

Faculty of Science Strategic Plan – January 9, 2016

Vision

The Faculty of Science is a place to experience, experiment, explore and learn as we discover the unknown and invent the future.

Mission

The Faculty of Science dedicates itself to:

- i. expanding the frontiers of knowledge, through cutting edge, curiosity-driven research,
- ii. creating know-how from knowledge to improve society, protect our world and transform the future,
- iii. inspiring, engaging, educating and preparing the next generation of scientists, citizens, and professionals through deep, broad and innovative research-inspired teaching and learning inside and outside of the classroom,
- iv. acquiring and maintaining high-quality infrastructure to support research, teaching, learning, and an active community of science,
- v. working across disciplines, faculties, universities, industry, government and a diverse public, expanding our capabilities and sharing the wonder of the contributions of science to society.

Values

The Faculty of Science is committed to nurturing:

- i. the creation and free exchange of new ideas as we question what we think, seek new evidence, and find new connections,
- ii. the inextricable link between first-rate research and first-rate education,
- iii. the courage to ask big questions and to take risk in pursuit of important outcomes,
- iv. all aspects of integrity, “The quality of being honest and having strong moral principles”, and “The state of being whole and undivided” (Oxford Dictionary); in our research, in our teaching, in our desire for diversity, in our building of a sense of community, and in our dedication to the success of individuals and the reputation of the Faculty as a whole,
- v. the wonder of discovery, the understanding of the natural, numerical, built and imagined worlds it brings, and the power it provides to quantify, model, and improve the future for our students, ourselves, Winnipeg, Manitoba, and the world.

Strategic Priorities for the Faculty of Science

1. Inspiring minds through innovative and effective teaching

The Faculty of Science at the University of Manitoba is committed to strengthening the dynamism and caliber of teaching in all its departments. We will promote deep and active science learning using enhanced technology in the classroom, laboratory, and tutorials, by fostering student interactions with expert faculty and with their peers, and through research experiences. We embrace the challenge of teaching large numbers of students from diverse

backgrounds and with varying academic readiness; we set ourselves the goal to help them become highly proficient, qualified scientists, critically-thinking professionals, well-informed citizens, and future leaders of our communities. To engage and ultimately inspire diverse groups of science learners in pursuit of wide-ranging personal and career goals, we will develop Strategic Science Education Plans at both the Undergraduate and Graduate levels, that embrace the following strategies:

(a) Science Undergraduate Education Strategic Plan

- i. We will strive for our students to realize love of science and competent (“deep”) learning from observation to synthesis and conceptualization, challenging our students to ask questions and seek connections, as we embrace new teaching approaches that build upon evidence of effective pedagogy including use of appropriate technologies.
- ii. We will create a set of science preparation courses, in collaboration, for students who do not meet high school GPA requirements for entrance to the science stream.
- iii. We will increase student opportunities for experiential and interdisciplinary learning in the classroom (e.g., by incorporating project-based learning in classes) and out of the classroom (e.g., through co-op and research opportunities), so that students make, see, do, and realize the connection between scientific inquiry, research, discovery, innovation, “soft skills” such as communication, teamwork, project management, and leadership, and the opportunities opened through interdisciplinary collaboration.
- iv. We will create science honours streams within all disciplines as well as across disciplines in key areas that attract and challenge the top students from their first year at University, providing them with an undergraduate science education second to none.
- v. We will work to increase science student contact with research active faculty and their research groups early in undergraduate students’ University careers, through consideration of novel approaches such as the introduction of first year faculty led small-group seminars for direct entry science students.
- vi. We will explore new interdisciplinary general science courses and educational streams that introduce the university student population to science, highlighting achievements, limitations, potential, and importance of science for life in the 21st century.
- vii. We will move towards a cohesive system for student advising by integrating career and academic advising to assist students in making informed decisions for their future.

(b) Science Graduate Education Strategic Plan

- i. We will develop requirements, standards, and approaches within and across our graduate programs to create discipline-specific expectations that we can describe, promote, and assess to ensure that we provide the highest-quality graduate education possible.
- ii. We will clarify and improve our funding model so that every student we want to attract to our PhD (and research oriented MSc) programs will receive a letter upon acceptance that clearly states that they will be funded at a competitive level throughout their graduate career (subject only to their satisfactory progress).
- iii. We will create and implement an approach to graduate student recruitment that will garner an increasing number of research-driven students to support both the excellence and growth of our graduate programs.
- iv. We commit ourselves to creating an interactive, collegial, respectful and stimulating environment for our graduate students, and look to develop cross-cutting approaches for

- science graduate students to learn soft skills, develop teaching and communication prowess, and experience a dynamic science community and culture.
- v. Many of our graduate students teach, and we will commit to developing strong training and mentoring programs for our teaching graduate students to promote their teaching expertise and to assure sound education for undergraduate science students.
 - vi. In an integrated fashion, across the Faculty of Science graduate programs, we will productively engage, and work with the Faculty of Graduate Studies.
 - vii. We will explore opportunities for new science graduate programs and certificates on campus, and in online and blended models, that meet the needs of working professionals to build scientific expertise.
 - viii. We will challenge ourselves to new scholarly heights in order to provide cutting-edge research opportunities for our graduate students, while promoting their research and accomplishments inside and outside the university.

2. Driving discovery and insight through excellence in research, scholarly work and other creative activities

The Faculty of Science has a tradition of excellence in research and scholarly endeavour and invests heavily in supporting research through recruitment, infrastructure upgrades, student awards and technical personnel. Continued support and encouragement for research will be an important element of and in line with the to-be-developed new Science Research Strategic Plan. New opportunities will be sought to transform existing strengths and develop new research directions. Research will be supported internally, through continued recruitment of top faculty, development of office and laboratory infrastructure, mentoring of grant and contract applications, and provision of internal new collaboration grants. Both individual and regionally-collaborative research will be sustained, while the value and importance of interdisciplinary, national, and international collaborations will be promoted.

- i. We will strive to support and promote research in themes at the core of the University of Manitoba Strategic Research Plan, including fundamental research; high-performance materials, structures and processes; integrative research in health, well-being, and safe, healthy, just and sustainable food systems; sustainable water management systems; arctic-system science and technology; and the signature areas of arctic system science and climate change; immunity, inflammation and infectious disease; and population and global health that are well established in the Faculty.
- ii. We challenge ourselves to identify a cross-cutting scientific research area with the goal of establishing a new Core Signature Area for the University of Manitoba to be led by the Faculty of Science within five years.
- iii. We will develop and maintain a clear, fact-based, understanding of our Faculty's current disciplinary and interdisciplinary research strengths and a vision of the key areas for future growth and nurturing, and use that knowledge to help guide, in part, our future hiring and investment decisions.
- iv. We will explore every avenue of support, including granting agencies, business, alumni, and government agencies, to improve research infrastructure and acquire state-of-the-art research instrumentation and facilities.

- v. We will increase the amount of research funding coming into the Faculty of Science by extending the existing grant-mentoring system for Tri-Council proposals to encourage researchers to pursue funding from a broad range of agencies and industries.
- vi. As successful graduate student education is a prime element of our teaching mission and critical to research competitiveness, we will pursue efforts to improve support for graduate students by identifying new sources of external funding, working with the Faculty of Graduate Studies.
- vii. We will continue to champion individual excellence, and at the same time promote interdisciplinary initiatives within the University of Manitoba and beyond.

3. Creating pathways to *Indigenous achievement*

The Faculty of Science has many successful Indigenous students and alumni, and many accomplishments on which to build. We are committed to supporting even greater levels of achievement. Partnerships, respect, and the recognition that we will all benefit, are the bedrock values of our approach to fostering Indigenous achievement. The growing population of self-declared Indigenous undergraduate students is recognized as a strength upon which to build and expand by improving access, recruitment, retention, and graduation. As for all our students, high-quality education in science will be the primary route to realizing these aims. Through these developments, the importance and relevance of science to Indigenous people and communities will be promoted throughout the University and beyond, as will the success stories of Indigenous science students during and after their experiences at the University. The Faculty is actively working to define a Strategic Plan for Indigenous Achievement in Science, which will embrace the following strategies.

- i. We will increase Indigenous student participation in science and research at the undergraduate and graduate levels by working with the Indigenous school population to promote an interest among the students in mathematics and science.
- ii. We will work with the University and Province to create viable and supportive educational and financial pathways for Indigenous students who may need education to bridge their success between high school and university science and mathematics.
- iii. We will foster Indigenous student success through tutoring, outreach, and teamwork with other units, to reduce and remove barriers to success.
- iv. We will develop Science advising that addresses Indigenous-specific issues.
- v. We will encourage faculty to review curricula with an eye to identifying and highlighting topics or areas with relevance to Indigenous issues and life within the context of high-quality science education.
- vi. We will foster mutual respect for, and understanding of the cultures of all our students and staff by recognizing and celebrating the contributions of all cultures to science, learning and society.

4. Building community that creates an outstanding learning and working environment

The Faculty of Science will strive to create an environment that promotes all scholastic and academic endeavours from teaching and research to student activities. We will encourage and support bottom up faculty-driven and student-driven initiatives. Administrative roadblocks will be minimized wherever and whenever possible. Improvements to infrastructure will be sought. Communication, formal and informal, will be encouraged through seminars and social

events. Work demands will be monitored so that balance is achieved in the lives of those who work and learn in the Faculty and at the University.

- i. We will create and maintain fit-for-purpose infrastructure to support faculty offices, staff offices, teaching labs, research labs, common space, and student activities (within and outside of the classroom).
- ii. We will balance workload and staffing levels, respecting all aspects of our jobs (education, learning, research, service, laboratory, student advising, administration, etc.), without placing undue burden on any one aspect or group of personnel.
- iii. We will create a vibrant, engaged, and entwined science-learning community that breaks down disciplinary and role barriers through scholarly and other activities.
- iv. We will support active and engaged science-student networks and opportunities including the many student led clubs and organizations, recognizing their importance to outreach, service, and research success and career development, and by ensuring that seminar series and speakers engage students at all levels.
- v. We will advocate for resources from the University, and beyond, in support of the extraordinary dedication, productivity and effectiveness of our faculty and staff as we deliver the Faculty of Science mission on behalf of the University of Manitoba.

5. Forging connections to foster high impact community engagement

Science has a long history of supporting communities through direct outreach and engagement. Maintaining and extending these connections will enhance the Faculty of Science and create a sense of belonging and life-long connection to the Faculty of Science. Contacts in the national and international scientific community and with business will promote and support our research endeavours; contacts with alumni will lead to new opportunities and increased support; and contacts within the provincial school system will attract talented students and lead, long term, to improvements in post-secondary education.

- i. We will pursue ways to increase collaboration with industry and consider hiring a business development officer within the Faculty of Science to promote research opportunities for our staff and co-op and internship opportunities for our students.
- ii. We will develop a strategy for K-12 science lectures, workshops, camps, and other education and outreach activities including online delivery, to optimize impact and access to students, teachers, guidance counselors, parents, community, and government.
- iii. We will create and engage a strong network of alumni and create a program for our students to receive mentoring and internships directly from those alumni.
- iv. We will seek to increase the level of giving to the Faculty of Science, through increases in the percentage of our alumni who give annually, and through major gift opportunities.
- v. We will optimize the impact of our engagement by enhancing our presence in local, national, and international science using expanded communication via the web, news stories, conferences and public lectures, with a particular emphasis on communicating scientific advances and benefits to the general public.
- vi. We will facilitate initiatives to extend our international collaborations with an emphasis on using our research strengths and connections to establish and promote international collaborations, and enhance opportunities for undergraduate and graduate student recruitment and exchanges.