



UNIVERSITY OF
TORONTO
SCARBOROUGH

Office of the Vice-Principal Research & Innovation

Annual Report

2020

→ 2021

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Land Acknowledgement

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and, most recently, the Mississaugas of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island, and we are grateful to have the opportunity to work on this land.

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Message from the Vice-Principal Research & Innovation

Inspiring inclusive excellence in research and innovation is front and centre at the University of Toronto Scarborough



I am delighted to join the University of Toronto Scarborough as the new Vice-Principal of Research and Innovation. U of T Scarborough's vision is to be a bold community of conscientious and adaptable global leaders who advance transformative change for the good of all. The opportunity to work here is truly exciting.

Empowering our research and creative endeavours by working through the lens of inclusive excellence will be essential in achieving the important priorities set in U of T Scarborough's Strategic Plan. As we embark on the implementation of this plan, we will be intentionally inclusive of the diverse origins of our campus community, diverse pathways for creating knowledge (including diverse knowledges, approaches, and communities), and diverse pathways for mobilizing knowledge for transformative impact.

This past year continued to present significant challenges for us as individuals and as a community.

The impact of the pandemic brought to light systemic inequalities and injustices—including longstanding health inequities and growing socioeconomic gaps—that we could not and should not shy away from. As we engaged in important conversations to understand and address these challenges, it is clearer that work still needs to be done. University leaders are taking action to identify and remove structural inequities for equity-deserving groups and working together to build a culture of inclusive excellence.

Despite the ongoing effects of the pandemic, our faculty have continued to push forward the frontiers of research and creative activities. The OVPRI Annual Report for 2020–2021 includes some of the noteworthy achievements of our U of T Scarborough research community. It highlights our research and creative works, including some of the important work done to address the lasting impacts of COVID-19 and some of the honours and awards bestowed on our incredible students and faculty.

It is an opportunity to celebrate these accomplishments and acknowledge what was achieved in the face of unprecedented challenges.

Over the next few years, I commit to lead the U of T Scarborough community in implementing our strategic research priorities, which include developing the convergent research approaches necessary to tackle global challenges, enhancing institutional resources to support faculty in pursuing large-scale partnerships and projects, engaging a greater number and diversity of external partners to strengthen our local and global impacts, creating “flagship” research initiatives that increase the position of the campus as a major player in transformative impact, and enriching our research culture to support a vibrant intellectual community that is a destination of choice for disruptive thought leaders and innovative thinkers. I look forward to working with you.

**Irena F. Creed, PhD,
Hon. D. Agr. Sci., FRSC**

Professor and Vice-Principal,
Research & Innovation

Message from the Associate Vice-Principal Research—Strategic Initiatives



I am delighted to join the Office of the Vice-Principal Research and Innovation as the Interim Associate Vice-Principal Research—Strategic Initiatives. I will use this opportunity to leverage our incredible expertise and talent to facilitate the development of large-scale multidisciplinary research projects and partnerships.

In the past year, the Office of the Vice-Principal Research and Innovation launched the EaRTH District's Collaborative Research Program as part of the Environmental and Related Technologies Hub. The program supports the green technology sector. It promotes research partnerships that connect scholars from Ontario Tech University, Centennial College, Trent University, and University of Toronto Scarborough. The 2020–2021 call for research proposals centred on Integrated Sustainable Technologies. The program will operate from 2021 to 2026, with a new and innovative theme introduced every year.

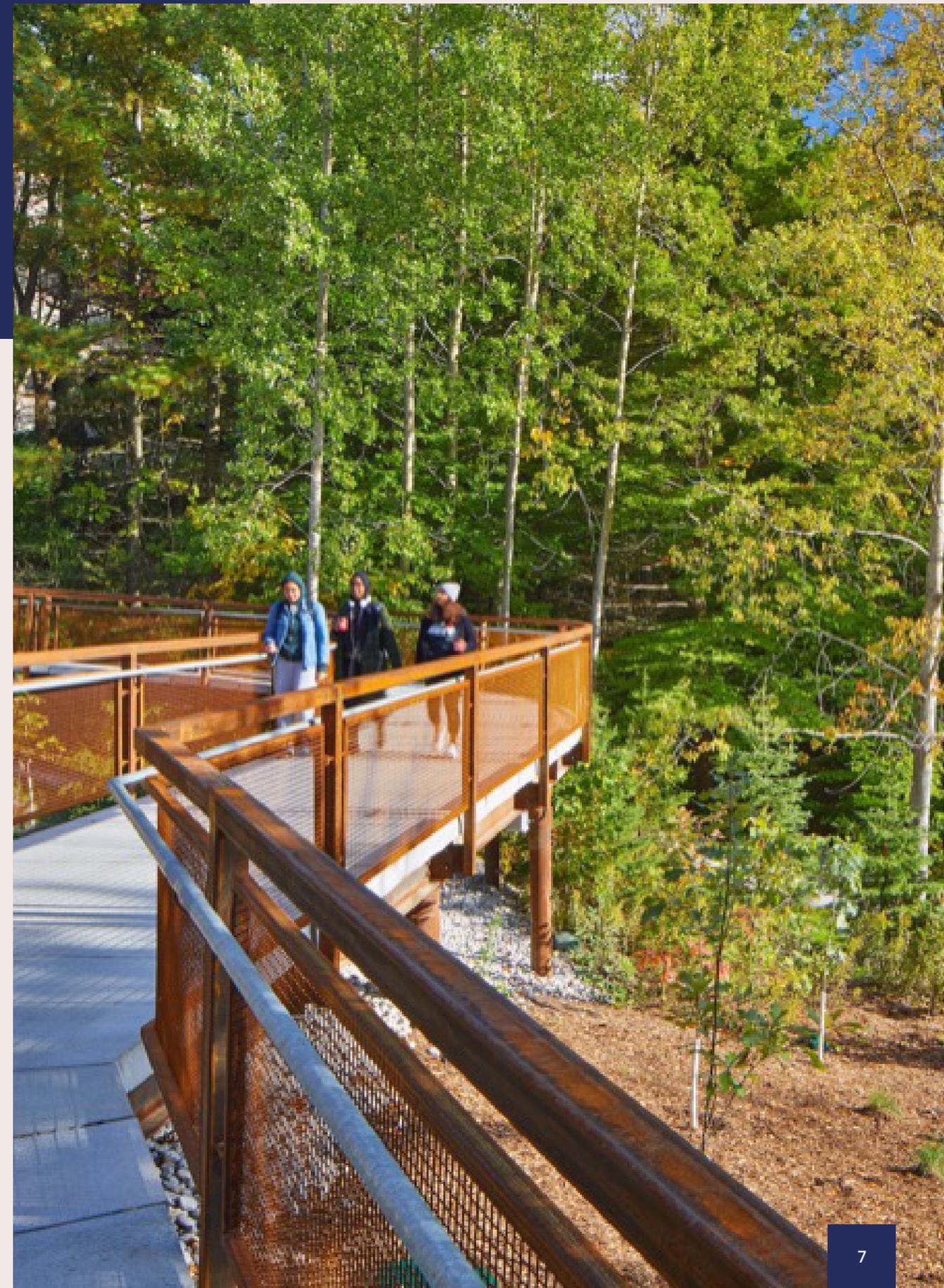
A core mandate of my work is to ensure U of T Scarborough faculty's active engagement in the university's Institutional Strategic Initiatives (ISI). These cross-divisional research networks tackle grand ideas that require innovative thinking and diversity of thought. In 2020–2021, U of T Scarborough faculty participated in

the Critical Digital Humanities Initiative, the Data Sciences Institute, the Mobility Lab, and the Toronto Cannabis and Cannabinoid Research Consortium, to name a few. Emerging projects in which our faculty are engaged include an ISI on youth and student mental health, an institute of pandemics, and an initiative on the United Nations' sustainable development goals.

I am proud to support our U of T Scarborough faculty members as we continue to evolve and adapt in these uncertain times. The resiliency, strength, and perseverance of our community is inspirational, and I look forward to working towards our vision of Inspiring Inclusive Excellence.

Patricia Landolt, PhD Professor of Sociology

Associate Vice-Principal Research—Strategic Initiatives (Interim 2021–2022)



Impact by Numbers

01

Impact by numbers provides an overview of our research statistics for 2020–2021, including total research funding by source, number of research faculty, supervisions, outputs, and more.



Impact by Numbers 2020–2021

General Statistics by Year

335

Research Funds
(Number of Grants and Contracts)

163

Funding Applications

52

Funding Sponsors

8

Private Sector Partners

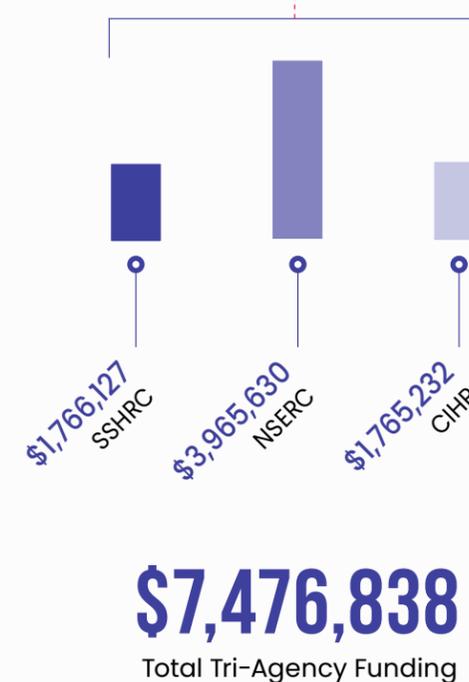
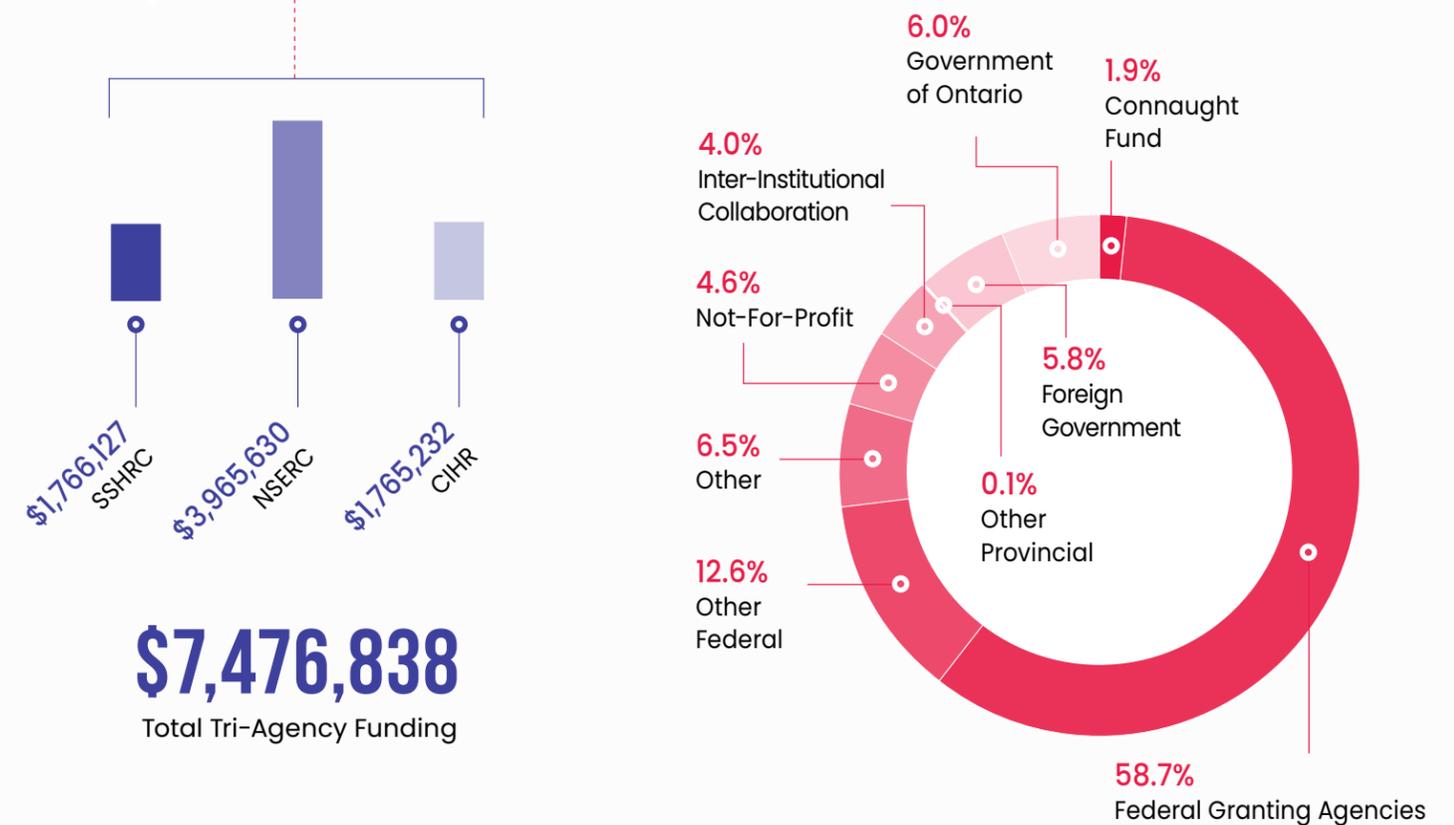
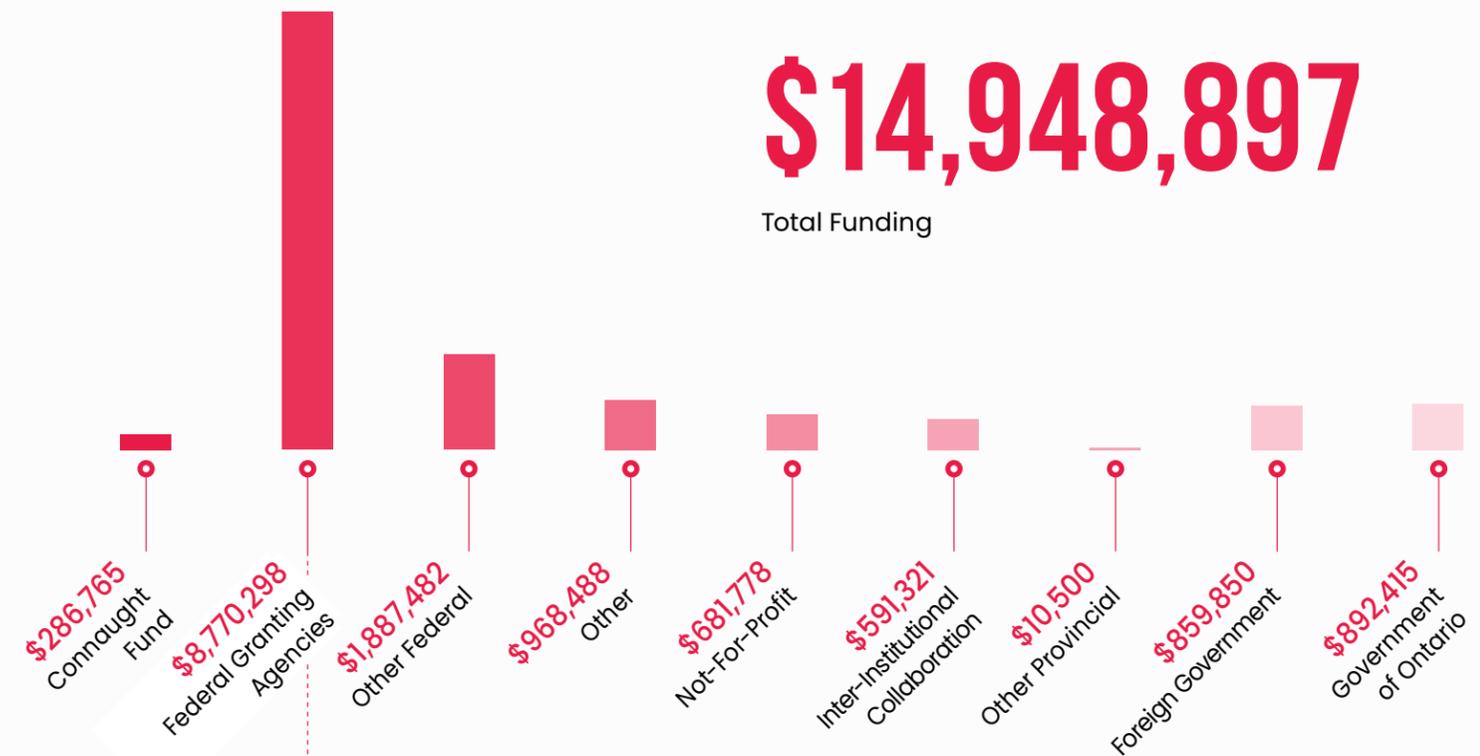
83

Funding Programs

Total Research Funding by Source

\$14,948,897

Total Funding

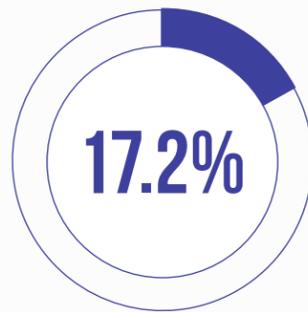


Grant Success 2020–2021

CIHR Project Grant
(Fall & Spring Competitions)



NATIONAL



SCARBOROUGH

SSHRC Insight Grant



NATIONAL



SCARBOROUGH

SSHRC Insight Development Grant

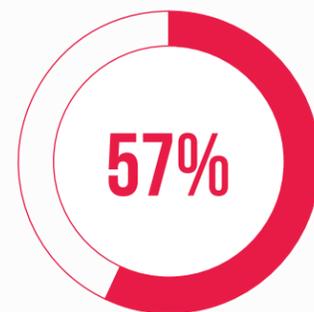


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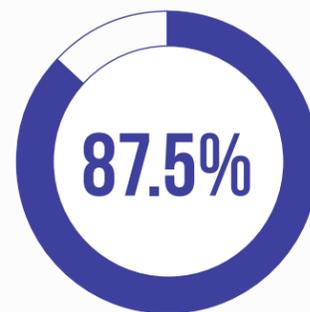


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NSERC Discovery Grant

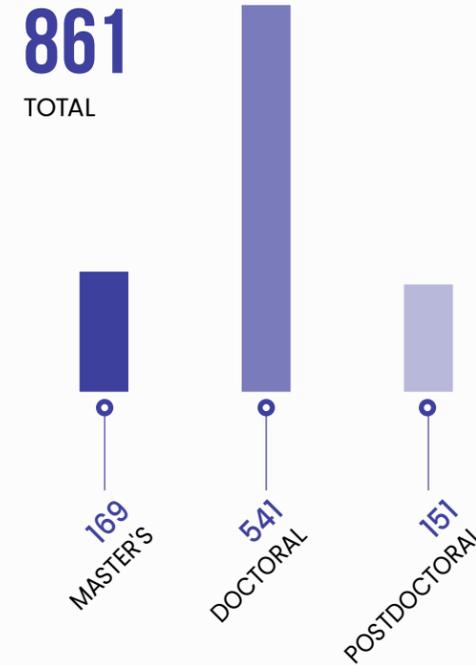


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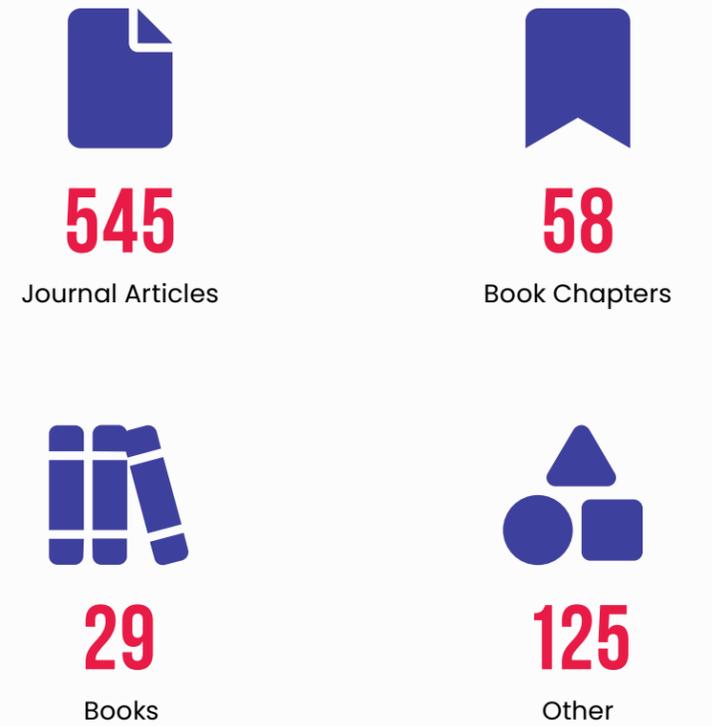


SCARBOROUGH

Supervisions by U of T
Scarborough Faculty



Publications 2020–2021



Commercialization

	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	TOTAL
New Invention Disclosures	●●●●●	●●●●	●●●●●	●●●●	●●●	25
Priority Patent Applications Filed	●●	●	●●●	●●●●	●	11
Licence and Option Agreements		●	●●●	●●	●	7
Startup Companies Formed by Faculty	●				●	2

EaRTH District's Collaborative Research Program

02



U of T Scarborough has partnered with Centennial College, Durham College, Ontario Tech University, and Trent University to establish the Environment and Related Technologies Hub (EaRTH). The EaRTH District's Collaborative Research Program aims to develop innovative partnered projects with stakeholders in the eastern GTA.



The inaugural competition was launched in early 2021 under the theme “Integrated Sustainable Energy Technologies,” where the following three projects were approved for funding.

Electro_EaRTH

This project will lead to the discovery of catalytic materials, new conversion processes, and system design. The technologies and strategies developed will be beneficial to industrial partners, to enhance the yield, concentration, or productivity of target fuels and chemicals in novel, green, and sustainable ways.



U of T Scarborough has partnered with Centennial College, Durham College, Ontario Tech University, and Trent University to establish the Environment and Related Technologies Hub (EaRTH). This joint initiative aims to develop collaborative projects with industry and government partners in the eastern GTA, including Scarborough, Durham Region, and Peterborough. It will explore synergies that can strengthen and enhance the Canadian green technology sector and provide increased opportunities for economic development that will foster the creation of highly skilled jobs and support the transfer of knowledge to society. The initiative includes shared research facilities, joint research projects, and collaborations on teaching and learning.

U of T Scarborough, Centennial College, Ontario Tech University, and Trent University have established the EaRTH District Collaborative Research Grant to support collaborative research initiatives in areas of mutual strength and shared interest. The grant provides initial seed funding of \$50,000 to undertake short-term visits to initiate, deepen, and extend collaborative research links to enable principal investigators to make joint proposals to external funding sources for the next phase of their research. Applications must involve at least one researcher from each of the four partner institutions.



Growing Change Through Energy, Education, and Equity: Off-Grid Food Production On-Campus

This project addresses the intertwined challenges of energy-efficient and localized food production, equitable campus food systems and student food security, and critical sustainability education.

Development of Improved Regenerative Braking Systems and New Batteries for Hybrid Hydraulic and Electric Heavy Vehicles

This project aims to explore a hydraulic-based regenerative braking system for hybrid hydraulic heavy vehicles and lithium-ion batteries integrated into fiber-polymer composite structures (or integrated lithium-ion batteries) for hybrid electric heavy vehicles.



Scarborough COVID-19 Initiative

03



In conjunction with the Toronto COVID-19 Action Fund, the Scarborough COVID-19 Initiative supported high-impact research by U of T Scarborough, U of T, and U of T hospital partners contributing to the global fight against COVID-19 with nearly \$9 million in funding in 2020–2021.



“Any contact tracing app has some inherent privacy risks. It is critical that both policymakers and end users understand these risks so that users can provide truly informed and meaningful consent.”

COVID-19 contact tracing apps: Balancing individual privacy concerns and public health benefits

Mobile contact-tracing apps have drawn interest across jurisdictions worldwide for their potential to contribute to controlling the spread of the COVID-19 virus.

Most apps include individual privacy protections. But, by its very nature, the automatic contact tracing process they initiate reveals personal information that would otherwise be protected.

How should individual privacy concerns be balanced against the public health benefits of mobile contact tracing? What privacy guarantees can contact tracing apps offer users, and what trade-offs should they ask users to make?

A team of Canadian and US researchers that includes **Yun William Yu**, Assistant Professor in the Department of Computer and Mathematical Sciences at U of T Scarborough, recently examined these questions in a brief communication published in the Journal of the American Medical Informatics Association.

The researchers argue that contact tracing apps must be transparent and enable informed consent to contribute to the fight against COVID-19 successfully.

Manual contact tracing involves revealing detailed personal information to a central authority. While automatic contact tracing apps are decentralized, they raise other privacy concerns, the researchers note.

Mobile contact tracing apps are typically designed to

comply with privacy and data protection laws, providing users some assurance that their personal information will be protected and that the potential for unauthorized access will be minimized.

But even the best-designed apps—including apps that exceed the privacy safeguards required by law by including privacy protocols designed to decentralize processing and storage—have the potential to “leak” users’ medical and location information.

“Any contact tracing app has some inherent privacy risks,” says Yu. “It is critical that both policymakers and end users understand these risks so that users can provide truly informed and meaningful consent.”

Ultimately, the researchers argue, technology is intrinsically limited in its capacity to prevent attacks that could compromise personal information. Many existing laws do not fully address the contact tracing app context, they note, and legal and regulatory changes could help better protect user privacy.

Yun William Yu

Assistant Professor, Computer and Mathematical Sciences

Tackling food insecurity and building sustainable food systems, pandemic and beyond

Would the food system be able to feed a large city like Toronto if it were to experience a large-scale systems shock?

Answers to this question, once the focus of scholarly debate, have been emerging in real time during the COVID-19 pandemic.

The pandemic has exacerbated and made visible longstanding inequities, with certain social groups disproportionately experiencing increased food insecurity.

The Greater Toronto Area has been one of the hardest-hit areas of Canada with respect to both COVID-19 infections and the pandemic's socioeconomic consequences. Even as the city is often celebrated as multicultural, disparities in food system changes have occurred along overlapping racial and class-based lines.

Recognizing the need to address these inequities, **Jayeeta Sharma**, Associate Professor at the Culinary Research Centre and the Department of Historical and Cultural Studies at U of T Scarborough, launched Feeding the City, Pandemic and Beyond.

This project brings together U of T scholars, student researchers, and a range of academic, community, and grassroots collaborators.

"With the crisis, you are forced to think about scarcity and whom it affects. The pandemic, as terrible as it is, is the point at which we began to seize the opportunity to inform people so they actually listen," Sharma says.

The team is examining how food growers and buyers, food providers, and civil society organizations have been affected by the pandemic—and the solutions they are creating to maintain food access, advance food security, and recover food sovereignty.

The researchers are collecting and analyzing quantitative and qualitative data from local farmers, community growers, food workers, community food assistance recipients, restaurants, and social enterprises.

Results to date suggest that while the food system is overly dependent on just-in-time global supply chains, and official policies have not sufficiently supported local food stakeholders, those stakeholders have been tremendously innovative and adaptable in the face of enormous challenges.

The project's success in supporting grassroots changemakers—from public market entrepreneur Jennifer Forde to BIPOC-led food security groups such as Feed Scarborough—demonstrates how university-community relationship-building can effectively achieve better futures.

Jayeeta Sharma

Associate Professor, Historical and Cultural Studies and Culinary Research Centre



"With the crisis, you are forced to think about scarcity and whom it affects. The pandemic, as terrible as it is, is the point at which we began to seize the opportunity to inform people so they actually listen."

Pandemic policing of the homeless in Canada: From crime control to public health strategy

What impact do traditional models of policing and crime control have on people experiencing homelessness during the pandemic? How can any harmful effects be mitigated?

These are the questions **Joseph Hermer**, Associate Professor and Chair in the U of T Scarborough Department of Sociology has been investigating as lead of the COVID-19 Policing and Homelessness Initiative (PHI).

Visibly poor and unhoused people have historically been subject to disproportionate levels of policing and crime control efforts—even though unhoused people are much more likely to be victims of serious crime and more in need of protection and assistance.

The criminalization of people experiencing homelessness clearly conflicts with ensuring their health and safety.

“During the pandemic, the policing response to homeless people in many Canadian cities is a disaster unto itself. The very worst thing one can do is push people further into life-threatening circumstances,” says Hermer.

The PHI is a rapid-response research project that aims to provide empirical evidence that can be used to address the immediate and long-term needs of people experiencing homelessness.

The project engages in short- and long-term research and public advocacy about the harms associated with the criminalization of street-involved and precariously housed people.

The PHI team first conducted a review of bylaws and codes in Canadian municipalities with populations of over 5,000 people.

Each bylaw was searched for one of six types of anti-homeless offences that are routinely enforced against unhoused people.

The result is one of the largest and most detailed databases on municipal law in Canada. Members of the public can now examine more than 800 anti-homeless offences on an interactive map or search using an index.

The mapping project has already had an impact across the country in communities debating police and law enforcement responses to the presence of unhoused people in public spaces.

Second, the team interviewed 164 frontline homeless shelter and outreach workers across Canada about the impact of the pandemic on their clients and the consequences of police interaction.

The preliminary results from this work document the catastrophic impact of the pandemic and the damaging impact of treating homelessness as a crime control problem.

Joseph Hermer

Associate Professor and Chair, Sociology

“During the pandemic, the policing response to homeless people in many Canadian cities is a disaster unto itself. The very worst thing one can do is push people further into life-threatening circumstances.”





“We often hear that the virus doesn’t discriminate. But, repeatedly, we’ve seen that it does discriminate—and it does so in ways that mirror and affirm longstanding and troubling social exclusions.”

Responding to the mental health challenges of 2SLGBTQIA+ people during the COVID-19 pandemic in Toronto

Findings indicate that 2SLGBTQIA+ people disproportionately experience a range of stresses, including unequal access to employment, housing, and healthcare, among other forms of structural and interpersonal discrimination.

For many 2SLGBTQIA+ people, intersecting forms of social marginalization and oppression exacerbate these profound challenges to mental health.

The COVID-19 pandemic has only magnified such inequities, exposing and worsening mental health disparities while producing new ones.

QueerCOVIDTO seeks to understand and make visible the mental health challenges of 2SLGBTQIA+ people in Toronto during the pandemic by focusing on shared and disparate experiences during a time of immense social and economic uncertainty.

“We often hear that the virus doesn’t discriminate. But, repeatedly, we’ve seen that it does discriminate—and it does so in ways that mirror and affirm longstanding and troubling social exclusions,” says **Jessica Fields**.

Fields co-leads the project with **Sarah Williams**, who earned her PhD at U of T in 2021 and is now Visiting Assistant Professor at Brown University, and **James K. Gibb**, former Visiting Scholar in the Department of Health and Society at U of T Scarborough and current PhD student at Northwestern University. They are supported by a diverse team of scholars and student researchers.

The team is gathering and analyzing data on how the pandemic is affecting the behavioural and mental health of 2SLGBTQIA+ people, their ability to access important social and healthcare services, and sources of resilience for them.

QueerCOVIDTO will provide recommendations that promote equitable responses to the public health crisis and reduce the mental health burden of 2SLGBTQIA+ people, equipping Canadian public health agencies and policymakers to prioritize their needs as the pandemic continues, as well as in future health crises.

“Lesbian, gay, bisexual, transgender, intersex, Two-Spirit, and queer people are too often neglected in health research,” Fields says. “With this project, we’re taking advantage of a critical opportunity to identify the intersecting social processes shaping their experiences of the pandemic.”

Jessica Fields

U of T Scarborough Vice-Dean Faculty Affairs, Equity, and Success, and Professor in the Department of Health and Society

Understanding emotions and protecting mental health during the pandemic

The COVID-19 pandemic has been an isolating experience. Shutdowns and quarantines have made maintaining mental health a challenge.

But, according to a study led by Professor **Gerald Cupchik** of the Department of Psychology at U of T Scarborough, there are specific precautionary measures students can take to protect their mental health during the pandemic.

The study surveyed 859 students throughout October 2020 about how they were responding to the pandemic, how they felt about the future, and challenges they faced inside and outside of school.

The study found that more resilient students were taking precautionary measures that helped diminish feelings of isolation and boost confidence to cope with negative emotions. These included following public health guidelines, healthy sleeping habits, connecting with family and friends, exercising, and volunteering to help others, to name a few.

Cupchik says that these measures help focus the mind on something other than sources of stress. They also allow for a sense of taking control over aspects of your life.

Students most at risk for mental health were also at greater risk for poor personal health and experienced greater difficulty focusing on everyday activities. They were more likely to get information from social media (as opposed to news or government sources), less

likely to receive support at home, and less likely to take precautionary measures.

“It’s those who are at risk who need our help the most in overcoming feelings of isolation, burnout, and helplessness,” Cupchik says.

The study’s findings are detailed in a recent report. Cupchik is also part of a team that analyzed public sentiment on Twitter during the pandemic.

Led by Antony Chum, Assistant Professor of Health Sciences at Brock University, the team conducted an observational infoveillance study that took stock of Ontarians’ reactions to pandemic restrictions such as business and school closures, social distancing, and masking.

Their study, published in the Journal of Medical Internet Research, found that public opinion was contextually driven.

For example, as COVID-19 case counts rose, negative sentiment associated with business closures decreased, and regional lockdowns generated more positive sentiment compared with province-wide lockdowns.

Gerald Cupchik
Professor, Psychology



“It’s those who are at risk who need our help the most in overcoming feelings of isolation, burnout, and helplessness.”

Research Stories



04

U of T Scarborough's extraordinary community of world-class researchers demonstrated incredible courage, creativity, and resourcefulness in 2020–2021, producing innovative, impactful, timely research and creative work.

01 Anxiety over COVID is negatively affecting Canadian workers, U of T study finds



“Establishing a sense of control in your life, even with respect to small things, can go far in facilitating resilience.”

A recent U of T Scarborough study reveals a simple coping mechanism that might help you feel less anxious about the COVID-19 pandemic.

The study, by **John Trougakos**, Associate Professor, and **Julie McCarthy**, Professor, both of the U of T Scarborough Department of Management and the Rotman School of Management, and Nitya Chawla of Texas A&M University, surveyed 503 workers from a range of social, educational, and employment backgrounds after social distancing orders were enacted in March 2020, including those working from home and those who had to physically go into work.

Workers reported feeling anxiety about contracting or having COVID-19. As the researchers point out, a major consequence of health anxiety is emotion suppression, which has been shown to reduce our ability to perform various tasks by impairing thought processes, problem-solving, and memory.

Emotion suppression also has a negative impact on psychological need fulfilment.

“This may include how effective you feel at your job, or how connected you feel to others.... If those needs aren't being met, you are more likely to withdraw or be less effective in various aspects of your life,” says Trougakos.

The study, published in the Journal of Applied Psychology, evaluated a coping strategy participants used: hand-washing. McCarthy explains that hand-washing is a form of problem-focused coping.

“Establishing a sense of control in your life, even with respect to small things, can go far in facilitating resilience,” says McCarthy.

McCarthy says other coping strategies, such as mask-wearing and avoiding public gatherings, may help us mitigate some of the consequences of anxiety. The authors also highlight the role that partners, parents, organizations, and work supervisors can play in mitigating anxiety. They recommend training in resilience, stress management, and work-life balance to help workers feel greater autonomy in their lives.

02 U of T Scarborough startup configures tech to help connect health providers to donations of critical supplies

A U of T Scarborough startup that put its launch on hold due to COVID-19 pivoted to help health service providers find critical supplies.

“We wanted to pitch in and find a way that can help support our frontline medical workers,” says **Melanie Ratnam**, founder of INDAGGO, a software platform that helps labs save time and money in finding research supplies.

When the challenge of quickly finding critical supplies became apparent—from personal protective equipment to hand sanitizer—Ratnam and her team started thinking of ways they could apply their software development expertise to help. The result was RESPOND, a web application that connects organizations in need of critical health and medical supplies to donations in the local community.

Service and Housing in the Province (SHIP), which provides housing and supports to vulnerable populations

in Peel, Dufferin, and West Toronto, used the application to find face masks and tablets to assist with personal counselling sessions. “During these uncertain times, many doors have been closed to those most in need. Individuals who are homeless, precariously housed, or living with a mental health issue may face increased challenges in practicing measures essential to keeping them safe,” says **Laurie Ridler**, CEO of SHIP.

Ratnam came up with the idea for INDAGGO during her time as a PhD candidate in a research lab at U of T Scarborough. She says lab budgets can be tight, and every dollar needs to go a long way, but it's also equally important to source quality materials so that experiments won't be compromised.

“I feel so privileged to be on such a creative, hard-working team,” says Ratnam of her startup, which came out of **The HUB**, U of T Scarborough's entrepreneurial incubator.



03 “An environmental injustice”: Study finds exposure to certain organic pollutants on the rise in pregnant Inuit women

Pregnant women in Nunavik are increasingly exposed to harmful chemical compounds commonly found in consumer products, according to a recent study by a group of Canadian researchers including **Élyse Caron-Beaudoin**, Assistant Professor in the Department of Health and Society and the Department of Physical and Environmental Sciences at U of T Scarborough.

“It’s an environmental injustice because people’s food in the Arctic is being contaminated by chemicals made far away from their homes,” says Caron-Beaudoin, an expert on toxicology and public and environmental health.

Perfluoroalkyl acids (PFAAs) are used in a range of consumer products, including nonstick coatings for cookware, water repellents, food packaging, cosmetics, and cleaning products. PFAAs do not biodegrade easily and can persist for a long time in the environment. They are carried over long distances in the atmosphere and in oceans, where they accumulate in the tissues of organisms in the Arctic food chain, says Caron-Beaudoin.

Exposure to these compounds, including during fetal development, is associated with changes in hormonal, kidney, cardio-metabolic, and immune function.

The study, published in the journal *Environment International*, involved measuring changes in the concentration of PFAAs in the blood of 279 pregnant women living in the Nunavik region of northern Quebec from 2004 to 2017. The researchers found that PFAA concentrations in pregnant Inuit women were twice as high as those in a representative sample of Canadian women.

One of the likely sources of PFAA concentrations in the blood is country foods, particularly marine wildlife. Caron-Beaudoin says that many living in the north experience food insecurity and rely on the nutritional and cultural value provided by country foods, which make up the traditional Inuit diet.

“The benefit of consuming traditional foods still outweigh the negatives,” she says. “We need adequate regulations that protect these country foods from harmful contaminants.”

“The benefit of consuming traditional foods still outweigh the negatives. We need adequate regulations that protect these country foods from harmful contaminants.”



“This means polar bears everywhere will face longer periods without food, and this will affect their ability to reproduce, survive, and persist as healthy populations.”

04 Polar bear populations likely to collapse by end of century if global warming continues

A recent U of T Scarborough study finds that most polar bear populations will likely collapse by the end of the century if global warming continues at the current pace. The study, published in the journal *Nature Climate Change*, is the first to offer timelines showing how Arctic sea ice loss will affect the ability of polar bears to reproduce and survive.

“The challenge is that Arctic sea ice will keep disappearing as the world continues to warm,” says lead author **Péter Molnár**, Assistant Professor in the Department of Biological Sciences at U of T Scarborough. “This means polar bears everywhere will face longer periods without food, and this will affect their ability to reproduce, survive, and persist as healthy populations.”

The polar bear diet consists mainly of seals, which they can catch only on sea ice. But as the ice continues to melt, the bears have less time to hunt, which means eating less,

putting on less weight, and fasting longer. The researchers estimated the consequences of more prolonged fasts in three steps. First, they estimated how long polar bears can survive based on their body condition when they are forced to leave the ice and begin fasting. Knowing the number of days polar bears can go without eating, they then used climate model projections of ice loss to figure out how long future fasting seasons will be in each polar bear population.

Putting these pieces together, Molnár and his team calculated “fasting impact thresholds,” or how many days the bears can go without food and still nurture their young and sustain life. Knowing when these impact thresholds are likely to be crossed reveals the limits for how long polar bears can persist across the Arctic.

05 What makes us generous? It might be the first thing we pay attention to, according to new research

A U of T Scarborough study published in *Nature Communications* finds that when it comes to generosity, the assumption that self-control is required to overcome our inherent selfishness might be wrong.

“With generosity ... we sometimes have this view that we are controlled by instinctual biases, and the only way to override it is to exert some really effortful self-control,” says **Cendri Hutcherson**, Assistant Professor in the Department of Psychology at U of T Scarborough.

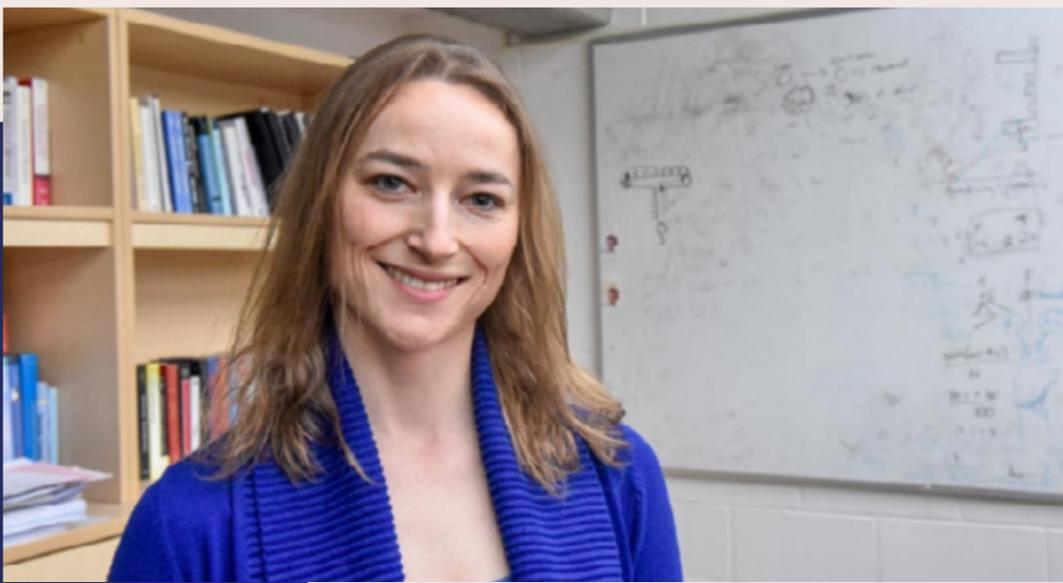
“Our research suggests that maybe our behaviour is a little more flexible, that if you find it hard to be generous all the time, it doesn’t mean you are hardwired to be selfish.”

Hutcherson and her colleagues looked at how time pressure influenced people’s willingness to be generous. The researchers measured and manipulated attention by tracking and controlling what people looked at as they made their choices. They found attention bias—the things that we see and pay attention to first—determined whether people are generous in a given situation.

“By simply changing the information that people see first, we found we can dramatically increase or decrease their generosity towards others, particularly under time pressure,” says Hutcherson, a Canada Research Chair in Decision Neuroscience.

Deciding whether to be generous requires people to know how much they will have to sacrifice and how much someone else will benefit, she notes. Under time pressure, they may not have time to look at both of those things. Most people seem to prefer to look at their own outcomes, even if it means they’re ignorant about the consequences for the other person.

But a few seem to have the opposite preference: when under time pressure, they look out for the other person and are willing to make choices without knowing how it will affect their own outcomes.



06 U of T Scarborough-led project will help fish at risk of going extinct rebound in Lower Great Lakes

A research and habitat recovery project led by **Nick Mandrak**, Professor in the Department of Biological Studies, aims to help fish and freshwater mussel species currently at risk of becoming extinct. The project, which received a \$1.8 million grant from the federal government, will target thirteen fish and eight freshwater mussel species currently at risk in the Lower Great Lakes watershed.

“The main threat to these species is habitat degradation and loss, all of which have come as a result of human activity,” says Mandrak. “For recovery efforts to be successful, we need to fully understand the specific habitat requirements and the habitat threats for these species at risk.”

The Lower Great Lakes watershed, home to countless aquatic species and habitats across the GTA and southwestern Ontario, has 32 fish and 15 mussel species considered at risk of extinction. These species are found in streams, rivers, wetlands, and lakes.

Mandrak says the main threats to aquatic habitats are increasing water temperatures related to climate change and resulting lower oxygen levels, high levels of chloride from road salt, and increased murkiness, also known as turbidity, caused by sediments suspended in the water. Fertilizer is also a contributor to water pollution in the form of increased nitrogen and phosphorous. The main drivers behind these threats have been the conversion of land for agricultural and urban use over the past 150 years.

“What you end up having is long periods where streams are relatively dry followed by intense flooding, and this wreaks havoc on aquatic habitats,” says Mandrak, an expert on aquatic biodiversity.

In addition to studying habitat requirements for these species, Mandrak and project partners will physically restore some habitats. They will also develop captive-breeding methods to help specific species rebound in the wild.

07 Innovative technique using nanoparticles shows hope in defeating deadly drug-resistant pathogens

A new therapy developed by U of T Scarborough researchers may bring us one step closer to effectively killing deadly drug-resistant “super-bugs.”

“The threat posed by pathogens that are increasingly becoming resistant to all known antibiotics is an alarming and pressing healthcare problem,” says **Ruby Sullan**, Assistant Professor in the Department of Physical and Environmental Sciences at U of T Scarborough.

“It’s resulting in hundreds of thousands of deaths and billions of dollars in healthcare costs annually, so there’s an urgent need to seek alternatives to antibiotic-only therapies.”

The therapy developed by Sullan and postdoctoral researcher **Nesha Andoy** uses nanoparticles made from polydopamine, a naturally occurring hormone and neurotransmitter, making it highly compatible with the human body. The therapy can kill bacteria in two ways. The surfaces of the nanoparticles are coated with an

antimicrobial peptide (AMP) that targets and kills the bacteria by binding to and destabilizing its membranes. Since the dopamine-based particles are also highly photosensitive, they heat up when exposed to low-powered laser light, killing the bacteria through heat.

Sullan says a major benefit of using these nanoparticles is that it allows the bacteria to be killed at a lower temperature using lasers, leaving the surrounding healthy cells unharmed. Her lab is currently looking at ways to decrease the size of the nanoparticle to make it more suitable for use in living organisms and exploring ways to improve its efficiency. Since the system they’ve developed is highly modular, she says it can be modified to change its killing mechanisms, like changing the coating to different antimicrobial agents or loading it with antibiotic drugs.

“That could make a third bacteria-killing mechanism, so it would really enhance it as a multi-functional therapy for drug-resistant pathogens.”

“That could make a third bacteria-killing mechanism, so it would really enhance it as a multi-functional therapy for drug-resistant pathogens.”

08 The Knowledge Equity Lab: Elevating voices that haven’t been heard in academia



Is there such a thing as plant racism? To many, that question is nonsensical, but to **Leslie Chan**, Associate Professor at the Department of Global Development Studies at U of T Scarborough, the question is not whether it exists, but how best to address the racism inherent in how science categorizes plants. Chan’s solution, the Knowledge Equity Lab, is already home to dozens of collaborations worldwide. Each of these will address what he terms “scientific racism”—the marginalization of systems of knowledge and ways of understanding the world that are not central to the West.

Abukutsa-Onyango, a professor at Jomo Kenyatta University of Agriculture and Technology, wrote a scientific paper on the jute marrow and other African indigenous vegetables and how these legumes could replace global monoculture. She submitted her research paper to several international journals. “They didn’t recognize my work, not because it wasn’t good, but because they regarded these plants as weeds.”

“The world of scientific publishing privileges knowledge that comes out of the Western institutions,” Chan says. “It devalues knowledge that comes out of the former colonies because they are seen as places of backwardness.”

There has been a growing number of research papers on the problem of scientific racism and how it distorts what is supposed to be a pure and unbiased enterprise. The Knowledge Equity Lab will be a research and teaching space that supports researchers doing similar work. The lab will also promote collaborations with people who may have knowledge about a specific area affected by systemic bias but are not part of the academic system.

The damage to fragile ecosystems necessitates seeking partners beyond the traditional academic system among those Chan calls “knowledge holders,” people who understand the realities on the ground and what adaptations are necessary.

09 U of T Scarborough researchers play key role in identifying toxic chemical likely killing wild salmon

Researchers in Professor **Andre Simpson's** lab at U of T Scarborough have played an important role in discovering a chemical by-product in tires that may be responsible for killing wild salmon.

Simpson and his team were able to map out the structure of the chemical based on two tiny, 10-microgram samples sent to them using nuclear magnetic resonance (NMR) technology, a piece of sophisticated machinery that can map the structure of molecules, including chemicals. The Simpson lab is renowned for this work and is one of the few labs in North America doing environmental NMR research.

Simpson's team were able to map out every single bond in the molecule and realized it was a new chemical structure.

The chemical 6PPD is commonly used in automobile tires to make them last longer, but as the tire tread breaks down, it leaves behind small microplastics on the road. As

6PPD reacts with ozone, it becomes a different chemical by-product, known as 6PPD-quinone, which dissolves easily in water and shows greater stability, meaning it can easily enter aquatic environments.

The chemical, which is highly toxic to Coho salmon, has been found in roadway runoff at sites across the West Coast of the United States. Scientists have been trying to figure out why the fish have been turning up dead in large numbers after heavy rain during the fall when the salmon swim inland to spawn, and feel they have likely found the culprit.

"We started with a mix of 2,000 chemicals and were able to get all the way down to this one highly toxic chemical," says Ed Kolodziej, the study's lead investigator and an associate professor at the University of Washington.

The researchers add that more work needs to be done to see if this chemical is toxic to other fish and aquatic wildlife in general.



10 Gay men may be at a greater risk of poor bone health, U of T Scarborough study finds

Researcher **James Gibb**, a biological anthropologist and former Visiting Scholar in U of T Scarborough's Department of Health and Society, has found disparities in bone health associated with sexual orientation, with gay men being at a greater risk.

The study, done in collaboration with Eric Shattuck, an assistant professor at the University of Texas at San Antonio, looked at bone health data from 3,243 participants in the US National Health and Nutrition Examination Survey. "We found that gay men, and to a lesser extent bisexual men, have lower bone mineral density relative to heterosexual men."

They found that sexual orientation was associated with disparities in bone mass across the spine and femur, the areas in which bone mineral density was measured as part of the survey. The finding was independent of known risk factors for poor bone health, such as tobacco, alcohol, and illicit drug use.

"It's not that sexual orientation on its own is responsible for this disparity in bone health, rather it's lifestyle and

stress associated with sexual minority status that is possibly driving these differences," says Gibb. He says the root cause may come down to discrimination. Gay men in the US and elsewhere typically experience higher levels of discrimination and depression, which can have an effect on bone health.

"There's an association between depression and bone mass, which past research has found independent of sexual orientation, but we also know that sexual minorities tend to have higher rates of depression," Gibb says.

The study, published in the *American Journal of Human Biology*, is the first to look at the social determinants of skeletal health with a focus on sexual orientation. Gibb says there's been some past research looking at the impact of certain HIV medications, but this is the first to look at bone health from a public health perspective.

"Ensuring everyone has strong, healthy bones is an important way to make sure people are able to achieve a better overall quality of life, especially as they age."



"We found that gay men, and to a lesser extent bisexual men, have lower bone mineral density relative to heterosexual men."

11 What the Zebrafish can tell us

It's only an inch long, but the humble zebrafish—a freshwater fish native to South Asia—allows scientists to better understand disorders of the human brain and nervous system.

The zebrafish's brain has many similarities to our own, explains **Tod Thiele**, an Assistant Professor of Biological Sciences at U of T Scarborough. The zebrafish “is one of the main genetic animal model systems,” he says. Crucially, the zebrafish is nearly transparent in its early stages, which means researchers can see what all the neurons in the animal's brain are doing while also monitoring its movements and behaviour. “You don't have to do a dissection,” says Thiele. “You can just look through the fish.”

Thiele and his colleagues are investigating how the fish's brain processes sensory information and then uses that information to move about its environment. They are also looking at how those processes are impaired when key

neural circuits are damaged. The research could ultimately shed light on movement disorders such as Parkinson's disease and dystonia, which can affect people at any age. Parkinson's is believed to be primarily a disorder of the basal ganglia, while dystonia has been linked to dysfunction in the basal ganglia and the cerebellum—brain regions whose workings can be examined in minute detail in the zebrafish.

Tod Thiele's lab studies the areas of the zebrafish brain that are evolutionary ancestors to the striatum and pallidum in humans. The lab runs behavioural and imaging experiments on both normal larval zebrafish and ones that have a genetic mutation linked to a hereditary form of dystonia, a movement disorder. By comparing the neuronal activity and movements of the two kinds of fish in minute detail, the scientists hope to gain insight into the brain abnormalities that underlie dystonia.



12 “It needs to change”: Study highlights the significant healthcare barriers women with disabilities face during pregnancy

A new U of T Scarborough study finds that women with disabilities are nearly twice as likely to experience life-threatening pregnancy complications or maternal death compared to their peers. The study highlights the need for better access to medical care in this population of women.

“We need to make healthcare more accessible, but this also raises awareness that women with disabilities have a right to quality healthcare and good pregnancy outcomes,” says **Hilary Brown**, an Assistant Professor in the Department of Health and Society.

She notes that pregnancy rates among women with disabilities have also been rising over the past 20 years to the point where nearly one in eight births are to women with disabilities.

“At the same time, healthcare guidelines in Canada on how to best provide pregnancy-related care to these women has not improved.”

The study looked at Ontario health record data from 222,000 women with physical, sensory, and intellectual or

developmental disabilities, and 1.6 million women without disabilities, who gave birth between 2003 and 2018. Brown and her colleagues found that life-threatening pregnancy complications or maternal death happened at a higher rate for women with disabilities.

She says there are social factors faced by women with disabilities, but, even after accounting for these factors, there were still disparities between pregnancy outcomes for women with and without disabilities.

She points to a lack of pre-conception programs tailored to meet the needs of women with disabilities and inadequate or non-existent disability-related training for obstetrical healthcare providers as examples.

“It's time for us to address how disability shapes access to healthcare, and how it interacts with other risk factors like poverty, to ensure that these life-threatening pregnancy complications and maternal death rates are reduced.”

13 Popular agricultural pesticide may be slowing down hummingbirds

Hummingbirds need an incredible amount of energy to flap their wings 50 times per second. Their metabolism is so supercharged that if they were human-sized, they would consume energy at a rate more than ten times that of an Olympic marathon runner.

Researchers in Professor **Ken Welch's** lab in the Department of Biology discovered that a common neonicotinoid pesticide can slow the metabolism of ruby-throated hummingbirds by as much as 25 percent in the hours after exposure.

"We don't know exactly why it goes down—whether the chemical is disrupting the metabolic processes or because they simply feel sick as a result of exposure—but they definitely show a reduced metabolic rate during the first few hours after ingesting it," says Welch.

Welch says that hummingbirds in the wild may be especially prone to the negative effects of exposure, pointing to recent research where the chemical was found in hummingbirds that lived near sprayed blueberry crops in

B.C.'s Fraser Valley. The research found the chemical in the nectar of blueberry plants up to a year after it was sprayed.

It begs the question about the long-term effects of chronic exposure.

"We only looked at the first few hours after exposure, but, theoretically, there could be a long-term impact on the central nervous system," says Welch.

"We could assume that those potential risks also exist for hummingbirds through long-term exposure. At the moment, we just don't know. It would require more research."

Welch says some policy considerations should be given to when the pesticide is sprayed, especially during periods when vertebrates or important pollinators are active to reduce the chances of exposure.

"If hummingbirds are skipping their normal foraging behaviour because of a dip in their metabolic rate, it could put them in an energy bottleneck," he says.



14 Organization that helps support young African entrepreneurs earns global recognition

Efosa Obano (U of T Scarborough BBA 2018) wants to see more young Black entrepreneurs getting the necessary mentorship opportunities and resources to turn their ideas into solutions to the world's biggest problems.

"It's already hard enough being Black or being African," says the Management alum.

The African Impact Challenge, a U of T Scarborough-supported project Obano started during his undergrad, was chosen as one of the top 50 solutions featured in the 2020 Youth Solutions Report from Sustainable Development Solutions Network and received recognition from the United Nations.

Eight years ago, Obano arrived in Toronto as an international student from Nigeria and saw a need to create a community that would bring together students from Africa. **William McConkey**, an Assistant Professor in the Department of Management, became a mentor for Obano, and was impressed that Obano displayed two necessary traits for an entrepreneur.

"He had the vision to do something worthwhile for a community that wasn't being done, and he wanted to solve a real problem," said McConkey.

By December 2018, Obano and a few colleagues had raised enough money to fund a small healthcare project in a rural southern Nigerian community. After returning to Canada, Obano received news that the clinic was overflowing and babies were born using the equipment they helped secure.

"We learned it couldn't be sustainable unless we found a more efficient way to do things and continue to be involved in communities on a permanent basis."

The central tenets on which the African Impact Initiative is built line up with those of another important program at U of T Scarborough that Obano drew support from: The BRIDGE.

"Efosa and his team really put in the hard work and the right planning, and it's terrific to see them getting the accolades and recognition they deserve," said David Fenton of The BRIDGE.



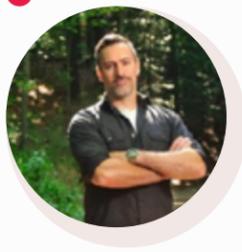
Faculty and Student Awards

Our internationally renowned faculty and diverse community of engaged students reached for the stars this past year. They took home an impressive array of awards and honours for research excellence and academic achievement.

05

External Faculty Awards

New Members of the Royal Society of Canada 2020–2021



Marc Cadotte

Biological Sciences

Growing up among nature shaped career of UTSC ecologist elected to Royal Society of Canada

Professor **Marc Cadotte**, Department of Biological Sciences, was elected to the **Royal Society of Canada's College of New Scholars, Artists, and Scientists**.

Cadotte is a renowned expert on urban ecosystems, specifically the role different native species play in maintaining urban ecosystem function and the role invasive species play in affecting urban ecosystems. He is listed among Web of Science's top one

percent most cited environmental scientists since 2017.

Science communication and outreach have always been important to Cadotte. "I really enjoy being able to teach people of all ages about the natural world, whether it's through exciting stories and anecdotes or just showing them real examples from nature," says Cadotte, who runs the CUBES Lab at U of T Scarborough. "I also feel an obligation to give back."



Diana Fu

Political Science

Professor elected to Royal Society of Canada plans to use her platform to bring greater understanding of China

Professor **Diana Fu**, Department of Political Science and the Munk School of Global Affairs and Public Policy, is a new member of the **Royal Society of Canada's College of New Scholars, Artists, and Scientists**.

Fu's current research focuses on popular protest, state control, civil society and authoritarian citizenship in contemporary China. Her award-winning book *Mobilizing Without the Masses*, published in 2018, is

an in-depth look at how people and labour organizations in China help migrant workers without public demonstrations or protests.

Among other public engagement roles, Fu is a Public Intellectuals Fellow at the National Committee on US–China Relations, a prestigious non-profit advisory group. She also hosted a seven-part TVO documentary series exploring China's recent evolution and its changing influence in the world.

Current New College Members of the Royal Society of Canada

Katherine Larson

English, Member of College of New Scholars, Artists, and Scientists

Natalie Rothman

Historical and Cultural Studies, Member of College of New Scholars, Artists, and Scientists

Current Fellows of the Royal Society of Canada

John Friedlander

Computer & Mathematical Sciences, Fellow

Lisa Jeffrey

Computer & Mathematical Sciences, Fellow

Bernie Kraatz

Physical & Environmental Sciences, Fellow

Michael Lambek

Anthropology, Fellow

Judith Teichman

Political Science, Fellow

Frank Wania

Physical & Environmental Sciences, Fellow

External Award Winners

Amazon's 2020 Machine Learning Research Award, Amazon Research Awards

Gennady Pekhimenko

Computer & Mathematical Sciences

American Academy of Arts & Science, Member

Maydianne Andrade

Biological Sciences

André Aisenstadt Prize in Mathematics, Centre de recherches mathématiques (CRM)

Robert Haslhofer

Computer & Mathematical Sciences

Black River Chapbook Competition, Black Lawrence Press

SJ Sindu (Sinduja Sathiyaseelan)

English

Canadian Mathematical Society Class of Fellows

John Friedlander

Computer & Mathematical Sciences

Cottrell Scholar Award, Research Corporation for Science Advancement

Ruby May A. Sullen

Physical & Environmental Sciences

Distinguished Service Award, Association for Computational Linguistics (ACL)

Graeme Hirst

Computer & Mathematical Sciences

Facebook's 2020 AI System Hardware/Software Co-Design Research Award, Facebook Research

Gennady Pekhimenko

Computer & Mathematical Sciences

Joel Gregory Prize, Canadian Association for African Studies

Mark Hunter

Human Geography

Martin-Baker Award, Mycological Society of America

Wang Yan

Biological Sciences

Micro Top Picks Award, Institute of Electrical and Electronics Engineers (IEEE)

Gennady Pekhimenko

Computer & Mathematical Sciences

Minister of College and Universities' Award of Excellence

Steve Joordens

Psychology

Society of South Africa Geographers, Fellow

Thembele Kepe

Human Geography

W. A. E. McBryde Medal, Chemical Institute of Canada

Kagan Kerman

Physical & Environmental Sciences

Awards & Honours



Professor Maydianne Andrade named member of American Academy of Arts & Sciences

Professor **Maydianne Andrade**, a world-renowned evolutionary ecologist from the Department of Biological Sciences, joins an elite group of artists, scholars, and scientists as a new member of the **American Academy of Arts and Sciences**.

"This is both an honour and an invocation to action," says Andrade, who is among 37 new international members from 22 different countries joining the academy.

"This is one of the oldest scholarly societies in North America, with a service-oriented culture that promotes the importance of working across disciplines to solve social challenges. I am privileged to be a member of a group that included Charles Darwin, Toni Morrison, and Nelson Mandela."

The American Academy of Arts and Sciences was founded in 1780 to honour exceptionally accomplished individuals who advance the public good.



Steve Joordens recognized with Minister of College and Universities' Award of Excellence

Professor **Steve Joordens** from the Department of Psychology has received a **Minister of College and Universities' Award of Excellence** for his extraordinary contributions to the COVID-19 response in Ontario.

Joordens felt it was critical to gain a deeper understanding of how the mind and body react to all the various challenges of the COVID-19 pandemic. Within weeks of the onset, Joordens launched a free online

course to help people understand and manage their mental health.

The ten-hour course, which received a 98 percent approval rating on Coursera, offered tips on how to stay socially connected despite physical distancing, techniques of guided relaxation to help manage anxiety, and how to use learning to stay positive.



Mark Hunter wins Joel Gregory Prize

Professor **Mark Hunter** from the Department of Human Geography received the **Joel Gregory Prize** for his book *Race for Education: Gender, White Tone, and Schooling in South Africa*.

Hunter's decade-long ethnographic study follows individual families and schools during South Africa's political transition following apartheid and the subsequent demand to decolonize and make public

education more affordable. "The book expertly engages with discussions on race and class dynamics in South Africa in an insightful way. It is extremely empirically rich and a pleasure to read," said the award committee in selecting the book.

The Joel Gregory Prize is the most prestigious prize awarded by the Canadian Association of African Studies once every two years.





Ruby Sullan named a Cottrell Scholar

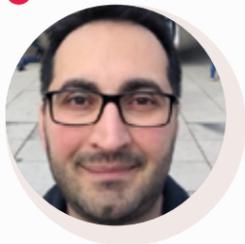
Professor **Ruby Sullan**, Assistant Professor in the Department of Physical and Environmental Sciences, has been named a **Cottrell Scholar** by the Research Corporation for Science Advancement.

The Cottrell Scholars program honours outstanding teacher-scholars who are recognized by their scientific communities for the quality and innovation of their research programs and their potential for academic leadership. Sullan is the only

scholar at a Canadian university among the 25 honourees named this year.

"It is highly motivating knowing that your contributions at the formative stage of your career have been recognized," says Sullan.

Sullan's research is part of the global fight against antimicrobial resistance. Her lab is developing multifunctional and biocompatible nanomaterial-based therapeutics—or nanotherapeutics.



Kagan Kerman wins W. A. E. McBryde Medal

Professor **Kagan Kerman**, Department of Physical and Environmental Sciences, is the recipient of the 2021 **W. A. E. McBryde Medal**. The Chemical Institute of Canada presents this award to a young scientist working in Canada who has made a significant achievement in pure or applied analytical chemistry.

Professor Kerman's research provides electrochemical platforms to develop diagnostics and therapeutics for Alzheimer's and Parkinson's diseases. He has established a strong track record of research outputs with international collaborations and is recognized as a leading authority in biosensors for neurodegenerative diseases.



Connaught New Researcher Award

Professor **Mark V. Campbell**, Assistant Professor in the Department of Arts, Culture, and Media, is a recipient of the 2020–2021 **Connaught New Researcher Award**.

For the last decade, Mark V. Campbell has worked to preserve and celebrate Canada's rich hip-hop history through Northside Hip Hop—a growing digital archive he's developed with the help of networks in the music industry and academia.

He will begin field research for a new project, *Hip-Hop Archives: Remixing the Production of Knowledge*. The project will explore how political economies affect the preservation of hip-hop history in countries like France, Cuba, and New Zealand.

The Connaught New Researcher Awards help new U of T faculty develop a strong research program, with the goal of achieving external funding.

2020–2021 Connaught New Researcher Award winners from UTSC

Elizabeth Acorn

Political Science

Governance at Home and Abroad: The Origins and Impact of Corporate Criminal Law in Canada

Michael William Best

Psychology

An Examination of Factors Underlying Neurocognitive Impairment in Schizophrenia: Defeatist Beliefs, Mood, and Amotivation

Waqas Butt

Anthropology

Cities of Change: Urbanisation, Infrastructures and the Environment of Pakistan

Mark Campbell

Arts, Culture & Media

Hip-Hop Archives: Remixing the Production of Knowledge

Laurent Xavier C. Cavenaile

Management

The Disappearing Middle Class and Educational Attainment

Urvashi Chakravarty

English

Dark Futures: Slavery and the Reproduction of Race in the Early Modern British Atlantic World

Anup Grewal

Historical & Cultural Studies

Chinese Socialist Feminist Imaginaries and their Global Context

Cassandra Hartblay

Health & Society

Crippling Communities: Performance Ethnography Research on the Disability Theatre Process

Christopher Higgins

Human Geography

Form, Function, and Local Dynamics: Measuring Neighborhood Morphological and Behavioural Context in Toronto

Scott MacIvor

Biological Sciences

Healthy Soils for Ground-Nesting Bees: the Next Step in Conservation and Pollination Service Delivery

Adam Martin

Physical & Environmental Sciences

The Role of Wood Chemical Traits in Global Forest Carbon Dynamics

Glenn Mott

Biological Sciences

The Evolution of a Complex Signaling Network that Controls Plant Growth and Defense

Christian Pfeiffer

Philosophy

Aristotle's Metaphysics H

Laura Risk

Arts, Culture & Media

Sustaining Community Music-Making in Quebec Through Historical Inquiry and Mobilization of Audiovisual Archives

Nicholas Spence

Health & Society

The Impact of Social Context (Income Inequality) on Health Among Indigenous Peoples in Canada

Ting Kam Leonard Wong

Computer & Mathematical Sciences

New Tools for Statistics and Machine Learning Using Logarithmic Divergences

Internal Faculty Awards



U of T Scarborough
Principal's Research
Award

Nicholas Mandrak

Biological Sciences



U of T Scarborough
Research Excellence
Faculty Scholars Award

Lucan Way

Political Science



U of T Scarborough
Research Recognition
Award

Adrian Nestor

Psychology



U of T Scarborough Pre-
Tenure Faculty Research
Award, Humanities

**Urvashi
Chakravarty**

English



U of T Scarborough Pre-
Tenure Faculty Research
Award, Social Sciences

Brett Ford

Psychology



U of T Scarborough Pre-
Tenure Faculty Research
Award, Sciences

Stefanos Aretakis

Computer & Mathematical
Sciences



Student Awards

2021 Undergraduate Research Prize

Since 2016, U of T Scarborough undergraduate students have participated in two undergraduate research initiatives created by the U of T Scarborough Office of the Vice-Principal Research and Innovation and U of T Scarborough Library—the Undergraduate Research Prize and the Undergraduate Research Poster Forum.

The U of T Scarborough Undergraduate Research Prize honours UTSC students who have excelled in research, scholarship, and creative activities in the classroom and beyond. This prize recognizes the research and creative activities of undergraduate students and their overall

contribution to U of T Scarborough and illustrates the role of the library in the research process. The project may take many forms, such as a traditional paper, database, website, digital project, or creative expression. Three cash prizes of \$1,000 were given out, one each for projects in the humanities, social sciences, and sciences.

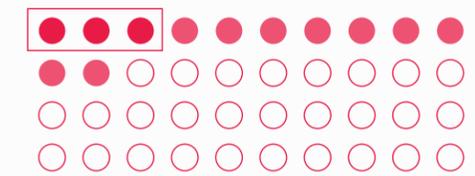
3 × \$1,000

Cash prizes awarded

2021 Undergraduate Research Poster Forum

The poster forum provides opportunities for students who excel in research, scholarship, and creative activities to showcase research and win cash prizes that range from \$1000 for first place, \$500 for second place, and \$250 for third place. Forty students submitted research abstracts to the Undergraduate Poster Forum for consideration. Of those 40, 12 finalists were selected by faculty and librarians to present their prepared poster and a pre-recorded video. From the 12 finalists, Oviya Muralidharan, Gloria Umogbai and Raymond (Ruolin) Wu, and Aqsa Zahid were named the first, second (tied), and third 2020–2021 prize winners.

3 Prize Winners



40

Students submitted research abstracts to the Undergraduate Research Poster Forum

12

Finalists were selected by faculty and librarians



Jane Ching Lam Lui

Physical & Environmental Sciences

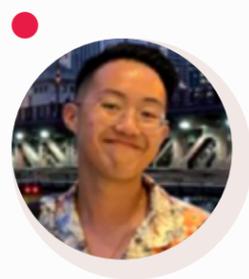
Decoding Bacterial Adhesion One Molecule at a Time



Rajpreet Sidhu

Centre for Critical Development Studies

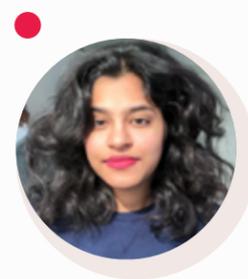
Public Memorialization of Disappeared Persons on Instagram, in the Aftermath of the Nepali Maoist Civil War



Jeffrey Liu

Historical & Cultural Studies

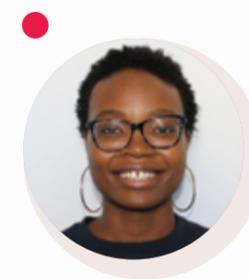
Confronting Hybridity: The “Eurasian Problem” in Colonial India



Oviya Muralidharan

Biological Sciences

E-Survey of Stressors and Protective Factors in Practicing Medical Assistance in Dying



Gloria Umogbai

Health & Society

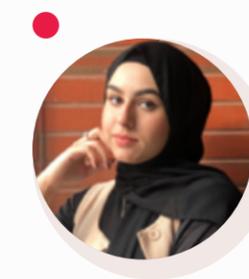
Black Don't Crack? The Amplification of Racism and Ageism on Black Aging Bodies



Ruolin Wu

Psychology

The More the Better? Examining the Relation between Strategy Repertoire and Goal Attainment



Aqsa Zahid

Psychology

Stigma Associated with Schizophrenia: The importance of diagnostic label vs. negative symptom presentation

Canada Research Chairs

The Canada Research Chairs Program is a tri-agency initiative that promotes research excellence in engineering and the natural sciences, health sciences, humanities, and social sciences. Nominated Chairholders' fields of inquiry help improve our depth of knowledge and quality of life, strengthen our international competitiveness, and help train the next generation of highly skilled people.

06

Canada Research Chairs at U of T Scarborough tackle important challenges

Professor Myrna Simpson

Physical & Environmental Sciences, Tier 1 CRC in Integrative Molecular Biogeochemistry



Professor Myrna Simpson, Department of Physical and Environmental Sciences, and Assistant Professor Hilary Brown, Department of Health and Society, join 21 other researchers in becoming new Canada Research Chairs at U of T.

Simpson, who is the Associate Director of the Environmental NMR Centre at U of T Scarborough, explains that her work will focus on studies of human-made impacts on soil carbon stabilization and destabilization in several forests around the world. Her research investigates how information can be used to

Assistant Professor Hilary Brown

Health & Society, Tier 2 CRC in Disability and Reproductive Health



improve ecosystem health and sustainability to solve critical environmental challenges.

Brown, a perinatal epidemiologist and expert on reproductive, maternal, and child health whose research looks at maternal and child health with a focus on populations with disabilities and chronic disease, aims to improve the understanding of sexual and pregnancy-related health outcomes and healthcare experiences of women with disabilities.

Daniel Bender

Historical & Cultural Studies, CRC in Global Culture

2014–2021



Brian Connelly

Management, CRC in Integrative Perspectives on Personality

2016–2021



Marney Isaac

Physical & Environmental Sciences/Global Development Studies, CRC in Agroecosystems and Development

2013–2024



Bianca Schroeder

Computer & Mathematical Sciences, CRC in Data Centre Technologies

2014–2024



Cendri Hutcherson

Psychology, CRC in Decision Neuroscience

2018–2023



Kagan Kerman

Physical & Environmental Sciences, CRC in the Bioelectrochemistry of Proteins

2016–2021



Bebhinn Treanor

Biological Sciences, CRC in Spatially Resolved Biochemistry

2016–2021





Research Events

In 2020–2021, the Office of the Vice-Principal Research and Innovation partnered with the Toronto Zoo to present the Zoo Talk Discussion Series. It brought together U of T Scarborough research faculty, Zoo experts, and university and community partners to discuss science, our environment, and conservation.

07

Zoo Talk Discussion Series

In 2020–2021, the Office of the Vice-Principal Research and Innovation partnered with the Toronto Zoo to present the Zoo Talk Discussion Series. This series of discussions brought together our renowned U of T Scarborough research faculty, Zoo experts, and university and community partners to discuss science, our environment, and conservation. The events were broadcast live via the Toronto Zoo's YouTube channel and hosted by Exploring by the Seat of your Pants, which engaged young students from around the world, providing an inspiring and impactful learning experience for all who attended.

The inaugural event celebrating Lemur Awareness Day featured Professor **Julie Teichroeb** from the Department of Anthropology, along with participants from Planet Madagascar, the Department of Sociology and Anthropology at the University of Guelph, and the New England Primate Conservancy. Opening remarks were provided by U of T Scarborough Principal Wisdom Tettey and Toronto Zoo CEO Dolf Dejong, with Professor H. Bernie Kraatz offering closing remarks.

The second event focused on bison and featured Professor **Rudy Boonstra** of the Department of Biological Sciences and Gabriela Mastro Monaco of the Toronto Zoo and discussed how the Zoo helps with bison reproduction, the difference between wild and captive bison populations, and how environmental stressors affect these populations.

The next event featured Professor **Péter Molnár** of the Department of Biological Sciences and investigated issues surrounding polar bears, including how animal experts at the Toronto Zoo provide care for these animals. A range of topics was covered, such as what the bears eat to maintain their healthy lifestyle and the challenges facing our current polar bear population.

As part of the One Health theme, the last event featured Professor **Christina Guzzo** of the Department of Biological Sciences, who was joined by researchers from Simon Fraser University and members of the Toronto Zoo's veterinary staff. They discussed caring for sick animals, how many deadly human viruses arise from spillovers of animal viruses to human hosts, and the importance of pathogen surveillance in animal hosts in the wild and in farmed animals.



Professor Julie Teichroeb
Anthropology



Professor Rudy Boonstra
Biological Sciences



Professor Péter Molnár
Biological Sciences



Professor Christina Guzzo
Biological Sciences

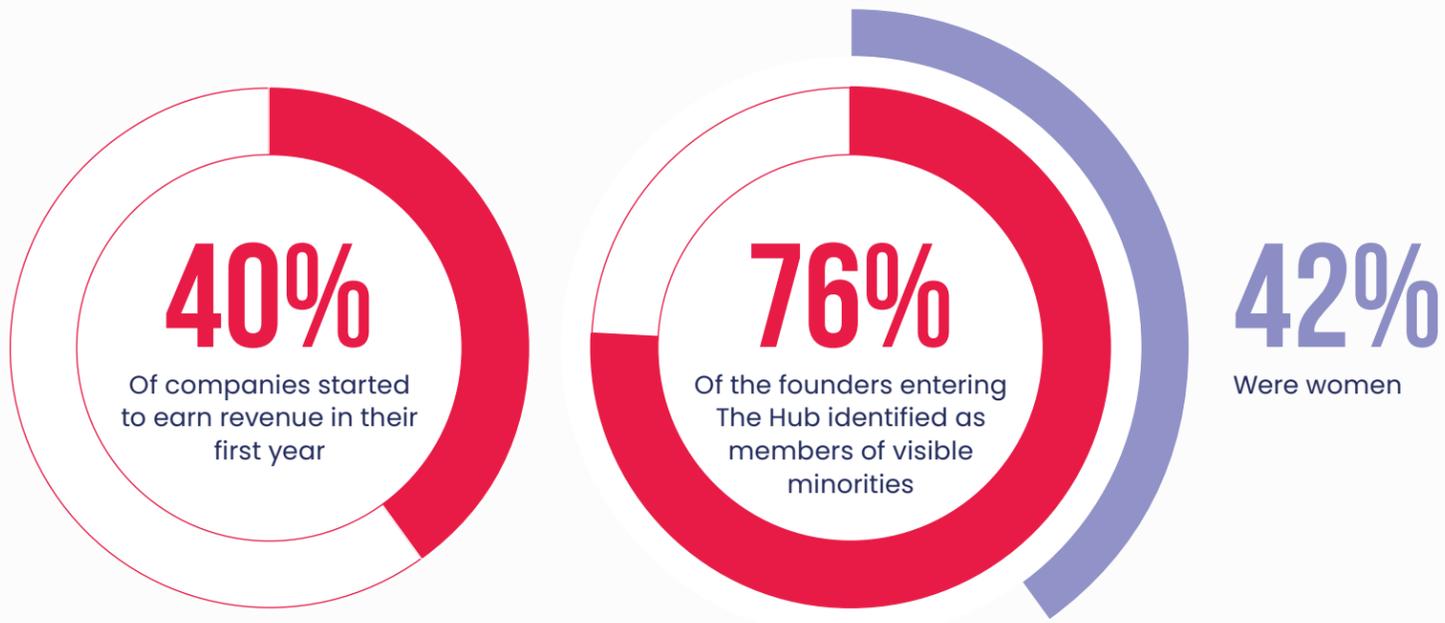
The Hub

08

The Hub is U of T Scarborough's startup incubator. It helps students and recent alumni from all disciplines launch successful businesses. Here a summary of their notable achievements for 2020–2021.



The Hub

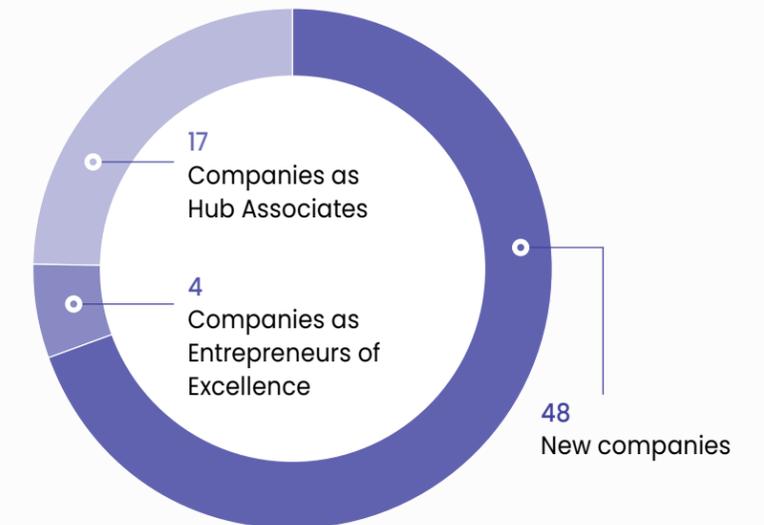


69

Companies took residence in The Hub during 2020–2021

104

Founders



Despite the pandemic, The Hub had a very active year with above-average participation and notable success. A series of interactive workshops, Fireside Chats, Board of Trade Sessions, and Speakers' Corners were held virtually to encourage engagement during this challenging time.

This year marked the pilot of the Inspire Series, Breaking Down Barriers to Success, which was aimed at providing real-life examples of successful entrepreneurs among underrepresented groups. The first in this series was entitled Celebrating Leaders, Black Women in Business. This series showcased leaders in the business community who shared their experiences, knowledge, and expertise with young entrepreneurs.

More students and recent alums signed up to participate in The Hub's annual competition than ever before, and there was significant engagement to help build their startup initiatives. A total of \$30,000 was

awarded among nine winning teams: Legazelle, Scoops Supplements, ExViLent, Arbore, Sumer, FittedFast, Axonaly, Pinch, and Gradient Robotics. These awards function as seed money, helping students launch their ideas into tangible startups.

During 2020–2021, 69 companies took residence in The Hub, with a total of 104 founders. The breakdown is 48 new companies, 4 as Entrepreneurs of Excellence, and 17 companies as Hub Associates maintaining their affiliation post residence. Since its inception, The Hub has created more than 180 companies, the top five of which have a combined valuation of over \$62 million. Overall, 40% of companies started to earn revenue in their first year. Of particular note, 76% of the founders entering The Hub identified as members of visible minorities, and 42% were women.

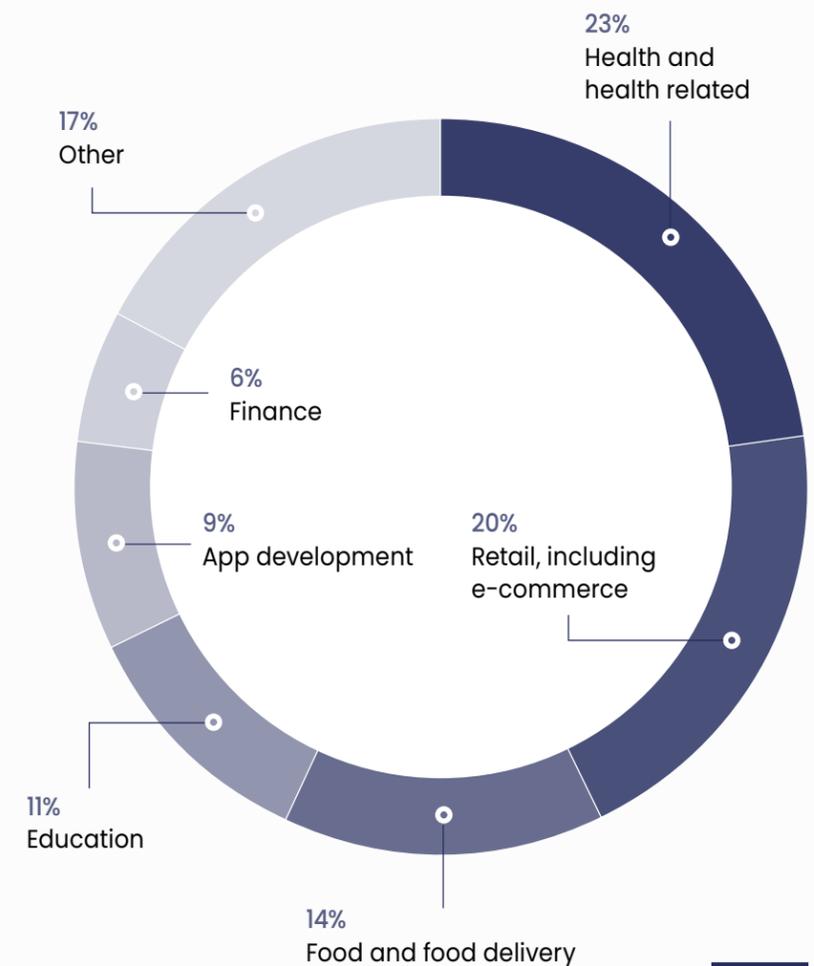
\$8.4 M

Combined valuation of companies resident in The Hub

771

Students participating in Hub events

Of the companies in The Hub, 23% are health and health related, 20% are retail (including e-commerce), 14% are in food and food delivery, 11% are in education, 9% are in app development, 6% are in finance, and 17% are other.





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Design: Tennis

Office of the Vice-Principal Research & Innovation

2020

Annual Report



2021



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