

Catalyst for a Connected World

STRATEGIC PLAN 2019-2022





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Engineers are society’s builders and innovators. They play a vital role in creating the infrastructure and services that support the standard of living we enjoy in our modern society.

Seymour Schulich

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Catalyst for a Connected World

Billions of devices are linking to the web, collecting data and connecting everything. Technology and research innovation are transforming engineering and our communities. To thrive, we need to think globally, act boldly and embrace our entrepreneurial spirit. Engineers are developing vital solutions that are sparking positive impacts. We are connecting the world.



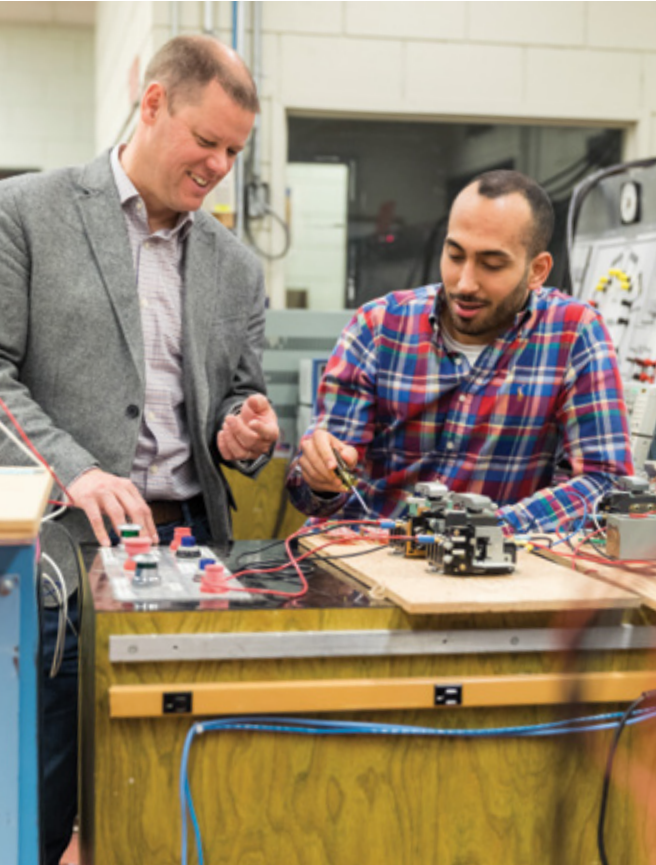
Vision

As a community defined by energy, enterprise and excellence — both on our campus and beyond — we will be recognized for enhancing our global research impact and driving innovation, for expanding access to engineering and for enriching the student experience.



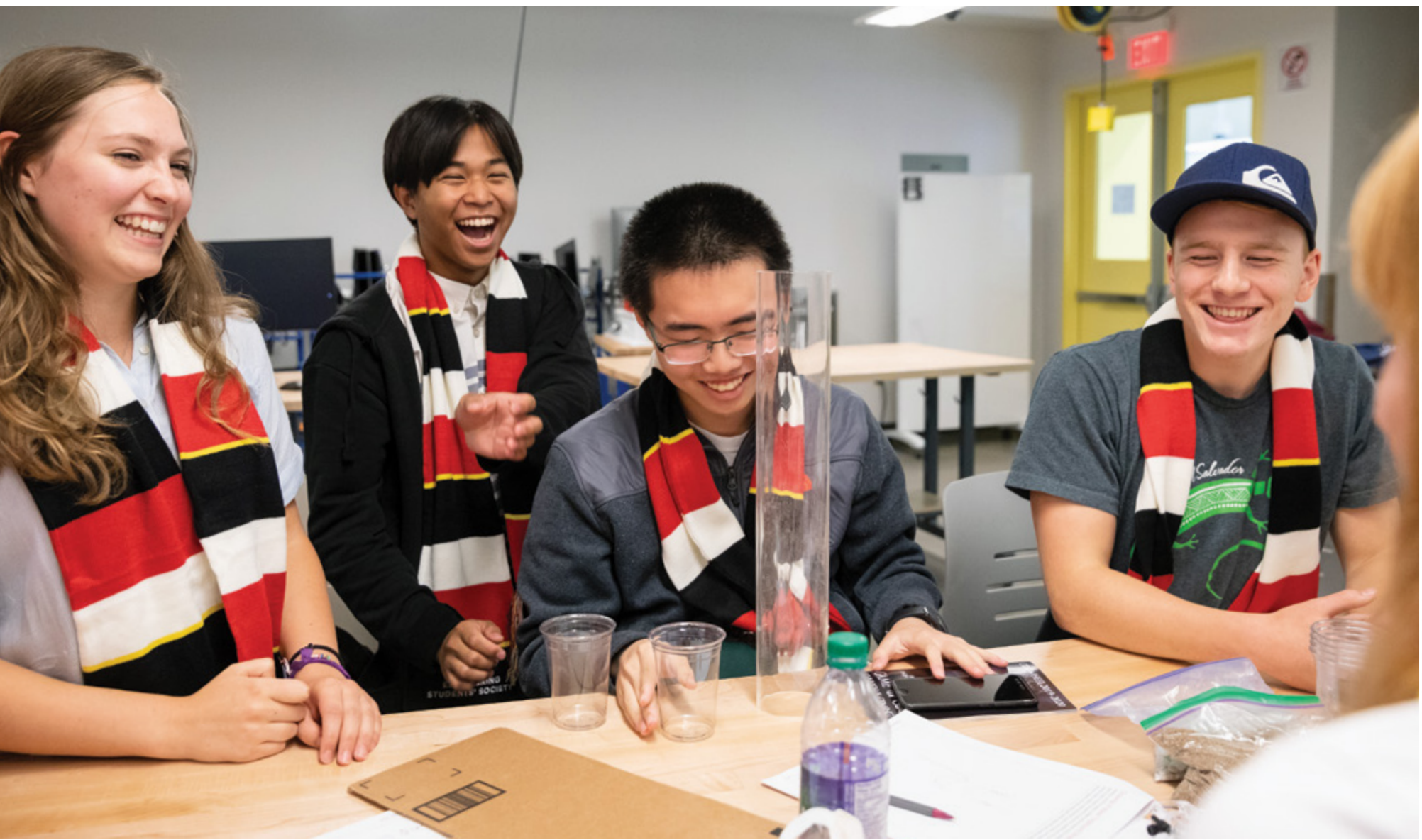
Values

Collaboration • Creativity • Kindness



Mission

Through pivotal research findings and by embracing student success and experience, the Schulich School of Engineering will build on Calgary's strength as a national hub of engineering excellence, to expand the diversity and the impact of our profession, locally and globally.



Process

Throughout 2019, our engineering community gathered to chart the next course for the Schulich School of Engineering. We formed a strategic plan task force with faculty, staff and student representatives who provided a diverse range of perspectives. We spent a year consulting our academic community on its key research priorities. We sought guidance from our leadership team through a series of discussion-fueled leadership retreats. Hundreds of students, alumni, faculty, staff and community members engaged in an online survey, focus groups, committee meetings, lunchtime feedback sessions and more. This strategic plan is the culmination of the ideas and insights of these valued communities.



Message from the Dean

In the fall of 2015, we launched our five-year strategic plan *Energizing Engineering Leadership*. This united vision sparked bold actions in supporting student success, fostering diversity and doing research that makes a difference.

With the digital revolution underway, our world is changing at an unprecedented rate. As engineers, our role is to lead that change. That's why we've updated our strategic vision. We know action is needed now.

At the Schulich School of Engineering, we strive to be a *Catalyst for a Connected World*. As a proud faculty within a research-intensive university, we are committed to enhancing our global research impact, to expanding access to engineering and to enriching the student experience.

We will accelerate digital innovation and the growth of our e-economy through Zetta, our vehicle for digital transformation. We will amplify the positive effects of our research by more effectively sharing our discoveries with the world. We will grow the number of faculty who are recognized global leaders by championing the many positive impacts of their research, teaching, mentoring and leadership.

Enhancing Global Research Impact	Expanding Access to Engineering	Enriching Student Experience
Matching strengths with opportunities	Fostering a welcoming culture	Amplifying student opportunities
Internationally recognized research leaders	Establishing new paths into engineering	Supporting mental health and resiliency
Changing lives	Engaging our community	Focusing on careers

We will continue to embrace interdisciplinary research through new collaborations to find the solutions society needs most. By partnering with the university's entrepreneurial ecosystem, we will take discoveries from our laboratories to the communities around us. As an entire school, we will translate our global research impact into action.

To expand access to engineering, we will create new pathways into our programs by collaborating with other post-secondary institutions and establishing new streams into our profession. Through partnerships across campus, and with groups such as the Association of Professional Engineers and Geoscientists of Alberta, and Engineers Canada, we will continue our work to ensure engineering is a welcoming profession.

As part of enriching the student experience, our school is establishing Catalyst, a new initiative to support student leadership and professional development, entrepreneurial thinking and meaningful mentorships with professional partners. We are cultivating new Work Integrated Learning opportunities for all of our students with a goal of 100 per cent of our students having a meaningful work experience before graduation. Our new initiatives and spaces will allow our researchers and students to boldly embrace Calgary's entrepreneurial and leadership spirit.

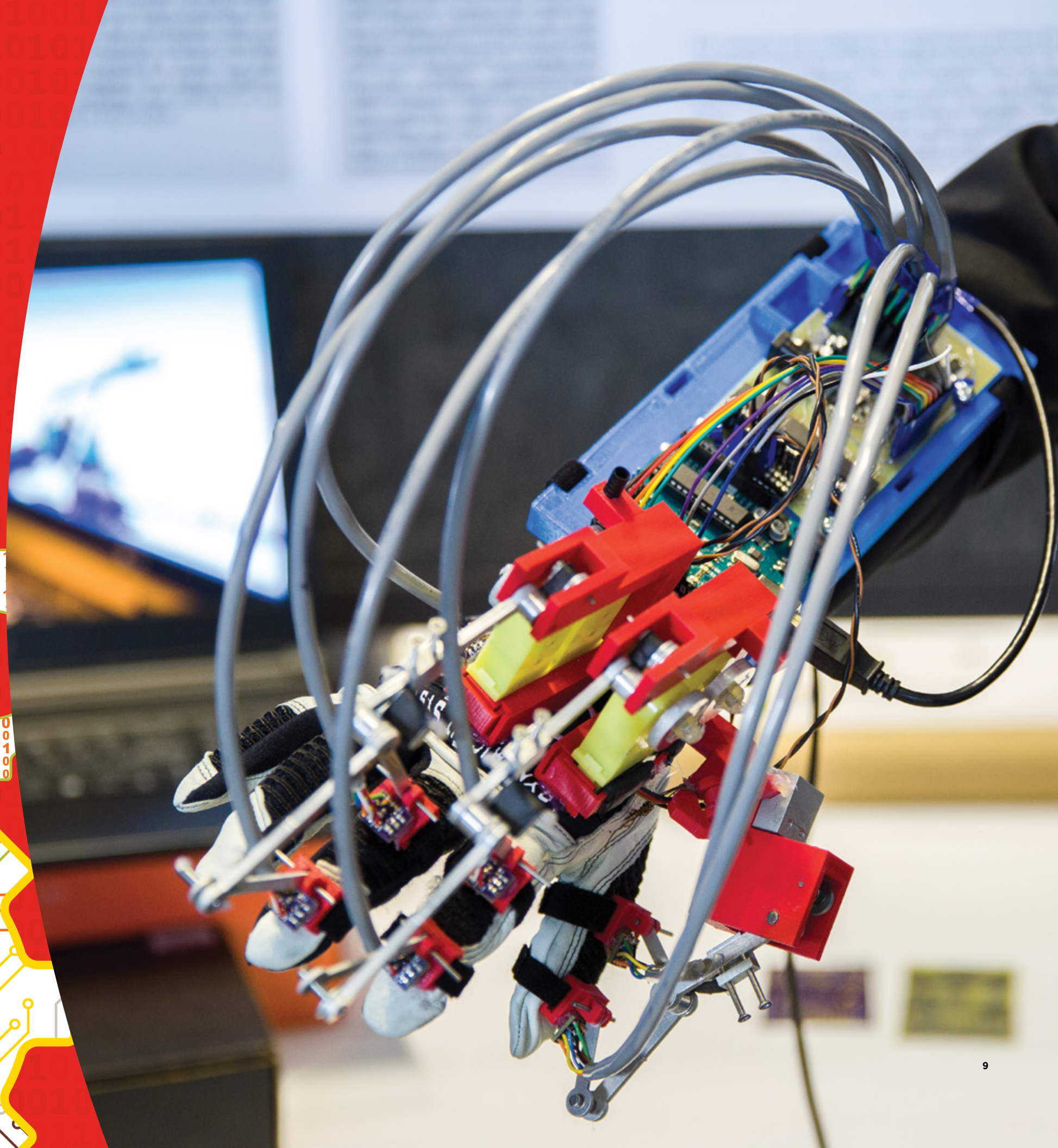
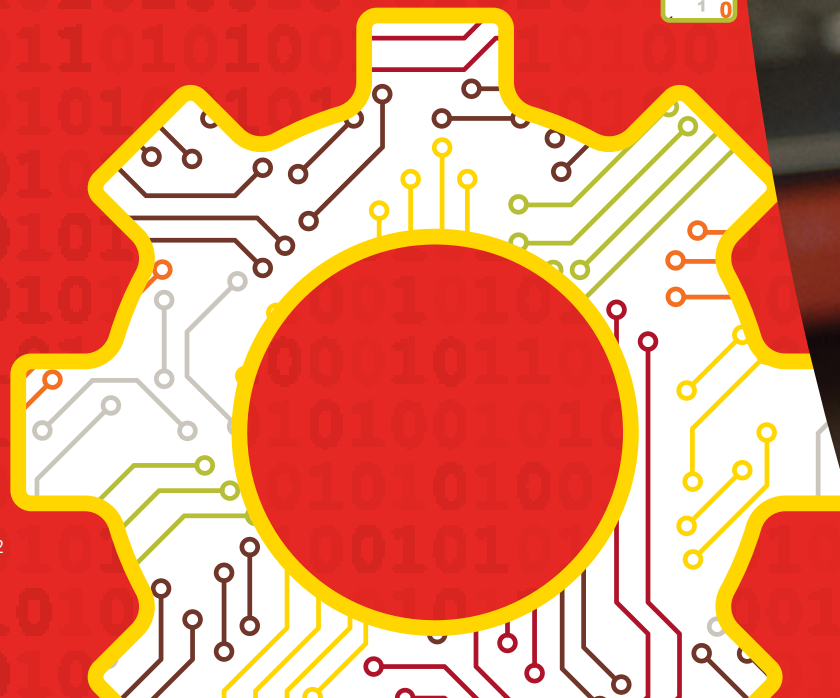
With today's evolving technologies, economy and environment — it's time to become a catalyst for change.

Bill Rosehart, P.Eng., PhD
*Dean and Professor
Schulich School of Engineering*

Zetta

Engineering our digital ecosystem

Representing 10^{21} , a Zetta is massive by any calculation. It's estimated that the world will generate 175 Zettabytes of data annually by 2025. Digital innovations are everywhere, driving every industry. We need to bring a digital lens to everything we do. That's why we created Zetta — a hub of digital research and teaching innovation. Zetta is our vehicle for digital transformation. It brings together researchers and students from across our faculty to develop integrated digital solutions. By focusing on the big picture and creating digital systems that work together seamlessly across industries, Zetta will raise the bar for technology research and prepare our graduates to be leaders in the digital revolution.



Catalysts for Change

Our engineering teams are reshaping the world



Biomedical Engineering

We are improving diagnostic tools to find diseases sooner, designing new individualized therapeutics to better treat each patient, making devices and technologies for improved human and animal health, and investigating new methods to prevent injury and disease.

Our engineers are creating life-saving health innovations.



Chemical and Petroleum Engineering

We are developing innovative solutions and advanced materials for renewable energy storage and conversion, carbon capture, environmental remediation, as well as extraction, upgrading and transportation of hydrocarbon fuels to make our energy industry more sustainable.

Our engineers are catalyzing change through innovation.



Civil Engineering

We are creating new ways to adapt our communities for climate change resiliency, protecting our water supplies, developing new materials and safeguarding our infrastructure from natural hazards. We are designing sustainable structures and high-tech urban infrastructure, preparing complex transit systems for autonomous vehicles, and engaging diverse groups of stakeholders for their perspectives on sustainable development and environmental stewardship.

Our engineers are building a sustainable future for all.

Electrical and Computer Engineering

We are enhancing biometric security systems and facial recognition, designing software for everything from improved patient care to driver assistance, enhancing telecommunications tools, re-imagining our electrical grids, supporting renewable energy sources and inventing tomorrow's technologies.

Our engineers are sparking a high-tech future.

Geomatics Engineering

With a majority of the data we collect related to location, we are developing new technologies and harnessing big data through the Internet of Things, satellites, 3D imaging, remote sensors and autonomous robots to help the world make sense of this high volume of information.

Our engineers are connecting people to land, sea and space.



Mechanical and Manufacturing Engineering

Our strong emphasis on autonomous systems, machine-computer and human-machine interfaces, nano-sensors, system integration, renewable energies and biomechanics fosters Alberta's economic diversification. From the development of next-generation highly manoeuvrable unmanned aerial vehicles and robots to intelligent systems and prosthetics, we support Alberta's aerospace, sustainable energy and health industries.

Our engineers are fostering new industries and diversifying our economy.



Software and Digital Engineering

We are contributing to cutting edge software by leveraging sensor and data acquisition technologies, Internet of Things (IoT) systems, Fog/Edge/Cloud computing, data engineering and data science techniques, and Augmented/Virtual/Mixed reality technologies to support decision making and the control of complex, autonomous engineering systems. We create solutions that ensure that the software powering the next generation of AI-driven systems is reliable, high-quality and cost-effective.

Our engineers are designing the software solutions society needs most.



Sustainable and Environmental Engineering

We are developing new ways to monitor and mitigate water, land and air pollution, expanding renewable energy opportunities, controlling greenhouse gases, promoting sustainable development methods and tackling today's largest environmental challenges to enhance the quality of life around the globe. We are also integrating our research with Indigenous, rural and urban communities to find sustainable infrastructure solutions that meet the specific needs of the people and the environment they are designed to help.

Our engineers are protecting human health and our ecosystem for generations to come.



Schulich Innovates

Engineering research impact

Engineering research is all about driving innovation to improve society. Our chemical and petroleum engineers are extracting energy-rich hydrogen from oil reservoirs while leaving the oil and carbon emissions underground. Our geomatics researchers developed international standards and cloud technologies for the Internet of Things that allows oil and gas companies, first responders, and logistics companies to improve efficiency and safety. Our biomedical engineers are using low-power microwaves to develop new approaches to monitoring breast cancer treatment.

Developing new methods to harness natural resources that support the economy and protect the environment, creating new techniques to manipulate big data to improve safety and finding new ways to track the effects of breast cancer treatments — for our researchers, that's only the beginning.





Enhancing Global Research Impact

To be the catalyst this world needs, we will accelerate research innovation and drive forward to make the greatest positive impact. We will mobilize creative minds through interdisciplinary teams, we will promote our entrepreneurial spirit and gather the necessary resources to inspire answers to global challenges.



Matching strengths with opportunities

With so many successful research leaders within our engineering school, we have identified significant research strengths and will increase our capacity in:

- Biomedical engineering
- Digital engineering
- Energy engineering
- Sustainable and environmental engineering

Our remarkable strengths in materials and systems engineering compliment these research areas, and will enhance our ability to make a vital contribution to the world. By concentrating our research efforts, identifying new opportunities to extend the impact of our discoveries and leveraging unique research accelerators such as the University Research Park, we will become a model for innovation in action.

Internationally recognized research leaders

We will amplify the impact of our ideas by more effectively supporting knowledge translation, increasing the number of academic fellowships, prizes and awards, and expanding our national and international media outreach to achieve our status as a recognized leader in engineering research.

We will boost our international reputation and establish new opportunities to make a meaningful difference in the world by creating an environment conducive to world-class innovation.



Changing lives

We will continue to develop our interdisciplinary teams by identifying new research partners — bringing our best to the international stage to spark innovation.

With our focus on global citizenship, we will work with communities to understand their needs and find solutions to some of their greatest challenges. We will provide new research opportunities for undergraduate and graduate students, seek new platforms to share our research findings and bolster the impacts of our discoveries.

Our researchers will literally change the world.



Schulich Wellness

Engineering student resiliency

Career success cannot exist without personal wellness. By launching Schulich Wellness we are establishing the resources needed to support our students' positive mental health, to teach healthy ways to handle stress and to promote personal resilience. Schulich Wellness features a "decompression zone" where members of the engineering school can come to relax, de-stress and have fun with their friends. Activities hosted in our new wellness centre include pet therapy, yoga and meditation, and stress-reduction workshops. Programming and advocacy education will bring mental health and resiliency into the classroom to ensure everyone can achieve their full potential.





Expanding Access to Engineering

Engineering, at its core, is a call to serve society. An engineering community that is welcoming to all and rich in diversity will be well-equipped to find solutions that better our planet.



Fostering a welcoming culture

We will continue working within our campus community and beyond to ensure everyone feels welcome in the engineering profession. We will be known on campus for our supportive and respectful environment. Our actions will be thoughtful — designed to increase engagement and collaboration, and ensure everyone's voice is heard so that all faculty, staff and students can thrive. We will continue to champion Equity, Diversity and Inclusion by adopting new initiatives and through partnerships with organizations like the Association of Professional Engineers and Geoscientists of Alberta, Engineers Canada, the University of Calgary's Office of the Vice-Provost (Indigenous Engagement) and Actua (Canada's largest STEM outreach organization).



Establishing new paths into engineering

We are committed to increasing access to high-quality engineering education.

Building on the success of our Energy Engineering program, we will establish made-in-Alberta approaches to increase access to engineering. We will collaborate with polytechnics and seek new partnerships with Indigenous communities and other post-secondary institutions to create new avenues for entry into our programs. We'll build bridges for those who need them, find new ways to embrace unique learners and ensure engineering is a profession open to all. We will develop new learning opportunities in areas such as biomedical engineering, digital and software engineering, and sustainability and environmental engineering, diversifying opportunities for future engineers.

Engaging our community

We will continue inspiring the next generation of engineers through varied youth outreach activities — going into classrooms or bringing students to campus — to spark excitement in STEM careers. We will also create opportunities for engineering professionals to expand their skills and take their careers in new directions.



Maker Multiplex

Where creative ideas come to life

Engineers are designers, builders and makers at heart. They need the spaces, tools and talent to bring their ideas to life — and that's just what we've achieved with the Maker Multiplex. A fleet of high-end 3D printers form newly designed prototypes. High-tech recording booths allow for the complex manipulation of sound. Industrial tools provide access to woodworking and machining of metal, with spaces for painting and working with textiles and other materials. With guidance and training from our qualified team, we're creating an innovation incubator for Calgary within the heart of our engineering school.





Enriching the Student Experience

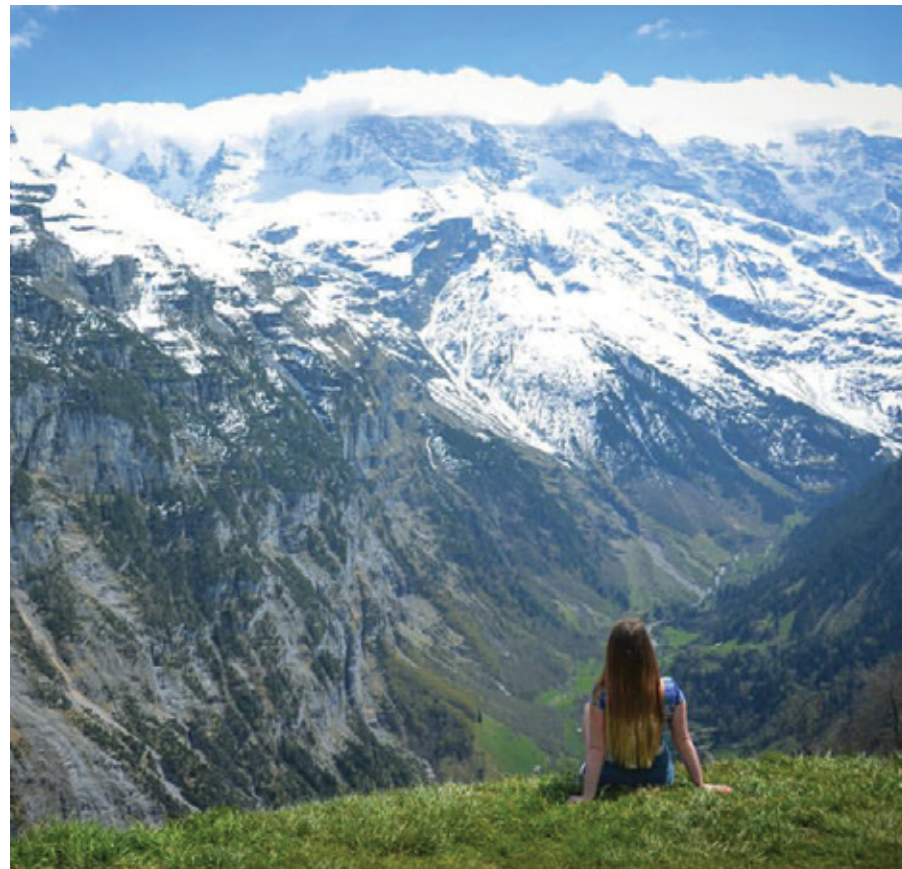
Our school is a launch pad for engineering excellence. We produce graduates who have the academic and professional experiences they need for rewarding careers.



Amplifying student opportunities

We will continue our focus on providing world-class teaching, experiential learning and leading-edge learning spaces, ensuring our graduates possess the engineering academic fundamentals they need to succeed in the workplace.

We will complement teaching excellence with entrepreneurial thinking, leadership experiences and hands-on learning opportunities through Catalyst, our new student professional development initiative. We will expand access to undergraduate research and increase possibilities for students to have local, national and global learning experiences to prepare them to excel in tomorrow's engineering profession.

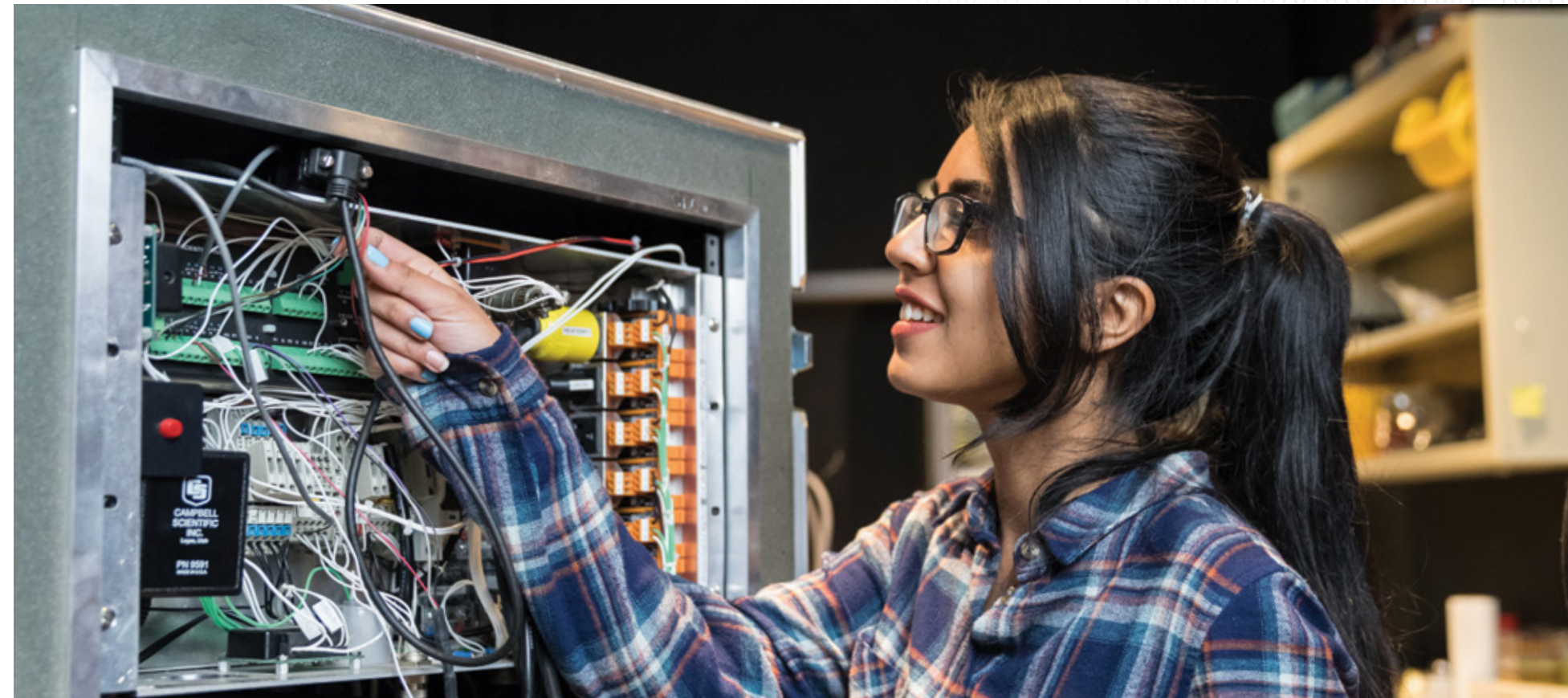


Supporting mental health and resiliency

Having adopted the Campus Mental Health Strategy, we established our own Mental Health Action Committee and created Schulich Wellness — our permanent home for wellness activities within engineering.

We are committed to increasing mental health supports for students and promoting personal resilience. We will embed positive mental health and resiliency discussions into the classroom. And, we will help students and their instructors identify the life-long strategies they need to manage stress and find resources that support personal wellness.

We will continue to offer programs that relieve anxiety and support academic performance, such as the guaranteed placement program. We will work with our faculty to increase co-ordination to better balance student workloads and explore alternative assessment methods.



Focusing on careers

While maintaining our commitment to academic excellence, we will extend Work Integrated Learning opportunities to undergraduate and graduate students. Our goal is for all of our students to have meaningful work experience before graduation.

We will establish a new initiative to engage with industry leaders and enhance professional development and mentorship opportunities for our students. We will expand our design workshops and short courses to support the career advancement of students and alumni.

Catalyst

Engineering leadership and entrepreneurial spirit

Meaningful hands-on student experiences ignite understanding and inspire careers. That's why we've launched Catalyst — an initiative to support expanded student learning opportunities outside the classroom. Engineering students will develop their professional skills through hands-on leadership training, new mentoring programs, increased national and global learning experiences, enhanced support for clubs and teams, and new entrepreneurial training opportunities. Helping all of our students grow as young professionals is part of our commitment to enhancing the student experience.





Engineering Change

Engineers design the instruments of tomorrow. Engineers make research discoveries that spark societal shifts. Engineers create technologies that transform our lives.

Help us inspire positive change and shape our future.

- Partner with us on research
- Hire a student intern
- Volunteer on an industry advisory council
- Donate to enhance our global research impact, expand access to engineering and transform the student experience.

Together, we can engineer meaningful change.



**The pace of change
today is unprecedented.
As engineers, it's up
to us to be catalysts for
innovation in a more
connected world.**

Bill Rosehart
Dean, Schulich School of Engineering

