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MEMORANDUM

ATTENTION Senate
FROM Catherine Dauvergne, Vice-President,
Academic and Provost and Chair, SCUP
RE: Strategic Research Plan Progress Report (For Information)
(SCUP 22-01)

DATE January 5, 2022
PAGES 1 of 1

A handwritten signature in blue ink, which appears to read "Catherine Dauvergne", is written over the "PAGES" field.

At its January 5th, 2022 meeting, SCUP reviewed for information the Strategic Research Plan Progress Report. This is attached for the information of Senate.

C: D. O'Neil

MEMO

ATTENTION Senate Committee on University Priorities	TEL 778-782-5080
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FROM Dugan O'Neil, SFU's Vice-President, Research and International
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RE Strategic Research Plan Progress Report

DATE January 5, 2022	TIME
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TOPIC

The attached report summarizes Simon Fraser University's research performance through the 2016-2020 period. The Strategic Research Plan (SRP) Progress Report is a baseline-setting document as we begin the process to create the next SRP.

A PowerPoint presentation will be shared at the SCUP meeting to speak to this report.

BACKGROUND

The current SRP was set to expire at the end of 2020. Due to the ongoing search for a new VPRI at that time, the term of the existing SRP was extended until the end of 2022. In early 2021 the VPRI team embarked on an assessment process on the existing plan, culminating in this document.





SFU

SIMON FRASER
UNIVERSITY

STRATEGIC RESEARCH PLAN PROGRESS REPORT

CANADA'S ENGAGED UNIVERSITY

Find out more at sfu.ca/research

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RESEARCHER RESOURCES
AND SUPPORTS

ENGAGING RESEARCH

**SIMON FRASER UNIVERSITY IS COMMITTED
TO DISSEMINATING KNOWLEDGE AND
HARNESSING NEW IDEAS AND INNOVATIONS
FOR THE BENEFIT OF SOCIETY**

The Strategic Research Plan (SRP) Progress Report has been developed to share just some of the incredible progress we have made since 2016. It will help inform the next SRP, along with SFU community consultations.

A MESSAGE FROM THE VICE-PRESIDENT

SFU's 2016-2022 Strategic Research Plan (SRP) was built with the university's strengths and successes in mind. It positions SFU to grow our capacity in research, knowledge mobilization, partnerships and impact on the national and international stage. In October 2020, we made the decision to extend the SRP until the end of 2022. This enabled the plan to carry forward until the university's Vice-President, Research and International (VPRI) role was filled in a continuing capacity. After serving as SFU's Associate Vice-President, Research since 2017, I feel both honoured and humbled to have officially started the VPRI position in July 2021.

SFU continues to be one of the fastest growing research institutions in the country. Since the writing of the SRP in 2016, research income has grown more than 50 per cent. We have also seen continued growth in research outputs whether we choose to measure this by number of publications, citations, news mentions or any other way that we can count these things. Those outputs are having a big impact in a tremendous variety of areas, as you can see in this report. SFU researchers are publishing in top journals, changing laws and policies, producing innovative technologies, creating new works of art and are changing the way we think about the world and ourselves. I am incredibly proud to be SFU's VPRI.

I want to thank those from the SFU research community who helped inform this progress report by participating in our online survey and consultations in early 2021. It is the valuable feedback from you that brings expertise to the discussion of how we can do even better in the next plan. We learned that we needed to find ways to better support faculty working within the challenge areas.



Dugan O'Neil

For example, in Challenge 1: Addressing Environmental Concerns and Creating a Sustainable Future, we addressed this feedback by moving ahead on a Sustainable Development Goals (SDGs) mapping project to broaden and deepen our understanding of current activities taking place at SFU that contribute to the SDGs. We created the Research Expertise Engine to help faculty (and staff) find a researcher with specific expertise and interests, and to help researchers find each other to start new, interdisciplinary collaborations.

The intention of this report is to showcase and celebrate just some of the many impacts and successes the SFU community has made in relation to the SRP—we have so much to be proud of. It also informs on areas we may not have covered as much ground in as we had hoped.

In 2022, expect more news to come as we work together to produce and publish the next Strategic Research Plan.

Thank you and I hope you enjoy reading the report.

A handwritten signature in black ink, consisting of a stylized 'D' followed by a horizontal line.

Dugan O'Neil
Vice-President, Research and International

HOW WE DID AND WHERE WE ARE GOING

BY CREATING AND MOBILIZING KNOWLEDGE, NURTURING PARTNERSHIPS AND HARNESSING THE POWER OF RESEARCH, ENGAGEMENT AT SFU IS AN INSTRUMENT FOR CHANGE

The progress report includes only a slice of the myriad of research activities taking place at SFU that have been aligned with the SRP. While we have worked hard to continually assess the SRP's progress in meeting the goals, we know that with ambitious targets, sometimes everything we want to do is not possible—there is a risk of not fully meeting the goals. This is not always negative, as it provides us with an opportunity to move things ahead for the next SRP and inform our new goals. For instance, we want to improve the involvement of undergraduates in research, and we want to put in place better resources and strategies to support people doing new work in our challenge areas.

Our research income is growing, but our Tri-Agency funding is flat and has dropped when measured as a share of the funding of the whole system. This is something we need to strategize about to improve upon in the coming years.

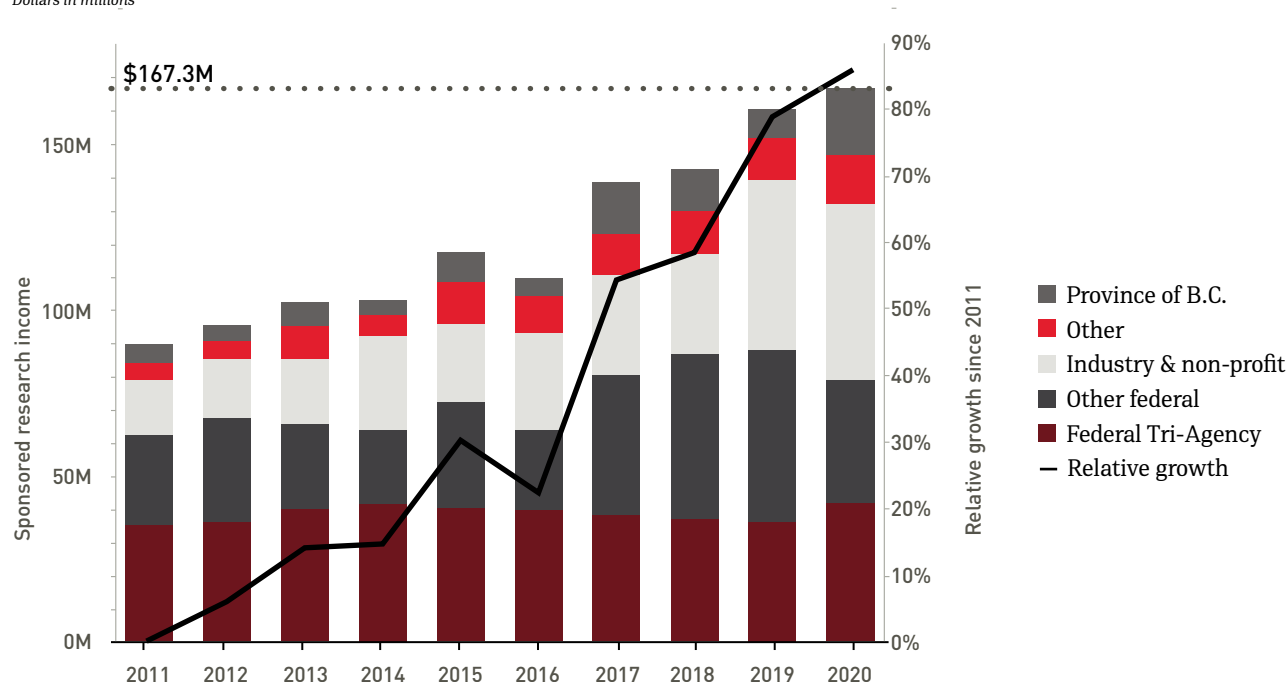
We look forward to working with and gathering feedback from the SFU research community in 2022. It is a way to build community around important issues and determine our targets for the next SRP.

RESEARCH INCOME

SFU is among Canada's fastest growing research-intensive universities. From 2016-2020, our sponsored research income grew by 52%, reaching \$167.3M in 2020. Research income is how we obtain world-class infrastructure and fund our students and postdoctoral researchers. As shown in the figure below, from 2016-2020 SFU's sponsored research income grew by 52%.

SFU's sponsored research income growth

Dollars in millions



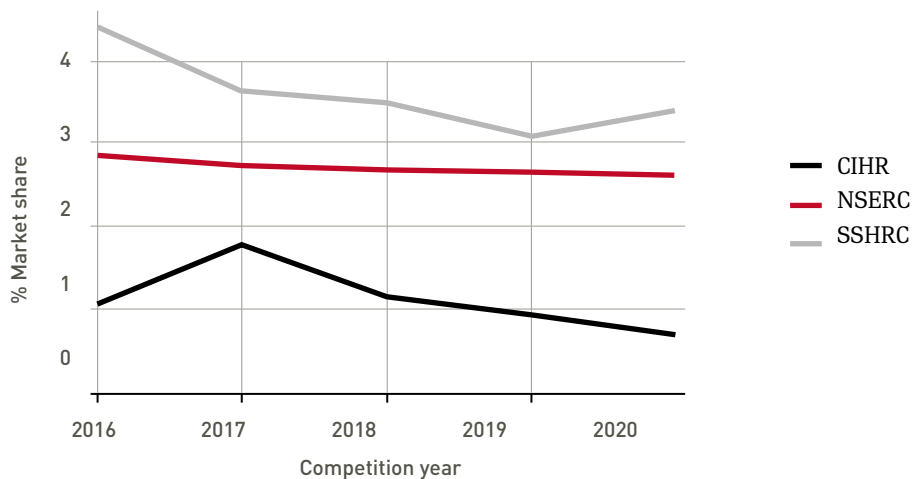
TRI-AGENCY GRANTS

Over the last 5-year period, Tri-Agency grants made up 29% of SFU's total research income. Tri-Agency programs are: Social Sciences and Humanities Research Council (SSHRC), Natural Sciences and Engineering Research Council (NSERC) and Canadian Institutes of Health Research (CIHR).

The 5-year average success rate for the core operating Tri-Agency programs

	5-year national avg. success rate	5-year SFU avg. success rate	Difference from national average
SSRHC (Insight Grants, Insight Development Grants)	38.6%	42.6%	+4%
NSERC (Discovery Grants)	66%	72%	+6%
CIHR (Project Grant)	15.5%	18.6%	+3.1%

Tri-Agency market share (as per the programs listed in the table above)



Despite higher than national average success rates, SFU's market share of Tri-Agency grants programs is falling. This is important for us to change because the funding drives allocations of Canada Research Chairs, investments from the Canada Foundation for Innovation and the Research Support Fund. There was a promising upturn in SSHRC funding in 2020. We want to continue this movement towards improving the overall drop in our Tri-Agency market share.



RESEARCH OUTPUTS

SFU researchers mobilize their scholarly work in a wide variety of ways. From publishing journal articles or books, patenting and licensing inventions, publishing op-eds in newspapers and online media, to being interviewed on the news and displaying their works for the public to see, our researchers are committed to knowledge mobilization.

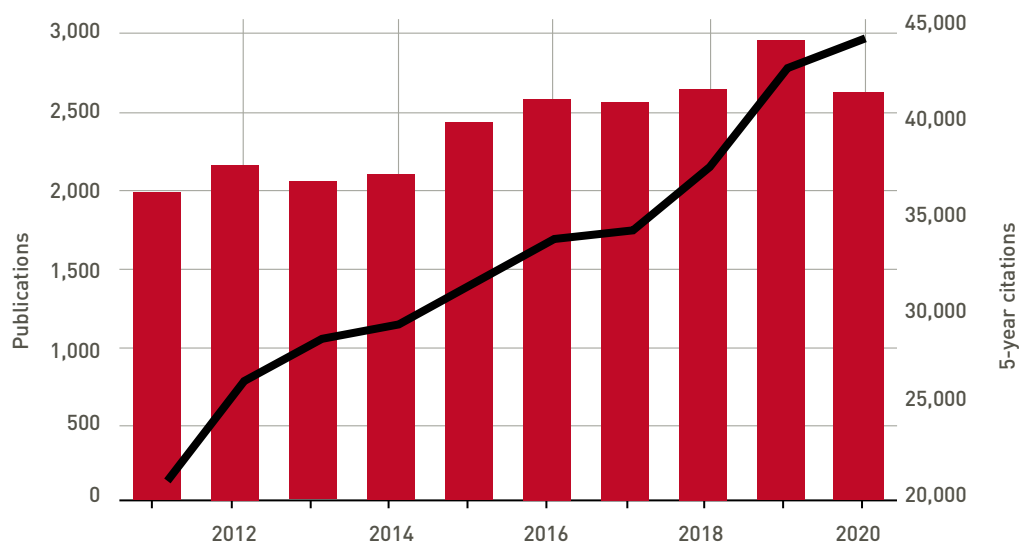
From January 1, 2016 to December 31, 2020, SFU authors published over 13,000 journal articles (source: SciVal), were mentioned in the news over 14,000 times (source: Altmetric) and filed over 300 patent applications (source: Derwent).



PUBLICATIONS AND CITATIONS

Research at SFU spans eight faculties, covering a broad range of fundamental, interdisciplinary and applied research topics. On average, SFU researchers publish 2,500 journal articles per year, over 40% of which appear in the world's top 10% journals (Source: Scopus).

SFU publications and 5-year citation rates (source: Web of Science)



Over the past 10 years, SFU has increased our annual number of publications by 23%. Over this same period, SFU's citation rate, measured by a 5-year rolling window, has doubled.

SFU researchers are on average among Canada's most productive researchers, measured by the number of publications per author. Over the past 5-year period, SFU ranks second in Canada, among the U15 universities in publications per author (source: Elsevier's SciVal).

ALTERNATE FORMS OF PUBLICATION

ALTMETRIC

Altmetric is a database that captures metrics and qualitative data that are complementary to traditional, citation-based metrics.

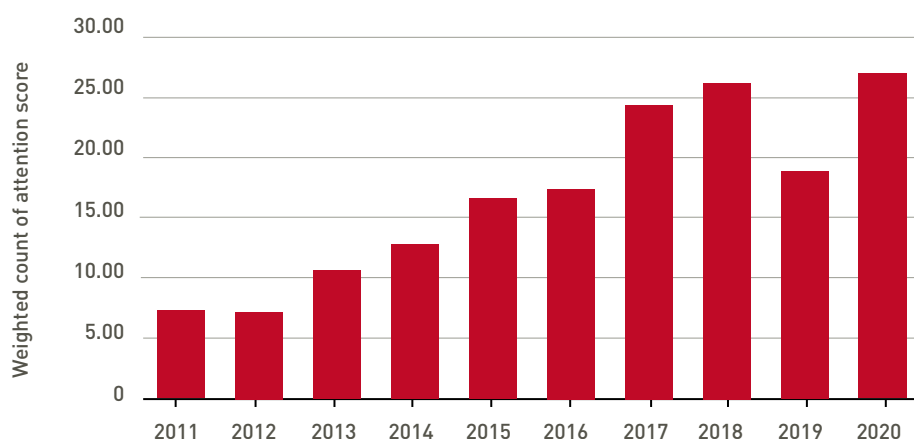
Sourced from the Web, altmetrics help inform how often journal articles and other scholarly outputs like datasets are discussed and used around the world. While the most important part of an Altmetric report is the qualitative data, it is also useful to put ‘attention’ in context and see how some research outputs are doing relative to others.

The Altmetric Attention Score for a research output provides an indicator of the amount of attention that it has received.

SFU's Research Expertise Engine (REE) features an Altmetric badge on each of the publications in REE that appear in Altmetric, with a link to the attention data for that publication.

SFU'S ALTMETRIC ATTENTION SCORE

Attention score

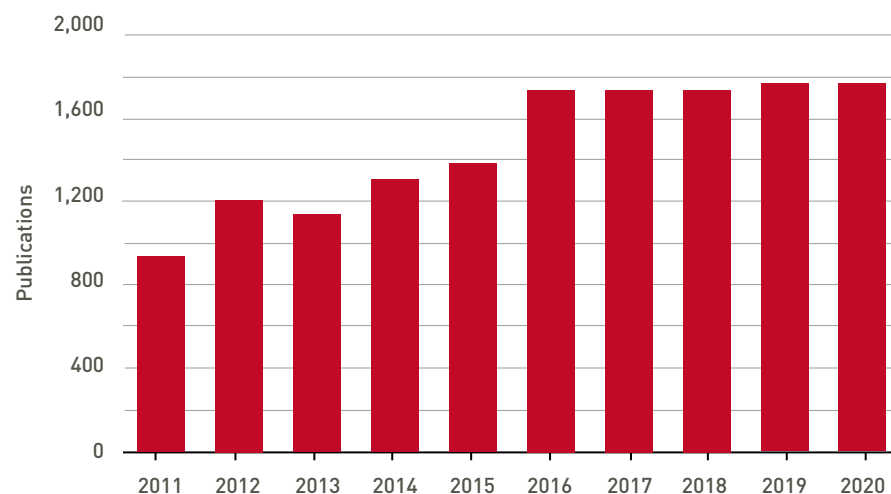


Altmetric's attention score represents a weighted count of mentions in traditional and non-traditional media platforms for a specific research output

Note: the chart shows SFU's attention score from January 1, 2011 to December 31, 2020, accounting for five years preceding the publication of the 2016-2020 SRP, as well as the five-year period of the plan

ALTMETRIC STATISTICS ON SFU PUBLICATIONS

Number of publications





Rekha Krishnan



Rajiv Kozhikode

MEDIA CHANNELS TO MOBILIZE RESEARCH

One knowledge mobilization strategy is to disseminate and engage the public through media channels, locally and internationally. SFU supports this through our [media activities](#), membership in [The Conversation Canada](#), training opportunities, and support from [faculty and department communicators](#).

THE CONVERSATION CANADA

SFU is one of the founding partners of The Conversation Canada, one of the world's most trusted independent sources of news and views from the academic and research community, delivered directly to the public. Academics and researchers who publish articles get access to a robust analytics dashboard which provides data they cannot get from traditional academic publications. Researchers can use this data to demonstrate knowledge mobilization, an increasingly important element in grant applications. The [2019 SFU Newsmaker Award winner](#), postdoctoral researcher Fatemeh Torabi Asr, appeared in The Guardian, Salon, Daily Cos, National Post, PBS and other media, after publishing articles in The Conversation. The estimated reach of her media mentions in 2019 was 178 million.

THE CONVERSATION CANADA RESULTS FROM SEPTEMBER 2011 - NOVEMBER 2021

203 **138**
SFU PUBLICATIONS SFU AUTHORS

3,462,313
TOTAL READS

SFU'S TOP 5 ARTICLES IN THE CONVERSATION CANADA (BY NUMBER OF READS TO DATE)

1. [It's taken thousands of years, but Western science is finally catching up to Traditional Knowledge](#) (George Nicholas, SFU archaeology professor)
2. [Should I eat red meat? Confusing studies diminish trust in nutrition science](#) (Scott Lear, SFU health sciences professor)
3. [Snack your way to better health with bite-sized exercise breaks](#) (Lear)
4. [Downsizing to an early death? Why exercise is so important as you age](#) (Lear)
5. [The language gives it away: How an algorithm can help us detect fake news](#) (Fatemeh Torabi Asr, SFU computing science PhD student)

SFU'S SCHOLARLY IMPACT SERIES

Established in March 2021, [SFU's Scholarly Impacts series](#) has featured the work of more than 30 SFU researchers from across all eight faculties, and continues to be well-received by the SFU community. The response to SFU Beedie Professors [Rekha Krishnan and Rajiv Kozhikode's August feature](#) contributed to them publishing a related piece in The Conversation Canada—it was republished by media across the country.



Scott Lear



Fatemeh Torabi Asr



George Nicholas

UNIVERSITY RANKINGS

SFU consistently ranks among Canada's top universities in major national and global ranking systems. Research performance and reputation are important factors in these rankings.

- In Macleans's Rankings, **SFU has been ranked first every year** in the Comprehensive University category, with the exception of 2014, when it was ranked second.
- World's Universities with Real Impact (WURI) 2021 rankings put SFU third in the world for its entrepreneurial spirit (up from seventh) and 24th overall (up from 34th) among innovative universities—the **number one university in Canada** and the only one within the top 100.
- In its 2022 World University Rankings, Times Higher Education (THE) ranks SFU tied for **eighth in Canada**. SFU has **moved up to the top 201-250** universities in the world—previously the university was within the 251-300 world ranking.

#1

COMPREHENSIVE UNIVERSITY
(MACLEAN'S 2021 RANKINGS)

#3

ENTREPRENEURIAL SPIRIT
(WORLD'S UNIVERSITIES WITH
REAL IMPACT 2021 RANKINGS)

TOP 10

FOR THREE OF THE UN'S SUSTAINABLE DEVELOPMENT GOALS
(TIMES HIGHER EDUCATION'S 2021 IMPACT RANKINGS)



- In the 2021 THE University Impact Rankings, SFU is placed in the **top 10 worldwide** for **three of the United Nations' Sustainable Development Goals (SDGs)**: Climate Action (SDG 13); Sustainable Cities and Communities (SDG 11); and Peace, Justice and Strong Institutions (SDG 16). SFU is placed within the top 50 overall in the world.
- The 2021 QS World University Rankings positioned SFU **within the top-300 in the world**, moving up 25 places year-over-year and maintaining our rank as **13th in Canada**. In addition, **SFU ranked eighth in Canada for citations per faculty** and **consistently has ranked in the top-200 worldwide** for research impact.

RESEARCH EXCELLENCE

BUILDING ON A SOLID FOUNDATION OF FUNDAMENTAL RESEARCH, OUR RESEARCHERS ARE COMMITTED TO CHALLENGING CONVENTIONS, CELEBRATING NEW IDEAS AND EMBRACING UNCONVENTIONAL PARTNERSHIPS

SFU's Institutional Strategic Awards (ISA) works to recognize and promote SFU research and scholarship. From 2016-2021, the ISA team supported with a number of major national awards for SFU researchers, including:

- A Bank of Canada Fellowship;
- Four Canadian Academy of Engineering Fellowships;
- Three Canadian Academy of Health Sciences Fellowships;
- A CIHR Trailblazer Award;
- A Governor General's Award for Innovation;
- Two Partners in Research National Awards;
- 27 Royal Society of Canada Fellowships and eight Royal Society of Canada College Members; and
- Two SSHRC Impact Awards.

FELLOWS AND COLLEGE MEMBERS OF THE ROYAL SOCIETY OF CANADA

- In 2021, 11 SFU scholars were named to the Royal Society of Canada (RSC), the greatest number of faculty elected to the RSC in any year, bringing our total number of active members to 65. Membership in the RSC is Canada's highest academic honour.

CANADA 150 RESEARCH CHAIRS

- In 2018 and 2019, SFU celebrated the arrival of Canada 150 Research Chairs: Caroline Colijn, chair in mathematics for infection, evolution and public health, and Wendy Hui Kyong Chun, chair in new media.



Caroline Colijn



SFU scholars named to the Royal Society of Canada in 2021



Wendy Hui Kyong Chun

CANADA RESEARCH CHAIRS

- As of October 2021, SFU has a total of 30 Canada Research Chairs.

DISTINGUISHED SFU PROFESSORS

- Since 2019, SFU has a total of 23 Distinguished SFU Professors. The Distinguished SFU Professor program recognizes SFU research faculty members of distinction who have achieved exceptional performance and distinguished accomplishments relative to their rank and years of service.

SCHOLARLY IMPACT OF THE WEEK

- Established in 2021, a weekly feature of an SFU researcher is selected by the Office of the Vice-President, Research and International to celebrate scholarly milestones and research impacts from across the SFU research community.

STRATEGIC RESEARCH INITIATIVES

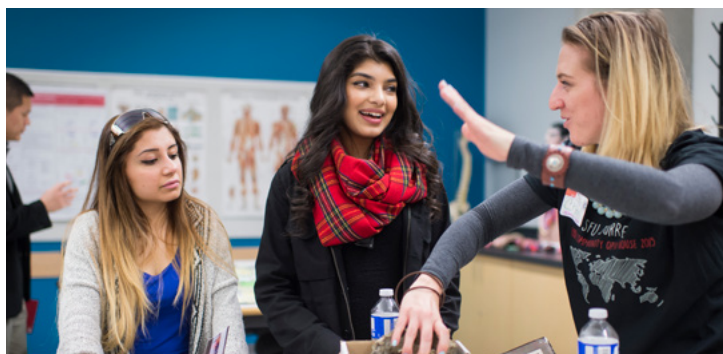
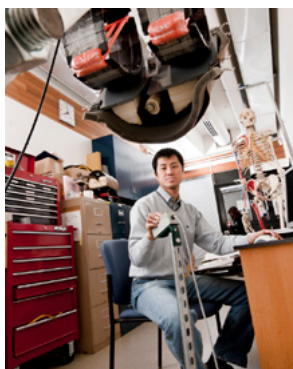
- Our university-wide strategic research initiatives align with our research vision, supporting students and faculty members to carry out research for good—in Canada and around the world.

- SFU Innovates is the university's innovation strategy with a mission to engage SFU researchers, staff and students with our communities and partners to solve societal challenges through innovation and entrepreneurship.

- SFU's Big Data Initiative was built on a decade of leadership in the field of big data. The university's investment in the initiative strengthened our position and set the university up for future growth in the area. The activities of the initiative continue under the management of the Big Data Hub core facility.

- SFU is committed to providing sustained resources to support researchers in sharing their findings with wider communities in meaningful ways. This commitment to knowledge mobilization is intended to facilitate wider public engagement with research and deepen connections between researchers and knowledge users. SFU's Knowledge Mobilization Hub provides services and supports to SFU researchers across all three campuses.

- SFU developed a new social infrastructure within the university, to entrench and expand our capacity to lead community-engaged research. In 2019, the Community-Engaged Research initiative—or CERi—was established.





THE 6 RESEARCH CHALLENGES

The SRP identifies six priority research challenges that were designed to push the limits of discovery and knowledge mobilization, and deliver breakthroughs with impact. The challenges serve as an inclusive space where SFU researchers can engage across disciplines to lead to breakthrough discoveries and innovations.

OVER THE PAST 5 YEARS, MORE THAN 4,030 ACTIVE FUNDED PROJECTS HAVE ADDRESSED ONE OR MORE RESEARCH PRIORITY AREAS AS DEFINED BY THE SIX CHALLENGES

CHALLENGE 1: ADDRESSING ENVIRONMENTAL CONCERNS AND CREATING A SUSTAINABLE FUTURE

OUR COMMITMENT TO GLOBAL SUSTAINABILITY

The [SFU 2025 Sustainability Plan](#) provides the foundation for SFU's sustainability efforts from 2020 to 2025. Given a global climate crisis, the plan mobilizes the entire institution to embed climate action throughout its operations, research, academics and community engagement.

WE ARE COMMITTED TO BOLD ACTIONS FOR A BETTER FUTURE ACROSS THE GLOBE

SFU is advancing the United Nations' Sustainable Development Goals (SDGs) through our research, teaching and learning, campus operations, and community engagement.

Learn more at sfu.ca/sdgs.



“We are scaling up our sustainability initiatives, strategies and resources, building on the good work done over the last two decades. Part of this scale-up is a broad grounding in a wider framework of the UN’s SDGs. With the creative energy and contributions from students, faculty, staff and partners, we can not only achieve our targets, but build community around an important issue.”

— DUGAN O’NEIL, VP RESEARCH AND INTERNATIONAL

IMPACT EXAMPLES

- Times Higher Education’s 2021 Impact Rankings places SFU in the top 10 worldwide for three key SDGs: Climate Action (SDG 13); Sustainable Cities and Communities (SDG 11); and Peace, Justice and Strong Institutions (SDG 16).
- We have launched a SDGs website to share how the institution has—and is—advancing in these areas.
- New SFU faculty are being hired and new research directions are being pursued because of SFU’s School of Sustainable Energy Engineering.
- SFU’s Living Lab program facilitates sustainability-themed research at SFU by creating structured collaborations between staff, faculty and graduate students. The program aims to provide opportunities for applied research and experiential learning that improve the sustainability of our three campuses.
- ACT – Action on Climate Team is the first—and still the only—university-based think tank initiative in North America dedicated to a comprehensive suite of climate action issues.



- SFU has an active climate change research program. Areas of research include greenhouse gas mitigation and sustainable energy systems, climate change impacts and adaptation to climate change. SFU is also part of the Pacific Institute for Climate Solutions.
- Ionomr is an award-winning start-up company, founded by members of the Polymers for Electrochemical Energy Lab at SFU (led by SFU Science Professor Steven Holdcroft). Ionomr designs, adapts and manufactures advanced ion-exchange membranes to enable cost-effective clean energy generation, energy storage, power to gas, onsite chemical generation and wastewater treatment.
- SFU Resource & Environmental Management Professor Tammara Soma is the director of research for the Food Systems Lab, a research and innovation hub. Soma and her research team work on solutions for equitable collaboration to reduce food waste and support a sustainable food system that enhances ecosystems, conserves natural resources and mitigates climate change.

SCHOLARLY IMPACT EXAMPLES

- SFU’s Department of Geography: CO2 removals are not equal to CO2 emissions
- SFU’s Faculty of Science: breakthrough technology fuels clean energy shift

CREATING A SUSTAINABLE FUTURE

BY THE NUMBERS

#6

IN SUSTAINABLE CITIES & COMMUNITIES (SDG 11)

(TIMES HIGHER EDUCATION'S 2021 IMPACT RANKINGS)

263

RESEARCH PUBLICATIONS RELATING TO CLIMATE ACTION (SDG 13)

(2016 - 2021)

134

ACTIVE RESEARCH PROJECTS RELATED TO CLIMATE ACTION (SDG 13)

(FUNDED FROM 2016 - 2021)

58 PUBLIC LECTURES

62 PANEL EVENTS

66 PODCASTS

8 COURSES RELATED TO CLIMATE ACTION (SDG 13)
(REPRESENTING 1,898 STUDENTS OFFERED BETWEEN 2018-19 AND 2020-21)

5,422

RESEARCH PUBLICATIONS RELATED TO THE SDGS WITH COLLABORATORS IN

154

COUNTRIES

63+

SCHOLARS INVOLVED IN RESEARCH RELATING TO CLIMATE ACTION (SDG 13)

#7

IN CLIMATE ACTION (SDG 13)

(TIMES HIGHER EDUCATION'S 2021 IMPACT RANKINGS)

#5

IN PEACE, JUSTICE & STRONG INSTITUTIONS (SDG 16)

(TIMES HIGHER EDUCATION'S 2021 IMPACT RANKINGS)

CHALLENGE 2: UNDERSTANDING OUR ORIGINS

WE MUST ASK FUNDAMENTAL QUESTIONS ABOUT THE UNIVERSE, OUR PLANET AND SOCIETIES

SFU has built considerable capacity in fields that address questions about the origin and evolution of the universe, about human life and organisms, and about human culture. Using advanced infrastructure and traditional methods of scholarly inquiry, SFU researchers are making important contributions to fundamental questions that are central to research in the sciences, education and the humanities.

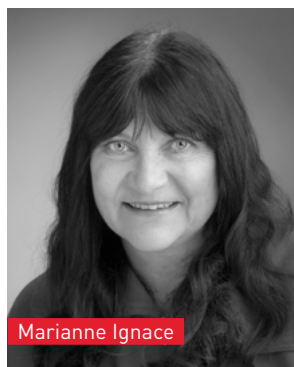
IMPACT EXAMPLES

- SFU Linguistics Professor Marianne Ignace and her husband, Chief Ronald Ignace, have worked with B.C.'s Indigenous communities for decades and their work was recognized with the 2019 Governor General's Innovation Award. Their research successfully combines advocating and practicing western scientific knowledge in dialogue with the wisdom and knowledge of past and present elders.
- SFU Archaeology Professor Rudy Reimer's academic career path is built upon his experience as a member of the Squamish Nation, his early work experiences and a need to disrupt traditional archaeology.
- Researchers in SFU Molecular Biology and Biochemistry Professor Peter Unrau's laboratory have isolated a genetic clue—an enzyme known as an RNA polymerase—that provides new insights about the origins of life. The research is published in the journal of Science in March 2021.

- SFU Science Professor Levon Pogosian is pushing the boundaries of what is understood about the origin, evolution and the fate of the universe. His research explores a novel idea to solve the Hubble Tension.
- SFU Philosophy Professor Endre Begby's research focus is on issues in social epistemology, on the cognitive underpinnings of language and communication. His article published in Philosophy and Phenomenological Research introduces the concept of evidential preemption.
- SFU Mathematics Professor Tom Archibald is part of the History of Mathematics Research Group, studying the origins and development of mathematical ideas and methods from the beginnings of recorded history—in all societies and cultures.

SCHOLARLY IMPACT EXAMPLES

- SFU's Department of Molecular Biology and Biochemistry: RNA research reveals clues to the origins of life
- SFU's Faculty of Communication, Art and Technology: exploring the transnational choreography of human movement



CHALLENGE 3: SUPPORTING HEALTH ACROSS THE HUMAN LIFESPAN

Globally, we are looking for ways to support the health and wellness of young and aging populations, manage pandemics, and develop treatments, interventions and preventative approaches for seemingly intractable diseases. Addressing this challenge requires approaches that span the spectrum from modelling organisms to understanding human society.

WE ARE INVESTIGATING THE CAUSES AND CONSEQUENCES OF DISEASE, INCLUDING CHRONIC AND INFECTIOUS DISEASES, MENTAL ILLNESS AND CANCER

IMPACT EXAMPLES

- In 2020, SFU became the new host institution for the Kids Brain Health Network, part of the national Networks of Centres of Excellence Program. KBHN is dedicated to helping children with neurodevelopmental disabilities and their families.
- A partnership between SFU's Personalized Lightweight Apparel Network (PLANet) and Mitacs will accelerate the development of new Canadian wearables and gear over the next five years. The agreement provides \$5.1 million in funding for graduate students and postdoctoral fellows to work with the industry to develop technologies that will benefit societal health and wellbeing. Additional support was provided by our innovation strategy, SFU Innovates, to develop the SFU Wearables and Gear Accelerator Program, led by Neil Branda, SFU Innovates director of technology readiness and prototyping and executive director of 4D LABS.

COVID-19 RESEARCH

- SFU Science Professor and Canada Research Chair in Mathematics for Evolution, Infection and Public Health, Caroline Colijn, and SFU Health Sciences Professor and Canada Research Chair Tier 1 Kelley Lee were jointly award the 2020 SFU Media Newsmaker of the Year for their extensive contributions to the understanding of COVID-19.



- A core facility, SFU's Containment Level 3 (CL3) Lab is one of a few biosecure facilities in Canada that are certified by the Public Health Agency of Canada. SFU Health Sciences Professor and Scientific Director of the Lab Ralph Pantophlet's research is focused on investigating antibody responses to viruses such as HIV-1, Flu, HCMV and SARS-CoV-2 (which causes COVID-19).
- SFU School of Interactive Arts and Technology (SIAT) Professor and Canada Research Chair Diane Gromala, SIAT Professor Chris Shaw and a team of graduate students used their extensive work with health technologies to identify those who would need vaccinations first—individuals who the Centre for Disease Control identified as most vulnerable and at-risk.

SCHOLARLY IMPACT EXAMPLES

- SFU's Faculty of Health Sciences: information and collaboration key to addressing opioid crisis
- SFU's Faculty of Applied Sciences: improving medical imaging for better outcomes



President Joy Johnson with Maite Taboada discussing the Gender Gap Tracker

CHALLENGE 4: STRENGTHENING CIVIL SOCIETY BY ADVANCING JUSTICE, EQUITY AND SOCIAL RESPONSIBILITY

Combining new tools and traditional methodologies, SFU researchers are mobilizing knowledge to understand the complexity of the social, economic and political forces that challenge global communities.

FOSTERING COMMUNITY PARTICIPATION IN RESEARCH IS BOTH A VEHICLE FOR SOCIAL CHANGE AND A CRITICAL SOURCE OF SCHOLARSHIP

IMPACT EXAMPLES

- SFU is advancing our efforts in equity, diversity and inclusion (EDI). We are committed to creating a diverse, equitable and inclusive community where all feel welcome, safe, accepted and appreciated in learning, teaching, research and work.

We are ensuring that all Canada Research Chair nominations and recruitment processes follow best practices and adhere to equity requirements. SFU's Institutional Strategic Awards implemented many of the recommendations in SFU's EDI Action Plan and developed an EDI in Hiring training module for faculty search committees.

- In 2019, Informed Opinions, in partnership with SFU, developed a new tool to track in real time the number of women and men quoted in major news platforms in Canada. The Gender Gap Tracker powered by SFU uses the latest advances in big data analytics and text data mining to measure gender equity in news sources with the aim of drawing attention to—and closing—the persistent gap. The tool was developed by SFU's Discourse Processing Lab (led by Lab Director and Linguistics Professor Maite Taboada) using the latest advances in computational linguistics to identify who is mentioned and quoted and provides an accurate gender breakdown.

- As a world-class science and technology accelerator, SFU VentureLabs supports the university's equity, diversity and inclusion initiative. In 2019, the B.C. Regional Women Entrepreneurship Knowledge Hub—a national network of knowledge, data and resources for women entrepreneurs—was launched at VentureLabs. The accelerator is collaborating with a strong B.C. women entrepreneurship ecosystem to provide a regional perspective and support, and to strengthen and grow the network through workshops, events and regular communications.



Wendy Hui Kyong Chun



- In 2020, the Digital Democracies Institute (formerly the Digital Democracies Group) was launched. Led by SFU Professor and Canada 150 Research Chair in New Media Wendy Chun, the Institute's goal is to create global partnerships and integrated research in humanities, social sciences, networks and data sciences to address questions of equality, justice and democratic dialogue.
- In 2020, the First Nations Health Authority (FNHA) and SFU signed a Research Affiliation Agreement that will support FNHA to manage federal government funds for research into Indigenous health and wellness.

This agreement contributes to reconciliation, positioning SFU and FNHA as equal, and recognizes the right of First Nations to control all aspects of the research, information and data that impacts them.

The Institutional Strategic Awards team provides support for ground-breaking research partnerships with Indigenous communities and organizations and contributed to this Research Affiliation Agreement.

SCHOLARLY IMPACT EXAMPLES

- SFU's Faculty of Health Sciences: why a ban on conversion therapy isn't enough
- SFU's Faculty of Arts and Social Sciences: confronting the business model of modern slavery



SFU researcher Wolfgang Stuerzlinger making virtual reality a collective experience

CHALLENGE 5: ENHANCING OUR WORLD THROUGH TECHNOLOGY

As technology enables collaborative networks with a high order of complexity, SFU researchers can lead or participate in Big Science projects across the research spectrum and attract complementary expertise in key growth areas. Working in coordination with industry, SFU researchers cover a wide range of innovative research and training programs, seamlessly integrating new research questions with technological outcomes.

FROM DISCOVERY TO APPLICATIONS IN THE REAL WORLD, WE LEVERAGE TECHNOLOGY AND DATA-INTENSIVE APPROACHES TO TRANSFORM SOCIETY AND DELIVER TOMORROW'S SOLUTIONS

IMPACT EXAMPLES

- In 2019, the provincial government invested over \$17 million over five years to establish the Quantum Algorithms Institute situated at SFU's Surrey campus. The institute focuses on building quantum computing software and algorithms. It will help SFU collaborate with research universities throughout B.C. to position the province as a world leader in the emerging field of quantum computing technology.
- SFU molecular biology and biochemistry researchers have used their pioneering imaging technology—called Mango, for its bright colour— to develop COVID-19 testing kits.
- In 2018, SFU joined Canada's Digital Technology Supercluster (CDTS), a Canadian government initiative led by a cross-industry collaboration among some of the country's biggest names in healthcare, telecommunications, natural resources, technology and transportation. SFU researchers from across the university are involved in several CDTS projects to position Canada as a global leader in digital technology.

SCHOLARLY IMPACT EXAMPLES

- SFU's Faculty of Communication, Art and Technology: improving the 3D virtual reality experience
- SFU's Faculty of Science: UK Biobank data advances human genetics

CHALLENGE 6: TRANSFORMING THE LANDSCAPE OF TEACHING AND LEARNING

CENTRAL TO FOSTERING HUMAN DEVELOPMENT AND GROWTH IS TEACHING AND LEARNING, WHERE ART- AND SCIENCE-BASED APPROACHES COMBINE TO INSPIRE INNOVATION AND TRANSFORMATION

With a responsibility to develop and disseminate knowledge, researchers continually question their approaches to teaching and learning. Deepening our understanding of the linkages between knowledge, experience and engagement supports the development of lifelong learners and lays the foundation for conceptual and practical innovations in teaching and learning.

IMPACT EXAMPLES

- In November 2020, SFU Education Professor Gillian Judson's "The Walking Curriculum" was named one of the world's most inspiring innovations in K-12 education by non-profit HundrED's annual Global Collection.

This innovative and interdisciplinary resource was developed for K-12 educators who want to take student learning outside school walls with the simple message: #getoutside.

- Even before COVID-19 forced universities to move their coursework online, SFU Education Professor Kevin O'Neill conducted research on the factors that made undergraduate students choose online versus in-person learning. Between September 2017 and April 2018, O'Neill and Education Professor John Nesbit and their colleagues undertook one of most comprehensive studies of its kind. They surveyed 650 undergraduate students to learn what course modalities they preferred and why, and published the article, Modeling undergraduates' selection of course modality: A large sample, multi-discipline study.

SCHOLARLY IMPACT EXAMPLES

From SFU's Faculty of Education:

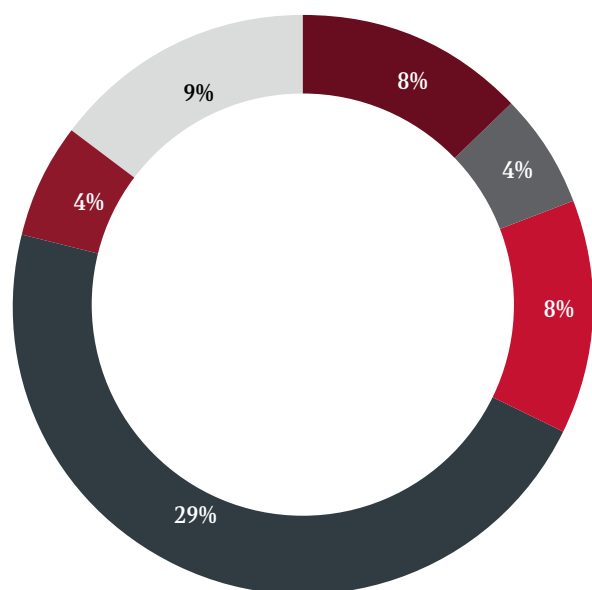
- Course conundrum: how do students choose between online and in-person learning?
- Optimizing social learning networks



RESEARCH CENTRES AND INSTITUTES

Over 60 research centres and institutes directly contribute to SFU's position among Canada's top universities in research impact. SFU's Research Centres and Institutes support collaborative research to confront key scientific and global challenges, foster creative interaction and stimulate engagement with students and visiting scholars.

Research focus of SFU's Centres and Institutes within the SRP's six research challenges



- Challenge 1: Addressing environmental concerns and creating a sustainable future
- Challenge 2: Understanding our origins
- Challenge 3: Supporting health across the human lifespan
- Challenge 4: Strengthening civil society by advancing justice, equity and social responsibility
- Challenge 5: Enhancing our world through technology
- Challenge 6: Transforming the landscape of teaching and learning



CANADA RESEARCH CHAIRS

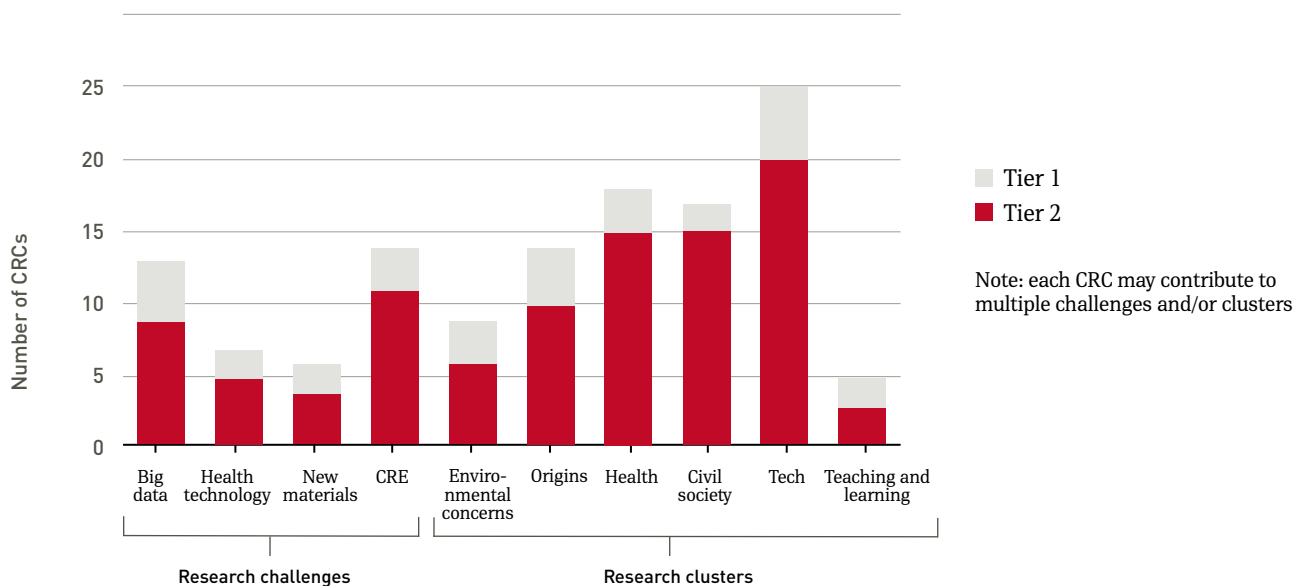
SFU's Canada Research Chairs (CRC) are allocated according to the SRP's clusters and challenges. The CRC program is a prestigious award sponsored by the Government of Canada to attract and retain the best minds in research, by global standards, covered by all disciplines supported by the Tri-Agencies. It consists of two types of awards: Tier 1 Chairs are titles held by senior and established researchers, who are world-leaders in their disciplines, and Tier 2 Chairs, which are titles held by exceptional and emerging scholars in their field of research.

Since 2016, SFU has had over 50 active CRCs, with 30 new Chairs appointed or renewed. Over this period, the recruitment and nomination process for the CRC program has been reviewed and readjusted to ensure equity, diversity and inclusion across all CRC groups.



Yuezhi Zhao, communication professor, Tier 1 CRC in political economy of global communication, Fellow of the Royal Society of Canada

SFU's Canada Research Chairs contributing to the research challenges and clusters



THE 4 RESEARCH CLUSTERS

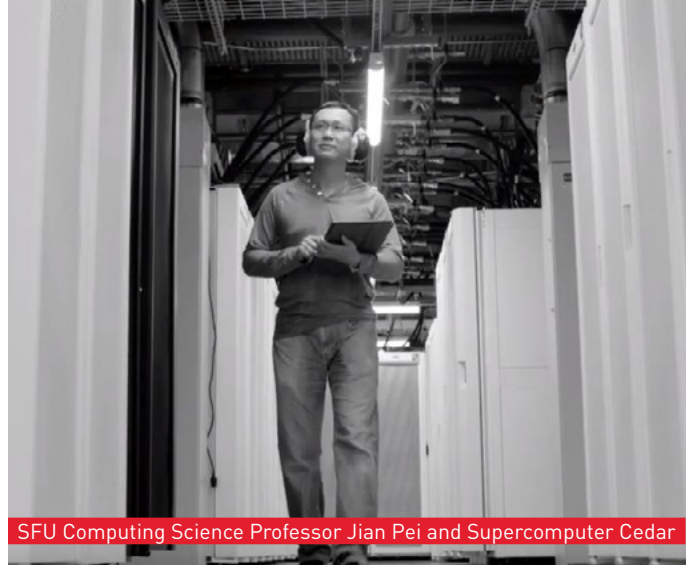
In the process of addressing the six research challenges, four research clusters were included in the SRP. The clusters are defined by a strong core of researchers from diverse disciplines who use innovative approaches and methods to drive impactful outcomes. Each research cluster helped us: strengthen areas of research excellence; seamlessly connect our research to our partners; and increase our impact on the national and international stage.

FOR MORE INFORMATION ABOUT THE 4 RESEARCH CLUSTERS, PLEASE SEE THE [SRP](#)

CLUSTER 1: BIG DATA

SFU IS HARNESSING THE POWER OF BIG DATA

We have built on over a decade of leadership in the field of big data, investing in advanced research computing to accelerate scholarship and innovation, raising awareness of big data in every field of study, and mobilizing knowledge for real world impact. Established in 2016, SFU's Big Data initiative was created to strengthen SFU's reputation as a leading data science institution. The university invested over \$9 million for big data research, training and advancement. Where many universities invest in depth, SFU also invested in breadth that leveraged all our expertise to generate more powerful insights and solutions that are directly relevant to our communities.



SFU Computing Science Professor Jian Pei and Supercomputer Cedar

In 2019, the initiative evolved into one of SFU's core facilities, SFU's Big Data Hub. This facility enables the convergence of data-driven expertise linking computing science to gender studies, statistics to climate change modelling, criminal justice to mathematics, epidemiology to policy, and more.

Learn more at sfu.ca/big-data.

IMPACT EXAMPLE

In 2017, SFU launched one of Canada's most powerful academic supercomputers named, Cedar. Cedar provides the scale and capacity that is paving the way for new research breakthroughs. The supercomputer is one of five national systems that Compute Canada has deployed as part of one of the biggest advanced research computing renewals in Canada's history. As the future of research moves to agile prototyping and integrating big data approaches across the spectrum of research, SFU has world-leading expertise to guide researchers on their big data journey by using Cedar.

Learn more at sfu.ca/research/supercomputer-cedar.

\$9M

IN TOTAL EXTERNAL FUNDING FOR RESEARCH, TRAINING AND ADVANCEMENT FACILITATED BY SFU'S BIG DATA INITIATIVE

1,000+

PEOPLE TRAINED IN DATA-INTENSIVE TOOLS AND APPROACHES

55

GRADUATE STUDENTS FROM ACROSS THE DISCIPLINES AWARDED THE SFU BIG DATA GRADUATE SCHOLARSHIP

97+

COMPANIES ACTIVELY ENGAGED TO UNLOCK NEW INSIGHTS AND SOLUTIONS

15

NEXT BIG QUESTION PROJECTS FUNDED TO SEED SFU RESEARCHERS IN DELIVERING BREAKTHROUGHS THAT TRANSFORM THE FIELD

CLUSTER 2: HEALTH TECHNOLOGY AND HEALTH SOLUTIONS

TECHNOLOGY-DRIVEN SOLUTIONS AND INNOVATIONS TO ADVANCE HEALTHCARE AND HELP PEOPLE LIVE HEALTHY, INDEPENDENT LIVES

SFU is dedicated to research in areas such as development and aging; mental health, brain health and disease; personalized medicine and drug development; demography, policy, economics and management; life sciences; computation and design; nanotechnology; robotics; and innovation.

Developing new technologies, instruments and applications supports human health from point-of-care diagnostics, to monitoring and treatment, to long-term preventive strategies.

IMPACT EXAMPLES

In 2019, the Digital Health Circle was launched at SFU's Surrey campus with funding from Western Economic Diversification Canada and funding from AGE-WELL. This national innovation hub addresses aging challenges through digital technologies to improve seniors' quality of life.

Learn more at www.digitalhealthcircle.ca.

In 2019, SFU introduced the Core Facility Program to define how core facilities are governed and provide common services. The program also was developed to ensure that SFU core facilities align with the SRP and that overall administrative overhead is minimized. To date, all five SFU Core Facilities have conducted research in health technology and health solutions.

Established in 2018, SFU's ImageTech Lab is a leading medical imaging research facility—the first lab of its kind in Western Canada.



The facility enables the region's top health innovators to bring rapid advances in the treatment of devastating brain disorders and diseases, brain injury, brain tumours, epilepsy, autism, Down Syndrome, aging and dementia, depression, addictions and mood disorders.

Learn more at sfu.ca/research/facilities/imagetech-lab.

SFU Mechatronic Systems Engineering Professor Faranak Farzan is the inaugural chair in technology innovations for youth addiction recovery and mental health. She is also the founder and scientific director of SFU's eBrain Lab where she is working with an interdisciplinary team focused on effective therapeutic solutions for youth mental health and addiction recovery.

Learn more at www.sfu.ca/research/scholarly-impacts/faranak-farzan-novel-treatment-youth-depression.

A research team, led by SFU Mechatronic Systems Engineering Professors Siamak Arzanpour and Edward Park, has been designing, developing and fine-tuning the most advanced wearable exoskeleton in the world to assist people with motion disability to walk naturally and independently.

Learn more at www.sfu.ca/mechatronics/news/2021/SFU-mechatronic-systems-engineering-professor-wearable-exoskeleton-ready-for-clinical-trials/.





The School of Sustainable Energy Engineering's first student cohort

CLUSTER 3: NEW MATERIALS AND TECHNOLOGY FOR SUSTAINABILITY

BOLD ACTIONS FOR A BETTER FUTURE

As a society we must urgently reduce greenhouse gas emissions while at the same time respond to the growing demand for energy. SFU has facilities and researchers dedicated to sustainability that have helped position the university as a globally recognized leader in the development of emerging renewable, clean and energy efficient technologies.

IMPACT EXAMPLES

In September 2019, SFU launched a new School of Sustainable Energy Engineering (SEE), offering a strong fundamental and interdisciplinary engineering education in energy systems with elements of public policy, economics, management and entrepreneurship.

Learn more at sfu.ca/see.

Ionomr, a clean-tech, advanced materials company, grew out of Chief Strategy Officer and SFU PhD student Benjamin Britton's research, where he helped develop what are now the most efficient, durable and scalable systems for hydrogen production and energy consumption. These innovations hold major promise for the fuel-cell electric vehicle industry, to improve system durability and deploy a green hydrogen-refueling network.

Learn more at www.ionomr.com.

4D LABS is SFU's \$65 million state-of-the-art materials science and engineering research core facility. In 2018, SFU and Nanotech Security joined forces to commission a \$4.5 million electron beam lithography (EBL) system. Using the system, SFU students and researchers are conducting research on quantum computing devices, micro-LEDs, clean technology and meta-material structures. It enables new research and insights in nanotechnology.

Learn more at www.4dlabs.ca.



SFU's new Surrey building houses the School of Sustainable Energy Engineering

CLUSTER 4: COMMUNITY-ENGAGED RESEARCH

STRENGTHENING THE CAPACITY OF SFU RESEARCHERS AND STUDENTS TO ENGAGE RESPECTFULLY AND ETHICALLY WITH OUR COMMUNITY MEMBERS

Launched in 2019 and designed around a collaborative research infrastructure, SFU's Community-Engaged Research initiative (CERi) promotes principles of participation, cooperation, social transformation and knowledge translation to lift and strengthen the capacity of SFU's researchers and students, to engage respectfully and ethically with community members.

CERi focuses on a reciprocal relationship between universities and communities. The initiative is developing meaningful and productive research partnerships that are making a positive difference in communities throughout British Columbia—and beyond.

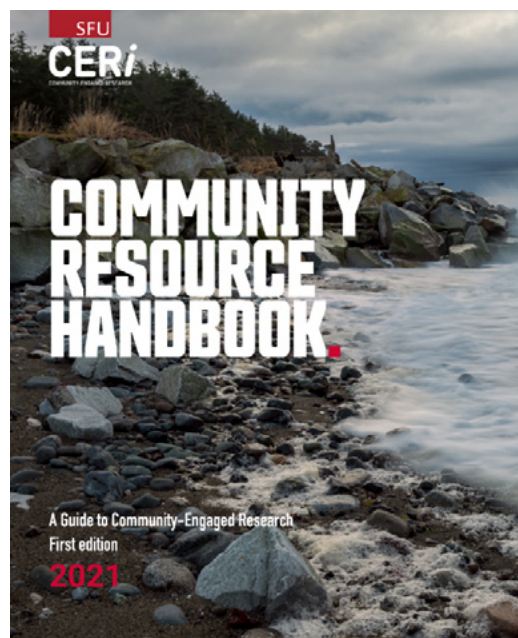
Learn more about SFU's Community-Engaged Research initiative: sfu.ca/ceri

IMPACT EXAMPLES

Created in 2021, CERi's [Community Resource Handbook](#) offers a practical and accessible how-to guide for community-engaged research (CER) that demonstrates the value of CER to communities and the people working alongside them. The guide also provides diverse examples of successful CER projects at SFU since 2018, offering evidence of the university's commitment to placing academic and community partnership at the heart of research.

CERi also developed the following research programs from 2020-2021:

- [Researchers-in-Residence](#)
- [Community Scholars](#)
- [Graduate Fellowship](#)
- [CERi Funding](#)



RESEARCHER RESOURCES AND SUPPORTS

The Office of the Vice-President, Research and International (VPRI) serves to encourage, facilitate, administer and promote research at SFU—nationally and internationally. We advocate and support university research, while guiding policy development at academic and government levels. SFU's VPRI portfolio has several departments, services and initiatives that help researchers launch a successful and fulfilling research program at the university.

See how the portfolio can support SFU researchers and get in touch with the various VPRI departments by visiting sfu.ca/research/departments. The SFU Research website also has a [contact directory](#) to find specific VPRI staff members.

Below are just some of the VPRI portfolio resources established throughout 2016-2020:

→ [Institutional Strategic Awards \(ISA\)](#)

Since 2017, ISA has provided support, resources and professional services for major national and international research applications and nominations. ISA provides the SFU research community with a wide range of research support mechanisms, enhances connections between researchers, partners and communities, and is a valuable contributor to increasing SFU's impact on the national and international stage.

→ [Research Services](#)

Research Services underwent a systematic and strategic restructuring between 2017 and 2020 to fully align with all the SRP themes and SFU's vision for research excellence. Leadership, organizational structure, staff expertise and business processes were changed. Today, Research Services is a dynamic and efficient partner in grant and contract administration.



→ [Funding and Award Opportunities Database](#)

Released in 2017, the database includes upcoming funding and award opportunities, and allows users to sign up to receive email alerts for self-selected opportunities.

→ [Research Intelligence Office \(RIO\)](#)

The RIO team includes data analysts, data engineers and software developers building data pipelines to answer questions of strategic importance for university research. Since 2018, RIO's services have included research on the competitive advantage of SFU as a research organization, and building web applications and workflow automations to improve the administration of research at the operational level.

Developed by RIO, SFU's [Research Expertise Engine](#) includes more than 41,000 titles authored by SFU researchers, searchable by keyword, author, department, faculty or their work within the UN's SDGs.

→ [Core Facility Program](#)

Established in 2019, SFU's Core Facility Program allows for the pooling of resources at a university scale, providing opportunities to acquire world-class equipment and to realize economies of scale in facility management.

→ [Research Enterprise System](#)

The Research Enterprise System (RES) Program was established in 2019 to improve the way we manage the growing research portfolio and reduce administrative burden for faculty so that researchers can focus on conducting research.



- SFU's Partnerships Hub
Created in 2020, the Partnerships Hub advances SFU's vision as Canada's engaged university by facilitating and supporting external partnerships.
- Technology Licensing Office (TLO)
Operating since 2020, the TLO is focused on delivering intellectual property protection and technology licensing services and support.
- Research Ethics Application System
SFU's Research Ethics Application System was released in 2020. The system supports researchers in the submission of applications and manages amendments and renewals for research ethics applications and course ethics applications.
- SFU's Knowledge Mobilization Hub
The Knowledge Mobilization Hub is growing the culture of knowledge mobilization at the university, expanding the scope of external knowledge mobilization resources, and helping SFU faculty, students and staff access SFU's existing resources.
- VPRI Communications and Marketing (C&M) team
Established in 2016, the VPRI C&M team delivers strategies that align with the SRP, and build on SFU's positive research reputation—locally, nationally and globally. The team is accountable for the public perception of SFU for research, innovation and sustainability, and is aligned with SFU's Central C&M team in defining, defending and advancing SFU's brand position and reputation.

RESEARCH FOR GOOD

BY CREATING AND MOBILIZING KNOWLEDGE, NURTURING PARTNERSHIPS AND HARNESSING THE POWER OF RESEARCH, ENGAGEMENT AT SFU IS AN INSTRUMENT FOR CHANGE

We look forward to working together with our research community to establish SFU's next Strategic Research Plan.

Engage with us at sfu.ca/research.

DISCOVERY. INNOVATION. IMPACT.

**SIMON FRASER UNIVERSITY RESEARCHERS
PUSH THE BOUNDARIES OF KNOWLEDGE AND
DELIVER REAL-WORLD RESULTS**

SFU

CANADA'S ENGAGED UNIVERSITY

Find out more at sfu.ca/research