institute of Canada (CIC). Professor Sundararaj was also elected as a fellow of the Society of Plastics Engineers (SPE).

## ASTech Awards

Our school won three ASTech Awards in 2018, including:

The automated monitoring and control systems group with **Dr. Reza Maalek, PhD**, (civil) **Dr. Derek Lichti, PhD**, (geomatics) and Vice-Provost (International) **Dr. Janaka Ruwanpura, PhD** (civil) won the outstanding achievement in applied technology innovation.

**Dr. Orly Yadid Pecht, PhD**, (electrical and computer) won the outstanding achievement in technology award.

PhD student **Emily Marasco** (electrical and computer) won the outstanding leader of tomorrow award.

## APEGA Awards

Professor emeritus **Dr. Lynn Cowe Falls, PhD**, (civil) earned the Women in Engineering and Geoscience Award for her work mentoring a generation of younger women engineers and in developing the Homes of Hope program building homes in Mexico for disadvantaged families.

Professor **Dr. Yang Gao, PhD** (geomatics) received the Research Excellence Award for his work on improving the accuracy and lowering the costs of location-based technologies.

Associate professor **Dr. Nashaat Nassar, PhD** (chemical and petroleum) was awarded the Early Accomplishment Award for his teaching and research accomplishments relating to nanotechnology innovations for CO<sub>2</sub> capture and conversion, oil and gas, wastewater treatment and natural gas conditioning industries.

## Leadership award

Professor **Dr. Yang Gao, PhD** (geomatics) earned the Institute of Navigation (ION) Thomas L. Thurlow Award for his leadership in the development and application of Precise Point Positioning (PPP) and high-precision GNSS technology.

## Research strengths and emerging opportunities

For the past 12 months, the Schulich research team has embarked on a school-wide conversation to discuss our research strengths and emerging opportunities. Intensive consultations have identified four research themes and sub-areas in which we are poised to lead and grow. They include:

Intelligent and autonomous digital systems

Biosystems and biomedical engineering

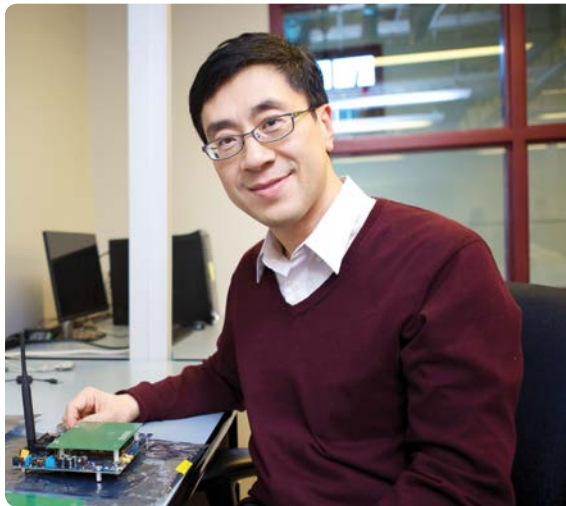
Engineering for the environment

Energy engineering

*Matching strengths with opportunities is a research priority in the University of Calgary's updated research plan, developed under the direction of **Dr. Ed McCauley, PhD**, Vice-President (research) and released in 2018. Dr. McCauley has been selected as UCalgary's ninth president and vice-chancellor, and will assume his new role on January 1, 2019.*



GOAL: WORKING IN TEAMS



Strategic partnership grants

Professor **Dr. Henry Leung, PhD** (electrical and computer) and his team will be working to replicate human decision-making in automated big data software that detects anomalies using the “observe, orient, decide and act” model of human decision-making. Leung’s system, being developed with Defence Research and Development Canada, General Dynamics Mission Systems Canada, Hifi Engineering and Larus Technologies, will replicate human decision-making and be capable of autonomously processing multiple, continuous sets of data in a dynamic environment.

Collaborative research and training experience

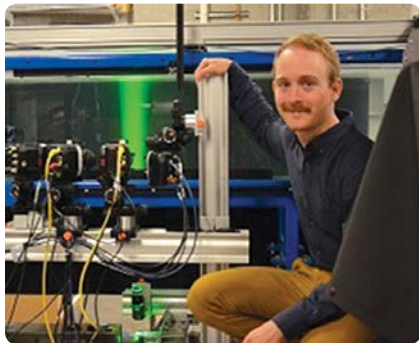
Drone technology, GPS and other sensor-dependent systems are transforming our world. Professor **Dr. Naser El-Sheimy, PhD** (geomatics) (*pictured*) is leading a multidisciplinary team that is working to train the next generation of multi-sensor system (MSS) scientists and engineers to support the development of a highly skilled workforce for high-tech sectors including aerospace, traffic control, smart cities, energy and more.

With the emergence of driverless cars and other technologies transforming our communities, Professor **Dr. Lina Kattan, PhD** (civil) is leading a team looking at training the next generation of professionals on how to make the most of integrated infrastructure for sustainable cities.

To increase the adoption of intermittent renewable energy, new energy conversion and storage technologies are needed. Professor **Dr. Ted Roberts, PhD** (chemical and petroleum) is leading a team working to train future scientists and engineers to develop new materials for electrochemical energy conversion technologies.



GOAL: IMPROVING LIVES



Re-inventing the wheel

Graduate student and avid cyclist **Rob Crane** (mechanical and manufacturing) (*pictured*) collaborated with Calgary wheel manufacturer Energylab and assistant professor **Dr. Chris Morton, PhD** (mechanical and manufacturing) on research investigating professional bike tires. His research found that a rider’s performance can be boosted by ensuring tires are narrowed to the width of the rim, potentially helping athletes shave seconds off their times.



Perfecting bus schedules

Former graduate student **Dr. Willem Klumpenhower, PhD** (civil) is using math to craft efficient transit routes to help keep passengers happy. His research, which is based on Calgary Transit’s operating hours and budget numbers, could save a transit system up to \$3 million per year by moving stopping points around and shaving a few minutes from each bus route.

Technology to the rescue

Assistant professor **Dr. Mozdeh Shahbazi, PhD** (geomatics) is developing autonomous vision-guided UAVs that will transform search and rescue, law enforcement, precision agriculture, infrastructure inspection and safety, and more.

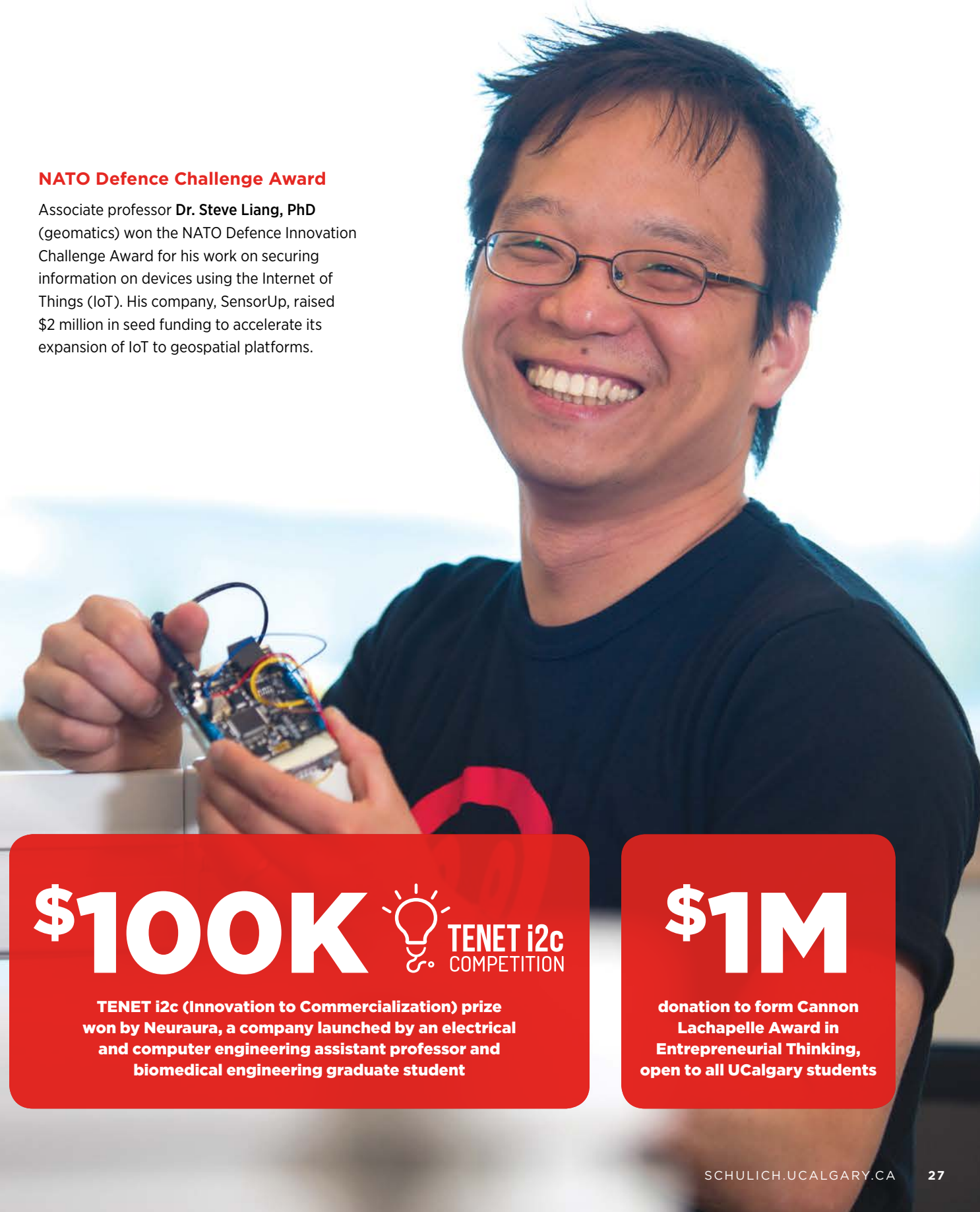


# Innovator, Entrepreneur

These words from our strategic plan represent our vision of an energized engineering leader. They are reminders of the unique mixture of technical and professional skills we work to instill in our students and expand in ourselves. We are proud that the Schulich School of Engineering's focus on leadership has always included entrepreneurial thinking. We look forward to expanding our entrepreneurial activities and offering more leadership development possibilities across our entire school.

## NATO Defence Challenge Award

Associate professor **Dr. Steve Liang, PhD** (geomatics) won the NATO Defence Innovation Challenge Award for his work on securing information on devices using the Internet of Things (IoT). His company, SensorUp, raised \$2 million in seed funding to accelerate its expansion of IoT to geospatial platforms.



**\$2M**

in seed funding  
secured for SensorUp —  
a company launched by an  
engineering professor

OVER  
**25%**

of ventures to graduate the  
first cohort of CDL-Rockies  
were led by engineering  
faculty or graduates

NEARLY  
**120**

student inventions and  
projects showcased  
at the 2018 Capstone  
Design Fair

**\$100K**  **TENET i2c  
COMPETITION**

TENET i2c (Innovation to Commercialization) prize  
won by Neuraura, a company launched by an electrical  
and computer engineering assistant professor and  
biomedical engineering graduate student

**\$1M**

donation to form Cannon  
Lachapelle Award in  
Entrepreneurial Thinking,  
open to all UCalgary students



# GOAL: BUILDING STUDENT LEADERS



## Maker Multiplex (M²)

We opened the Maker Multiplex, also known as M², to offer a place for our school community members to embrace their inner entrepreneurs and join the growing maker movement. The Maker Multiplex offers expanded access to tools and experts who will demonstrate how to use them. With 40 3D printers, electrical soldering irons, electronics, robotics materials and plans to expand into space for prototyping, music and art — the Maker Multiplex is all about enhancing learning, helping build technical skills and inspiring creativity in the engineering design process.

## Engineering and Business competition champions

Schulich student **Manpreet Deol** (mechanical and manufacturing and biomedical), engineering grad and current BComm student **Megan Leslie**, as well as Haskayne School of Business students **Nik Golob** and **Coleton Strand**, took first prize in the Engineering and Commerce Case Competition (ENGCOMM) in Montreal. Up against teams from across North America as well as Israel, Ireland, Egypt and Holland, they excelled in the competition which focused on innovation and entrepreneurial thinking. They won for best engineering solution and best business solution.

## Re-imagining office trash cans

Students **Rebecca Dukart**, **Michael Aissie**, and **Murray Bondy** (civil, mechanical and manufacturing) felt the office wastebasket wasn't up to handling multiple streams of trash. They designed a new one as part of their Technology and Society class. Now, office workers can sort recycling and compost from waste right at their desks.



## Cannon Lachapelle Award in Entrepreneurial Thinking

University President **Dr. Elizabeth Cannon, PhD** and professor emeritus **Dr. Gerard Lachapelle, PhD** (geomatics) donated \$1 million to establish the Cannon Lachapelle Award in Entrepreneurial Thinking. The gift enables promising UCalgary students in any faculty to become entrepreneurial thinkers. Each year, up to four undergraduate students from any field of study will be awarded scholarships, allowing them to explore and develop their creativity and innovation.

## Satellite signal breakthrough prompts patents

By theorizing a signal be established at the satellite to help a Global Navigation Satellite System receiver to estimate its position from a so-called “cold start” to reduce Time to First Fix (TIFF), **Vyasaraj Guru Rao** (geomatics) saw his PhD thesis spark an impressive five US patents. His breakthrough could prove invaluable for military and strategic applications by reducing TIFF to as little as a few seconds. It now takes nearly a minute to estimate position.

## Designing the future

From a bike that can withstand ice and snow to a DNA sequencer to exploring variable speed limits on Glenmore Trail and a device to remove plastics from polluted rivers, nearly 120 student-designed projects were on display at this year's Capstone Design Fair — the first one hosted in our new engineering complex.



Thinker  
Creator  
Designer  
Innovator  
Entrepreneur  
Communicator  
Team Player  
Leader



# GOAL: DEVELOPING RESEARCH LEADERS



## Neuraura

Graduate student **Pierre Wijdenes**, (biomedical) and assistant professor **Dr. Colin Dalton, PhD** (electrical and computer) developed an electronic chip with neurosensors that can record brain activity at a higher resolution, allowing doctors a more detailed look at the brain to determine the areas to target to prevent seizures in epilepsy patients. Their company, Neuraura, won TENET i2c, a business pitch competition, and received close to \$100,000 to support the development of their project.

## Creative Destruction Lab (CDL) Rockies

Creative Destruction Lab Rockies is a unique objective-based mentoring and financing program for massively scalable science-based companies. Several engineering spin-off companies — including SensorUp and Neuraura — created by our researchers have successfully completed the first cohort of this unique program that is operated at the Haskayne School of Business.

## Engineering book club

We've launched a new internal book club to help our faculty and staff share thought-provoking books on student success, fostering diversity and research impact. The goal is to encourage out-of-the-box thinking and problem-solving within our school.



## Elizabeth Cannon 2010 - 2018

The University of Calgary's *Eyes High* strategic direction was launched by University of Calgary President **Dr. Elizabeth Cannon PhD**, focusing the entire university on improving the quality of teaching and learning, research and community engagement. Her support as past dean, and then as university president made our new \$174-million Canadian Natural Resources Limited Engineering Complex possible. Her vision launched *Energize: The Campaign for Eyes High*, which raised more than \$1 billion from more than 24,000 donors. As UCalgary's eighth president and vice-chancellor, Dr. Cannon is an outstanding example of what an engineering leader can achieve.



## Robert Thirsk 2014 - 2018

During his four-year term as UCalgary Chancellor, which concluded in June 2018, former Canadian astronaut **Dr. Robert Thirsk, (BSc Eng'76) PhD**, was a tireless ambassador for the university and promoter of the value of education. He presided over our graduation ceremonies, celebrated research excellence on campus, raised money through Chancellors Club events for scholarships, and inspired students, faculty and staff to reach new heights.

# GOAL: CELEBRATING ENGINEERING LEADERS

## New Alumni Awards

Six outstanding engineering alumni were honoured as part of a new alumni recognition program.

Jackie Forrest, BSc Eng'96	Environment and Sustainability Alumni Award
Pat Fenton, BSc Eng'81	Technical Achievement Alumni Award
Rachael L'Orsa, MSc'16	Early Achievement Alumni Award
Doug MacKenzie, BSc Eng'74	Entrepreneurship Alumni Award
Natalie Panek, BSc Eng'07	Diversity and Equity Alumni Award
Cheryl Sandercock, BSc Eng'90	Alumni Leadership Excellence Award

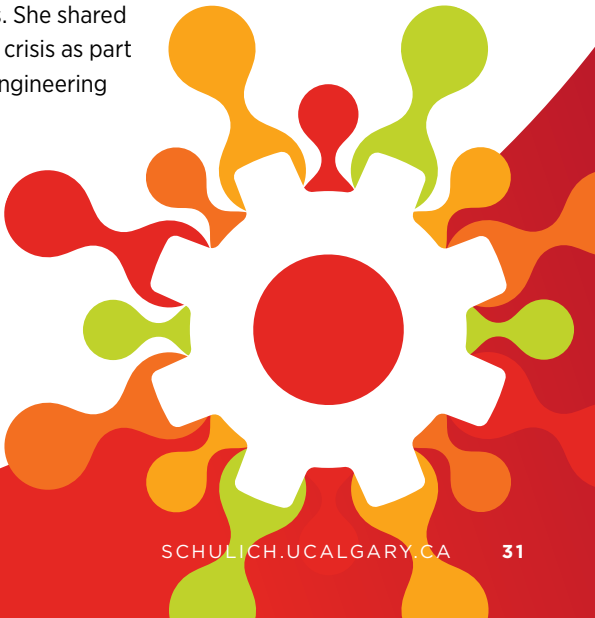


## Kim Sturgess

Alberta WaterSMART CEO **Kim Sturgess, PEng**, was awarded an honorary degree at the June 2018 convocation for her work promoting water management through better technologies and practices. She shared her reflections on the South African water crisis as part of a special breakfast before addressing engineering graduates in the class of 2018.

## Schulich Connects

After more than 25 years as the Engineering Associates Program, we relaunched our engineering breakfast series. Schulich Connects is all about sparking engineering conversation and innovation. With discussions on everything from engineering our digital future to clean energy technology and early cancer detection, we welcome the community to join us for Schulich Connects.





# Spark meaningful change

*Energizing Engineering Leadership* isn't just a strategic vision — it is a call to action. We are living in a digital revolution that is influencing every single industry. The pace of knowledge development is growing at exponential rates. We need to prepare our students for careers that don't even exist yet.

Our profession also needs to continue embracing a diversity of ideas and perspectives to thrive. Innovation sparked by world-leading researchers is critical to helping us answer some of the globe's biggest challenges.

Our school has made an amazing start, but we are only at the halfway mark of our \$80 million goal as part of *Energize: The Campaign for Eyes High*. We've got bold plans to revolutionize engineering education and research to prepare Calgary, Alberta and Canada for a bright tomorrow. We can't do it alone.

We need you to join us as we continue to transform into the engineering school of tomorrow.

- Become a student mentor
- Partner with us on research
- Hire a student intern
- Volunteer on an industry advisory council
- Donate to transform the student experience, to power our strategic research priorities and to create meaningful connections with our community

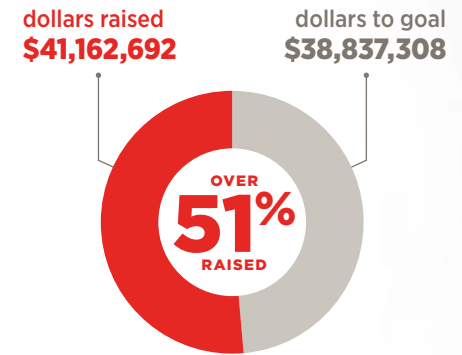
Your insights, your ideas and your support make our progress possible.

**Help us spark meaningful change and energize the future.**

## SOURCES OF SUPPORT

1,096	alumni
291	individuals (non-alumni)
39	foundations
257	corporations
26	other organizations

## \$80M CAMPAIGN GOAL





“Engineering leaders spark new ideas and find solutions never before imagined. By embracing entrepreneurial thinking, hands-on learning and a digital mindset, we’re preparing engineers to be the innovators and disrupters society needs. Join us as we take out-of-the-box thinking to the next level.”

Bill Rosehart, Dean, Schulich School of Engineering



**SCHULICH**  
School of Engineering

Schulich School of Engineering  
University of Calgary  
2500 University Drive NW, Calgary, Alberta T2N 1N4  
[schulich.ucalgary.ca](http://schulich.ucalgary.ca)