



Enhancing Community, Expanding Impact

STRATEGIC PLAN 2023-26

SCHULICH SCHOOL OF ENGINEERING

















A message from the Schulich School of Engineering

Engineers have many opportunities to make significant positive changes in our communities, but the world also faces complex challenges. Access to reliable and trusted information, secure and affordable energy, clean water and climate resiliency are just a few of the issues our society is up against. These are also areas where engineering know-how and problem-solving will make a difference.

At the Schulich School of Engineering, it is incredible to see how far we have come since opening our doors in 1965. Fast forward to current day, and our students, alumni, staff and faculty members continue to innovate and have a meaningful and positive impact in our community.

Momentum at the school helped launch a new department and several new programs, recruit numerous new faculty members, create makerspaces, introduce improved ways to teach our students and embrace digital technologies across our faculty. This momentum has also helped us to elevate our disciplinary and transdisciplinary research, discover breakthrough technological advances, achieve record-setting internship placements and celebrate our biggest graduating class to date.

It is with this momentum, anchored by our vision, mission and values, that we are proud to launch our new strategic plan: **Schulich Momentum: Enhancing Community, Expanding Impact**.

We are committed to weaving ways of being, ways of knowing, ways of connecting and ways of doing into our learning and research through *Indigenous engagement and reconciliation*. We are driven to be a national role model in *fostering a community through equity, diversity, inclusion and accessibility*. We are *preparing tomorrow's changemakers* by providing unique experiences inside and outside of the classroom. We are inspired by the significance that will come from *elevating our research and innovation impact*.

We have created something special at the Schulich School of Engineering and look forward to carrying this momentum forward.















Wision

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 and inclusivity in engineering, for our contributions towards Truth and Reconciliation, and for enriching student success and experience.

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, inclusivity and the impact of our profession, locally and globally.



- Collaboration
- Creativity
- Kindness

Biomedical

Biomedical engineering is a rapidly growing field applying engineering tools and approaches to solve challenges in human and animal health. This broad field includes biomechanics, imaging, diagnostics, software, wearables, regenerative medicine, sports performance and devices. Biomedical engineers work at the intersection of many disciplines including medicine, engineering, science, kinesiology, veterinary medicine and nursing. Through working in transdisciplinary teams, biomedical engineers are significantly improving our quality of life.



X Civil

Civil engineering is a broad and growing area that branches into water resources, transportation, geotechnical, materials, structural and project management. Building quality of life underpins all that civil engineers do. From clean water and autonomous vehicles to nanomaterials, advanced data analytics and artificial intelligence, civil engineering draws from the tool kits of technology to design, build, maintain and conserve sustainable and resilient infrastructure that is adaptive to the climates of today and tomorrow.



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>>>> Chemical and Petroleum

Chemical engineering has broad societal impact through the design of sustainable processes and innovative technologies, and plays a vital role in creating advanced materials, enhancing food production, producing clean water, manufacturing pharmaceuticals and therapeutics, extracting natural resources, leading the transition towards clean energy, and saving the environment. Chemical engineers enhance our daily quality of life and strive to create a healthier planet for all.





>>> Electrical and Software

From the metaverse to large interconnected industrial processes, the modern world depends on electrical and software engineering. Electrical and software engineers create sensors and data acquisition systems that measure everything around us. Software-defined networks that securely transmit data to the cloud and data centres are also built by these engineers. It is an evolving field focused on creating artificial intelligence that extracts insights, applications, web tools and virtual reality solutions to visualize data. The clean electricity generated by electrical and software engineering is foundational to a sustainable future.



Geomatics

Location data has always been key to the evolution of human civilizations. In our increasingly interconnected world, geomatics engineering technology continues to develop rapidly. These solutions are needed and create opportunities for a prosperous and sustainable future. Examples of geomatics at work include satellite navigation systems, web mapping, self-driving cars, drones, Internet of Things sensors, earth observation systems, geospatial artificial intelligence and medical imaging.

Mechanical and Manufacturing

Mechanical engineers play an important role in designing and manufacturing everything from autonomous vehicles and supersonic aircraft to microdevices that are smaller than a human hair. Their impact can be seen in the development of new materials, processes and systems all around us. Pushing the envelope of human achievement, mechanical engineers develop innovative ways to generate renewable energy, to increase productivity through automation, and to help put humans in space and bring them back safely. The scope of mechanical and manufacturing engineering can be seen from the depths of the ocean to the outer reaches of the solar system.



>>> Sustainability Engineering

Sustainability engineering blends environmental, economic and social sustainability into all engineering disciplines. With all eyes on creating a cleaner, healthier planet, Schulich is advancing how we can imagine, design and build a regenerative future. As our world is increasingly environmentally aware, Schulich is proud to help integrate environmentally conscious practices when designing, building and managing engineering solutions and systems over their entire life cycles.



Schulich Strengths

Schulich strengths are what we do, or need to do, exceptionally well. They're what we are – or will become – known for. These strengths show up in our classrooms and in our labs. They permeate our student body and present themselves in research projects across all engineering disciplines.



Engineering for a Sustainable Future

The Schulich School of Engineering is integrating sustainability across our programs, research activities and departments. We are launching a new undergraduate program in Sustainable Systems Engineering. Sustainability engineering is a technical, transdisciplinary field focusing on how to design, integrate, and manage complex systems over their life cycles, while ensuring environmental, economic, and social sustainability. With teaching and research areas such as sustainable and resilient infrastructure, clean technology, circular economy and regenerative design, environment and climate change, Schulich is focusing on engineering for the planet and for our future generations.



Energy

Calgary is the energy capital of Canada and energy engineering is a core focus at Schulich. Energy engineering is an interdisciplinary field that includes traditional and renewable energy, and how to manage a sustainable energy transition. Its scope ranges from developing useable energy resources, storing energy and moving it to where it is required, and then efficiently utilizing energy. Energy engineers advance and integrate knowledge from across engineering disciplines. They explore ways to reduce the environmental impact of the traditional energy sector, such as reducing water use or finding cost effective ways to capture and sequester carbon emissions. They design and operate reliable and resilient electrical energy systems that support variable renewable energy generation and enable electrification of transportation and heating systems. Our energy engineers will continue to help drive innovation and foster an entrepreneurial mindset among the industry and community.



Hyperconnected World and Our Digital Future

Technology has fundamentally changed the way we live our lives. From the early days of dial-up internet to today's discussions around Web 3.0, 5G networks and virtual reality, our digital world has evolved in ways we once thought were found only in science fiction. Technological evolution is continuing to rapidly change the world we live in. From developments in artificial intelligence and data analytics, sensors and the Internet of Things, digital engineering and nanotechnology, it is critical to be a leader in this growing field. We develop some of the newest geomatics technologies, communications algorithms and circuits, and digital tools for engineering problems across all engineering disciplines. Our programs will provide our graduates with the skills necessary for launching their careers in our digital future.



>>> Solutions for Health

Our students and faculty are researching and learning about solutions for some of the most pressing issues in healthcare and medicine. Solutions for health are not confined to one program, but rather woven throughout Schulich. Through biomedical engineering, Schulich is teaming up with multiple faculties to develop innovative solutions in areas such as biomedical diagnostics, advanced imaging, biomechanics and mobility, regenerative medicine, and health monitoring and management. These technologies will have applications in precision human and animal health, and advanced diagnostics and therapeutics.



Advanced Materials and Manufacturing

Just as the pace of advancements in technology are accelerating, so is the development of new materials and manufacturing processes. Bringing together government, researchers, industry and community in this important area, Schulich is leading the way. This includes additive manufacturing, nanotechnology and nanoengineering, renewable, sustainable and smart materials.





Engineering Education

Education is a cornerstone of what we do at Schulich. Whether undergraduate or graduate, a key objective of our school is to offer engineering students the opportunity to experience learning in ways that will allow them to thrive. Engineering education involves collaborating with other faculties and other postsecondary institutions, seeking new partnerships with Indigenous communities, finding ways to embrace unique learners and developing new learning approaches. This includes expanding experiential and work-integrated learning, further growing Maker Multiplex programming and our internship program. We are a leader in education innovation and are committed to being among the best in Canada in terms of learning outcomes and the student experience.



Schulich Priorities

Schulich priorities underpin the four pillars of our Strategic Plan. They are top-of-mind in everything from setting department and faculty-wide goals, to how we prepare our future engineers, expand our research impact and tell our stories.

- Celebrate our positive impact in the community.
- Enhance our culture of collaboration and inclusion.
- Grow external connections and partnerships to further build a culture of continued engagement with our alumni and community.
- Embrace transdisciplinary research and scholarship.
- Expand our storytelling, including those about student experience and research impact, to a national and international audience.
- Become a top-five Canadian engineering faculty for student satisfaction and graduate employability.
- Become a national leader in work-integrated learning.
- Be nationally recognized as a top entrepreneurial engineering school.
- Be recognized globally as a top-150 engineering faculty.



Schulich Pillars

The Schulich Pillars are the cornerstone of our new strategic plan. The four pillars show us the way forward and speak to how we interact with our community and how we demonstrate our positive impact.



SCHULICH PILLAR

Indigenous Engagement, **Inclusivity and Reconciliation**

At the Schulich School of Engineering, we are mindfully responding to the Truth and Reconciliation Commission of Canada's Calls to Action; the United Nations Declaration on the Rights of Indigenous Peoples; and ii' taa'poh'to'p, the University of Calgary's Indigenous Strategy. Alongside UCalgary, Schulich is in a unique position to empower and engage the campus community in a journey of transformation and renewal grounded in the seven statements of commitment and guided by the recommendations in ii' taa'poh'to'p.

We are committed to walking together on parallel paths that weave Indigenous Ways of Being, Ways of Knowing, Ways of Connecting and Ways of Doing into the fabric of our school's culture. All members of our community play an important role in supporting and collaborating on this strategic pillar. Through an evolving approach, our focus on Indigenous engagement, inclusivity and reconciliation will work towards achieving systemic transformation in our engineering community.



Ways of Being

Schulich focus: campus identity, inclusivity, leadership and engagement

Schulich is committed to sharing cultures that value and practice being good relatives on a journey of parallel paths in ethical space with Indigenous students, staff and faculty. We recognize the importance of shared leadership. We will foster an active community of support, engage through meaningful dialogue, create opportunities for reciprocal learning and place the utmost importance on mutual respect.





We will enhance engineering education and research to reflect Indigenous Peoples' communities and knowledge systems through decolonized research and teaching. Schulich will embrace inclusive knowledge approaches in our teaching and research that aim to enhance and preserve Indigenous cultures, languages and understanding.





Ways of Connecting

Schulich focus: relationships, partnerships, and connections to land and place

We will encourage, support and value research, teaching and service that interacts with Indigenous communities as equal partners and promotes stewardship with the land and the people living within it. Schulich will enhance our place and space to better create belonging and foster a welcoming campus for Indigenous students, faculty, staff and community members. We will implement land-, placeand community-based learning opportunities.





Ways of Doing Schulich focus: policies, procedures and practices

We will develop new policies and review existing practices to: improve Indigenous student recruitment and retention; encourage inclusive hiring practices that actively recruit Indigenous Peoples; eliminate barriers in our processes and workplace that limit meaningful inclusion of Indigenous Peoples; and create respectful processes that uphold cultural protocol and practices.

Learn more about **UCalgary's Indigenous Strategy**



Fostering a Community through Equity, Diversity, **Inclusion and Accessibility**

At the Schulich School of Engineering, we strive to create an inclusive and and staff can thrive. We are dedicated to increasing the number of people from equity-deserving groups in engineering such as, but not limited to, minorities and racialized groups, and members of the LGBTQ2S+ community.

Schulich strives to become a national role model in equity, diversity, inclusion and accessibility (EDIA) by:



Building a culture of inclusive practices for the benefit of all. We are committed to creating teaching and research practices and spaces that ensure greater participation of all.



Leading change for equitable practices through ensuring access to supports and resources as well as tracking and monitoring data related to our school's demographics. Schulich will enhance recruitment, retention and training practices while taking into consideration systemic barriers as well as historical and contemporary injustices.



Elevating and engaging with our diverse and intersectional community by fostering connections within our local, national and international community to showcase the diversity and excellence within Schulich. We will continue to inspire the next generation of diverse engineering changemakers through engaging outreach activities.







Advocating for and championing equity-deserving

groups by building education and career pathways for all students, post-doctoral scholars, faculty and staff. We will create opportunities for all engineering professionals to expand their skills and take their careers in new directions of their choosing. We will recognize and celebrate all the EDIA contributions of individuals and teams.

Learn more about equity, diversity, inclusion and accessibility at UCalgary



SCHULICH PILLAR

Preparing Tomorrow's Engineering Changemakers

The Schulich School of Engineering is committed to providing the best educational experience possible for our undergraduate and graduate students and post-doctoral scholars. Our goal is for all Schulich engineering students and post-doctoral scholars to engage in the innovation and entrepreneurial ecosystem, learn ready-for-the-world skills, and become part of the community of global changemakers with a strong sense of social responsibility.

With an emphasis on student experience and success, Schulich will do this through:



Innovative programs that engage with industry, alumni and the engineering community. Our programs will use a holistic approach to engineering, highlighting digital technology, sustainability, creativity, communications and teamwork. Students will have the ability to earn micro-credentials and participate in a culture of continuous improvement.



Learner-focused delivery that concentrates on active and project-based learning, blended and hybrid delivery, experiential learning and work-integrated learning. We are committed to engaging learners and incorporating their perspectives to improve their overall experience. All Schulich undergraduate students will graduate with engineering-relevant work experience, and all graduate students will have access to work-integrated learning opportunities.



Learn more about how Schulich supports tomorrow's engineering changemakers





Wellness and resiliency initiatives that will provide holistic academic and personal support. These important initiatives will foster our culture and community. Schulich will implement curricular and co-curricular opportunities for students, and programs that encourage the well-being of students, post-doctoral scholars, staff and faculty.

Curious about our programs? Learn more



SCHULICH PILLAR

Elevating Research and Innovation Impact

Research and innovation within the Schulich School of Engineering has tremendous impact in our community. We are developing disciplinary and transdisciplinary leading-edge tools, knowledge, solutions and technologies to address challenges from the nanoscale to the global scale and beyond.

For Schulich to continue building on its research impact, and to reach its goal of becoming a global top-150 engineering faculty, we will focus on:



Intensity while strengthening mentorship and support for researchers. We will grow our graduate student population, number and diversity of research chairs, research funding, and scholarly and innovation outputs. We will launch collaborative research labs, so innovative ideas can be explored quickly with technical support. We will increase funding and opportunities for undergraduate students in our research activities.



Collaboration to solve grand challenges. Schulich will expand partnerships across campus, with industry, start-ups, governments, top universities, non-profit organizations and communities to maximize our reach and impact. We will translate our research into practice and drive our growing innovation economy.



Recognition of researchers and their contributions. We will elevate the profiles of our researchers by telling their stories locally, nationally and internationally. Schulich will champion and support an increase in the number of fellowships, prizes and awards received by our faculty, staff and students.



Learn more about Schulich's research





Nurture Something: Schulich Wellness

We believe the health and well-being of everyone in the Schulich School of Engineering has a tremendous impact on our community. Our goal is to foster a culture of wellness and work-life balance throughout the faculty and student body and be recognized as a national leader in this area.

Our dedicated wellness room will offer everything from pet visits and paint nights to yoga and mental health workshops. We are developing more programing, including workshops and events, throughout the year to assist our campus community. The wellness room will be a space for students to take a break from their studies and nurture their well-being.

Schulich will implement a co-curricular certificate in Personal and Community Well-Being for undergraduate and graduate students. We will cover a wide range of topics including mental well-being, resiliency, emotional intelligence, learning strategies and creating an inclusive culture. The first tier of the certificate will be embedded into the first year of all our programs to better ensure our students have the diverse tools they need to succeed.



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Build Something: Schulich Maker Multiplex and Zetta

At the Schulich School of Engineering every student will have the opportunity to roll up their sleeves and build something. Whether that be a physical prototype or a virtual solution, this hands-on approach will be fostered through the Maker Multiplex and our Digital Innovation Hub, Zetta.

Open to all UCalgary community members – faculty, staff and students - these areas are being developed to drive innovation. Featuring a virtual reality lab; 3D modelling, design and printing; robotics and mechatronics; sound and music software, recording and mixing; art and textiles; CNC machining, welding, metal and woodworking; Internet of Things, and electronics and circuits, our creative spaces will help bring ideas to life.

Schulich's Maker Multiplex and Zetta will offer a wide selection of workshops where students can further refine their skills while earning digital badges and microcredentials in areas such as 3D printing, machining, music, programming, soldering, electronics and robotics.



Explore Something: Work-Integrated Learning

Through a focus on work-integrated learning (WIL), we will increase opportunities for all students to gain valuable engineering related work experiences before they graduate. Work-integrated learning builds career readiness and bridges the gap between the classroom and the workplace. It is quickly becoming a cornerstone of our educational programs. Through the Engineering Career Centre, we will grow our WIL opportunities including: the Engineering Career Practicum, the Engineering Internship Program and Summer Research Awards.

Learn more about work-integrated learning at Schulich



>>>> Create Something: Tech Entrepreneurship

UCalgary is Canada's entrepreneurial university. Entrepreneurship continually grows with new technological advances, and the Schulich School of Engineering is at the forefront. Our students, alumni and faculty members are problem-solvers. Schulich will help turn their solutions into creative new businesses. We will provide students training in tech entrepreneurship through our Certificate in Engineering Entrepreneurship, tech entrepreneurship courses, and our entrepreneurship capstone design course. Building an entrepreneurial toolkit will enable our students to start something before or after they graduate. We will remain highly integrated into the UCalgary entrepreneurship ecosystem through Innovate Calgary and the Hunter Hub.

>>>> Try Something: Learning Beyond the Classroom

Engineering education is more than lectures, labs and courses. Students gain immense value from taking their learning beyond the classroom. Experiential learning initiatives such as clubs, teams, field trips, international exchanges, peer mentorship and hackathons enrich the knowledge learned in the classroom. For many students, trying these opportunities help them build lifelong friendships and the professional skills needed when they enter the work force after graduation. We will grow these opportunities to ensure every student graduates with experiences and stories to share.





Schulich Momentum Enhancing Community, Expanding Impact Strategic Plan 2023-



Named one of Canada's top five research universities by Re\$earch Infosource in 2022, UCalgary is also the youngest university in the top five. We are changemakers with a focus on the future through entrepreneurial thinking, innovative research and community partnerships. The Schulich School of Engineering embodies all these values that are central to UCalgary's Start Something campaign.

Learn more about UCalgary's Start Something



The Schulich School of Engineering is gaining momentum.

Learn more about all the exciting initiatives happening at Schulich:





SchulichEngineering

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