SFU Seaches for Climate Change Solutions

Coming to terms with climate change will prompt an increasing pace of research and innovation at BC’s four major universities.

Recognizing this, the BC government has created the Pacific Institute for Climate Solutions (PICS), based at the University of Victoria. SFU is a founding member.

In late February, UVic President David Turpin led an information session on PICS at SFU Burnaby. He stressed that, besides research, PICS will support graduate student and post-doctoral fellowships, visiting fellows, and global internships (www.pics.uvic.ca). “We are excited to be a part of this major collaboration,” says B. Mario Pinto, SFU’s Vice-President Research and a member of PICS Interim Executive Committee. “It brings together experts in different disciplines and institutions.”

SFU has many climate research initiatives underway. They fall into three main areas—determining the impact of climate change; mitigating the effects of climate change; and education & public policy. Here is a short sample.

Determining the impact of climate change

Tim Takaro and Diana Allen lead a team from Earth Sciences, Resource & Environmental Management and Health Sciences investigating the secondary effects of climate change. These include changing infectious disease patterns, impacts on water and air quality, and reductions in biodiversity. Their goal is to identify ways to prevent the negative effects of climate change in these areas, and begin to assess the costs of doing so. This research is funded by SFU’s Community Trust Endowment Fund (see page 6).

Meanwhile, the Cooperative Resource Management Institute (CRMI) brings together SFU faculty and government agencies, such as Fisheries and Oceans Canada, to develop solutions to problems in forestry, fisheries, water and wildlife management. With climate change now identified as a major challenge to good resource management, impact models and projections developed by scientists such as John Clague, Canada Research Chair in Natural Hazard Research in Earth Sciences, are becoming increasingly important.

As well, SFU’s School of Resource and Environmental Management (REM) is home to several environment and climate-related research teams. In the Forest Ecology and Management Lab, students and faculty work on diverse problems in forest ecology, management and conservation, linking forest ecosystem dynamics, economics, policy, and social concerns. Interactions between changing climate and fire regimes, biodiversity, and carbon sequestration are among the key aspects of how the Lab is rethinking forest management.

Other SFU scientists are studying the effect of climate change on glaciers, sea-level changes, river floods and erosion, and freshwater and marine plants and animals.

Mitigating the effects of climate change

Climate change is a reality. How can we cope with its effects? And what will it cost? At the Centre for Sustainable Community Development (CSCD), members are evaluating and identifying environmentally friendly building materials and practices, and sketching plans for sustainable communities. “It is in local communities where the tangible impacts of global trends play out,” explains CSCD Director Mark Roseland. “The CSCD is addressing climate action and sustainability leadership through its focus on the integration of economic, social and environmental goals.”

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In previous issues, I have discussed the many ways in which Simon Fraser University has gained an international reputation for its excellence in scholarship and research. A defining feature of SFU is our commitment to collaboration, synergy, and the strategic investment of resources to gain prominence in select areas. This focused approach provides a platform from which our highly qualified faculty and students are increasingly being sought to lend their expertise to national and international initiatives. SFU is now well positioned to create robust academic and research alliances in key areas with institutions worldwide, for mutual benefit.

Canada’s Asia Pacific Gateway Strategy has expanded beyond strategic investments in transportation infrastructure to include a focus on fostering strong relationships in education, research, and the exchange of innovative ideas and technologies. Asia’s rapid urbanization is presenting new global challenges and opportunities, and by lending our collective knowledge and building our research capacity through partnerships with Asia Pacific institutions, we can play a valuable role in the solution. As reported in our last issue, we continue to develop partnerships with India, and we are now extending our existing relationships with China and Korea.

SFU has had an intellectual engagement with China for over two decades, starting with its 1985 partnership with Jilin University for student exchange. Since then, we have expanded to create relationships with many Chinese institutions including Tsinghua University and Zhejiang University, with which we have a dual-degree program. Of all international students currently attending SFU, 39 percent are from China. The David Lam Centre for International Communication, housed at SFU, offers several programs in East Asian culture and communication. SFU is the International Secretariat of the China Council for International Cooperation on Environment and Development, on which Mark Jaccard of SFU’s School of Resource and Environment served from 1996-2001. One of our Canada Research Chairs, Yuezhi Zhao of the School of Communication, studies communication industries and policies in China and has just published Communications in China: Political Economy, Power and Conflict. SFU spin-off company Welichem Biotech Inc. has partnered with Celestial Pharmaceuticals in China to further research and development on a novel drug therapy for psoriasis.

This May, SFU was given the opportunity to showcase our research excellence and to foster new relationships at the China-BC Research and Innovation Partnership Summit in Beijing. Jack Chen and Fiona Brinkman of SFU’s Molecular Biology and Biochemistry Department (the latter via video) presented their work in genomic and pathogen bioinformatics, respectively. Carolyn Egri of SFU’s Faculty of Business Administration spoke on her pioneering research on corporate environmental and social responsibility. I was invited to host the colloquium on infectious diseases, to discuss knowledge transfer from the BC universities, and to present alternative models for transforming ideas to innovation and commercialization. At the summit, the BC and China Innovation and Commercialization Strategic Development (ICSD) Program competition results were announced, including a project with Shanghai Jiao Tong University on proton exchange membrane fuel cells, in which Steven Holdcroft of SFU’s Department of Chemistry is one of the Canadian partners.

SFU was also a participant in the Premier’s Mission to Korea in May, during which we strengthened existing collaborative relationships through the signing of two MOUs with Yonsei University, in the areas of materials science and nanomedicine. SFU’s 4D Labs will collaborate in the areas of fuel-cell materials and nanomedicine, and SFU’s Department of Chemistry will participate in the area...
SFU-Based MITACS Delivers Nationwide Student Internship Program

MITACS leapt to national prominence in 1999 as the first—and still only—Network of Centres of Excellence focused on the mathematics sciences. With its head office at SFU, it links 487 scientists, 817 students, 264 partner organizations and 48 Canadian universities. Among its early achievements was an internship program, funded in part by Western Economic Diversification Canada, through which graduate students could work four months with private companies on special projects.

Both the federal and provincial governments liked what they saw. So, rather than creating new programs from scratch, they asked MITACS to expand its program to all graduate student disciplines. The BC government provided $10 million for its share of the expansion, renaming the program ACCELERATE BC. More recently, MITACS received $8.6 million from Industry Canada to expand the program, as ACCELERATE Canada, across the country.

MITACS’ soaring reputation doesn’t surprise its energetic Scientific Director, SFU computing science professor Arvind Gupta. “Industry loves the program because the internships are for just four months, which is just right for their typical short-term projects. The governments are happy because they could use an existing model. And, of course, the students like it because it gives them hands-on experience in an industrial setting.”

Dr. Gupta points out that the companies enter into contracts with MITACS. The graduate students, meanwhile, are charged with preparing the initial proposals, giving them an important learning experience. And the funding goes to the professors, ensuring that they’re accountable for the research.

Visit www.mitacs.ca for more information.

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social, and environmental objectives in community development."

Warmer winters in recent years have played a key role in the devastating expansion of the mountain pine beetle in BC’s pine forests. SFU scientists in the Centre for Chemical Ecology, Chemistry and Biological Sciences are world-renowned for their identification and synthesis of insect pheromones. Solutions could come from this line of research.

Since a major source of carbon-based greenhouse gases is fossil fuel burned by vehicles and some power-generating systems, there are research projects at SFU directed toward the science of advanced energy conversion technologies. Among the best known alternative power sources are hydrogen fuel cells, whose applications include transportation, stationary power units and consumer products. SFU scientists Steven Holdcroft and Michael Elkerling of the Chemistry Department head teams investigating the chemical and physical processes at work within fuel cells and the materials that will best promote their efficiency and acceptance. Both are major participants in the National Research Council’s Institute for Fuel Cell Innovation in Vancouver.

The Adaptation to Climate Change Team (ACT), a multi-disciplinary SFU initiative, researches how governments, business and the public need to adapt to critical climate change impacts, and facilitates workshops and public fora that culminate in public policy white papers.

For more on individual faculty members and their expertise in the area of climate change, see: http://www.sfu.ca/pamr/issues_experts/hot_topics/environment.html.

A New Faculty of the Environment

In April, the SFU Senate approved a new Faculty of the Environment. It will include several departments, research and policy groups, further focusing the university’s environmental studies.
Support from Western Economic Diversification

For decades, the “big three” federal granting councils—NSERC (Natural Sciences and Engineering Research Council), SSHRC (Social Sciences and Humanities Research Council) and CIHR (Canadian Institutes of Health Research)—have been generous supporters of SFU research. Similarly, through its Industrial Research Assistance Program and support of institutions like TRIUMF and the Herzberg Institute of Astrophysics, the National Research Council of Canada (NRC) ensures that our scientists and engineers can do their research in outstanding facilities throughout the country.

Recently, another source of federal funding for SFU research infrastructure, innovation and related programs has become prominent—Western Economic Diversification (WD). So far this year, WD’s contributions to SFU are nudging an unprecedented $3 million. These include $325,000 for an advanced wireless antenna pattern measurement facility, $417,800 towards the Faculty of Business’ new Entrepreneurship Initiative at SFU Surrey, and just over $1.9 million for the new MedChem medicinal chemistry facility in Burnaby.

Antenna pattern measurement facility

Wireless devices, such as cell phones and laptops, send and receive their signals via antennas. The proliferation of such wireless devices and their associated access points demand better sharing of the radio spectrum, a finite and internationally regulated resource. New generations of smart communications systems with smart antennas are required. These smart antennas can instantly change signal strength and direction to avoid interfering with other users.

Enter SFU’s new antenna pattern measurement facility. It is expected to be installed this year, after which it will provide support for wireless companies in Western Canada, especially in antenna-plus-terminal design innovation. The facility’s principal researcher is Rodney Vaughan of Engineering Science. “Through our research, we want to ensure that every snippet of information that is radiated into the shared radio spectrum gets to where it’s supposed to go, with minimal interference with other people’s services and devices.”

Entrepreneurship Initiative

This is a multi-faceted community development program, based at SFU Surrey, intended to equip students with the skills and knowledge to become successful entrepreneurs. Already underway or planned under the Initiative are activities such as mentoring, consulting, workshops and seminars and courses at all SFU campuses.

“WD’s support is for a component known as the Student Business Incubator Program,” explains Justine Bizzocchi, Technology Manager at SFU’s University/Industry Liaison Office at SFU Surrey. “A principal objective is to foster economic development, including the establishment of new enterprises—especially spin-off companies—out of faculty and students’ research projects.”

From left: Dr. Robert Young, SFU Merck Frosst Leadership Chair in Pharmaceutical Genomics and Drug Discovery, and Genome BC Fellow; the Honourable Rona Ambrose, President of the Queen’s Privy Council for Canada, Minister of Intergovernmental Affairs and Minister of Western Economic Diversification; Dr. B. Mario Pinto, SFU Vice-President, Research; and Ed Fast, Member of Parliament for Abbotsford, at the May 2nd announcement of funding for a MedChem facility at SFU.

Members of the Medicinal Chemistry team from SFU’s Department of Chemistry, from left: Dr. George Agnes, Dr. Robert Young, Dr. David Vocadlo, Dr. Andrew Bennet, Dr. B. Mario Pinto, Dr. Andrew Lewis.
TIME Marches On

Located in SFU’s Vancouver campus and managed by the University/Industry Liaison Office under the direction of Mike Volker, SFU’s TIME (Technology, Innovation, Management and Entrepreneurship) Centre nurtures start-up technology companies. In the past year and a half alone, 14 new companies have occupied TIME space. Since 2005, TIME has received $277,000 in financial support for its activities from Western Economic Diversification (WD), and $116,000 from the National Research Council (NRC).

“We provide start-ups with facilities, advice, guidance and coaching in an entrepreneurial and professional environment that encourages company growth and sustainability,” says Elmer Sum, SFU’s Technology Manager for technology commercialization and new venture incubation. “TIME forums, workshops, breakfast meetings and other regular events enable company representatives to meet potential investors and other entrepreneurs and develop beneficial collaborations with the SFU community.”

With regard to the latter, TIME has recently obtained $60,000 in funding from the National Research Council Industrial Research Assistance Program (NRC-IRAP) for the SFU SME Initiative (Small and Medium-sized Enterprises). NRC-IRAP has a network of Industrial Technology Advisors (ITAs) throughout the Pacific Region, based at various locations including universities and colleges. NRC-IRAP ITAs provide technical and business-oriented advice, along with potential financial support to SME’s in their regions. As part of the new program NRC-IRAP can direct its company clients to SFU experts. TIME Centre staff will identify appropriate SFU faculty and staff for each situation.

“This pilot project gives our clients a quick and simple method of engaging university expertise,” says Julia Rylands, Regional Director NRC-IRAP Pacific. “We hope it will encourage companies that haven’t previously collaborated with a university to do so now. We are excited about the initiative’s potential.”

Interest in the program has been very strong, reports Justine Bizzocchi, UILO Technology Manager at SFU Surrey. “Eight companies have been matched with SFU research faculty and/or students, and have begun working together. Another three companies have expressed interest.”

TIME, meanwhile, has opened a small technology venture incubator in Discovery Park’s Multi-Tenant Building at SFU Burnaby. Amotrolex Technologies have already moved in. “Ideally, TIME will be present at all SFU locations where the entrepreneurial activities are strong,” says Mr. Sum.

Energy Aware (www.energy-aware.com) is one of the companies that’s taken advantage of the TIME Centre’s facilities. Established by UBC graduates Janice Cheam and Lauren Kulokas, the firm is developing an in-home real-time energy monitor called the PowerTab. It tells consumers their household electricity consumption in terms of dollars and cents at any given moment.

“We moved to the TIME Centre because of its convenient downtown Vancouver location,” says Ms. Cheam. “As an incubator fully furnished with telephone, Internet access and security, it was an easy transition from working out of our homes. A great benefit is being able to walk down the hall and find someone who can give us advice. And, of course, the TIME Centre staff has been extremely supportive of our business, always putting time aside for us and never hesitating to extend an introduction.”

According to Ms. Cheam, this year Energy Aware will launch its PowerTab home energy monitor and expand its engineering and management team.

Those investments include the generous support of BC’s Leading Edge Endowment Fund for Dr. Robert Young, the Merck Frosst Leadership Chair in Pharmaceutical Genomics and Drug Discovery and Genome BC Fellow, and Junior Chairs Rob Britton and David Vocadlo. MedChem will house the Centre for Drug Research and Development’s Drug Research Institute, and it will help integrate components of SFU’s medicinal chemistry program, including the nuclear magnetic resonance facility whose acquisition just over two years ago was made possible by a $700,000 WD grant.

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Two Research Projects Awarded CTEF Funding

The steady growth of UniverCity on Burnaby Mountain continues to be good news for SFU researchers. That's because part of lease revenue from the development goes to the Community Trust Endowment Fund (CTEF), and thus supports research consistent with the university's Strategic Research Plan. Two impressive multidisciplinary projects are the latest to be approved by the Fund -- one based in Earth Sciences, the other in Mathematics. Each has been awarded $200,000 for their first year.

"The primary impacts of climate change have been studied by scientists around the world," says hydrogeologist Diana Allen of the Department of Earth Sciences. "Relatively few studies have focused on the secondary effects of climate change, such as the potential for spread of disease, decline in water quality and loss of biodiversity. Our project will study these." Dr. Allen's research team includes SFU experts from Earth Sciences, Health Sciences, and Resource and Environmental Management in climate, water, air quality, human health, risk analysis and emergency preparedness.

Peter Borwein, Director of SFU's Centre for Interdisciplinary Research in Mathematical and Computational Sciences (IRMACS) has assembled a team to study and model the complex urban dynamics that drive the spread of crime, disease, homelessness and other social ills. "We call it MoCSS--Modelling of Complex Social Systems," says Dr. Borwein. "Our goal is to use mathematical and computational modelling both to better understand geospatial and social issues in crime and health and to predict the possible consequences of policy decisions in these areas. It will establish SFU as a leader in this field."

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of bioactive molecular hybrids and glycoscience for the purpose of drug design. We value highly our alliance with Yonsei University, Korea's oldest private university and one of Asia's leading post secondary institutions. SFU already has several exchange and research relationships with other Korean institutions, including Korea University, Cheonan University, KAIST, and Seoul National University.

SFU is proud of its tradition of synergistic research and scholarship. We recognize that finding solutions to global challenges requires a global response through the exchange and combination of knowledge and expertise. We will continue to work together with other institutions on the world stage to advance new discoveries for the common good.