



University
of Victoria

UNIVERSITY OF VICTORIA CRC AND CFI STRATEGIC RESEARCH PLAN SUMMARY, 2017-2021

The University of Victoria (UVic) is among Canada's most research-intensive universities, and occupies a unique historical, geographical and cultural niche in Canada. UVic has made significant strides forward in the breadth and depth of its research and social impact in recent decades. In the process, the university has developed unique capabilities for research and knowledge mobilization that are reflective of its values and commitment to research. These guide UVic's approach to remaining at the forefront of research excellence among international peers, and to being relevant to challenges facing contemporary society.

The UVic [Strategic Research Plan](#) (SRP) supports intellectual inquiry at its inception, enables the research projects and programs of faculty, staff, students and research partners, and sustains an environment that promotes excellence in research, education and training for the next generation of researchers and leaders. At the core of UVic's SRP are five overarching priorities for enhancing and leveraging the best of UVic research:

1. Defining and Achieving Research Excellence
2. Enhancing the Integration of Research and Education
3. Expanding Partnerships, Innovation and Entrepreneurship
4. Improving Research Competitiveness through Differentiation and Specialization
5. Enhancing and Optimizing the Provision of Research Service.

UVIC CRC AND CFI PROGRAM OBJECTIVES

The Canada Research Chair (CRC) and Canada Foundation for Innovation (CFI) programs enhance UVic's research capabilities and help UVic attract and retain internationally recognized research leaders. The following objectives guide the university's CRC and CFI research:

- Foster research excellence and enhance UVic's role in the global exchange of knowledge to maximize the translation and application of research results.
- Build on UVic's areas of dynamic research capabilities and promote emerging areas of interdisciplinary research of the highest quality and impact.
- Optimize the recruitment, development and retention of talented graduate students, post-doctoral fellows and faculty by recruiting world-class researchers.
- Enhance UVic's training environment and capacity to educate highly qualified personnel for BC and Canada.
- Build, operate and sustain infrastructure to support leading-edge research and to ensure maximum leverage and impact through partnerships.
- Contribute to the economic growth and social advancement of BC and Canada.

DYNAMIC RESEARCH CAPABILITIES AND TRAINING

UVic has identified eight clusters of research excellence that it describes as its dynamic research capabilities. As a research-intensive university, UVic has enabled research excellence in these eight areas by investing in faculty, staff and students, infrastructure, space and supports for research. These capabilities are the focus of UVic's CRC and CFI research and are described below in alphabetical order.

Culture and creativity

As the only university in BC with a freestanding Faculty of Fine Arts, and as one of very few across Canada, UVic is a leader in creative innovation and arts knowledge. UVic's well-developed capabilities in Indigenous studies, religious diversity, global engagement, questions of nationhood and equality, and linguistic diversity have situated it well to address the challenges and opportunities associated with cultural difference and interaction.

Creative and cultural research at UVic includes researchers from the faculties of Fine Arts, Humanities, Law, Human and Social Development, Education, Social Sciences and Engineering. UVic is also home to the Centre for Studies in Religion and Society (CSRS), the Centre for Asia Pacific Initiatives (CAPI), the Centre for Global Studies (CFGS), and the Consortium on Democratic Constitutionalism.

Data science and cyber physical systems

Data science has emerged as an important field in its own right, and enables other fields of research such as climate science, oceanography, physics and digitally based research in the humanities and social sciences. UVic has outstanding research capabilities and expertise in the field of cyber physical systems including: computing; networked control systems; adaptive systems; energy systems; “smart oceans” technologies; assistive technologies and medical care monitoring, including elderly care; transportation and mobility; autonomous systems; smart materials; and wearable devices.

With investment from CFI, UVic has been chosen by Compute Canada as one of four hubs across Canada for advanced research computing which increases 13-fold the university’s resources for cloud research computing capacity. UVic is home to an internationally significant interdisciplinary group working on digital humanities and arts; Ocean Networks Canada’s data management system, Oceans 2.0; contributions from the Department of Mathematics and Statistics and the Department of Computer Science to biostatistics work in health and life sciences; and a broad range of researchers working on cyber physical systems.

Environment, climate and energy

UVic’s research on climate, ecology, terrestrial and atmospheric environmental science, and sustainable energy systems is focused on the search for innovative new approaches to living within planetary boundaries and restoring and protecting biodiversity. UVic has a reputation for excellence in marine and terrestrial conservation and restoration, ecological and biological research, and sustainable human practices. UVic researchers are working with governments, industry and community groups to find effective public policy and technological solutions to address the challenges posed by climate change, and interactions between various Earth systems. Expertise is drawn from the faculties of Science, Social Sciences, Engineering, Law, Education, and the Gustavson School of Business, and is complemented by research in public education and public administration.

UVic has leaders in research on climate modelling, climate change mitigation and adaptation, development of sustainable energy systems, and the human dimensions of climate change. UVic is a global leader in research in safe, clean and sustainable energy and green civil engineering solutions with a unique approach in integrated energy system modelling and optimization. UVic’s Institute for Integrated Energy Systems (IESVic) is a leader in marine renewable energy systems (wind, wave, current and tides), hydrogen and fuel cell systems, and transportation. Research in this area is facilitated by a number of centres and entities including: the UVic-led Pacific Institute for Climate Solutions (PICS); the Pacific Climate Impacts Consortium; Environment Canada’s Canadian Centre for Climate Modelling and Analysis, and Water and Climate Impacts Research Centre (both located on campus); the Centre for Forest Biology (FORB); Ocean Networks Canada (ONC); Bamfield Marine Sciences Centre; and IESVic.

Global studies and social justice

Global studies and social justice research at UVic involves the faculties of Humanities, Fine Arts, Social Sciences, Education, Human and Social Development, Business and Law. Areas of research include governance, politics, international law and trade, public management, women’s and gender studies, cultural inquiry and social policy analysis. UVic has clusters of significant research capability in CFGS, CAPI, CSRS, and the Consortium on Democratic Constitutionalism. UVic is the only university west of Quebec that has two UNESCO Chairs, one in early childhood education and the other in community-based research and social responsibility in higher education. UVic is home to the world’s only Chair in Transgender Studies and the world’s largest transgender archives. The Gustavson School of Business has a substantial focus on international business, including the Global Leadership and Organizational Behaviour Effectiveness study on cross-cultural leadership.

The UVic [International Plan: Making a World of Difference](#) 2017-2022 takes UVic’s global commitment another step further by identifying key objectives and strategies to move us forward in this era of heightened connectivity, complex geopolitics and increased international collaboration.

Health and life sciences

A wide array of academic units at UVic contribute to this capability, including: nursing, biochemistry and microbiology, physics and astronomy, chemistry, biology, mathematics and statistics, social work, child and youth care, exercise science, physical and health education, educational psychology and leadership studies,

health information science, public health and social policy, sociology, psychology, anthropology, the Division of Medical Sciences, and almost all departments in the Faculty of Engineering.

The scope and depth of health research at UVic is demonstrated through the work of more than 200 researchers who conduct health research or work in allied fields. Developing collaborations and synergies between UVic researchers and community partners, including Island Health (the health authority for Vancouver Island), are stimulating research clusters in proteomics and genomics, medical physics, neuroscience, mental health, social determinants of health, and aging. Researchers in the Centre for Advanced Materials and Related Technology (CAMTEC) are developing biosensors using nanomaterials for detection of biomarkers, and biomedical engineering and medical physics are emerging areas of interdisciplinary strength involving many UVic faculty. The Department of Mathematics and Statistics has an internationally recognized team in mathematical modelling of biochemical networks and disease dynamics and epidemiology.

The following research centres and groups support UVic's capabilities in health and life sciences: Institute on Aging & Lifelong Health, Centre for Addictions Research of British Columbia (CARBC), Centre for Indigenous Research and Community-Led Engagement (CIRCLE), Centre for Biomedical Research, FORB, UVic-Genome BC Proteomics Centre, Centre for Youth and Society (CFYS), CanAssist and CAMTEC.

Indigenous research

UVic is located on the traditional territories of the Songhees, Esquimalt and WSÁNEĆ nations, and the university promotes research reflecting the aspirations voiced in the Truth and Reconciliation Commission to advance reconciliation between Indigenous and non-Indigenous peoples in Canada. Indigenous research is grounded in the knowledge and traditions of diverse Indigenous peoples, explores past and present interactions between Indigenous and non-Indigenous peoples, and considers ways in which those relationships might be reordered and restructured to secure a better future. UVic's research programs aim to enhance the lives of Indigenous individuals, communities and nations through advancing Indigenous knowledge and engagement with diverse knowledge keepers, seekers and systems.

In January 2017, UVic published its [Indigenous Plan, 2017 – 2022](#). UVic is a committed and recognized leader in Indigenous research, not only as a research focus or in terms of long-standing relationships with Indigenous partners, but also in terms of growing the number of Indigenous scholars. UVic has approximately 25 Indigenous faculty members, and 4.6 per cent of undergraduates and 6.2 per cent of graduate students are self-declared Indigenous—among the highest proportions in a Canadian university. Indigenous issues in BC are a central focus of UVic's research, but its reach also extends throughout Canada and also to the US, Australia, New Zealand, Fennoscandia, and increasingly to Latin America, Asia, and Africa. This research yields theoretical, methodological and policy outcomes of national and international significance and application in the field of Indigenous research.

A wide range of research projects have been undertaken at UVic over many years with particular emphasis on Indigenous language, culture, laws and governance, health and human services, and environment. The majority of Indigenous research here is undertaken in anthropology, child and youth care, social work, Indigenous governance, history, philosophy, political science, Indigenous education, Indigenous language revitalization, geography, environmental studies, visual arts, and law. UVic is home to a CRC in Indigenous Law, a Law Foundation Professor of Aboriginal Justice and Governance, and a Hakai Professor in Ethnoecology. Many UVic research centres and groups also have a focus on Indigenous research including the Indigenous Governance unit, CIRCLE, Indigenous Law Research Unit, CFYS, CAPI, and CSRS. Finally, the Gustavson School of Business and Faculty of Law established the National Consortium for Indigenous Economic Development in 2014.

Ocean science and technology

UVic is an international leader in the study of ocean science and the development of marine technology. Ocean science and technology research is undertaken by researchers in the schools of Earth and Ocean Science and Environmental Studies; the departments of Biology, Chemistry, Geography, and Mechanical Engineering; and ONC. UVic researchers have strong links with the region's thriving marine technology sector, and with scientists at several nearby research centres. Researchers are focused on a wide range of research themes including biogeochemical cycles, climate-ocean dynamics, marine environment and ecosystems. UVic researchers and

students are also deeply involved in the work of the Bamfield Marine Sciences Centre, a shared campus of UVic, UBC, U of A, U of C and SFU. The centre provides a permanent base and infrastructure for marine and coastal field operations on the west coast of Canada. Ocean engineering and marine energy are a focus in the Department of Mechanical Engineering and IESVic. Research themes in this field include underwater vehicles, tidal turbines and wave energy devices, offshore wind power, and green ship propulsion systems.

The flagship for ocean science and technology at UVic is ONC, a national research platform established by UVic in 2007. ONC operates and maintains the NEPTUNE and VENUS ocean observatories, to position Canada as an international leader in the science and technology of ocean observing systems, and to maximize associated economic and societal benefits through commercialization and outreach. The observatories collect data in real time on physical, chemical, biological, and geological aspects of the ocean over long time periods, supporting research on complex Earth processes in ways not previously possible. More recently the Smart Oceans BC system is extending ONC’s capacity, delivering science and information for responsible ocean management and sustainable ocean use. Smart Oceans BC uses a range of underwater and land based instruments to monitor ocean conditions, help predict tsunamis and earthquakes, and provide science-based information for response to offshore accidents and natural disasters. ONC’s Innovation Centre (a national Centre for Excellence in Commercialization and Research) is a world leader in commercializing this oceans observing technology, related digital infrastructure, and data analytics and modelling.

Physical science and engineering, and mathematical and computer science

This research strength at UVic encompass researchers from the departments of Physics and Astronomy, Chemistry, Biology, Mathematics and Statistics, Computer Science, Mechanical Engineering, Electrical and Computer Engineering, Civil Engineering, and the School of Earth and Ocean Sciences.

In the broad area of physical sciences, UVic has significant capability in the areas of high-energy physics and astronomy – supported by centres such as the Astronomy Research Centre and the Victoria Subatomic Physics and Accelerator Research Centre – and enjoys close connections with nearby facilities such as the TRI-University Meson Facility (TRIUMF) in Vancouver and NRC Herzberg in Saanich. UVic faculty members have taken leadership roles in several global science endeavours, such as the ATLAS experiment at CERN, the Thirty Meter Telescope, the ARIEL linear accelerator at TRIUMF, and others, leveraging substantial (and often international) capital investment to benefit UVic research. The Department of Mathematics and Statistics has internationally recognized groups in operator algebras, dynamical systems and mathematical modelling, with strong interactions between them. UVic is a founding member of the Pacific Institute for the Mathematical Sciences (PIMS) and continues to be a major participant. A cluster of researchers in advanced materials in IESVic, CAMTEC and the Department of Civil Engineering use technologies such as nanotechnology, spintronics, photonics, supramolecular design, crystal growth and advanced microscopy to investigate new materials for applications as diverse as health, energy, manufacturing, construction, electronics and biotechnology.

CANADA RESEARCH CHAIRS DEPLOYMENT

UVic has 38 CRCs conducting research in engineering, natural sciences, health, humanities, business, law and social sciences. For reference the following table situates UVic’s CRCs (both occupied and vacant) against only one of their research areas, however, all of UVic’s CRCs are interdisciplinary researchers.

Areas	CIHR		NSERC		SSHRC	
	Tier 1	Tier 2	Tier 1	Tier 2	Tier 1	Tier 2
Culture and creativity					1	1
Data science and cyber physical systems			2	1		
Environment, climate and energy			2	1	1	
Global studies and social justice						3
Health and life sciences	1	5		5	1	1
Indigenous research					1	1
Ocean science and technology			1	1		
Physical science and engineering, and mathematical and computer science			4	5		

EQUITY PLANNING

UVic has a demonstrated commitment to equity, as reflected in the first goal of the university's Strategic Plan, "to be a diverse, welcoming learning community, with a demonstrated commitment to equity and fairness". In 2012, UVic was the first university in Canada recognized for its exemplary practices in recruiting CRCs and exceeding its equity targets for chair holder representation from women, visible minorities and Aboriginal Peoples. In 2015, UVic earned the same recognition. UVic has been named one of Canada's Best Diversity Employers each year from 2012 to 2017, one of 65 organizations leading the nation in creating inclusive workplace cultures. UVic is ideally positioned to address CRC's Equity, Diversity and Inclusion Action Plan.

The university has articulated its institutional commitment to equity through the release of the [Employment Equity Plan](#) 2015–2020, which outlines a detailed implementation plan to achieve three goals:

- To promote and implement employment practices advancing equity and access for all.
- To ensure the principles of fairness and equity are incorporated into all aspects of employment, including recruitment and hiring, training and promotion, retention and accommodation in the workforce.
- To improve the participation of members of designated groups in all jobs and at all levels where they are under-represented, and achieve and retain a workforce representative of the appropriate community.

INTER-INSTITUTIONAL AND INTER-SECTORAL COLLABORATIONS

UVic has 15 centres that respond to emerging research opportunities, promote collaborative and interdisciplinary research, and enhance research networking capacity and infrastructure. UVic also had a Research Partnerships and Knowledge Mobilization unit, which builds research partnerships to mobilize knowledge for the benefit of the community. UVic provides support for, and participate in, a number of large-scale multi-university consortia such as PICS, WestGrid, TRIUMF, Compute Canada, the Canadian Consortium Ocean Research Universities and PIMS, all of which support our researchers to achieve research excellence in their fields.

PLANNING AND APPROVAL PROCESS

The development of the UVic SRP – from which this plan's key content is derived – involved extensive engagement and consultation with the campus community and partners. The UVic SRP sets out five priorities, 35 objectives and 67 implementation strategies aimed at enhancing and leveraging research excellence at UVic. The UVic SRP commits to tracking and reporting on implementation over the life of the plan. A set of guidelines have also been established to enhance the management of UVic's CRC and CFI program. The guidelines are aligned with the UVic SRP and ensure the university makes best strategic use of its CRC and CFI allocations.

MEASURES OF SUCCESS

The continued success of UVic's CRC and CFI research will be assessed against the following measures:

- **Research excellence**, as recognized through external peer review, nationally and internationally, and including citations, rankings, and external awards;
- **Significant investment** that has been made, or is expected, by the university, its funders or research partners;
- **Selectivity in infrastructure investments** aligned with research capacity;
- **A critical mass of researchers** at the university that fosters the growth of leading edge disciplinary or interdisciplinary research through national and international collaborations and partnerships;
- **Responsiveness to community** needs and evidence of significant benefits, resulting from research on/with those communities;
- **Competitive or comparative advantage** over other universities; and
- **Connections** to graduate or undergraduate education and training.