School of Engineering

Okanagan Campus

ANNUAL REPORT 2018-19

Welcome

MESSAGE FROM THE DEAN

Every engineering institution in Canada is accredited by the Canadian Engineering Accreditation Board, and institutions regularly undergo accreditation visits. When the School of Engineering underwent its regular accreditation visit this past year, one of the overwhelming themes I heard during the process was the consistency and character of its people and programs. That consistency and character is well-documented within the pages of this annual report.

The seed of the School of Engineering was to build an institution that would embrace its locale and act as a catalyst for innovation. In just over a decade, the School is already succeeding in addressing those goals through its research and academic pursuits.

In addition to conducting research with global impact, students and faculty are building a vibrant knowledge economy in the region, supporting entrepreneurship and creating a successful venture ecosystem.

Through this year's Annual Report, you will discover some of the exciting endeavours that exemplify the consistency and character that embodies the School of Engineering.

James Olson, PEng, PhD, FCAE

Dean, Faculty of Applied Science

Professor of Mechanical Engineering

MESSAGE FROM THE ASSOCIATE DEAN

The 2018-19 academic year has been another exceptional year of academic and research achievement; in amongst the sustained growth the School of Engineering has been experiencing since its inception.

Inside this year's Annual Report, you will learn about the incredible people within our School who make it such an impactful institution that is making a difference everyday.

This past year, we have announced an industry-funded Smart Energy Chair and new Eminence-funded research clusters headed by School of Engineering researchers. These research initiatives continue the School of Engineering's extraordinary momentum.

Our alumni are also making their mark in industry and academia around the globe. Many alumni joined us in late October for the inaugural Homecoming at UBC's Okanagan campus. Their continued success is our success, and we are tremendously proud of their achievements.

The accomplishments of our students, faculty, alumni and staff this past year continue to propel us forward towards the next stages of our evolution.

Rehan Sadiq, PEng, PhD

Associate Dean, School of Engineering

UBC's Okanagan campus

By the numbers

1397 Undergraduate students

322 Graduate students

60 faculty

24 staff

OPERATING EXPENSES

$12.2 TOTAL EXPENSES

Faculty Salaries
$7,386,874

Other Salaries & Benefits
$3,544,228

Operating Expenses
$844,850

Capital Expenses
$385,000

UNDERGRADUATES BY YEAR

30% First-year

25% Second-year

23% Third-year

22% Fourth-year

FOURTH-YEAR BY PROGRAM

29% Civil

26% Electrical

46% Mechanical

Research

The rapid evolution and development of research at the School of Engineering has resulted in new research collaborations and facility expansions to address this growth. In 2019, some research facilities will open in a new research space at 1540 University Way as part of the first phase of UBC Okanagan's Innovation Precinct.

Funding

RESEARCH FUNDING 2018/19 Fiscal Year Projects

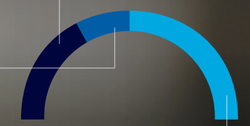
43% Tri-Council Funding
$2,920,922

31% Other External Funding
$2,151,420

16% UBC Internal Funding
$1,097,198

11% Research Infrastructure
$702,433

FUNDING BY DISCIPLINE



31% Civil
$2,316,450

24% Electrical
$1,148,562

44% Mechanical
$3,406,961

MITACS INTERNSHIPS

59 internship units

83% of total UBCO Accelerate Funding

Research headlines

TUNED IN TO THE SOUND OF LIGHT

New research from the School of Engineering may have uncovered the keys to one of the darkest secrets of light – **Kenneth Chau**

RETROFITTING DONATION BINS

UBC engineering students tasked with designing safer donation bins after series of deaths – **Ray Taheri**

SPEEDING UP BACTERIAL INFECTIONS DIAGNOSIS

Using a small and inexpensive biosensor, researchers at UBC Okanagan have built a diagnostic tool that provides health care practitioners almost instant diagnosis of a bacterial infection – **Mohammad Zarifi**

IRONING OUT THE WRINKLES IN TEXTILE COMPOSITE MANUFACTURING

UBC team reduces wrinkles in textile composite manufacturing .Even the smallest of wrinkles during the manufacturing process can diminish textile composite strength by up to 50 percent – **Abbas Milani**

TALL TIMBER BUILDINGS TO WITHSTAND TORNADOS

UBC's School of Engineering and Western University provides a roadmap to safer building designs in tornado-prone areas – **Matiyas Bezabeh** (Solomon Tesfamariam)

NANOTECHNOLOGIES TO REDUCE OPIOID ABUSE

Nanotechnologies can help address drug addiction by identifying the most at-risk individuals and help develop new therapeutic targets and personalize appropriate treatments. – **Sepideh Pakpour**

A BUILDING METHOD AS OLD AS DIRT IS A VIABLE MODERN CONSTRUCTION MATERIAL

Compressed soil, also known as rammed earth, is a method of construction that dates back centuries. – **Sumi Siddiqua**

TIME TO RETHINK CONSTRUCTION IN WATERWAYS

New research looks at impact of construction on natural habitats – **Greg Courtice** (Deborah Roberts)

HARNESSING THE POWER OF VIRTUAL REALITY

Engineers take detour to help immerse builders in their environments – **Vincent Loi** (Kenneth Chau)

DRY BOATS

Hydrophobic particle compound will keep boats dry and travel faster – **Kevin Golovin**

NOT YOUR EVERYDAY TEST DRIVE

The first-ever personal belongings carrier, specifically designed for homeless people, is ready to roll onto Kelowna sidewalks – **CRN Network – Okanagan Laboratory**

WIRELESSLY EFFICIENT POWER

Researchers have discovered a way to balance power transfer efficiency with power loss due to inactivity in wireless power transfer systems – **Connor Badowich** (Loïc Markley)

NEW TECHNOLOGY PRODUCES LIVING, 3D PRINTED BIO-TISSUES

Researchers hope to make advances in tissue replacement and cancer research through new 3D printing technology – **Keekyoung Kim**

STRETCHY, WEARABLE TECH

New GNF sensor pad could be the key to developing inexpensive wearable tech. The GNFs create a rubber-like adhesive pad that acts like a stretchable sensor while gathering information about a human body – **Mina Hoorfar, Homayoun Najjaran**

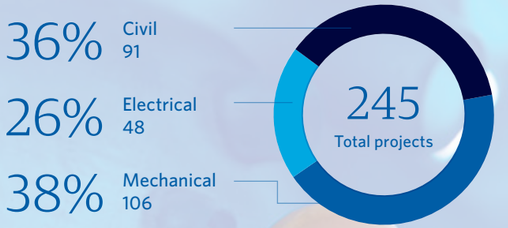
WATER IS THE NEW FIRE

Researchers suggest municipalities should put a greater emphasis on green initiatives to reduce heavy rainfall flooding in urban areas – **Yekenalem Abebe** (Solomon Tesfamariam)

Innovation & collaboration

With an emphasis on research beyond disciplines, School of Engineering researchers focus on collaboration and innovation with community and industry partners. In 2018, nearly 300 individual research projects were undertaken with results published in top-tier publications. Those results are leading to impactful change for our community, our partners and our world.

2018/19 FISCAL YEAR PROJECTS



36% Civil 91

26% Electrical 48

38% Mechanical 106

PUBLICATIONS

217 Scholarly Outputs

43 Outputs in Top 10 citation percentiles*

12K+ Citations

*Number of publications that are highly cited, having reached a particular threshold of citations received.

KEY RESEARCH COLLABORATIONS

HYDROGEN RESEARCH
Lead Researcher
Mina Hoorfar

KAL TIRE
Lead Researcher
Lukas Bichler

DLR PARTNERSHIP
Lead Researcher
Homayoun Najjaran

ESS TECHNOLOGIES
Lead Researcher
Mohammad Zarifi

Notable Announcements

2019 UBC OKANAGAN RESEARCHER OF THE YEAR (NSERC) – Kasun Hewage

Through innovative approaches to life cycle management, Dr. Hewage has made significant breakthroughs in developing tools that enable builders and governments to make knowledgeable fact-based decisions pertaining to sustainable building practices.

CLUSTER OF RESEARCH EXCELLENCE IN BIOCOMPOSITES

Developing novel agricultural and forestry-based biocomposites to minimize the impact of conventional plastics on the environment. Lead researcher – **Abbas Milani (Eminence Funding)**

FORTIS SMART ENERGY CHAIR – Kasun Hewage

New role seeks to optimize energy use in BC and reduce the province's greenhouse gas footprint.

OFFICIAL LAUNCH OF OKANAGAN INNOVATION CENTRE

UBC opens downtown facility to provide a space designed to promote interaction between the University's research community and the region's innovation network.

GREEN CONSTRUCTION RESEARCH & TRAINING CENTRE ANNOUNCEMENT

UBC Okanagan and Okanagan College sign letter of cooperation to promote construction research and training initiatives. Lead researcher – **Shahria Alam**

Manufacturing

Through funding allocated by the government of British Columbia, UBC Okanagan launches a Manufacturing Engineering Program (MANF) in conjunction with UBC Vancouver. The program is led by members of the advanced manufacturing cluster at both campuses, and will have a transformative impact on the areas of aerospace, automotive, energy, machinery and medical device industries.

Professor Homayoun Najjaran has accepted the role of Associate Director to oversee the program's successful roll out at the Okanagan campus.

The program in Vancouver will focus on Production Technology while the Okanagan will focus on Production Management. In the Okanagan, the program will hire six assistant professors and one Education Leadership instructor.

40 student intake per year across the two campuses

~130 students on the Okanagan campus (when the program is fully operational)

New Options

RESILIENT INFRASTRUCTURE MANAGEMENT

Equipping students with multi-disciplinary knowledge, theories and skills needed to manage aging infrastructure

MECHATRONICS

Students learn state-of-the-art skills, theories and methodologies related to electrical and mechanical systems

Building a community

Nearly eighty percent of enrolled students at the School of Engineering are domestic; with one-third of that number originating from the Okanagan. Since inception, enrollment has risen at a steady rate and maintains a trajectory that projects 2000 undergraduate and 500 graduate students by 2025.

This growth is indicative of demand generated from forward-thinking academic programming and innovative research that strives to address the multi-disciplinary needs of local, provincial, national and global stakeholders.

Inclusivity & diversity

BRINGING INDIGENOUS PERSPECTIVES AND BEST PRACTICES INTO THE CLASSROOM

New funding from UBC Okanagan's Aspire Learning and Teaching (ALT) Fund brings Indigenous-focused modules into the Engineering curriculum.

Over the next three years, Indigenous-focused modules will be added to the Engineering curriculum enhancing the existing Applied Science program. The School of Engineering's Ian Foulds and Jannik Eikenaar are leading the initiative.

17% Undergraduate students are female

11% ↑ Registered female students*

22% ↑ Registered Indigenous students*

* Since 2017

Student & alumni success

School of Engineering has 1551 alumni since the first graduating class in 2009. Our outstanding alumni have become a major force throughout industry and academia in Canada and around the world. The lessons they learned at UBC and the networks they developed are the foundation of their success.

2018 CONVOCATION NUMBERS

8 PhD
24 MASc
20 MEng
214 BASc

Awards & recognition

James Seabrook BASc'11
2018 UBC Alumni Builder Award Recipient

Matiyas Bezabeh
Young Scientist Award 2018 World Conference on Timber Engineering

Bridge Preservation Building
4th place, 2018 Association for Preservation Technology Student Design-Build Competition

Julianna Neudorf and **Shena Changirwa**
2nd place at 2018 Canadian Society for Civil Engineering Conference in Fredericton, New Brunswick

Great Northern Concrete Toboggan Race
3rd place OVERALL (& Best Concrete Mix Design) at 2018 GNCTR

Junchi Bin and **Chengkai Zhang**
2nd place at International "Sensor and Measurements" IEEE Student Contest in Houston, Texas

New faces

To address expanding enrollment and exciting new research opportunities, the School of Engineering welcomed a number of faculty and staff across all programs during the 2018-19 academic year.

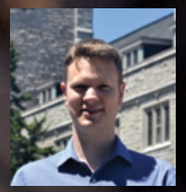
FACULTY

Morad Abdelaziz
Mahmudur Fatmi
Nicolas Miguel Peleato
Alexander Uhl
Mohammad Arjmand
Natalie Forssman
Dean Richert

STAFF

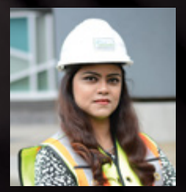
Rhonda Hay
Samantha Luckow
Hassan Iqbal
Marie O'Brien

Announcements include **Alec Smith** named Lab Manager and **Renée Leboe** named Senior Advisor of the Student Advisor Team.



Performing research at the UBC School of Engineering helped equip me with the skillset to build and lead a research program.

Christopher Collier (PhD, Electrical) & Assistant Professor at the University of Guelph.



When I was at UBC Okanagan I realized being able to conduct research in a smaller campus is ideal.

Nilufar Islam (MASc, Civil '10 & PhD '15) & Project Engineer at the City of Vancouver's Sewers & Drain Design Branch | 2013 recipient of the NSERC Alexander Graham Bell Canada Graduate Scholarship Grant

THE UNIVERSITY OF BRITISH COLUMBIA

School of Engineering
Faculty of Applied Science
Okanagan Campus

engineering.ok.ubc.ca