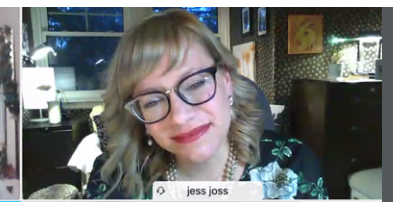
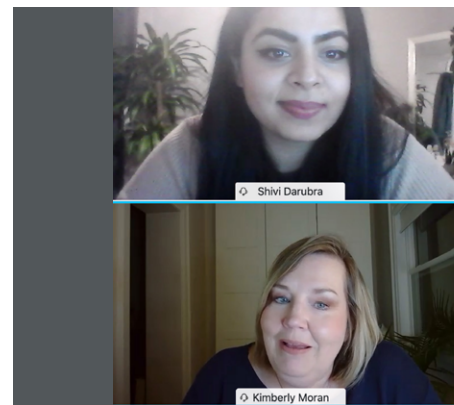




ANNUAL REPORT



2020/21





“Don’t let anyone rob you of your imagination, your creativity or your curiosity.”

MAE JEMISON
Physicist and Astronaut

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Dean's Message

Adapting to change. This was the theme of Seneca's primary innovation event this year, the 2021 Seneca Innovation Showcase, and in retrospect, it was the theme of the year for Seneca Innovation.

The pandemic has caused significant hardship, the needless loss of life and in many ways has broadened the divide between the wealthy and the poor, the privileged and the marginalized, amplifying barriers to inclusion and success. At the same time, it has brought so many together with a common goal of overcoming this global crisis and has shone a necessary spotlight on social issues at the local, national and global levels. Can we emerge from the pandemic as an improved society? Can we be innovative in ways that benefit society as a whole, rather than just one group?

Like other organizations, Seneca Innovation had to adapt quickly to our new circumstances. Some research activity had to pause while we prioritized the health of our students, faculty and staff, but our research team quickly found ways to continue their work safely. Our student research assistants and faculty principal investigators adapted to virtual mentorship and supervision, while our intra/entrepreneurship centre, HELIX, moved all its training, mentorship and coaching activities online. Our innovation- and intrapreneurship-focused career advancement program, Career Recharge, developed new modules on virtual work. Our applied research team rolled up their sleeves and started working with local businesses on projects contributing to COVID-19 vaccine development, enhanced disinfection, diagnostic testing, and employment and risk mitigation for personal support workers, to name a few.

I am proud of the Seneca Innovation team's efforts and tenacity in adapting to this new environment. We have achieved a lot, but we still have work to do in enhancing equity, diversity and inclusion in Seneca's research enterprise, and encouraging and supporting equity-deserving individuals in their entrepreneurial pursuits. If the past year is an example of what we can achieve, I know Seneca Innovation will make huge strides in this direction over the coming months.

A handwritten signature in black ink that reads 'Ben Rogers'.

Ben Rogers
Dean, Seneca Innovation

Seneca INNOVATION Meet the Team



Namrata Barai
Director, Applied
Research



Huy-Tung Bui
Communications &
Admin Assistant, HELIX



Kate Collins
Project Manager, HELIX



Chris Dudley
Director,
Entrepreneurship



Atani Gopalasingam
Senior Manager,
Operations & Finance



Yanqing Hu
Finance Assistant



Caroline Kewley
Marketing &
Communications Specialist



Ralph Lisak
Research Manager



Andrew Paton
Research Manager



Tina Perricone
Research Manager



Ben Rogers
Dean, Seneca Innovation



Valeryia Shydouskaya
Project Co-ordinator



Alison Sylvester
Career Recharge
Co-ordinator



Sally Yeung
Seneca Innovation
& REB Co-ordinator

Recognition of Funders and Donors

Seneca Innovation is honoured to recognize and thank Seneca and various organizations and government funding agencies for their continued support. We would like to acknowledge the following organizations for their significant contributions throughout the year:



Mike Shaver



Seneca Innovation Funding

		Applied Research	HELIX	Total Seneca Innovation
Federal Funders		\$1,333,970		\$1,333,970
Municipal Funders			\$40,000	\$40,000
Provincial Funders		\$233,988		\$233,988
Not-for-Profit Funders		\$22,500		\$22,500
Partners	Cash	\$336,194	\$192,500	\$528,694
	In-Kind	\$490,365	\$42,000	\$532,365
	Total (all sources)	\$2,417,017	\$274,500	\$2,691,517



ventureLAB is a leading founder community for hardware technology and enterprise software companies in Canada. Located at the heart of Ontario's innovation corridor in York Region, ventureLAB is part of one of the biggest and most diverse tech communities in Canada. Their initiatives focused on raising capital, talent retention, commercializing technology and IP, and customer acquisition have enabled thousands of companies to create more than 4,000 jobs and raise more than \$200 million in investment capital. ventureLAB strives to grow globally competitive tech titans that build to scale in Canada, for global markets.

ventureLAB and Seneca have had a strategic partnership for many years to foster the innovation and talent ecosystem. Entrepreneurs at Seneca's on-campus

incubator, HELIX, work with ventureLAB to scale their businesses and, through work-integrated learning, regional businesses in ventureLAB's network can hire skilled interns. Seneca Applied Research also works with ventureLAB to connect businesses with Seneca students and faculty to carry out industry-directed research projects, with funding support from federal and provincial governments. To date, Seneca has worked on 19 research projects with ventureLAB clients, leading to improved business competitiveness and productivity. Further, five ventureLAB advisors work with HELIX as mentors and workshop facilitators.

Throughout this report we have noted some of the collaborative activities with ventureLAB during the past year.



Seneca Innovates

Seneca Innovates is an employee innovation program that encourages Seneca's faculty and staff to submit their ideas, inspirations and suggestions for solving a problem, improving a service or process, or changing something for the better at Seneca. Launched as a pilot in April 2020, *Seneca Innovates* is a multi-layered program involving education about the innovation process, tools to refine innovative ideas, guidance to move ideas along the path to adoption, mechanisms to implement innovation, and recognition through internal communications channels and digital badges.

At the core of the *Seneca Innovates* program is the Innovation Council, a diverse, multi-campus group of innovators and creative thinkers who help to lead and implement innovative changes at Seneca. The council comprises Innovation Champions, who guide innovators along the path of building partnerships, refining their ideas and preparing a pitch (presentation summarizing the idea and how it can be implemented), and Innovation Reviewers, who review finalized ideas and pitches, and make recommendations to Seneca departments about implementing them.



25 Innovative Ideas Submitted



9 Ideas Advanced to Innovative Council



8 Ideas Recommended for Implementation



Research Ethics Board

The Research Ethics Board's (REB) main goal is to ensure that research involving humans, conducted with the support of, or on the premises of Seneca, meets the highest scientific and ethical standards. The REB guarantees that all studies respect and protect research participants; this is enforced by requiring all research studies involving human participants to partake in a REB review and obtain approval before any recruitment or data collection may start. The REB application process can take up to 10 business days if the proposed study poses minimal risk to participants. If the proposed study is deemed to be above minimal risk for participants, the study will be reviewed at full board meetings to determine if the study can commence. It is extremely important that the REB reviews each and every study that involves human participants, as it is their duty to protect participants from any potential harm. The REB is an integral part of Seneca Innovation, including Seneca Applied Research. Without the REB, important projects and studies may not have been able to continue.

REB Metrics

Applications to the REB are divided into three categories: student, staff/faculty and external applications. Seneca students engaged in curriculum-based research must submit their proposals to the REB for review if they choose to work with human participants. Seneca staff and faculty are also able to carry out research while working at Seneca. Lastly, applications by external organizations who wish to work with Seneca students or staff as research participants must also be approved by the REB.

A total of 159 applications were reviewed in 2020/2021. Some notable mentions are ***Social Isolation and Faculty-Student Perceived Engagement During Emergency Remote Teaching and Learning Amidst the COVID-19 Pandemic (faculty-led project)*** and ***Effectiveness of Online Training and Delivery of the Linggo Augmentative Communication Application (Applied Research project)***. Both of these projects were faculty-led, external applications. Two examples of student applications to the REB were ***Is Social Distancing Affecting Us As Social Beings? What Impact Does It Have on People's Risk/Benefit Analysis?*** and ***Comparing the Psychological and Emotional Wellbeing Between Single and Two-Parent Households***.

Number of REB applications (2020/2021)

Processed applications	159
Above minimal risk applications that were assigned for full board review	2
Minimal risk applications assigned for delegated review	157
Applications by student researchers	129
Applications by staff/faculty/external researchers	30

REB Members

Adam Norman

Professor, School of English & Liberal Studies

Allison Bair

Professor, School of English & Liberal Studies

Carly Prusky

Professor, School of Early Childhood Education

Chris Robertson

Professor, School of Information Technology Administration & Security

Farah Jindani

Professor, School of Community Services

Geraldine Lyn-Piluso

Professor, School of Early Childhood Education

Husam Wafaei

Professor, School of Aviation

Jennifer Sullivan

Professor, School of Early Childhood Education

Kelsey Hamilton

External Member

Laura Adams

Professor, School of Arts & Science

Lesley Rutledge

Professor, School of Biological Sciences & Applied Chemistry

Mahdi Pirmoradian

Professor, Faculty of Continuing Education & Training

Malini Persaud

Professor, School of Nursing

Paula Green

Manager, York Seneca Partnership

Peter Babiak

Professor, Faculty of Continuing Education & Training

Randa Mouammar

Professor, School of Management & Entrepreneurship

Rania Nafea

Professor, School of Human Resources & Global Business

Sara Potkonjak

Academic Program Manager, Faculty of Continuing Education & Training

Steven Litt

Professor, School of Marketing

Varinder Gill

Professor, School of Human Resources & Global Business

Applied Research Report

Seneca APPLIED RESEARCH

DATA ANALYTICS
RESEARCH CENTRE
(DARC)

OPEN SOURCE
TECHNOLOGY FOR
EMERGING PLATFORMS
(OSTEP)

SENECA CENTRE FOR
INNOVATION IN LIFE
SCIENCES (SCILS)

CENTRE FOR HEALTH &
SOCIAL INNOVATION

Applied Research Metrics

Seneca Applied Research External Funding

Federal Funders	Cash Total	\$1,333,970
Provincial Funders	Cash Total	\$233,988
Private Sector	Cash	\$358,694
	In-Kind	\$490,365
	Private Sector Total	\$849,059
	Total (all sources)	\$2,417,017

Funded Applied Research

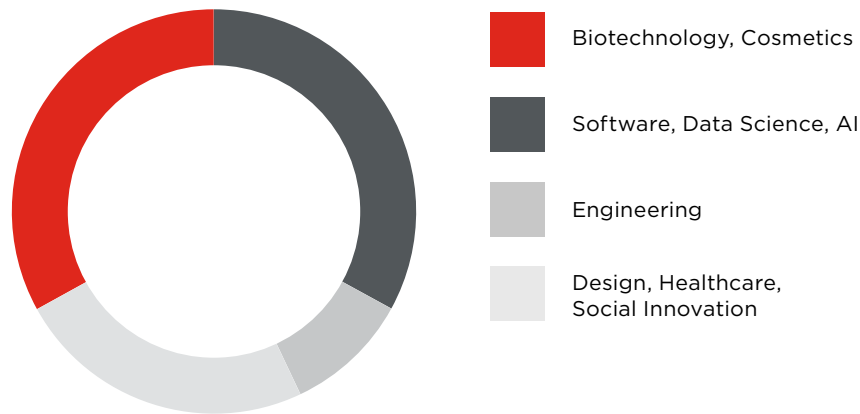
Research Partnerships	96
Seneca Applied Research Supported Projects	53
Faculty Investigators	49
Student Research Assistants	100

Curriculum-based Applied Research

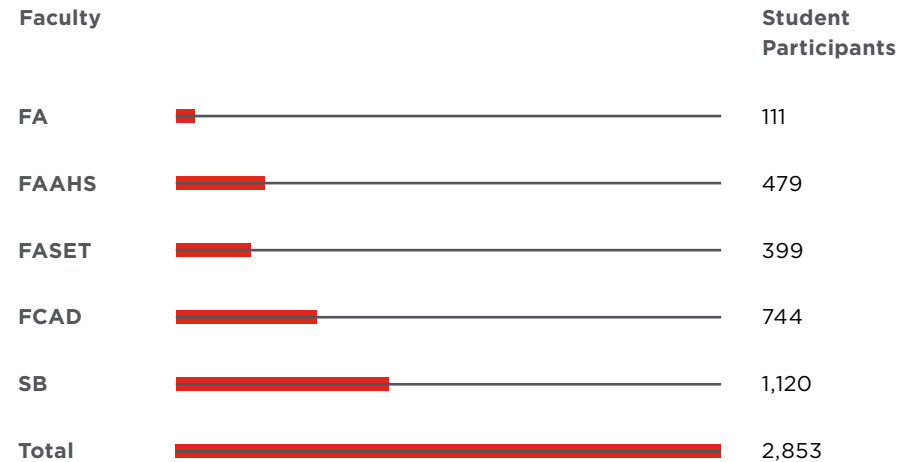
Students involved in Applied Research	2,853
Total Courses Surveyed	2,892
Courses Reporting Applied Research Activity	115
Research Intensity (% of courses involving applied research)	3.98%

Faculty Specific Metrics

Funded Applied Research Projects



Curriculum-based Applied Research



	Total	Faculty of Arts (FA)	Faculty of Applied Arts & Health Sciences (FAAHS)	Faculty of Applied Science & Engineering Technology (FASET)	Faculty of Communication Art & Design (FCAD)	Seneca Business (SB)
Courses Reporting Applied Research Activity	115	11	19	30	24	31
Faculty Engaged in Research Activities	24%	27%	22%	21%	29%	21%

What's in your water?

Seneca team helps create a test collection system

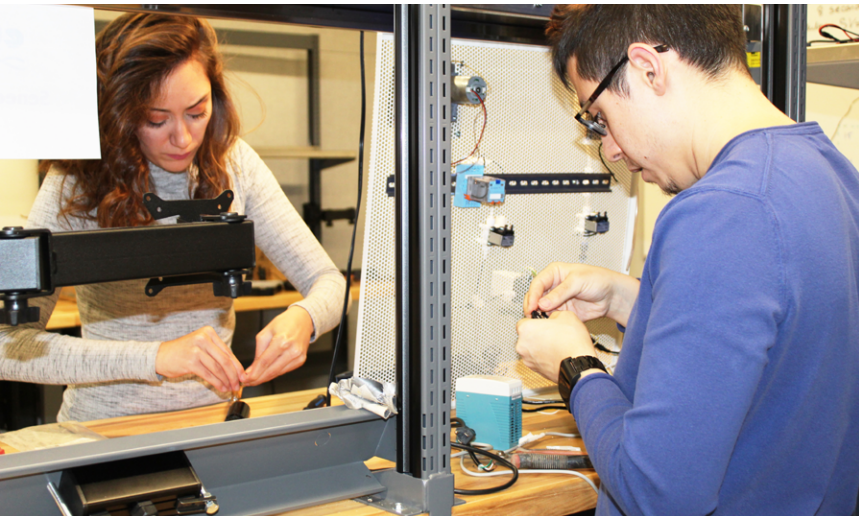


Environmental Bio-Detection Productions Inc. (EBPI) is a biotechnology company located in Burlington, Ontario that focuses on developing and manufacturing biological testing kits. EBPI develops assays to monitor for the presence of toxicity, genotoxicity and mutagenicity in environmental samples. Over the past 15 years, EBPI has worked closely with various drinking water and wastewater groups internationally to monitor sub-chronic effects of various water treatment technologies.

Working collaboratively, Seneca and EBPI built a prototype “turn-key” system to concentrate environmental samples (drinking water and wastewater), onto filter membrane. The system is designed to be installed in water processing facilities which are interested in monitoring treated water. The system is

designed to regulate flow rate, while acidifying the sample to a required pH. This ensures compounds of concern are trapped onto the filter allowing for both chemical and biological analysis. The system developed by Seneca and EBPI will allow for continuous sampling over a period of time which will allow for better analytical and biological data to be gathered verses a commonly used “grab sample” technique.

Kyle Valdock, a professor in the **School of Electronics & Mechanical Engineering Technology**, led the project and supervised two student Research Assistants, Arian Hajiakbar and Burcu Us. The research team created a continuous positive flow water system that would regulate the level of pH by mixing acid into the water in real-time to obtain the required pH.



The research team created a filter system prototype that shifts the pH levels the desired range (-2.0 to -2.5) to ensure compounds of concern are effectively collected for analysis.

We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC), through the Engage for Colleges program.

“

The demand for new approaches in chemical and biological detection drives the evolution of our business. This system will increase export sales from Canada, improve Canada's reputation in the drinking water technology field and provide jobs in southern Ontario.”

— **Will Lush, President,
Environmental Bio-Detection
Productions Inc.**

Applied Research Report

Seneca APPLIED RESEARCH

**DATA ANALYTICS
RESEARCH CENTRE
(DARC)**

OPEN SOURCE
TECHNOLOGY FOR
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CENTRE FOR HEALTH &
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Connecting PSWs faster with a new portal

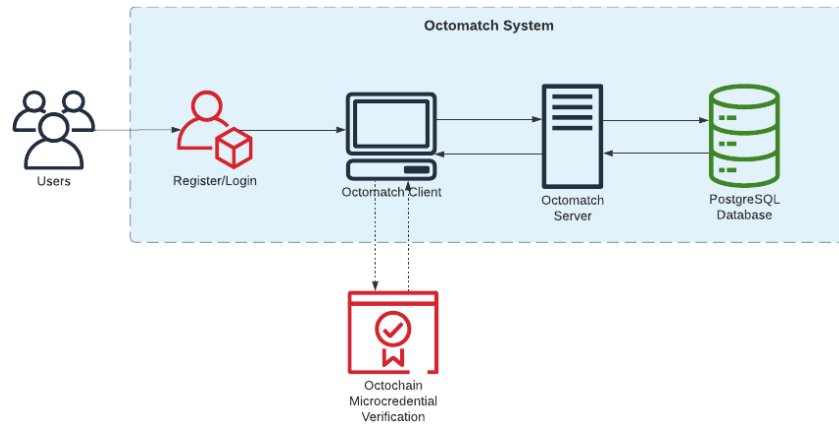


TriNetra Systems Inc., based in Markham, Ontario, provides software and information technology solutions by creating innovative ways to narrow the gap between people and technology. During the pandemic, TriNetra noticed a bottleneck in the personal support worker (PSW) hiring process, which was hindering people's ability to receive the care they needed. By building a platform to assist PSW employers to connect more easily with PSWs seeking work, and facilitating the validation of their PSW credentials, TriNetra believed that healthcare seekers could be connected more quickly and reliably with PSW support, while simultaneously empowering PSWs to reduce commute times and choose suitable work. TriNetra approached the **School of Software Design & Data Science** and **Personal Support Worker certificate program** in the **School of Nursing** to collaborate in creating this platform. During the study Seneca and TriNetra collaborated with two other companies, Octochain Inc., which develops Blockchain-

based software products, and ConnexHealth, an agency that connects healthcare users with healthcare professionals through their online portal.

The principal investigators for the project were Mark Buchner from the **School of Software Design & Data Science** and Judith Minsky from the **School of Nursing**. The research consisted of two phases: the first phase goal was to develop an online system to confirm PSW credentials in a fast, easy and reliable way. The second phase goal was to use artificial intelligence (AI) and machine learning technologies to match PSWs to job assignments. Research Assistants, Saihong Xiao, Crystal Ding, Tony Sim, Denver Stewart, Nastaran Baharfar and Lieca Cangson contributed their knowledge while gaining industry experience.

In the first phase of the project, the research team carried out online surveys of PSWs and PSW employers



to determine what training credentials were most sought after in a PSW candidate and what factors contributed to PSWs choosing certain placements over others. The team compiled a list of 12 primary credentials that employers are looking for. All of the information gathered in this phase was used to guide the AI and machine learning placement matching platform developed in the second phase, which saw the Seneca team develop algorithms for optimized matching of PSWs with job postings. This included creating the web platform for PSWs and recruiters to register, using sample data to develop algorithms.

The team utilized the SOSCIP Advanced Computing Platform to test and train the algorithms, which increased the ability to test many different potential computation options. This optimized set of matching algorithms now backs the OctoMatchAI platform implemented by OctoChain, which connects the PSWs with the most appropriate training to each job posting. The intention is to

reduce the risks to both PSWs and employers by matching the most qualified candidates according to their specifications and make the hiring process faster to ensure timely placement.

During the COVID-19 pandemic, many PSW positions went unfilled due to delays in validating staffing requirements, despite qualified candidates looking for work. The OctoMatchAI system and Trinetra’s platform developed through this collaborative research project is now being further developed and will ultimately enable a secure, optimized, and rapid way to support both PSWs and PSW recruiters in finding their ideal jobs, and supporting health care seekers in finding the care they need.

We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC), through the Engage for Colleges program.



This project is an opportunity to further accelerate our research progress and ultimately the commercialization of our solutions and services.”

— Neeraj Vashist, CEO,
TriNetra Systems

Building intelligent tools!

Finding a way for better data collection and business analysis

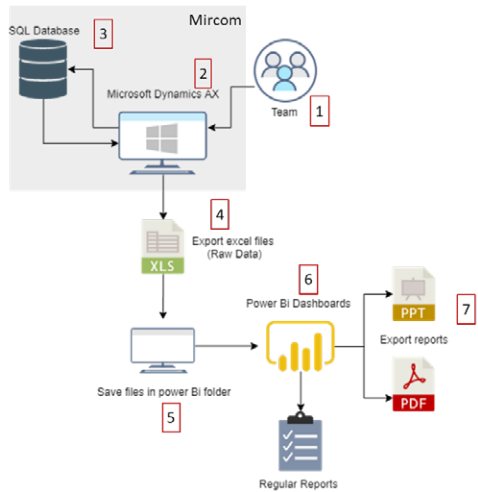


Mircom Group of Companies is a Canadian company that operates as a global player in the building solutions sector and is the largest independent fire alarm manufacturer in North America. The product line spans fire alarm and emergency audio, communications and security solutions'. Brands include Mircom™, Secutron™ and U.E.C.™ United Export Corporation. The company collects a significant volume of sales and demographic data which informs strategic decision making and process enhancements. Mircom Technologies Ltd. partnered with Seneca to develop enhancements to their data collection and analysis systems in order to improve responsiveness to business opportunities.

Mircom Technologies Ltd. has a comprehensive database of transactional information, including sales, manufacturing, supply chain and inventory data. These data have been integral to Mircom's pricing decisions.

Current data analysis processes involve a manual data extraction step, resulting in additional workload and challenges in mapping internal data analysis to external data such as competitive market analyses and social media trends. To assist Mircom in reacting quickly to changing market trends, competition and internal demands, the Seneca research team created an automated process to organize data and provide accurate reports using third-party business intelligence software tools. Additionally, the research team developed a machine learning tool capable of predicting future sales and analyzing high-potential new markets.

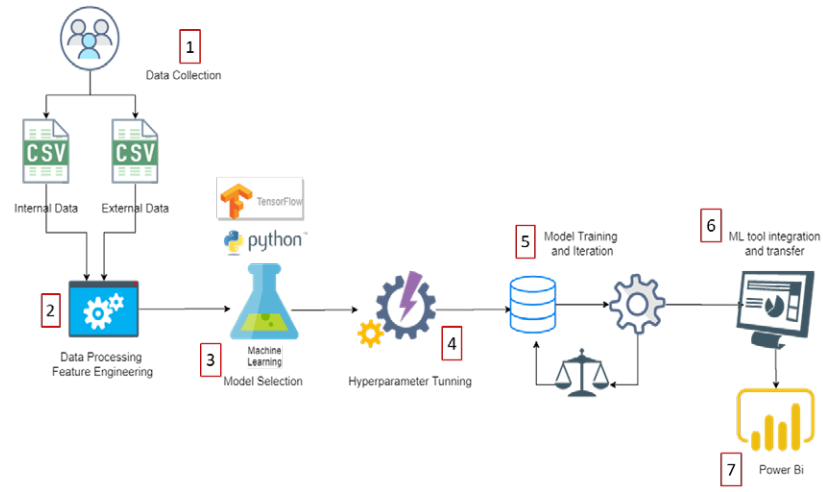
The research team carried out the project in two phases. The first phase involved data analysis through the development of a dashboard to visualize business intelligence data. The second phase involved the development of a machine learning tool to predict sales



First Phase

data based on the relationships among internal data and external variables. As a pilot, the team delivered a sales overview, year-to-date sales numbers and sales trends for a three-year period. In the second phase, the team tested four machine learning models to identify the best approach to provide accurate sales predictions.

Principal Investigator, Mark Buchner, a professor in the school of **School of Software Design & Data Science**, led the research project with four student Research Assistants, Aracelli Tumbalobos, Saihong Xiao, Yuka Sadaoka and Shichao Wang.



Second Phase

As a result of this project, Mircom Technologies Ltd. has new machine learning and data visualization tools that position the company for growth in the sector. Mircom hired one of the Seneca Research Assistants after completion of the project and is considering a second project with Seneca.

We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC), through the Engage for Colleges program and Mitacs through the Mitacs Accelerate program.



To implement this solution, we require the expertise of Seneca’s Research Assistants and Professor Buchner, in order to create the data lake architecture and machine learning tools to support advanced analytics and forecasting.”

— **Jason Falbo, CTO,**
Mircom Technologies Ltd.

The doctor will see you

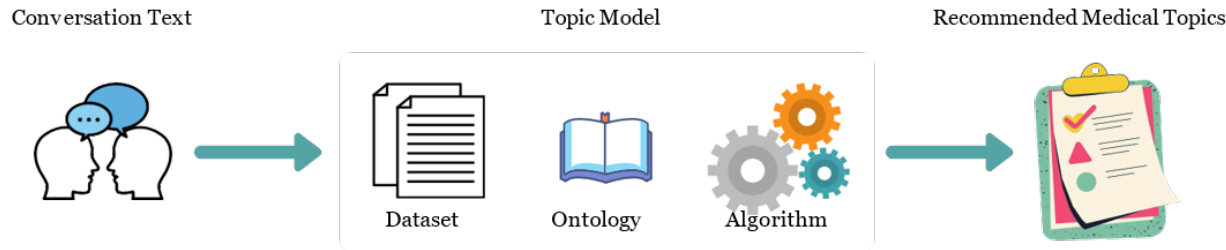
Developing a phrase recommendation engine for the Your Doctors Online platform



Mississauga-based **YourDoctorsOnline** owns and operates a website called yourdoctors.online (YDO), which allows users to access accredited healthcare professionals 24/7 to talk about their health concerns. The company has collaborated with Seneca to address certain inefficiencies in their workflow. The YDO model requires doctors to spend time typing responses while keeping track of each conversation, which has a significant negative impact on their productivity. The company identified this as one of the main barriers to YDO's profitability, revenue growth and market adoption. In order to alleviate some of the more tedious aspects of this model, YDO aims to build a phrase recommendation (PR) engine. The goal is to suggest phrases relevant to the context of a conversation, minimizing the time the doctors spend typing their responses. The first step toward developing such a tool is to build a knowledge base (or ontology). YDO partnered with Seneca

to explore machine learning and natural language processing (NLP) techniques with the goal of building a knowledge-base of medical terminologies to enable further development of the YDO PR engine.

To build the knowledge base, the research team collected descriptions of medical terms from various, reputable, publicly accessible sources. In the initial phase of the project, various NLP techniques such as stop-word removal, tokenization, and lemmatization, were used to clean the dataset and to improve its quality, so it could be used for further analysis. In the second phase, the research team implemented two different approaches to ranking and retrieving information from the knowledge base. The first approach involves training a topic modelling algorithm on a historical dataset of doctor-patient chat logs, labelling the model's topic results with respect to the knowledge base, and combining them to



determine the relevant medical themes of a text conversation. The second approach involves directly cross-referencing a text conversation against the terms in the knowledge base to determine the relevant medical themes.

The performance of the two designs were then evaluated based on how closely-related their recommended medical terms were to the context of a given conversation. The evaluation of this engine involved critical feedback from both the research team and the doctors associated with YDO. After evaluating the approaches and examining their performance and results, it was clear that the proof-of-concept built in this project has a lot of potential for addressing YDO's challenges. Seneca and the company will collaborate further to leverage the results of this project, to develop a fully-featured Phrase Recommendation tool that will be deployed into the YDO platform.

The research team that conducted this study consisted of Dr. Asem Omar, Principal Investigator, and two Research Assistants, Sergio Armando-Hernandez Perez and Alex Quan. Dr Asem Omari is a professor in the **School of Software Design & Data Science** with deep expertise in the application of data mining techniques and algorithms in health care, sales and marketing. Through this project, the research assistants obtained invaluable opportunity to work on a cutting-edge NLP project, and to develop skills that are highly sought-after by the industry.

We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC), through the Engage for Colleges program.



An AI-based phrase recommendation engine for our platform, will make doctor's work easier and more efficient."

— Raihan Masroor, Founder & CEO, Your Doctors Online

Applied Research Report

Seneca APPLIED RESEARCH

DATA ANALYTICS
RESEARCH CENTRE
(DARC)

**OPEN SOURCE
TECHNOLOGY FOR
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SOCIAL INNOVATION



Open Source Technology for Emerging Platforms

The Natural Sciences and Engineering Research Council of Canada (NSERC) Industrial Research Chair for Colleges in Open Source Technology for Emerging Platforms (OSTEP) was established to provide early access by local small and medium-sized enterprises to emerging computer platforms through collaboration with global open-source communities to increase their global competitiveness. The program focuses on the development of open-source software for emerging enterprise platforms such as ARM64, DevOps (Software Development and IT Operations) technologies and methodologies, and applications in super-embedded systems.

The OSTEP program, led by Chris Tyler in the **School of Software Design & Data Science**, advances the state of open-source software to make it possible for local companies to migrate from legacy computer systems to these emerging platforms, taking full advantage of new features, including reduced space, power and cooling requirements that are now demanded by the market.

OSTEP Metrics

Impact of Chair on College Faculty and Staff

Person hours of faculty and staff given paid release time to participate in applied research and development projects	2,160
Number of faculty participating in applied research and development projects	2
Number of faculty and staff receiving paid release time to participate in applied R&D projects	2

Impact of Chair on Students

Number of students participating in applied research and development projects	42
Person-hours of students participating in applied research and development projects	12,655

Impact of Chair on Local Businesses

Number of existing products, technologies, or processes improved / year	5
Number of new products, technologies, or processes developed	7

Number of prototypes developed	8
Number of technical publications derived from funded projects	17

A new technology for chiropractic students



The **Canadian Memorial Chiropractic College** (CMCC), based in Toronto, is a world leader in chiropractic education and research. CMCC is an academic institution and a not-for-profit charitable organization that focuses on basic and applied research related to neuromusculoskeletal interactions. CMCC also studies the role of chiropractic in care and health promotion to ensure that their curriculum is relevant. In addition to research and education, CMCC provides chiropractic care for patients in its seven community-based teaching clinics throughout the Greater Toronto Area.

CMCC's mission is to deliver world-class chiropractic education, research and patient care. CMCC has developed technology to aid the chiropractic profession, including a Force-Sensing Table Technology (FSTT®), with an embedded six-axis load sensor providing chiropractic trainees with immediate feedback regarding technique and performance. Through the FSTT® system,

students can view their performance and improve their skills in manual therapy. The FSTT® is an excellent system, but as the industry has evolved over time, there are new opportunities to enhance device support and improve functionality. CMCC and Seneca recently conducted a study, led by Chris Tyler, to enhance the FSTT® system and increase the business opportunity for CMCC.

Chris Tyler is a professor in Seneca's **School of Software Design & Data Science** and is the NSERC Industrial Research Chair for Colleges in Open Source Technology for Emerging Platforms. Mr. Tyler and a team of four student research assistants worked collaboratively with CMCC to enhance the FSTT® system in three ways:

First, the research team created a simplified set of control electronics, compatible with the FSTT®. The new setup requires fewer steps to move data from the FSTT® to a computer using an enhanced signal system. Second,



Force-Sensing Table
Technology (CMCC, 2021)

the team enhanced and updated the FSTT® system to allow use of different hardware types, such as mobile and embedded devices, as well as adjustments to allow data display in web and mobile applications. Finally, the research team advanced the functionality of the FSTT® system including the development of a new sensor and integration to the FSTT® system.

At the end of this study CMCC received an updated system and prototype that will help advance chiropractic students' education. CMCC and Seneca hope to continue to collaborate and further advance this technology in the chiropractic education industry.

This project was funded by the Canadian Memorial Chiropractic College.

“

The software can be customized to run in various setups; this will help when working among environments which have different infrastructure requirements for example, other institutions might require a unique setup that fits their needs.”

— **Chris Tyler, Principal Investigator, Seneca**

Applied Research Report

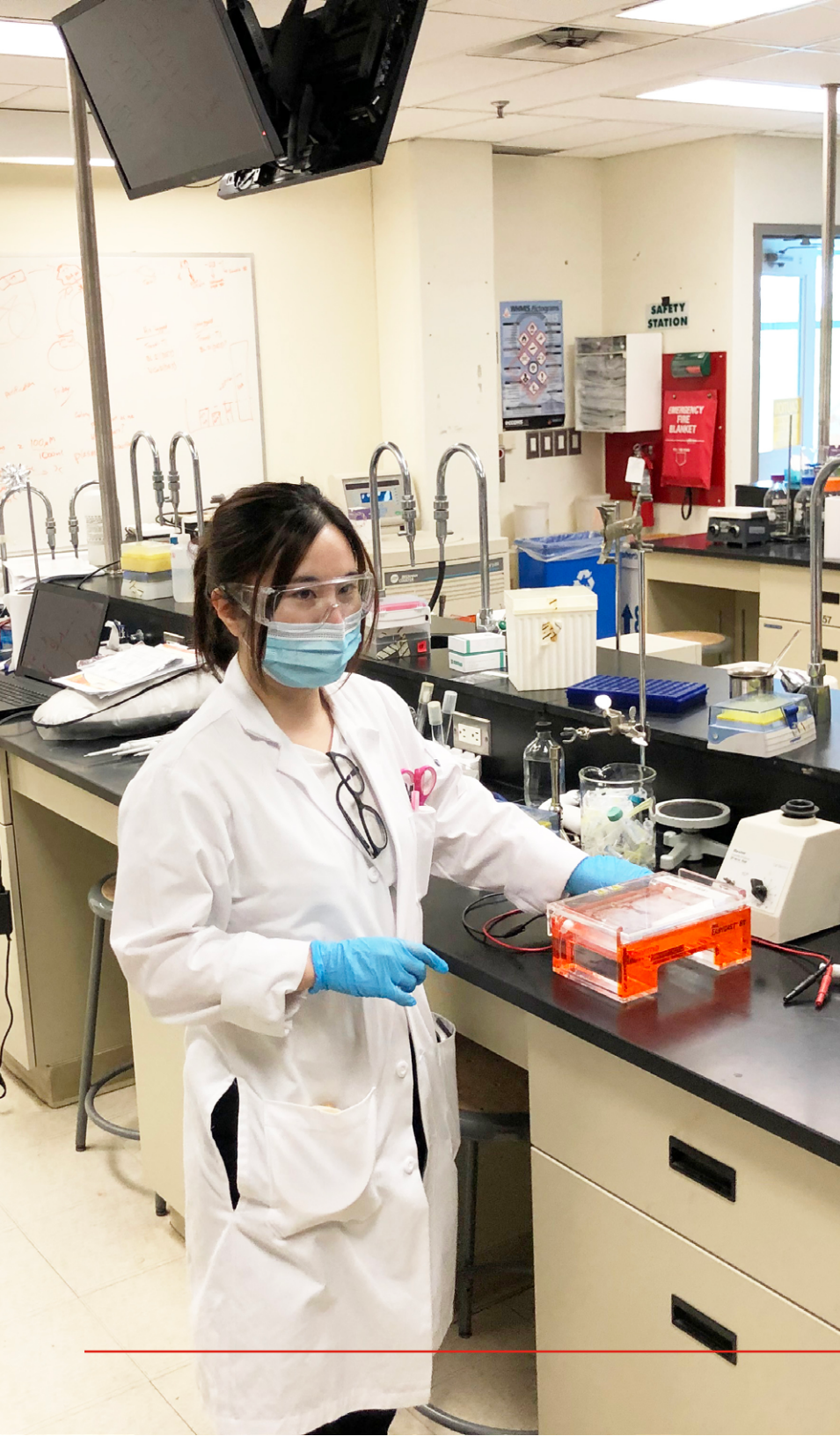
Seneca APPLIED RESEARCH

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**SENECA CENTRE FOR
INNOVATION IN LIFE
SCIENCES (SCILS)**

CENTRE FOR HEALTH &
SOCIAL INNOVATION



Seneca Centre for Innovation in Life Sciences

Located at the Seneca@York Campus, the Seneca Centre for Innovation in Life Science (SCILS) serves a previously unmet need among small and medium-sized enterprises in Ontario. SCILS enables industry-academic partnerships to further develop, enhance and validate life sciences technologies and products in the areas of diagnostics and cosmetics. As an integral component of the life sciences innovation ecosystem, and through partnerships with regional innovation centres, incubators and industry associations, SCILS connects enterprises with Seneca faculty and students to collaborate on applied research projects.

Ultimately, through its focus on life sciences talent and investment in research and development, SCILS plays a significant role in the growth of the life sciences sector in Ontario, enabling early-stage diagnostics and cosmetics companies to reach commercialization and scale their businesses.

SCILS Metrics

- 13** Projects
- 13** Faculty Investigators
- 30** Student Research Assistants



Life Sciences Diagnostics

Diagnostics in the life sciences include metabolomics testing, biochemical diagnostics, immunodiagnostics and molecular diagnostics used in either clinical or industrial settings. Developing, enhancing and validating these products is complex and costly. SCILS addresses business-driven challenges and opportunities for regional companies in Canada's life sciences sector, making life sciences diagnostics investments more feasible for companies on their growth journey.



Novel Cosmetics Formulations

Developing safe cosmetic products with consumer appeal can be prohibitive. Home to one of the only postsecondary cosmetic science programs in the world, Seneca can assist companies nationwide in addressing this challenge through support in applied research.

Producing COVID-19 proteins to use in diagnostic tests



Kenota Health, a Kitchener-based medical technology company, has developed a complete sample-to-result antibody/allergy testing system for point-of-care medical diagnostics. With a mission to reinvent disease diagnostics, Kenota's device fully integrates blood collection, purification and quantitative analyte analysis with an intuitive easy-to-use interface. With the rise of COVID-19 infections, Kenota began development of a testing platform specific to COVID-19 to determine whether an individual has been exposed to the virus. Kenota scientists had a goal of developing a rapid antibody test to determine an individual's exposure to COVID-19 in 10 minutes.

Kenota collaborated with Seneca's **School of Biological Science & Applied Chemistry** (BSAC) to produce three key proteins associated with COVID-19 for use in their

immunodiagnostic device using harmless yeast cells. Once incorporated into the diagnostic test, the proteins would bind to antibodies from a patient's blood sample if they had been exposed to the virus. Generating proteins in-house using yeast cells, rather than purchasing such proteins, would help Kenota avoid delays in production, decrease costs and serve as a model for production of other proteins for use in accurate allergy tests (Kenota's core business).

Co-Principal Investigators, Dr. Frank Merante and Bryan Chalk led student Research Assistants, Carmen Mei and Diljot Singh, students from Seneca's **Biotechnology - Advanced diploma program**. The team investigated and produced recombinant SARS-CoV-2 proteins for the Kenota lateral flow assay testing device.



While Seneca was operating virtually throughout the pandemic, the BSAC laboratories were operational and the team worked diligently to run the necessary experiments to produce proteins for Kenota. The promising results of this project have resulted in a follow-on project with Kenota where the research team will evaluate recombinant proteins and derivatives in *Pichia* yeast to enhance Kenota's existing recombinant protein needs for their allergy testing lateral flow device.

We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada for this project, through an Applied Research Rapid Response to COVID-19 grant.

“

Most pharmaceutical companies give themselves two to three years to develop a product like this, while we have given ourselves two to three months to produce three products.”

— Dr. Frank Merante, a PhD in biochemistry and co-principal investigator of the project at Seneca

Can psychedelics help with depression?



The partnership between psychedelic drug developer **Diamond Therapeutics** and an applied research team at Seneca's **School of Biological Sciences & Applied Chemistry** has resulted in promising research in the field of psychedelics that could lead to mental health treatment breakthroughs.

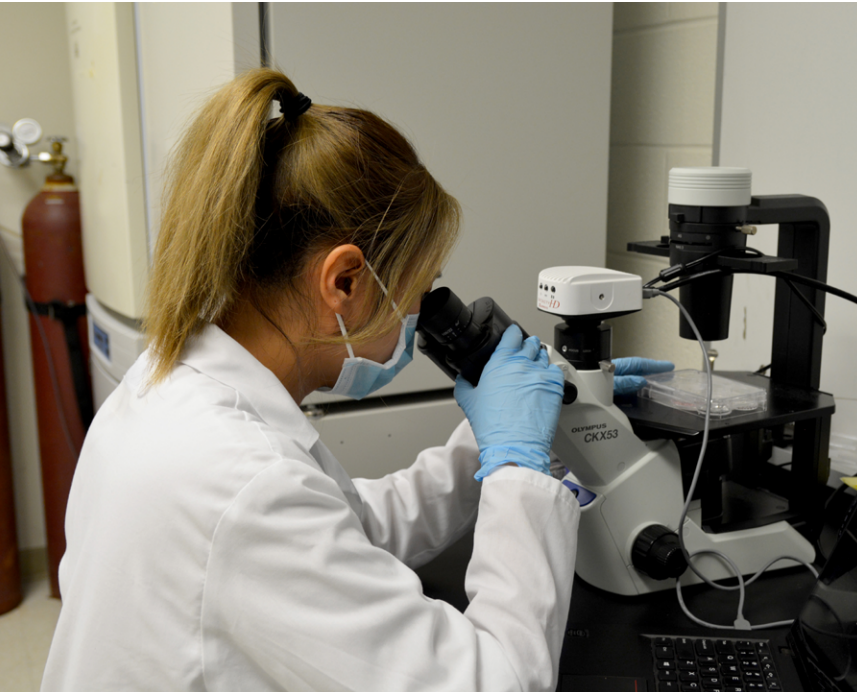
“This research collaboration with Seneca will aid our understanding of psychedelic compounds and assist us in the development of a strong pipeline of drug candidates that may include psychedelics, non-psychedelics and naturally derived compounds,” says Judy Blumstock, founder and CEO of Diamond Therapeutics.

Together, Seneca and Diamond Therapeutics are developing a cell-based model to quickly screen molecules and determine whether they show signs of facilitating neuroplasticity, which could signal their potential as drug candidates and lead to treatments for neurodegenerative and psychiatric conditions.

The team is using tumour cells from the adrenal gland for this research. These cells are pluripotent, which means they can be turned into different cell types.

“Suppose a compound causes the pluripotent cells to turn into something more neuron-like. In that case, we have something interesting that warrants further testing in a more complex system, both in neurons and *in vivo* in animals,” explains Dr. Jeff Sprouse, Diamond Therapeutics' head of pipeline development.

The research team is using this approach to test classical psychedelic compounds, including lysergic acid diethylamide (LSD) and psilocybin, and various others, including bioactives derived from natural extracts. The strategy builds on the work of Dr. Frank Merante, who is principal scientist of the Seneca Centre for Innovation in Life Sciences and an expert in identifying novel bioactive compounds.



This research could yield results that may help treat various mental health conditions. The demand for innovation in this field is considerable — there’s been a dramatic increase in mental health disorders as a result of the COVID-19 pandemic.

This partnership is overseen by Dr. Merante, and Drs. Sprouse, William Jamie Tyler and Rhea Mehta from Diamond Therapeutics.

The partnership between Seneca and Diamond Therapeutics has been supported by national, not-for-profit organization Mitacs through the Mitacs Accelerate program.

“

This early screening strategy will help us with drug discovery efforts by identifying promising molecules”

— **Judy Blumstock, Founder & CEO, Diamond Therapeutics**

Applied Research Report

Seneca APPLIED RESEARCH

DATA ANALYTICS
RESEARCH CENTRE
(DARC)

OPEN SOURCE
TECHNOLOGY FOR
EMERGING PLATFORMS
(OSTEP)

SENECA CENTRE FOR
INNOVATION IN LIFE
SCIENCES (SCILS)

**CENTRE FOR HEALTH &
SOCIAL INNOVATION**



Social Innovation

Social innovation is the use of new or existing ideas to solve social challenges. These ideas can be new programs, products, initiatives or services that serve a community and result in improved social or health outcomes for the community.

Through the Natural Sciences and Engineering Council of Canada's College and Community Social Innovation Fund, and through Seneca's Applied Research Fund, Seneca has engaged in numerous social innovation research projects with community partners and other not-for-profit organizations.

Social Innovation Metrics

- 11** Projects
- 13** Faculty Investigators
- 35** Student Research Assistants

Best practice guidelines for pet loss support

Seneca team creates guidelines for supporting end-of-life pet care



Kirsti Clarida, a professor in Seneca's **Veterinary Technician diploma program**, has come face-to-face with death many times in her career. A registered veterinary technician, she has vivid memories of taking part in the euthanasia of pets. To address a gap in training and support for veterinary teams when it comes to dealing with pets' end of life, Ms. Clarida and Angie Arora, a professor in the **Social Service Worker - Immigrants & Refugees diploma program**, collaborated as co-investigators on an interdisciplinary applied research project to develop best practice guidelines for veterinary professionals who support pet owners during this difficult process.

With a Seneca Innovation grant, the research team partnered with **VCA Canada**, the country's largest network of animal hospitals, and recently published ***Pet Loss Best Practice Guidelines for Veterinary Teams***. The report has been getting international attention from as far as Australia and the United Kingdom.

Ms. Arora has worked as a veterinary social worker with Pet Vet Hospitals, PawsWay Pet Discovery Centre, Halton/Peel Pet Loss Support Group and the Canadian Centre for Pet Loss Bereavement. She is currently a facilitator for a pet loss support group with VetVine and is on the inaugural board of directors for the International Association of Veterinary Social Workers.

"I have worked with clients who have had their pets die while in their care. Those are the traumatic ones," she said. "The most important thing I do is listen. I provide the space for them to talk about it, to release, to validate."

When Margaret Steffan heard about the pet loss project earlier this year, the Seneca student, who graduated from the **Veterinary Technician diploma program**, jumped at the chance to work as a research assistant.

Another Veterinary Technician graduate, Daniella Zamora, who also worked on the project as a research



assistant, says she wanted to help create a point of reference for veterinary professionals when responding to clients' needs.

"For many pet owners, losing a pet is like losing someone in their life — it's a very significant loss," she said. "But there isn't the same understanding in society. Some people expect you to get over it and get on with your life. They don't understand that you are allowed to grieve in the same way."

While the pet loss project is not going to solve grief, Ms. Clarida hopes the best practice guidelines will help address those high-stress situations and help pet owners and animal care professionals to get closer to "good death."

This project was funded by Seneca's internal Applied Research Fund.

“

There hasn't been much research undertaken previously. It's something that's really missing in the field. There's compassion fatigue, and we often have to go from euthanasia to an appointment with a puppy. Our emotions are quickly changing in response to the circumstances."

— Margaret Steffan, Research Assistant

A self-help tutorial for gambling addiction



The Centre for Addiction and Mental Health (CAMH) is a University of Toronto-affiliated teaching hospital and rehabilitation centre for people who suffer from addiction and mental health issues. With three main campuses in Toronto and multiple smaller clinics around the Greater Toronto Area, CAMH is the largest mental health teaching hospital in Canada. CAMH has a mandate to teach and improve the wellbeing of their patients. The hospital also participates and curates research projects to advance the understanding and treatment of mental health issues and addiction.

A team of researchers from CAMH and Seneca recently conducted a study to design and evaluate an online-gambling self-help tutorial for college students. The aim of the tutorial is to teach postsecondary students about the fallacies of gambling and what they can do to avoid or decrease their problem gambling. Most college students are young adults who are not educated about problem gambling. Further, young adults in

postsecondary schools are more likely than older adults to experiment with new activities, given their new-found freedom away from home. These characteristics place young adults in postsecondary schools at higher risk for problem gambling. Given the limited tools available to this population, CAMH and Seneca have focused their research efforts accordingly. CAMH prides itself on providing communities with education about preventing addiction. Equipped with knowledge of the long-term effects of gambling, postsecondary students can more easily recognize problem gambling and are less likely to start gambling in the first place. The study provided CAMH and Seneca with the information needed to build an effective self-help tutorial to decrease the chances of young adults developing a gambling addiction. Seneca has an interest in protecting its students and providing proper resources to deal with addiction and mental health issues.

Dr. Farah Jindani, a professor in the **School of**



Community Services, was the Seneca Principal Investigator for the collaborative study with CAMH, titled: *“The Development, Implementation and Evaluation of an Online Gambling Self-Help Tutorial with Ontario Post-Secondary Students”*. Professor Jindani is the program Co-ordinator for the **Mental Health Intervention graduate certificate program** at Seneca, as well as a clinical social worker and therapist. She works closely with Dr. Turner at CAMH to develop interventions for addictions. Professor Jindani’s specialties include substance use, problem gambling and mental health. The Seneca research team for the study includes student Research Assistants, Stephanie Macey Valdez and Tessa Bound. The team collaborated with Dr. Nigel E. Turner, an Independent Scientist at CAMH.

The research team conducted the study in two phases. In Phase One, Dr. Jindani’s team conducted a focus group, with subjects recruited from a pool of international and domestic Seneca students, to help design and refine the

online gambling self-help tutorial. During Phase One, students were asked a series of questions about gambling. The research team found that a majority of international students did not fully understand some of the gambling phrases and terms. The team took this information and used it to help redefine the self-help tutorial. In Phase Two, an experimental group completed the tutorial while the control group did not, both groups were then asked to complete a questionnaire about problem gambling. The experimental group showed a slightly better understanding of random chance than the control group however the sample size was quite small.

The team has recently improved the tutorial based on the feedback from the participants and is currently running a second study. Both CAMH and Seneca will be able to use the data gathered from this study to help young adults by educating and teaching them techniques to resolve problem gambling.

This project was funded by Seneca’s internal Applied Research Fund.

“

“Young adults in the postsecondary environment are at higher risk of becoming involved with gambling due to social influences that entice younger people to play. The findings from this pilot research will add to the gambling research-base and will inform future research and dissemination opportunities.”

— Nigel Turner, Independent Scientist, CAMH



Applied Research Participants and Recognition

Seneca APPLIED RESEARCH

Research Leader of the Year Winner

The award is presented to a faculty research leader (principal investigator) who has made a significant contribution to applied research at Seneca this year and who has gone over and above to provide mentorship and guidance to research assistants. The winner is nominated by research assistants.



Mark Buchner

School of Software Design & Data Science

Industry Partner for Project

Thinking North

Term of Project

September to December 2020

Statement From Nominator

“Mark is extremely knowledgeable, caring and hard-working. He always went the extra mile to support us in any way he could by setting up meetings and assisting with the overall project vision. Mark treats his students with the utmost respect, providing them with the opportunities and resources required to get experience in the industry.”

Seneca APPLIED RESEARCH

Applied Research Fund Recipients

Braden Evans and Jane Davey

Partner: Aspire Food Group

Interactions Among Cricket Frass-based Soil Amendments,
Biological Control Agents and Mycorrhizae in Organic Soil

Camie Condon

Partner: Ontario Police College

Exploring the Impact of De-escalation Training on Recruit Officers'
Tactical Decision-making During Crisis Encounters

Bahar Biazar

Partner: Intercultural Iranian Canadian Resource Centre

Coping With Crisis: Senior Newcomers During COVID-19

Seneca APPLIED RESEARCH

Faculty Principal Investigators

Abdur Rahman

School of Electronics & Mechanical Engineering Technology

Agnieszka Stopka

School of Electronics & Mechanical Engineering Technology

Alex Sochaniwskyj

School of Electronics & Mechanical Engineering Technology

Ali Taha

School of Electronics & Mechanical Engineering Technology

Allan Randall

School of Software Design & Data Science

Angie Arora

School of Community Services

Asem Omari

School of Software Design & Data Science

Asma Paracha

School of Software Design & Data Science

Bahar Biazar

School of English & Liberal Studies

Bamidele Olubadejo

School of Software Design & Data Science

Barkev Keoshkerian

School of Biological Sciences & Applied Chemistry

Bethany Kopel

School of Public Safety & Behavioural Studies

Braden G. Evans

School of Recreation & Environmental Studies

Bruce Griffin

School of Biological Sciences & Applied Chemistry

Bryan Chalk

School of Biological Sciences & Applied Chemistry

Camie Condon

School of Public Safety & Behavioural Studies

Catherine Leung

School of Software Design & Data Science

Chris Tyler

School of Software Design & Data Science

David Connolly

School of Community Services

David Zwick

School of Biological Sciences & Applied Chemistry

Farah Jindani

School of Community Services

Filimon Tsionas

School of Electronics & Mechanical Engineering Technology

Frank Merante

School of Biological Sciences & Applied Chemistry

George Clark

School of Biological Sciences & Applied Chemistry

Hla Wynn

School of Biological Sciences & Applied Chemistry

Ivana Knezevic

School of Biological Sciences & Applied Chemistry

Seneca APPLIED RESEARCH

Faculty Principal Investigators

James Manson

School of Recreation & Environmental Studies

James Mayo

School of Biological Sciences & Applied Chemistry

Jamie Cote

School of Biological Sciences & Applied Chemistry

Jane Davey

School of Recreation & Environmental Studies

Judith Minsky

School of Nursing

Kirsti Clarida

School of Health Sciences

Kyle Valdock

School of Electronics & Mechanical Engineering Technology

Lisa Li

School of Information Technology Administration & Security

Margot Wassenaar-Faber

School of Biological Sciences & Applied Chemistry

Mark Buchner

School of Software Design & Data Science

Mark Shtern

School of Information Technology Administration & Security

Mark Tucci

School of Public Safety & Behavioural Studies

Maryna Premyslova

School of Biological Sciences & Applied Chemistry

Monica Fontana

School of Creative Arts & Animation

Nooshin Beheshti

School of Information Technology Administration & Security

Sabine Weber

School of Fashion

Sandra Ireland

School of Biological Sciences & Applied Chemistry

Sharon Robertson

School of Biological Sciences & Applied Chemistry

Tania Killian

School of Nursing

Tanvir Alam

School of Software Design & Data

Varinder Gill

School of International Business & Management

Vera Borsos-Matovina

School of Biological Sciences & Applied Chemistry

Vida Movahedi

School of Software Design & Data Science

Seneca APPLIED RESEARCH

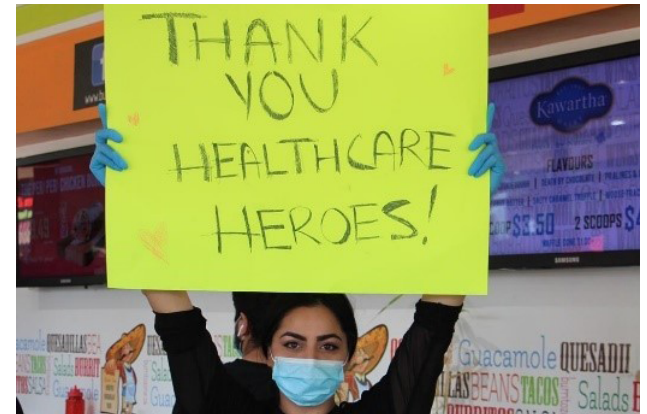
Student Research Assistants

Aaron Hipple	Diljot Singh	Lieca Meca Cangson	Rachel Lee Giffen
Adam George Gariba	Ehda Dolatabadi	Lyza Gin Fermin Austria	Rafael Albert Ungar
Alex Quan	Enrico Vergara	Mahshid Farrahinia	Rishabh Sharma
Alexander Ponomaroff	Evan Thomas Reynolds	Margaret Steffan	Ruiqi Yu
Amber Sky Margaret Clarke	Gabriella Ko	Maria Camila Lau	Rutvi Patel
Amina Arshad	Goncalo Semide Ferreira	May Lanie Fuentes	Saihong Xiao
Anaita Lashley	Helen Sosonna	Maya Hudon-Kaide	Sasha Mozaffari
Andrea Lorena Rey	Ishani Maharaj	Menaahel Zahid	Sergio Armando Hernandez Perez
Andrey Vadymovych Shmatukha	Jaideep Singh Sidhu	Meng-Chen Lee	Shichao Wang
Anton Biriukov	Janah Gabrielle Vitalicio	Miguel Eduardo Roncancio	Shu-Ping Chen
Antonia Julia Hoffman	Jasmin Khan	Monica Jiyeun Hong	Stephanie Macey Valdez
Aracelli Elizabeth Tumbalobos Cubas	Jaspreet Singh Badwal	Munaf Mansur Awadia	Tessa Caroline Bound
Arian Hajiakbar	Jeison Rafael Coronel Loaiza	Nastaran Baharfar	Thi Anh Truc Vu
Azadeh Nikoumanesh	Jessica Adrian Liu	Nataliia Shagarova	Thi Gam Dao
Brendan Yawney	Jingmin Zhou	Nicole Ting	Tien Phat Vu
Calvin Ho	Joshua Mayers	Oleksandra Sakhnatska	Wonhwa Lee
Carmen Mei	Josue Quilon Barrios	Omeshwari Baburam	Xiang Yi Ding
Christina Schiza	Juan Jose Vanegas Maya	Patricia Perrault	Yanhao Lei
Christopher Belsanti	Justin Arthur Bonsu	Paul Seung Kyung Kim	Ylva Birgersdotter
Craig Trustham	Kasandra Makayla Macmurray	Peter Lystbæk	Yoonkyung Kim
Crystal Kwan	Klodian Vocaj	Phan Y Nhi Nguyen	Yoosuk Sim
Dang Minh Tu Tran	LaChae Hood	Pouya Oftadeh	Yu Ri Yoon
Daniel Goncalves	Larissa Weber	Qiwen Ning	Yuhang Zhao
Daniella Christina Zamora-Natareno	Le Xuan An Ho	Quang Vu Bui	Yuka Sadaoka
Denver May Stewart	Lex A. Holman	Quoc Viet Nguyen	Zachary March



Seneca HELIX

Adapting to Change



Seneca HELIX



HELIX received the 2020 LatAM Visionary Award. This award honors an organization that supports inclusion and diversity with a unique vision to developing a stronger tech ecosystem and provides access and support for Latin American companies to establish business in Canada.

Director's Message

Fiscal 2020-21 has challenged all of us to be agile and to learn and develop new processes and practices at a faster rate. HELIX has consistently innovated through the challenges and opportunities presented by COVID-19. I am deeply proud of the innovative HELIX team that responded quickly to the pandemic to ensure that our services and programming would continue to support our entrepreneurs in their new venture development and the building of skills and resilience in our intrapreneurs.

Early in the pandemic, HELIX quickly pivoted by moving all entrepreneurship and innovation activities to virtual delivery, hosting more than 100 events and supporting more than 7,400 individuals throughout the year. HELIX Coaches and Mentors provided 958 hours of virtual mentoring.

Throughout the year HELIX continued to develop, refine and deliver virtual programming to encourage the growth of the entrepreneurial mindset in individuals and support new venture development for our students, alumni and community. We reached out to our HELIXers by way of surveys and town halls to fully understand how COVID-19 was impacting them and to ask what they needed. Based on their feedback, and with the financial support from CIBC, Tazwiz, Mike Shaver and Global Innovation and Skills Development Canada, we distributed \$42,000 in much-needed COVID relief through 21 funding envelopes to HELIX ventures.

In addition, HELIX launched *TouKEEPINGch*, a weekly e-newsletter designed to keep HELIXers up to date on supports, events and funding offered in the ecosystem. This weekly touchpoint, now surpassing 50 editions, is an important connector for the HELIX community.

TD renewed its support for the very successful Career Recharge initiative that since its launch in June 2019 has supported more than 6,000 participants in preparing for their career future. In 2021, HELIX launched Career Recharge 2.0. An additional 24 workshops, built around key themes including Thriving in the 2021 Workforce and Diversity and Inclusion, provided participants with the skills and qualities needed for the new world of work. These virtual workshops continue to build an incredible following in Toronto and York

Seneca HELIX

HELIX was awarded World Bank funding to develop the operational framework for the first incubator in Maldives. This initiative was completed and presented to the Government of the Maldives and the World Bank in 2020.



Arkaika Coffee and EMERGE teamed up to provide coffee and face masks to frontline workers at hospitals and walk-in clinics.

Little Blue Elephant teamed up with Nav the Superfan to provide hot lunches to frontline workers at Markham Stouffville Hospital.



Region, but have also attracted strong engagement from an international audience with regular participants from 57 countries.

HELIX, along with our partners Southlake Regional Health Centre, York Region, Humber College and ventureLAB, delivered the fourth annual Summer Institute. The six-day, virtual, interactive and cross-disciplinary initiative provided participants with design-thinking skills while they developed solutions to a real operational challenge facing Ontario's hospitals.

Throughout the past year, we continued to develop international partnerships in the entrepreneurship ecosystem. HELIX was identified as a leader in entrepreneurship development and was awarded World Bank funding to develop the operational framework for the first incubator in Maldives.

Though the pandemic restricted us from welcoming international students and dignitaries into the HELIX incubator, our virtual workshops and events have consistently attracted and engaged participants from around the world.

I am very proud of our HELIXers and how they have innovated and adapted to new realities during the past year. They have shown incredible resilience in the face of the pandemic. They continue to move forward, launching, pivoting and growing businesses, employing people and winning awards.

They have also contributed to those in need, and to frontline workers. Learn some of the ways our **HELIXers have given back**.

Finally, I would like to thank our partners and funders for another incredible year. Without their support, we would not be able to continue to positively impact innovation and new venture development.

Sincerely,

A handwritten signature in black ink, appearing to be 'Chris Dudley'.

Chris Dudley
Director, Entrepreneurship

Seneca HELIX

HELIX Impact

HELIX, Seneca's on-campus innovation and entrepreneurship incubator, invites Seneca students, graduates, faculty and staff, along with members of the community, to explore and develop their innovation mindset.

HELIX provides the tools needed to:

- design and launch a scalable startup as an entrepreneur
- innovate from within an existing organization as an intrapreneur

Since Inception (2014)



22,660+
Total Event Participation



560+
Ideas Pitched



Industry Agnostic

All changemakers, innovators, and entrepreneurial thinkers are welcome, regardless of background and type of idea. All faculties are welcome.



Every Stage of the Journey

Whether you are looking to learn more about entrepreneurship, build innovation skills, or launch and grow a business, we have resources and opportunities for you!



Actively Inclusive

We welcome a diverse membership, and clear space for under represented groups with programs and resources specific to your needs.

Seneca HELIX

HELIX Model



The HELIX program begins with the INNOVATION Strand, which is a series of entrepreneurial workshops and sector-specific support activities.

Upon completion of the INNOVATION Strand, the PITCH Event allows participants to provide a persuasive elevator pitch of their venture idea. This PITCH Event must be completed by all those that want to enter the ACCELERATION Strand of HELIX.

Those that have completed the INNOVATION Strand and have pitched their idea move into the ACCELERATION Strand. Here they receive additional supports to drive their ventures to the next level.

April 2020 to March 2021



101

Innovation/Entrepreneurial Events



7,496

Individuals in Innovation and Entrepreneurial Events/Workshops



958

Mentor/Coaching Hours



44

New Ventures Pitched to ACCELERATION Strand

HELIXers Adapting to Change



Adebola Adefioye is a HELIXer, certified coach, speaker and trainer. She is a registered member of the College of Early Childhood Educators, a board member at the Family Support Institute of Ontario and a recent graduate of Seneca's **Honour's Bachelor of Child Development degree program**. She is the 2021 winner of Seneca's prestigious Stephen E. Quinlan Award, which is presented to a student with strong academic achievement, demonstrating personal integrity, sound character, tenacity and assisting others in the community beyond Seneca. She also received the 2020 United Way Greater Toronto Black Community Leadership Award.

When Ms. Adefioye moved to Canada she often experienced anti-Black racism but these struggles did not deter her from excelling in her studies and extracurricular activities. Years later, when her daughter Joanna was in school, she had no friends as she was the only Black girl in her class. To evade the boredom, Joanna volunteered in the kindergarten classroom to avoid playing alone at recess. Joanna was unhappy about going to school, however, Ms. Adefioye became a mentor and coach to her daughter to teach her strategies on how to handle the situation at school. Joanna later gained confidence, learned self-advocacy and built resilience that recognized her as the most confident child in class.

Joanna's experience made Ms. Adefioye decide to start the Afro Women and Youth Foundation (AWYF) to support Black newcomer women and youth who may be struggling with racism and its intersectionality daily in Canada. AWYF is a registered non-profit organization

committed to helping Black newcomer and refugee women and youth to develop life skills, build resilience and integrate successfully in Canada. They do this through their Mentorship, Empowerment and Leadership Development programs. Some of the courses include Be the Best, Developing Healthy Self-Esteem, Handling Anti-Black Racism and Understanding Gender-Based/Sexual Violence.

AWYF has worked in collaboration with COSTI Immigrant Services shelter and Women Support Network of York Region to deliver their workshops and the feedback from participants has been positive. AWYF have a committed team of four volunteers: a project management professional, two child development and mental health professionals and a female engineer. Through Seneca HELIX, Ms. Adefioye learned critical business development skills and received support through weekly coaching sessions that gave her clarity on her social venture.

Before COVID-19 started, Ms. Adefioye and AWYF delivered workshops in shelters, but could no longer hold in-person sessions due to the pandemic. AWYF moved all of the sessions virtually and received HELIX COVID Emergency funds, which allowed AWYF to deliver mental health and self-care workshops to women and youth in shelters. This program has helped reach 345 people and their goal moving forward is to find a community space, raise additional funds for administration staff and to continue to deliver their workshops.



HELIXers Adapting to Change



skinrr.com

Jennifer Fisher is a passionate entrepreneur who loves to create skincare products that make a real difference for people who are experiencing skin challenges such as acne, eczema, psoriasis, dry skin and aging skin. Ms. Fisher created Skin RnR to help eliminate her acne. Based on learnings from her medical aesthetician training, her first skincare products were topical. This was the beginning of her Restore Topical Skincare line. Nature is Ms. Fisher's happy place so it is no surprise that she loves to use all-natural ingredients in Skin RnR products.

As Ms. Fisher continued to study and research, she realized healthy skin starts from within. That's when she created the 100 per cent natural and vegan Replenish Organic Nutrition. Skin RnR provides an all-natural two-step solution for women, men and adolescents to achieve radiant and healthy skin from the inside out and outside in.

HELIX helped push Ms. Fisher out of her comfort zone when she made her pitch on the big stage in front of 100 people to qualify for group coaching. Ms. Fisher was able to impress the coaches and land herself in group coaching. She explained that the group coaching was a great opportunity for her to build on her overall business skills, as well as keeping her highly motivated. When she started Skin RnR, Ms. Fisher had an idea but did not have the knowledge of how to create a business plan, design a customer survey and get her target audience to complete it to make sure she had a viable product. Her group coach, Heather Gramlow, and HELIX were able to help Ms. Fisher create everything that she needed to generate her skincare line. Ms. Fisher being excited about her idea

becoming a reality, she jumped in headfirst and took Skin RnR to the general public.

When Ms. Fisher first heard about the HELIX program, she thought it was only for younger entrepreneurs. When she learned it was for all ages, she was encouraged to sign up and quickly discovered it was the best decision she had made. The group coaching part of the HELIX journey helped Ms. Fisher learn how to improve her business in the areas that she needed help with. It was extremely helpful to have her group coach and groupmate encouraging her weekly. When Ms. Fisher moved into the lead mentorship stage of HELIX, it was more than she expected. HELIX mentors and coaches were able to guide her on how to create proper pricing and evaluate her business costs, which has been a true benefit to Skin RnR. She also learned more about content-building and SEO, which she feels will help Skin RnR move to the next level. Both the group coaching and lead mentorship stages were an invaluable process to Ms. Fisher, Skin RnR and HELIX.

Skin RnR was fortunate to receive one of the COVID relief funds. A portion went to social media campaigns and the other portion went to a fun and creative pivot for Skin RnR. With an increased global initiative to reduce plastic use and switch to more biodegradable packaging, Ms. Fisher decided to create a new line of eco-friendly products while still delivering the skincare products that her existing clients love.

"I'm very grateful to be a part of the HELIX community," she said. "It's an amazing resource for an entrepreneur."

HELIXers Adapting to Change



getemerge.ca

Paulo Meneghel, founder of EMERGE, envisioned the initial concept of the venture in 2016 when he joined the Seneca HELIX Innovation Strand. As an international student from Brazil, Mr. Meneghel did not have any previous knowledge on entrepreneurship, but HELIX has provided him and his team the support and opportunities from concept phase to commercialization phase. Through HELIX, EMERGE has had international exposure in India and in France during the European Innovation Academy, where EMERGE finished in the top 15 of the competition.

EMERGE Virtual Care is a patient-centric mobile application that aims to improve health care access for its users. EMERGE helps patients gain faster access to the right care by providing transparency on the available clinics providing care on demand. By connecting patients to the health care providers through the EMERGE platform, it allows walk-in clinics to deliver better and faster care in the community while saving them time and money, increasing the quality of care and providing exposure of their services.

Along the journey, EMERGE has evolved through many iterations to find the best product and market fit, however, its main vision has always remained the same — to enhance the experience of patients and physicians when seeking and when delivering care. In early 2020, when the COVID-19 pandemic hit, EMERGE saw a huge increase in its value and the positive impact it could bring to Canadians. Through HELIX, EMERGE was awarded an Emergency Fund, which has put EMERGE on track for its biggest pivot — the EMERGE Virtual Care.

The COVID-19 pandemic pushed EMERGE into a technical future that seemed distant, although they knew it was coming. In the health sector, it was no different.

Out of an abundance of caution, most doctors' offices in Ontario closed their doors for in-person appointments in March 2020. Most of the appointments were switched to telephone appointments and EMERGE decided to support patients and physicians to provide a better experience during remote assessments.

EMERGE Virtual Care allows patients to connect virtually with local doctors directly from their home, at no cost, with a valid OHIP card. EMERGE believes that a hybrid health care system (virtual and in person) is the best solution. In addition to the ability for video call appointments, it is also possible to connect with psychologists, receive COVID-19-related information, locate nearby walk-in clinic or hospital if in-person assessment is required.

"The safety of my patients and accessibility to care were important factors when choosing a platform," said Dr. Steven Matlis, who has been using the EMERGE platform for virtual appointments since the start of the pandemic.

During the first wave of COVID-19, EMERGE supported the community by donating more than 500 non-surgical masks and also launched the Coffee for Heroes campaign in partnership with Arkaika Coffee to donate coffee for frontline health care workers.

Launched with the Support of Seneca HELIX

arkaikacoffee.com

Arkaika Coffee is a Colombian coffee retailer located in Toronto specializing in high quality single origin specialty coffee. The cause-driven venture reinvests most of its revenue to support fair trade. Arkaika pays double the regular market price per kilogram to their farmers in Colombia, helping local producers develop and grow with the business, while multiple donations have and will continue to be made in Toronto.



nexushealth.ca

Nexus Health is a digital health startup based out of the Toronto area. Their goal is to create a more responsive and interconnected health care system. Nexus Health plans on accomplishing this through innovative software technologies and their unique medical ID offering. The NexID wristband is their proprietary medical ID that is built using the power of QR codes and universal IDs. It is connected to, and controlled by, the NexHUB mobile app, which they have developed to give the user complete control over their health information.



innscience.ca

InnScience is a research and development collaboration platform that helps small and medium-sized enterprises access new technologies that are not in the market yet. Their solution connects industries with researchers and other relevant stakeholders using intelligent technologies to offer a personalized matchmaking experience. Their matching technology scans user profiles, finds the most relevant partners and invites them to express their interest in your project.

plushura.com

Holistically and consciously crafted, Plushura's organic skincare line is made from fruit butters, marine botanical extracts and other natural ingredients. Their company is rooted in self-care, a commitment to natural skin health and cruelty-free products. They created a range of mindful products, from body scrubs and toners to moisturizers. Plushura takes your skin back to basics and is committed to crafting paraben-free and vegan products that are kind to your skin and to Earth.



Launched with the Support of Seneca HELIX

progoti.ca

Progoti is a Toronto-based social enterprise that makes casual, staple designs while helping improve the lives of garment workers in Bangladesh. Their goal is to spark change in the fashion industry by establishing a direct grassroots link between garment workers and the people wearing their creations. Over time, they hope their approach becomes a reference for alternative business models for social impact.



smartconcil.com

SmartConcil is a platform that automates the financial reconciliation process, helping companies to simplify their financial decisions, control cashflow and easily create financial projections. More than 80 per cent of companies worldwide are using an accounting Software or ERP system, but fewer than 10 per cent have a fully automated process. With SmartConcil, you will focus on growing your business by not having to worry about manual processes.

zealousbabycare.com

Zealous Baby Care Services partners with new parents and connects them with trusted care providers that specialize in newborn night care. The goal of the care providers is to enable parents to have the best prenatal and postnatal experience possible. Prenatal and postnatal care providers mainly go into the parents' homes to carry out the services they are contracted for. They have a large range of services to cater to each family's specific needs.



Career Recharge

WORKSHOPS. EVENTS. MENTORSHIP.

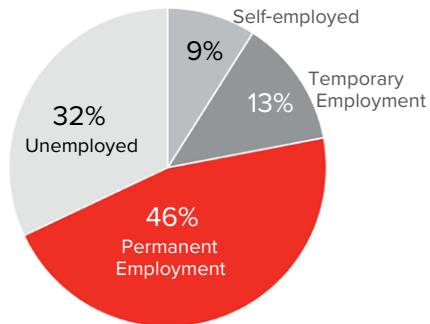
Launched in 2019, Career Recharge is an innovative approach to the challenge of re-skilling mid-career individuals at risk of job loss due to disruptive changes in the labour market. Instead of simply training those individuals for another career, Career Recharge’s model is to change career DNA — helping to transform them into creative thinkers, designers, problem solvers, collaborators, communicators, and to build up resilience as they navigate the ever-changing employment landscape and prepare for the economy of the future.

Our Participants

Our participants identify as:



Over 65% of our participants are employed

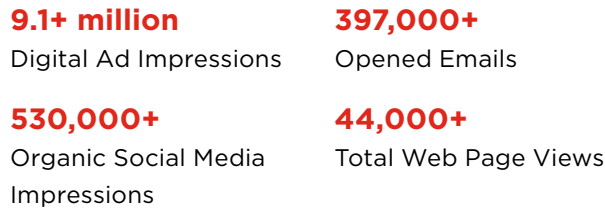


PRESENTED BY



This HELIX initiative, presented by TD, delivers free, virtual workshops every other week that are open to all. It is designed for individuals who want to prepare for their career-future, whether that means re-entering the workforce, advancing in their existing field, changing careers, starting a venture or understanding the impact of technological change on the world of work.

Our Reach



I have been taking Career Recharge workshops nearly every week and I love them! Very educational, inspirational and motivating. Wonderful information for my career development and to learn essential skills for the workplace.”

Diane Wright
Career Recharge participant



“I found Seneca’s Career Recharge workshops to be a wonderful use of my time. Whether you are looking to upgrade your skills or learn new ones, the topics are relevant and useful!”

Bernadine D’Souza
Career Recharge participant

HELIX Change Makers

HELIX coaches, mentors, facilitators and advisors are one of the most impactful aspects of HELIX. They are passionate about supporting the development of new ventures that are actively accelerating through HELIX. They contribute to the venture development of HELIXers and the overall progressive culture of HELIX. They are engaging, approachable and experienced, and provide relevant strategic and tactical guidance to our HELIXers aligned with their stage and goals. They are change-makers.

Coaches

Alan Luk
Heather Gramlow
Jason Presement
Judy Cameron
Perry Smith
Shelly Markel

Mentors

Elliott Atkins
Karen Dubeau
Paul Rivett
Ramy Taraboulsi
Rob Cattle

HELIX Facilitators

Elliott Atkins
InCITEful Series Host
Judy Cameron
Finance for the Entrepreneur
Lucas Chang
HELIX Summer Institute and
INNOVATION Learning Lab

Rob Cattle
HELIX Summer Institute and
INNOVATION Learning Lab
Shelly Markel
Improving Your Impact

HELIX Advisory Committee

The HELIX Advisory Committee is made up of dedicated leaders who provide advice on matters such as strategic direction, international growth, program reviews, fundraising, technology and industry trends. Additionally, council members are strong advocates of HELIX in the broader entrepreneurship ecosystem.

Christina Kakaflikas Sep Assadian
Mike Shaver Stephen Chait
Pat Clifford Sean Stephens
Balinder Rai Parth Patel
Charles Banfield

INNOVATION Strand is facilitated in collaboration with



Career Recharge Facilitators

HELIX's Career Recharge facilitators deliver engaging, interactive virtual workshops every other week to support individuals who want to prepare for their career-future.

Brian Bell

Imran Mouna

Leanna Monardo

Rachel Wong

Caroline Larocque

Jess Joss

Lucas Chang

Sepideh Hashemi
Delkhounason

Chris Magos

Joseph Crangle

Melissa Warner

Shivi Darubra

Cindy Lau-Chan

Kim Morgan

Naki Osutei

Sonia Dhawan

Daphne Magna

Nicole McLean



InCITEful Series Facilitators

The InCITEful series delivers focus fireside conversations with experts from the broader entrepreneurship ecosystem. This monthly series is designed exclusively for ACCELERATING HELIXers, coaches and mentors.

Intellectual Property and Corporate Law

Benjamin Mak Ridout & Maybee LLP

Joe Milstone Caravel Law

Thomas Southmayd Clausehound/DealPrep

Sales and Business Development

Jason Presement Calix

Carissa Cosgrove Shopify

Venture Development from Start to Scale!

Lisa Shi ventureLAB

Andrew Klotz Beyond Media

Anu Bidani STEM Minds

Building Your Team and Managing Staff

Irene Jackman Ontario Centres of Innovation

Parth Patel Tazwiz

Sophia Stone Indie Tech

Crowdfunding/Crowd Financing

Rubsun Ho Crowdmatrix

Shannon Ferguson FanSaves

Entrepreneurial Passion

Jeffery Potvin OPN/The Supporters Fund

Raza Jafari 3D CityScapes

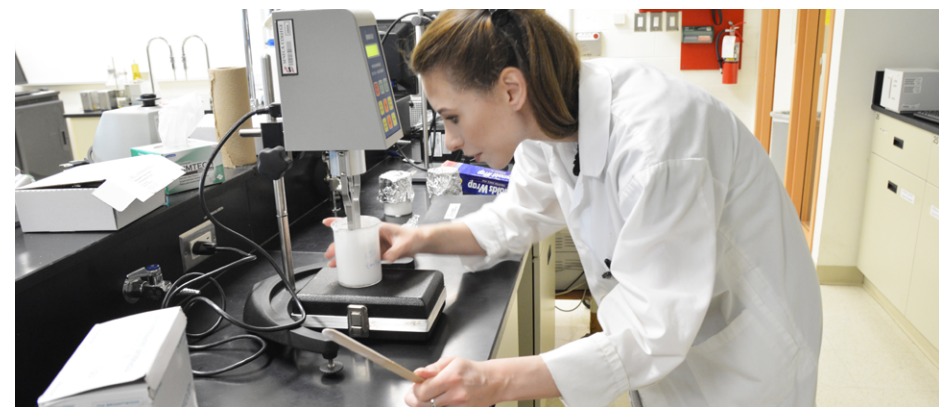
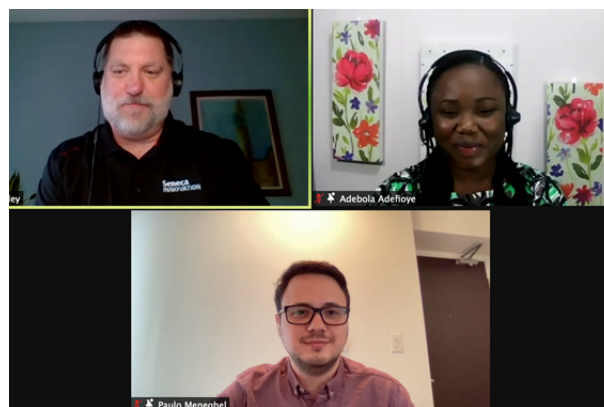
Shawn Hewat Wavy

Celebrating Female Founders

Cristina Italia Seneca Business

Susan Varty HeadStart Copywriting

Darlene Rupke The Petal Academy



Seneca INNOVATION