

# RESEARCH SPOTLIGHT: FACULTY OF SCIENCE



The pandemic and ensuing lockdown of Simon Fraser University (SFU) campuses from March 2020 – August 2021 challenged Science staff and faculty to find alternate delivery methods for teaching and community outreach and to find solutions for maintaining research excellence. The faculty's efforts to provide an engaging virtual platform for these activities were met with increased attendance at many of our virtual public events, higher enrolments for students (4% in 2020 and 6.6% in 2021) and safe and continuous access to research facilities.

## COVID RESEARCH

Caroline Colijn, Canada 150 Research Chair in Mathematics for Evolution, Infection and Public Health continued to make outstanding contributions to our understanding and handling of the COVID-19 pandemic across B.C. and Canada. In addition to leading SFU's MAGPIE (Mathematics, Genomics & Prediction in Infection and Evolution) research group, she co-founded the B.C. COVID-19 Modelling Group, co-leads the Canadian Network for Modelling Infectious Diseases and sits on the national Variants of Concern Scientific Advisory Council and the Office of the Chief Science Advisor's Expert Panel on COVID-19. Her research, leadership and willingness to engage with the public and the media have put SFU at the forefront of COVID-19 research and expertise.

Peter Unrau in the Department of Molecular Biology and Biochemistry contributed to SFU's COVID-19 research with a newly developed rapid COVID-19 test kit. The kit provides accurate COVID test results within 30 minutes and requires less costly chemicals than other tests. It has been approved for use by the U.S. Centers for Disease Control and Prevention.

## INNOVATION IN MATERIALS SCIENCE

Chemist Hogan Yu and his grad student Lishen Zhang were successful in patenting a new waterproofing coating that is cheaper, free of harmful fluorinated compounds, effective on fabric, wood, glass and metal and superior to current consumer products. Yu has since met with potential investors and collaborators and has begun work with the Wilson School of Design at Kwantlen Polytechnic University and the Surrey Amateur Radio Communications group testing potential applications for the textile industry and outdoor telecom infrastructure. An agreement with a large international company has been signed that will provide funding for additional testing and a potential licensing option. Yu was grateful to receive guidance from SFU's Technology Licensing Office.

## INNOVATION IN BIOMEDICAL RESEARCH

Jonathan Choy's lab in the Department of Molecular Biology and Biochemistry played an instrumental role in a multi-consortium discovery of an innovative coating for blood vessels that reduces rejection of transplanted organs. The breakthrough research relied on testing a unique polymer developed at the University of British Columbia that mimics the sugar coating found on blood vessels. These sugars normally suppress the immune system but become irretrievably damaged when an organ is harvested for transplantation. Choy's lab experiments confirmed that a mouse artery, coated in this way and then transplanted into another mouse, exhibited strong long-term resistance to inflammation and rejection. The experiment has vast implications for kidney, lung and heart transplant patients.

## MARINE CONSERVATION

Biological Sciences Professor Nick Dulvy continues to make headlines around the world for his efforts to conserve marine species. Along with his work as the past co-chair of the International Union for Conservation of Nature Shark Specialist Group, he continually draws attention to the plight of endangered species of sharks and rays. His publications are amongst the most cited world-wide by Clarivate Analytics and his analysis highlights the need for urgent conservation action across the globe.

PhD student Rhiannon Moore, along with Biological Sciences Professor Leah Bendell recently discovered microplastics in the gastrointestinal tracts of five species of arctic fish that are prey to beluga whales. The author's previous research that has shown beluga stomachs contain microplastics demonstrates how improperly discarded plastics can infiltrate marine ecosystems through air, water, sediment and ultimately the food chain.

## NATURAL HAZARDS

Earth Scientist Jessica Pilarczyk discovered geologic evidence that unusually large earthquakes and tsunamis from the Tokyo region are likely traceable to a previously unconsidered plate boundary 50 km east of Tokyo. The discovery will provide better informed seismic hazard maps for Japan and hopefully minimize further events from this plate boundary like the 2011 Tohoku event that triggered the Fukushima Daiichi nuclear disaster.

## EQUITY, DIVERSITY AND INCLUSION

The Faculty of Science has taken the first steps in developing a fairer, more welcoming culture for students, staff and faculty with the appointment of an Associate Director of Equity, Diversity and Inclusion (EDI), mathematics professor, Mary Catherine Kropinski. She is undertaking consultations with students, faculty, staff and alumni to assist in identifying and breaking down long standing structural biases that can create barriers to under-represented groups. These conversations will drive the development of an action plan with clear objectives, corresponding actions to achieve them and defined accountability.

Graduate students in Biological Sciences furthered the Faculty's EDI initiatives through the creation of a new scholarship aimed at improving enrolment of BIPOC

and Indigenous students at the graduate level. After assessing the low enrolment of these two groups in their own department, this grassroots team pledged to uplift early career peers by alleviating financial barriers faced by equity deserving communities. In the few months since the initiative was launched, their goal of raising \$30,000 has been exceeded.

## MAJOR AWARDS & APPOINTMENTS

**Caroline Colijn** shared the SFU Newsmaker of the Year Award with Faculty of Health Sciences Professor Kelley Lee. Colijn also won the Radio-Canada Scientists of the Year Prize and the Faculty of Science Excellence in Science Public Engagement and Outreach Award for her exemplary work in COVID modelling.

Chemist **Zuo-Guang Ye** was awarded the 2021 John Polanyi Award from the Chemical Institute of Canada.

Mathematician **Nilima Nigam** was awarded the Canadian Applied and Industrial Mathematics Society prize for her ground-breaking work demonstrating how theoretical results can have a major impact on the development of new mathematical models and her outstanding leadership in this community.

Physicist **Stephanie Simmons** won a YWCA Women of Distinction Award in the category of Research, The Sciences and Technology.

Physicist **John Bechhoefer** was appointed to the Royal Society of Canada for his research into fundamental theories that unite notions of information, feedback control, nonequilibrium statistical physics and thermodynamics.

Chemist **Steven Holdcroft** was appointed to the Royal Society of Canada for his discovery of revolutionary ionic polymer membranes that are transforming the clean energy sector by facilitating hydrogen production from water, hydrogen energy conversion in fuel cells, and electrolytic CO<sub>2</sub> reduction.

**Steven Robinovitch** in the Department of Biomedical Physiology & Kinesiology received the Canadian Society for Biomechanics Career Award.

Chemist **Tim Storr** was awarded an Early Career Award from the International Society for Biological Inorganic Chemistry.

Biological Sciences Associate Professor **Lisa Julian** was awarded the Canada Research Chair in Developmental Origins of Stem Cell Fate.