Acknowledgement of Traditional Nations and Territories

The Faculty of Science is privileged to undertake its research and teaching operations on the traditional territories of the Coast Salish peoples.

At the Burnaby Campus the Faculty of Science respectfully acknowledges the traditional territories of the Squamish (Skwxwú7mesh Úxwumixw), Tsleil-Waututh (səlílwətaʔ), Musqueam (xʷməθkʷəy̓əm), and Kwikwetlem (kw̓ik̓w̓əl̓əm) Nations.

At the Surrey Campus the Faculty of Science respectfully acknowledges the traditional territories of the Katzie, Kwantlen, Kwikwetlem (kw̓ik̓w̓əl̓əm), Qayqayt, Musqueam (xʷməθkʷəy̓əm), and numerous Stó:lō Nations.

The Faculty of Science looks forward to walking a new path in partnership with the Coast Salish peoples built on respect, understanding and shared learning.
SCIENCE IN A RAPIDLY CHANGING WORLD

SCIENCE IS A FOUNDATIONAL COMPONENT OF A SUSTAINABLE KNOWLEDGE SOCIETY, ENABLING INNOVATIVE RESPONSES TO THE CHALLENGES AND OPPORTUNITIES PRESENTED BY A RAPIDLY CHANGING WORLD.

The Faculty of Science is committed to realising this vision through excellence in its curiosity-driven research programs that address science questions of societal relevance, the transformation of new discoveries into innovative, relevant and legitimate knowledge; and high quality and engaging research-informed educational programs that raise the understanding and relevance of science to lead and support collective societal goals.

Since 1965 the Faculty of Science has built a world class suite of programs whose breadth spans the Life, Environmental, Physical and Computational Sciences. The Faculty’s dedicated research and teaching faculty and staff work alongside community organizations, 3,800 undergraduate program students, 600 graduate students and community, industry and government partners to deliver stimulating, challenging and research-rich learning experiences. The Faculty also plays a broader education role at SFU supporting fundamental science skills and knowledge development for students from other faculties and disciplines (~8,000 enrolments per annum).

The Faculty has been agile in developing unique centres of expertise that are internationally recognised and globally connected. These include areas as diverse as the Centre for Cell Biology, Development and Disease; Centre for Experimental and Constructive Mathematics; 4D LABS - an advanced facility for materials and development; Centre for Natural Hazards Research; Earth-2-Ocean Group; and Centre for High Throughput Chemical Biology. Recognised for its excellence in mathematical and statistics research, The Canadian Statistical Sciences Institute (CANSII) has located it headquarters at SFU to align with the University’s Big Data initiative. The Faculty is also a leading partner in multi-university consortia that provide educational and research opportunities for faculty and students, such as the Pacific Institute of Mathematical Sciences (PIMS) and Bamfield Marine Sciences Centre.

This academic plan addresses key opportunities and challenges facing SFU and the university community to ensure that the Faculty continues to enhance its world class scholarship, provides
distinctive and exceptional academic programmes and outstanding student experiences. Science is well-positioned to meet these challenges from its core commitment to enhance research and teaching excellence in each of its disciplines. From this foundation of disciplinary excellence, possibilities emerge to develop new interdisciplinary pathways in research and education that are emerging at the intersection of science and cognate disciplines. Such pathways recognise that solutions to contemporary societal issues require collaborative approaches across traditional boundaries of scholarship, and the Faculty of Science will seek new opportunities to develop programs that equip students for creative problem solving in a modern world.

The Faculty of Science is committed to the pursuit of excellence in research scholarship, which is paramount for the creation and delivery of high quality and contemporary research-informed educational programmes, the attraction of top-quality students and delivery of an outstanding science experience for our students. Consequently, this Academic Plan and its stated goals should be read alongside the Faculty of Science Research Strategy (to be completed in 2020).
BUILDING A DIVERSE, INCLUSIVE AND SAFE ENVIRONMENT

The Faculty of Science thrives on the commitment, creativity and energy of faculty, staff, students and alumni, and recognises that people are its most valuable asset. Consequently, the Faculty will ensure that it provides a safe, inclusive and equitable work and learning environment characterised by impartial and merit-based decision making. The commitment to equity, diversity and inclusion outcomes will attract, retain and support talented people to achieve their potential and benefit the intellectual life and support engagement in all the Faculty’s activities.

The Faculty of Science will establish a Dean’s Advisory Committee on Equity, Diversity and Inclusion comprising staff, faculty and student representatives. This committee will develop an EDI strategy for the Faculty that is consistent with the Universities Canada Principles on EDI and which cuts across all aspects of Faculty operations. This is a significant task that will include the following tasks:

- Unravelling the multiple contexts of EDI as they relate to the Faculty of Science staff, faculty, graduate and undergraduate student body.
- Prioritisation of EDI issues across the Faculty.
- Identification of goals and measurable indicators of success as they relate to EDI for the Faculty.
- Recommendation of specific policies and initiatives that support equity, diversity and inclusion.

**Action:** Led by a new Associate Dean EDI the Faculty will establish a roadmap to support the formulation and implementation of strategies and initiatives that strengthen the internal culture of the Faculty of Science and advances our efforts to improve equity, diversity and inclusion.
MEETING OUR COMMITMENT TO THE ARC REPORT

THE FACULTY OF SCIENCE WILL DEVELOP A STRATEGY AND IMPLEMENTATION PLAN THAT Responds TO THE CHALLENGES ARTICULATED IN THE SFU ABORIGINAL RECONCILIATION COUNCIL REPORT

The Faculty of Science has clear opportunities to support development of a more culturally rich student, faculty and staff complement as well as development of culturally informed educational programs. Such positive changes must be based on a framework of culturally sensitive support mechanisms and there are key challenges to address in contributing to this important transformation of university culture.

The development of culturally informed curriculum can be challenging in some disciplines that strongly align with the traditional constructs of Science. Furthermore, while many faculty understand the desire to develop culturally informed curriculum, they can feel ill-equipped to undertake this practice in meaningful ways.

However, there are remarkable pockets of leadership within the Faculty forging positive pathways alongside First Nations communities and young people, through engaged research and educational programmes. These innovative models provide exemplars upon which to build a more comprehensive strategy.

In recognition that the path to reconciliation is long, the Faculty of Science is committed to developing a considered and thoughtful strategy for implementation over the next five years.

The Faculty will form an Advisory Group on Indigenous Initiatives comprising members of the Office of Aboriginal Peoples and Indigenous Student Centre, science faculty, staff and students. The Advisory Group will define a set of Science specific goals that respond to the ARC Report and that are realistic with respect to:

- Culturally informed curriculum development;
- Co-created research and learning opportunities;
- Development of culturally appropriate student support to enhance the experience of aboriginal students;
- Bridging the secondary to tertiary divide and cultivation of an increased interest in science.
- Respectful research practice.

Action: An initial set of recommendations will be produced in 2020 for broader consultation followed by implementation.
1. RECRUITING CURIOUS MINDS

The Faculty will recruit a diverse and talented pool of students that not only maintains a stable enrolment but also takes advantage of opportunities to build enrolments in new programmes. Actions to meet this goal include:

- Proactive recruitment of high school students, generating an increased demand to enter the Faculty of Science. A new communication programme will be developed that provides more resources to address questions posed by prospective students, their care-givers and high school advisors.

- Personalize engagement with students in the critical period between application and acceptance of offers.

- Ensure high school subject lists required for entry to SFU Science are consistent with the spectrum of programmes offered within the Faculty.

- Increase the enrolment of international students into Science programmes through realising opportunities with Fraser International College (FIC).

- Increase graduate enrolments within the faculty, through graduate-specific open days and recruitment events that enable individual mentoring.

Action: Working closely with SFU’s new strategic enrolment planning initiative and in collaboration with SFU Student Services the Faculty of Science will establish an enrolment and recruitment plan for both undergraduate and graduate students for implementation in 2020.
2. STREAMLINED SCIENCE PROGRAMS

The Faculty of Science has a reputation for high quality education in the traditional science spheres. It is important that the Faculty maintains distinct academic programmes and ensures they are fit-for-purpose in a contemporary student focussed education market.

- **Distinctive program offerings**: Ensure the Faculty has distinctive degree programs that are clearly communicated to prospective and existing students.

- **Clear articulation of graduate profiles in each major**.

- **Streamline programmes**: Continue to review programmes to minimise impediments to students completing their programs in a timely manner.

- **Examine major requirements** and modify where appropriate to ensure:
  a) Majors are fit for purpose for the intended major and degree outcomes as they relate to graduate profiles.
  b) Sufficient flexibility is available for students to engage in minors or certificate possibilities to broaden their education experience.

**Action**: A review of Science programs will be undertaken to identify areas where improvements can be made within existing structures, and by exploring new program opportunities.

3. CREATE AN INTEGRATED LIFE SCIENCES LOWER DIVISION PROGRAM

The Faculty of Science hosts three life sciences departments, which collectively account for 63% of program students in the Faculty. The Faculty will develop, test and, if successful, implement a unified lower division Life Science curriculum. Such an initiative would act to: overcome confusion in opportunities for incoming students considering study in the Life and Environmental Sciences; allow flexibility for students to explore educational and career opportunities across the Life Sciences, and; allow fine-grained management of student entry to upper division majors offered in Biological Sciences, Molecular Biology and Biochemistry (MBB) and Biomedical Physiology and Kinesiology (BPK).

**Action**: A committee comprising the Dean, Associate Dean Academic and Chairs of relevant departments will develop a process to design, consult and make recommendations on the integrated life sciences lower division undergraduate programme by March 2020. The committee will establish a plan for testing, evaluation and implementation for 2021.
4. ESTABLISH NEW PROGRAM OPPORTUNITIES

From robust disciplinary foundations the Faculty will explore and realise new opportunities that cross disciplines both within the Faculty and between faculties. Such opportunities (together with initiatives later in the document) seek to advance Challenge 4 of the SFU Academic Plan to bridge divides and seek interdisciplinary programs. These opportunities have arisen from development of clusters of research expertise within the Faculty and responses to broader science trends. It is also timely that the Faculty consider new graduate programming, professional degrees, and where feasible premium fee programs. Such programs provide the opportunity to grow student enrolments; and create new graduate research opportunities. The range of opportunities include:

- **Marine and Coastal Science**: This interdisciplinary programme would likely be hosted by Biology with possible contributors from Earth Science, Chemistry, Physics and Faculty of Environment (UG and Graduate potential).

- **Natural Hazards and Risk**: Building on the unique development of the Natural Hazards Research Centre, develop a new graduate program in Natural Hazards and Risk (Graduate program).

- **Data Science**: Capitalising on research strengths, recent establishment of CANSII headquarters at SFU, the SFU research strategy and broader industrial and societal recognition of this field, there is potential to develop a number of relevant data science pathways (e.g. in health sciences, sports analytics).

- **Actuarial Science**: Based on the strength and quality of the SFU undergraduate programme a specialised graduate program would provide a premium fee opportunity.

**Action**: To progress these opportunities, the Associate Dean Academic and Dean will establish clear processes that engage interested stakeholders in discussion, design and implementation over the next three years.

5. INNOVATIVE SCIENCE PROGRAMMING AT SURREY

The Surrey campus affords the Faculty of Science opportunities to conceptualise and deliver new educational approaches to science programming that are distinct from the Burnaby campus. Key elements for consideration include:

- Standalone programmes that take advantage of the unique characteristics of Surrey as a dynamic and growing urban centre.

- A new interdisciplinary undergraduate science degree that is problem-based and thematically driven.

- Postgraduate programmes in thematic areas such as health innovation.

- The provision of leadership in environment and sustainability themes in collaboration with the Faculty of Environment and Faculty of Applied Sciences and other SFU Faculties.

**Action**: The Faculty of Science will establish a working group to explore the viability of new programmes at the postgraduate and undergraduate level.
COLLABORATIVE AND INTERDISCIPLINARY OPPORTUNITIES

The Faculty of Science hosts a number of foundational science programmes that underpin a multitude of educational and career opportunities for our students. The maintenance and further development of disciplinary excellence in research and teaching remains a cornerstone goal of the Faculty of Science. However, disciplinary excellence also provides a robust platform to realise collaborative opportunities and capitalise on the increased understanding that solutions to many societal issues and research problems must be based on multi- and interdisciplinary approaches. Science is perfectly positioned to develop new collaborative research and learning opportunities that span science departments and cross-Faculty partnerships. Key opportunities for interdisciplinary programme development that progress Challenge 4 of the SFU Academic Plan include:

1. ENVIRONMENTAL PROGRAMS

The Faculty must be bold and visionary in assuming leadership in environmental programmes that sit within its broad spectrum of expertise. The Faculty commits to work in an open and collaborative partnership with the Faculty of Environment to explore interdisciplinary programming of mutual benefit to students and each Faculty. In particular, the Faculty will take the lead in promoting a new Marine and Coastal Science program and seek to reposition its popular graduate programs in Pest Management and Conservation Science and Wildlife Ecology. In collaboration with the Faculty of Environment, the Faculty of Science will seek to streamline degree offerings and offer distinctive programs and opportunities to SFU students.

2. LIFE AND HEALTH SCIENCE PROGRAMS

Significant potential exists to explore collaborative programmes across the Life and Health Sciences leveraging off existing research partnerships and co-appointments with the Faculty of Health Science. Particular initiatives include:

- Collaboration in development of the common lower division Life Sciences program.
- An immunology and infectious diseases program (MBB and FHS).
- Development of a program in Big Data for the Life Sciences (MBB, MATH, STAT, FHS).
- Mobility and technology in health (BPK, FHS, FAS).
- Neuroscience – a pan university possibility.

3. COMPUTATIONAL AND PHYSICAL SCIENCE PROGRAMS

Building on existing collaborations with Faculty of Applied Sciences the Faculty of Science will pursue the following new programme opportunities:

- Data Science and Data Analytics.
- Quantum Computing (Engineering-Physics).
- Engineering-Chemistry.
1. ENHANCING PATHWAYS TO GRADUATION

In a context in which students face increasing financial pressures to commit to a university education it is important that students do not face unnecessary institutional impediments to timely completion of programs (undergraduate and graduate). Curriculum revision and streamlining of programs (including course pathways and scheduling) will be examined and adjusted, where necessary, to avoid unnecessary impediments.

2. A STEP CHANGE IN ACADEMIC SUPPORT FOR SCIENCE STUDENTS

In responding to student feedback on the SFU experience the Faculty aims to transform its support for students. Central to this initiative is the establishment, with VPA support, of a student support centre (Sci-Space) situated in a highly visible sector of campus that provides:

- An identifiable meeting place for all science students
- Provide centralized access for course advice and degree planning
- Support for student access to Co-op placement support
- Increased access to career advisors and exploration of career opportunities
- Student health and well-being supports
- Co-ordination of student tutor support

3. INCREASE SCHOLARSHIP SUPPORT FOR STUDENTS

Recognising the financial pressures that the decision to pursue tertiary education places on students, the Faculty will seek to increase the scholarship support for students through new advancement opportunities and research funding.

4. CONTINUAL IMPROVEMENT OF SCIENCE LEARNING ENVIRONMENTS

A core feature of our commitment to delivery of a high-quality education experience is the provision of contemporary learning spaces and research facilities. The faculty will maintain its commitment to revitalisation of teaching spaces and facilities through ongoing revision and analysis of its capabilities.
LEARNING AND TEACHING

Pedagogical approaches and tools used to support tertiary education programme delivery are constantly evolving. Adoption of innovative approaches into our curriculum is vital to ensure our programs remain relevant and vibrant to our student cohort. However, the time commitment to learn and implement new approaches can constrain adoption of these innovations. Given the importance of maintaining a vibrant learning environment the Faculty of Science will establish mechanisms to assist faculty in accessing new learning approaches to support their continued development of relevant and engaging teaching programmes. These initiatives will be developed in collaboration with the newly established Centre for Educational Excellence.

1. ASSOCIATE DEAN - LEARNING

The creation of a new Faculty role, Associate Dean – Learning (ADL), will maintain an emphasis on learning and teaching practice across the Faculty. The role will provide clearer communication lines between the VPA’s office and departments and will Chair a new Faculty Learning and Teaching Committee.

2. LEARNING AND TEACHING COMMUNITY OF PRACTICE

A committee, chaired by the ADL will be established that draws on Faculty leaders in teaching innovation and the Teaching and Learning Centre. The committee in collaboration with Student Services will also formulate a plan that provides support mechanisms (including resources) to faculty in revising course delivery methods. The committee will also lead facilitated workshops on new approaches and shared experiences in adoption of new teaching methods.

3. RETHINKING DIGITAL PLATFORMS FOR CURRICULUM DELIVERY

Online delivery of education programmes is a significant mode of delivery of education programming across the world. The Faculty has engaged in this mode of teaching via CODE, which is now undergoing transformation with the transfer of responsibility of course delivery back to departments. Notwithstanding the institutional imperative to consider how we deal with this transition the Faculty of Science will re-envision how it wishes to engage digital platforms to deliver courses and programmes. Led by the AD Academic and the AD Learning a Science approach for digital learning will be developed. Considerations will include: the different modes of delivery; identification of programmes best suited for different modes of delivery; identification of possible courses/programmes to adopt digital learning; resource and technical support; connection with SFU wide online learning practices and a timeframe for implementation.

4. INCLUSION OF THE STUDENT VOICE IN TEACHING PRACTICE

Currently, formal student feedback on courses and their delivery are evaluated via post-course surveys. While useful in tracking between semester variations and allowing reflection on delivery, content and evaluation of courses, any course refinements post-date the student experience. The Faculty will explore and test opportunities to actively engage the student body to furnish in-course formative feedback within each semester. The process will enable faculty to adapt courses where necessary in a responsive mode to student feedback or to clarify teaching approaches.
Science affords multiple opportunities to embed students in experiential learning environments, from the laboratory to the natural world. Through curriculum renewal the Faculty commits to maintain and enhance experiential learning opportunities including:

- Integrating new technologies that bring the natural world to the laboratory.
- Engaging undergraduate and graduate students in research experiences, on campus, locally, nationally and internationally.
- Problem-based learning approaches.
- Utilisation of the field experiences, where appropriate.
- Engage students in the community-based research and learning environments.
Through its departments the Faculty of Science has been an SFU leader in the formation and delivery of a diverse range of outreach and engagement initiatives. Such activities include campus public events such as Spooktacular, the Girls Exploring Physics programme, the Math Catcher programme for indigenous elementary and high school students from across the province, the community embedded Café Scientifique, the Nobel Prize lectures now held at Science World, and the creation of the Trottier Observatory that provides a publicly accessible educational and research facility in astronomy that is also firmly embedded in the Physics curriculum. From this impressive base the Faculty of Science is committed to further pushing the boundaries of its engagement programme, while recognising the resource limits it operates within.

1. ENGAGING THE FACULTY OF SCIENCE COMMUNITY

This initiative recognises that while engagement efforts are commonly directed off campus or at external stakeholders we commonly forget about our own community. A programme to engage faculty, staff and our student body into the operations of the Faculty will be implemented that includes celebration of our successes, faculty-wide research seminars, improved horizontal and vertical communications, and the creation of an inclusive environment.

2. AN ENGAGED COMMUNITY OF PRACTICE

Chaired by the Manager of Outreach an Engagement Community of Practice Committee will be convened (open to all interested faculty, staff and students) to map and co-ordinate activities, share experiences and consider new engagement opportunities. The committee will also oversee development of a Science Engagement Strategy based on: an assessment of the purpose and intent of each activity; mapping the different scales of existing engagement events; identification of gaps in the collective engagement effort and consider additional engagement opportunities. The strategy will include explicit reference to international and research engagement.

3. SPACE-EARTH-OCEAN-LIFE: MT BURNABY AS AN ENGAGEMENT HUB

Building on the Trottier Observatory a long-term goal is to use the physical landscape of Burnaby Campus to provide science learning opportunities that connect Space, Earth, Ocean, and Life. The intent is to develop research, teaching and engagement opportunities that connect the Trottier Observatory to Burrard Inlet utilising a trail of earth and ecological discovery down the slopes of Burnaby Mountain. Ultimately, this trail will end at a purpose built Urban Marine and Coastal Science facility that supports marine education opportunities. This proposal would provide an integrated science and environment engagement vehicle to draw community to campus and enable multiple engagement opportunities.
RECRUITING EXCEPTIONAL FACULTY AND STAFF

The faculty and staff who work collectively to produce leading research and deliver high quality education programs are crucial to the ongoing growth and success of the Faculty of Science. To ensure continued excellence in research and learning environments, the Faculty of Science needs to recruit and retain exceptional staff and faculty. To support this goal, the Faculty must provide a safe, inclusive and equitable work and learning environment characterized by impartial and merit-based decision making. The Faculty of Science commitment to equity, diversity and inclusion outcomes will attract, retain and support talented people to achieve their potential and benefit the intellectual vibrancy of the Faculty’s activities.

Faculty renewal planning will be guided by the following principles:

• Research is a core activity of the Faculty and as the platform of a first-class research-informed learning environment is a major consideration in the appointment of faculty and staff.

• Recruitment opportunities should be strategically planned to:
  o Enhance/maintain or develop research strengths within the Faculty.
  o Maintain and develop its education programmes.

• A commitment to avoid conformity and embrace difference that is free of bias and advances our commitment to Equity, Diversity and Inclusion and Indigenous Initiatives.

Underpinning recruitment and retention activities is the intent to support faculty to flourish in their research and teaching programs. Specific factors to support recruitment and retention include:

• Provision of access to facilities (space and equipment) that enable faculty to flourish in their research programs.

• Continue to pursue improvements in physical space to support faculty and research groups.

• Actively manage financial mechanisms to enable retention of high performing faculty.

• Maintain a focus on securing high quality graduate research students to support faculty research programs.

• Improve recognition of high performing faculty.