A Year in Quarantine: Reflections on the COVID-19 Pandemic  p. 04

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Editors:

Dr. Shadi Dalili

Anna Galang

Photo: NASA Johnson, CC BY-NC 2.0
“I (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 River. 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.”

- University of Toronto, Land Acknowledgement
A YEAR IN QUARANTINE: REFLECTIONS ON THE COVID-19 PANDEMIC

mRNA Vaccines
COVID-19, Climate and Environment
Resilience and Emotional State - UTSC Students During the COVID-19 Pandemic

DPES FEATURES

**Faculty:** Dr. Marco Zimmer-De Illusis
**Innovative Teaching:** The Three-Phase Assignment

GSAS EVENTS

Earth Month Photo Contest
Stepping Challenge
Resilience: A vital soft skill for scientists
**Podcast:** Emerging Environments

UNDERGRADUATE

Environmental and Physical Sciences Student Association (EPSA)
The Chemistry Society (CSU)
As of April 16, 2021, Ontario has extended the state of emergency and stay-at-home order until at least May 20th, as new COVID cases continue to reach record highs (Davidson, 2021). Experts fear that a third wave is well underway with the introductions of the variants from the UK and South America, that are more contagious and pose a higher risk of death. According to the Ontario COVID-19 science advisory table, infections by the new variants of concern means a 60% increased risk of death (Pelley, 2021). Combating this will depend on implementing strong public health measures and increased vaccination rates (Davidson, 2021).

**OVERVIEW**

**Worldwide**

As of April 16, 2021
- Infected 139.93 million
- Deaths 3.00 million

**Ontario**

As of April 17, 2021
- Infected 364,353
- Deaths 7,698

**VACCINATION**

**Worldwide**

As of April 16, 2021
- Fully vaccinated 194.81 million (2.50% population)

**Canada**

As of April 16, 2021
- Fully vaccinated 884,000 (2.34% population)

**Ontario**

As of April 17, 2021
- Fully vaccinated 344,244 (2.36% population)

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Sources:
mRNA Vaccines

The term “unprecedented” has been used to describe much about the COVID-19 pandemic and this is true of the vaccines that have been developed as well. This is the first time in history where a new vaccine has been developed in less than four years and the first time that mRNA vaccines have been approved for any disease (Komaroff, 2020). Previously, they were restricted by their instability, high innate immunogenicity, and inefficient in vivo delivery of mRNA, but recent technological advancements have been able to overcome these issues (Pardi et al., 2018).

Messenger RNA (mRNA) based therapies were first reported in 1990 when reporter gene mRNAs (genes that when introduced into target cells produce a protein receptor or enzyme) were injected into mice and protein production was detected (Pardi et al., 2018).

Non-replicating mRNA vaccines are further distinguished by their delivery method: direct in vivo injection, like the current COVID-19 vaccines (Public Health Ontario), and ex vivo loading of dendritic cells, which are being pursued for cell-mediated immunity against cancer and as a therapeutic vaccine for HIV-1 (Pardi et al., 2018).

mRNA vaccines work by having mRNA enter and deliver instructions to the cells in our body to produce the spike antigen of interest from the virus (see Figure 1; Public Health Ontario). This antigen is displayed on the surface of the cell and triggers an immune response, production of antibodies, and a cytotoxic T lymphocyte (CTL) response (Public Health Ontario).

Before COVID-19, mRNA based cancer vaccines had been tested in multiple clinical trials and studies had demonstrated the effectiveness of mRNA vaccines for the Ebola virus, Zika virus, and influenza virus (Pardi et al., 2018).

There are currently two major types of RNA vaccines: non-replicating mRNA and virally derived, self-amplifying RNA (Pardi et al., 2018). The latter contains not only the code of the viral antigen, but also the viral replication machinery to allow for intracellular RNA amplification (Pardi et al., 2018).

The activation of T cells (cell-mediated) immune response helps ensure long-term protection against the virus (Public Health Ontario).

mRNA vaccines hold many advantages to both traditional inoculation methods and other therapeutic approaches currently being pursued like DNA vaccines and viral vector-based vaccines. mRNA vaccines are non-infectious and have no risk of insertional mutagenesis, which is creating mutations in DNA by insertion of base pairs (Pardi et al., 2018).

Figure 1: How mRNA Vaccines Work
Source: https://www.oligotherapeutics.org/facts-about-mrna-vaccines-and-the-decades-of-research-that-went-into-creating-them/
They can also be degraded by normal cellular processes, further increasing its safety, and its in vivo half-life regulated by delivery methods and other modifications (Pardi et al., 2018). Unlike viral vector vaccines, there is no issue of pre-existing immunity that will cause the body to produce neutralizing antibodies that reduce the vaccine efficacy (Ura, Okuda, & Shimada, 2014).

The Pfizer-BioNTech mRNA vaccine (BNT162b2) was one of the first vaccines to be developed and approved for usage in Canada and has a 94-95% effectiveness as compared to the AstraZeneca viral vector-based vaccine with 62% efficacy (see Table 1). Production of mRNA is also rapid and simple and easily scalable by Good Manufacturing Practices (GMP) production (Pardi et al., 2018).

As mentioned, the development of mRNA vaccines for commercial usage required the advancement of several technologies. Naked mRNA is degraded by extracellular RNases and does not enter cells efficiently. A variety of transfection reagents have been developed to facilitate cellular uptake and increase stability as well as optimizing the 5’ and 3’ untranslated regions and poly(A) tail of the mRNA strand (Pardi et al., 2018).

It might be too soon to say that mRNA vaccine technology is the way of the future, but the current large scale trial run in the COVID-19 pandemic has shown it to be a promising therapeutic tool. Viral vector-based, DNA-based, and protein-based therapeutic approaches are currently being explored in the field as well.

### Table 1: Approved vaccines by Health Canada as of March 28, 2021

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>TYPE</th>
<th>APPROVED</th>
<th>DOSES</th>
<th>EFFECTIVENESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pfizer-BioNTech1</td>
<td>mRNA</td>
<td>December 9, 2020</td>
<td>2</td>
<td>94-95%</td>
</tr>
<tr>
<td>Moderna1</td>
<td>mRNA</td>
<td>December 23, 2020</td>
<td>2</td>
<td>94-95%</td>
</tr>
<tr>
<td>AstraZeneca2</td>
<td>Viral vector-based</td>
<td>February 26, 2020</td>
<td>2</td>
<td>62%</td>
</tr>
<tr>
<td>Janssen (Johnson &amp; Johnson)3</td>
<td>Viral vector-based</td>
<td>March 5, 2021</td>
<td>1</td>
<td>66%</td>
</tr>
</tbody>
</table>


Sources:


**COVID-19, Climate and Environment**

Pictures of clear city skylines around the world floated around on the internet as borders closed and quarantine policies were enacted during the beginning of the pandemic last March. There was hope that the pandemic would have a positive impact on reducing atmospheric pollution and CO2 emissions. While the emergency lockdowns have improved ambient air quality in many countries like China, Korea, and the United States (Mori et al., 2020), the latter did not hold true. Daily global CO2 emissions decreased by 17% in early April 2020 compared with the mean 2019 levels (Le Quéré et al., 2020), and fell by 6.4% or 2.3 billion tonnes in 2020 (Tollefson, 2021), but these decreases are only temporary, with some estimating an even higher rebound in emissions once lockdowns are over (Le Quéré et al., 2020). In addition, recent modeling by Gettelman et al. (2021) indicates that warming due to aerosol changes during COVID-19 were greater than the cooling effects of reduced CO2, ozone, and contrail, though the impact on global surface temperature is small (+0.03 K peak). Energy consumption patterns have only shifted, not reduced, as the current economic, transport and energy systems remain in place.

The effect on air pollution was much more significant. During the February lockdowns in China, aerosol optical depth was reduced (Diamond & Wood, 2020 as cited in Gettelman et al., 2021), but other regions experienced more pollution (Gettelman et al., 2021). There was a reduction in pollutants like NOx and PM, but in some locations this has accompanied increases in ground-level ozone (Le et al., 2020 as cited in Mori et al., 2020).

Beyond just emissions, the COVID-19 pandemic has also resulted in an increase in medical waste from the increasing usage of disposable masks, gloves and other medical devices (Mori et al., 2020). This is especially a concern in developing countries where waste treatment systems are vulnerable, and in facilities that lack systems for medical waste management, such as nursing homes or smaller hospitals (“Institute for Global”, 2020).

The focus should be on the aftermath, a post-crisis “Green Recovery” which calls for an environmentally sustainable recovery from the economic crisis caused by COVID-19 that tackles climate change and other environmental priorities (Mori et al., 2020). There are concerns that the pandemic would cause a set-back in climate action, as governments and industry may delay Green New Deal programmes and weaken vehicle emission standards and other emissions reduction strategies (Le Quéré et al., 2020).

Some, like the European Union and China, have confirmed they will commit to their carbon neutrality goals (Mori et al., 2020). The Institute for Global Environmental Strategies has outlined three broad categories for green recovery: large-scale investment in renewable energy and greening of land transportation, imposing environmental conditions on bailouts of industries, and redesign of current systems and lifestyle changes, like teleworking, promotion of decentralized society and introduction of a circular economy (Mori et al., 2020).
How the world responds post-crisis will be critical to tackling not only climate change, but also to build resilience for pandemics like COVID-19 that are increasingly likely to occur in the future (World Economic Forum, 2019; Smith et al., 2014). The virus is believed to have originated from a wet market in Wuhan, China and research suggests that human exploitation of wildlife, habitat fragmentation and land use changes may lead to future increased frequency of animal to human virus spillover (“Institute for Global”, 2020).

Air pollution is also a major factor that increases the risk for serious illness and premature death from COVID-19, due to the higher proportion of residents suffering from respiratory illnesses (Mori et al., 2020). While the crisis is not over yet, the planning for the future must begin now. The United Nations Environment Programme (UNEP) has stated that “prevention of future outbreaks requires properly addressing threats to ecosystems and wildlife, including habitat loss, illegal trade, pollution and climate change” (Mori et al., 2020). Health, climate, and economy are interconnected spheres that must be addressed on the road to recovery by the global community.

S o u r c e s :  

RESILIENCE AND EMOTIONAL STATE – UTSC STUDENTS DURING THE COVID-19 PANDEMIC

“Why are you not taking care of yourself?” and “Why are you not practising precautionary measures AND you know that you are not?”

These are the questions Professor Gerald C. Cupchik, Professor of Psychology at UTSC is asking, regarding those “at risk” students identified in the survey “Taking the Pulse of the UTSC Student Community During the COVID-19 Pandemic”. The anonymous survey (n=859), prepared with the assistance of Elizabeth Kiessos, Registered Nurse from the Health & Wellness Center, was sent out during September 2020 by the Office of the Registrar, looking at the connection between emotional control, which regulates anxiety and health threats posed by the pandemic, and danger control, which is reflected by engaging in appropriate precautionary measures.

The survey consisted of subsurveys to establish emotional state, risk and feelings about COVID-19, and resilience and engagement in 10 Precautionary Health Actions, which included physical distancing (staying 2 meters apart), maintaining hobbies, healthy sleeping and eating habits. Through regression analysis, they were able to determine which qualities best predicted students engaging in precautionary activity. What they found was that “at risk” students (those in poor current health or high health risk, those having difficulties focusing on everyday tasks and/or work due to anxiety and financial concerns) are in a negative emotional state and don’t practice precautionary activity, and do so KNOWINGLY! There was a gender gap as well, with students identifying as female more likely to engage in precautionary measures.

The issue here is not that they’re unaware. “They’re not practising precautionary measures, and they know they are not,” Cupchik says, “They’re in a bubble… a mental state [...]. Resilience goes hand in hand with your emotional state [and] people in a negative emotion state…. their stores are burnt out."
These students usually lack physical and emotional support at home; their current state is often exacerbated by the demands at home and the breakdown of the physical and mental barriers that separate work/school from home/private life. Their negative emotional state shows a bleak view of the future and ability to overcome challenges. Unreliable news from social media platforms rather than official channels may further feed into this negative echo chamber, though instead of channelling anger at the government or university, it is internalized as a helplessness or “it is what it is” mindset. So while these students are aware they are not practising precautionary activity, it may not be their top priority or they lack the energy and emotional control to do anything otherwise.

Professor Cupchik stresses the importance of faculty and staff at UTSC to be understanding and open at this time. "Right now, I think it’s important for people not to feel alone...they're others like me...not doing precautionary measures. If you can admit the emotions to yourself, if you can admit you have stress...you can come out of the bubble," he says, while also speaking about making lectures not an added stress, but a time when they can get away from it.

At the current state, with Ontario reporting a record-breaking 4,736 cases on a single day as of April 15th, the COVID crisis does not appear to be ending anytime soon. Students will require support to get through this on-going physical and mental health crisis. Elizabeth Kiosses, M.N and R.N from the Health & Wellness Center also has some words to share:

"It’s important we continue to work together to create opportunities for students who are not coping, who are stuck in this bubble, and to reach out. Let’s use our networks through classes and programming to validate they are not alone, provide hope as a community that we will overcome the pandemic and invite students to seek out support."

Let’s promote our student groups, such as clubs and departmental student associations, who have done tremendous work this year, to provide opportunities for student connection. Let’s encourage all staff, faculty and students to educate themselves by taking mental health training, such as Identify, Assist, Refer and address the stigma associated with asking for help. As a supportive community, we can do our part to reach out to our students and connect them to resources where they can feel empowered to make positive decisions in their lives during these times of crisis.

The DPES editorial team would like to thank Professor Cupchik for taking the time to speak to us about this project. You can find more about Professor Cupchik and his work here: 
https://www.utsc.utoronto.ca/people/cupchik/
and a recording on E-symposium on Disasters and Literature at: https://youtu.be/CtcCiDJMmUU

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**RESOURCES IF YOU OR SOMEONE YOU KNOW NEEDS SUPPORT:**

**FOR STUDENTS**

**Health & Wellness Centre** - for same day appointments call 416-287-7065 or health-services@utsc.utoronto.ca

**My SSP App** - 24 hours/7 days/week counselling for all UoT students through phone or chat mentalhealth.utoronto.ca - tri-campus student mental health resource website

**FOR NEW CANADIANS**

**Wellness Together Canada** - new mental health portal provides free counselling, toolkits and resources for all Canadians.
**About me and my career journey**

I started my university education dead-set on going to med school (as many of my current students do!) but after taking second year inorganic chemistry and making a bunch of amazing compounds in the lab with really neat looking glassware, I was hooked. I finished my undergraduate with a major in chemistry at U of T St. George campus and went right into my Masters and Ph.D with Professor Bob Morris at U of T St. George. Bob was a great mentor for me, and my fellow graduate students were a pleasure to work with. My research focused on the asymmetric hydrogenation of polar multiple bonds with iron, ruthenium, and osmium-based catalysts. I was able to TA many of the same courses that I took as an undergrad, which was a really nice experience.

I finished my Ph.D in 2009 and went on to post-doc two years with Professor Ulrich Fekl at UTM. Professor Fekl was going on sabbatical and I was able to fill in for his third-year inorganic chemistry course – my first taste of lecturing at the university level.

From there, I knew I was going to be an educator and so I decided I needed to go and do more school! I finished my B. Ed. at OISE U of T in 2012 and then decided to try my hand teaching high school in Aylesbury, a small town just outside of London, U.K. After one year and many great experiences (it is really easy to get to mainland Europe from London), I decided to focus on post-secondary education. I returned to Toronto in 2013 and started teaching as a sessional instructor at George Brown College and Seneca College. I taught many diverse subjects including math for culinary students, accounting, and of course chemistry.

In 2017, my dream job came up at UTSC and now I am here as full-time faculty!

**What is the most rewarding part of your job?**

I love sharing chemistry with students either in lecture or lab. It is a great feeling both discussing problems and theories in lecture and having discussions with curious students and seeing students isolate their final products or prepare samples for NMR.

**What is something interesting the department doesn't know about you?**

I started collecting comic books since I was in grade 6 (and I still do…)

**What is your biggest accomplishment?**

My biggest milestone was being hired to teach at UTSC. I’m a U of T “lifer” (I did my undergrad, grad school, teacher’s college and post doc spread out over all three campuses!).

**What led you on this career path?**

My inorganic lab coordinator and TA were big influences on my choice of going into chemistry and ultimately teaching chemistry. They made the material really interesting and the hands-on experiences in the lab making colourful inorganic compounds hooked me!

**What are the topics you enjoy teaching?**

The topics I enjoy teaching are those that I can teach while telling a story at the same time. For me, chemical bonding and the modern structure of the atom have a rich history full of interesting people with interesting stories. As well, atomic structure and bonding are very relevant to an undergraduate understanding of chemistry, so I think this is my favourite topic to teach.
What are the challenges of your current position?

There are many challenges to my position. Maybe the biggest one for me that I didn’t expect was how many different things a faculty member at UTSC is involved in beyond just teaching. There are workshops to attend, committees to participate in, community outreach events to organize, conferences to join, grants to apply for, and last but not least, working with students on educational research and teaching materials. Balancing my time between teaching and all of these other amazing opportunities is still a big challenge for me (the outlook calendar is my friend 😊)

Where do you hope to be career-wise in 10 years?

Working at UTSC has really taught me the value of collaboration and learning from others. I would very much like to try teaching at another university during a sabbatical.

Any Recent Accomplishments?

I am very proud to be a part of the writing team for our first-year textbook/resource package. We were awarded a CTL grant to work with a technical illustrator to develop figures and they are looking awesome. Here is one of my favourites on redox chemistry and chemical bonding.
With the ongoing COVID-19 pandemic, instructors in practical courses such as Chemistry have been focusing on enhancing student experience through remote, virtual learning. When asked about the pandemic and its impacts on teaching, Professor Marco Zimmer-De Iuliis has tried to keep many aspects of his course the same, as much as possible. This meant synchronous delivery for lectures to ensure first-year students are on track and not cramming for exams. He spoke about the difficulties with transitioning testing online, particularly the amount of time to transfer questions onto the Quercus platform. Additionally, the timezone differences for students abroad and absences have been difficult to accommodate. Despite the current situation, Dr. Marco Zimmer-De Iuliis has approached his teaching with the intent for students to engage and develop their research skills through this innovative and dynamic idea: the three-phase research assignment.

At UTSC, Professor Marco Zimmer-De Iuliis and a group of first year chemistry professors implemented the three-phase research assignment as a way to incorporate more writing in the first-year chemistry curriculum. Delivery of this assignment came about through conversations with the psychology department's Dr. Steve Joordens and his established platform, PeerScholar. Through additional help from the UTSC Centre of Teaching and Learning (CTL), they were able to accumulate resources such as self-study modules for students.

These include how-to videos on proper ACS citation, giving constructive feedback, and writing a scientific paper. The bulk of the assignment is conducted on PeerScholar, where students can submit their work and provide feedback for their peers.

Students begin the first phase of the assignment by drafting their research assignment on their topic of choice. There are a hundred different topics related to concepts of first-year chemistry to choose from. They are encouraged to use resources created by CTL, Web of Science and SciFinder, to compose their assignment. This allows students to advance their writing style and develop their research skills. As students fresh from high-school, this is fundamental to their toolkit as they advance into their upper years. Once students, have written their draft, they submit it on the PeerScholar site to begin the second phase of this assignment.

**Summary**

First-year chemistry students are given the ability to develop their research skills through a three-phase research assignment. Utilizing the PeerScholar program, students experience writing a research paper, while receiving and giving feedback from their peers. This innovative teaching idea allows for a dynamic and engaging classroom, that garners skills essential for undergraduate students.

**THE THREE PHASES:**

**Phase 1:** Drafting the Research Assignment

**Phase 2:** Peer-Review

**Phase 3:** Final Draft & Submission

Innovative Teaching Highlight

The Three-Phase Research Assignment

Dr. Marco Zimmer-De Iuliis

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Innovative Teaching Highlight

The Three-Phase Research Assignment

Dr. Marco Zimmer-De Iuliis
In the second phase, students are given one to two articles written by their peers to provide feedback on. This phase allows for students to learn and establish critical and constructive thinking through assessing their peers' work. Using the module resources, they learn to offer proper descriptive feedback through examples of previous students' comments. Using these tools, students are able to assess and formulate constructive feedback on their peers' work on the PeerScholar platform. They are able to rate the submissions title, body, conclusion, ACS citation style, and the organization of the ideas in the assignment. In this phase, students will understand how scientific work is evaluated, and that articles require peer-review and feedback before they are published.

Once students receive their reviewed submission, they will then begin re-writing their final draft. Based on their peers' comments, they will edit their work before submitting their final article for TAs to mark.

2,200 first-year students in the span of two semesters have been able to participate in this research assignment. The feedback has been positive and has greatly aided in the development of various skills for first-year chemistry students.

The DPES editorial team would like to congratulate Professor Marco Zimmer-De Iuliis and his colleagues for developing an amazing project and thank him for taking the time to speak to us.
Like your favourite photos or Bid/purchase photos (will be printed and enlarged to 8x10" and available for pickup)

Money raised from bidding will be donated to Rouge Valley Conservation Centre to help local conservation issues.

More details regarding bidding and contest platforms can be found here

GSAS STEPPING CHALLENGE

Checkout the views from the Stepping into Spring Challenge

Interested in joining the GSAS Stepping Challenge?

Join our discord and pacer to be in the loop for upcoming summer stepping challenges and win great prizes!
Resilience is our ability to navigate adversity, to learn from challenges, and to bounce back stronger. While working in science is extremely exciting and rewarding, it also comes with high levels of stress, uncertainty, and frustration. Thus, to thrive in science you must develop and build your resilience and remain resilient!

No matter whether a person is resilient or not, we can become resilient or boost our resilience every day. We can learn to be resilient!

During this workshop, Maria will show you the science behind resilience, and the methods you can use to improve and exercise this important skill. Through sharing her testimony and what she has learned during these years about resilience, this workshop can help you uncover the meaning of being resilient in science. Come and learn how the daily practice of this skill will help you improve your work productivity and protect your mental health.

We hope to see you there

**RESILIENCE: A VITAL SOFT SKILL FOR SCIENTISTS**

**GSAS EVENTS**

GRADUATE STUDENT ASSOCIATION AT SCARBOROUGH

**A COFFEE BREAK WORKSHOP**

LED BY MARIA CECILIA GIMENEZ, PHD AND SERENE MOUSSAOUI

**COME LEARN ABOUT:**

THE SCIENCE OF RESILIENCE

METHODS YOU CAN USE TO IMPROVE THIS SKILL (E.G. BREATHING EXERCISES)

THE DAILY PRACTICE OF RESILIENCE

**THURSDAY APRIL 29TH, 2021**

12:00 PM - 1:30 PM

**REGISTER HERE!**

https://docs.google.com/.../1FAIpQLScSag0yH0y.../viewform

**JOIN US ON ZOOM!**

https://utoronto.zoom.us/j/86767908710#success

**ABOUT THE SPEAKERS**

My name is Maria Cecilia Gimenez; I am an international postdoctoral fellow researcher at UTSC. I started research and teaching very early during my undergraduate studies, and since then, I have been devoted to investigating the cell biology of viral infections, and teaching students about viruses. As much as I enjoy and love working in science, I often also feel heavily overwhelmed by some inherent aspects of this profession. As a scientist in development, I have tried so hard to bust my resilience, mainly by studying the science behind resilience and by practicing how to improve and sustain it. Without a doubt, building resilience has benefited me in many aspects of my professional and personal life, not only by increasing my work productivity, but also by improving my mental health and wellbeing.

My name is Serene Moussaoui and I'm a new graduate student in Dr. Terebiznik's lab. One thing that has helped me reach this point of my journey is learning to manage my stress. In my high-school physical education class, I was exposed to restorative yoga and mindfulness. Restorative yoga and mindfulness significantly decreased my anxiety levels in high-school and this experience prompted me to learn more about it. I began by leading restorative yoga sessions for young teenage girls and eventually led mindfulness and breathing exercises for adults at my workplace. To this day, I practice mindfulness and this has helped me manage these stressful times with the global pandemic. I am so excited to share this experience with you.
Karen received her BSc. in Applied Mathematics and Mechanical Engineering from Queen’s University in 2002, and her Master’s in Environmental Science and Engineering from Caltech in 2004. After a short stint in environmental consulting, she completed her PhD in Atmospheric Physics with Paul Kushner at the University of Toronto (St. George) in 2011. Karen’s research focuses on climate and atmospheric variability and change in the mid-latitude and polar regions. She is currently an Assistant Professor (Teaching Stream) and the Director of the Climate Change Impacts and Adaptation Professional Masters of Environmental Science program at the University of Toronto-Scarborough.

Stu received his BSc. in Environmental Science from the University of Toronto (St. George) in 2012, and then studied under Professors Marc Cadotte and Marney Isaac at the University of Toronto-Scarborough towards the completion of his PhD in 2017. His graduate work focused on the ecology and management of invasive plant species in Ontario, and he has published extensively on a variety of conservation and ecology subjects. He is currently an Assistant Professor (Teaching Stream) in the Professional Masters of Environmental Science at the University of Toronto Scarborough where he teaches Conservation Policy, Professional Scientific Literacy and Topics in Applied Biodiversity.
WE ARE HIRING!

AS THIS ACADEMIC YEAR IS COMING TO A CLOSE, WE ARE LOOKING FOR PASSIONATE UTSC STUDENTS WHO WOULD LOVE TO HELP IMPROVE THE STUDENT EXPERIENCE FOR STUDENTS IN THE ENVIRONMENTAL AND PHYSICAL SCIENCES FACULTY FOR THE 2021-2022 ACADEMIC YEAR!

Available Positions

- Discipline Directors (5)
- Graphic Designers (2)
- Social Media Assistant (1)
- Outreach Coordinator (1)
- Events Coordinator (2)
- Webmaster (1)
- Video Technology Assistant (2)
- Financial Manager (1)

Deadline: April 30th at 11:59 pm

Applications are available in our website: myepsa.ca
Contact us for any questions
Available Positions:

**VICE PRESIDENT**

**DIRECTOR OF MARKETING (3)**
- Graphic Design
- Social Media
- Webmaster

**DIRECTOR OF FUNDING AND PARTNERSHIP**

**EVENTS DIRECTOR (2)**

**OUTREACH DIRECTOR**

**CHEMISTRY AID DIRECTOR**

*For details on the positions, please see shorturl.at/ikrL6*

**Deadline:** April 26th at 11:59 pm

To apply, complete the following Google Form and an e-mail with your attached resume sent to utsc.chem.society@gmail.com with "Position Title – Your Name" as the subject line.

*For more information, see our Facebook page: https://www.facebook.com/CSUforU*
DPES Programs Summary

Total Programs: 16

Coop Programs: 9

Chemistry
- Chemistry Specialist
- Chemistry Major
- Biochemistry Major
- Biological Chemistry Specialist
- Environmental Chemistry Specialist

Environmental Science
- Environmental Biology Specialist
- Environmental Geoscience Specialist
- Environmental Physics Specialist
- Environmental Science Major
- Environmental Science Minor
- Natural Sciences and Environmental Management Minor

Environmental Studies
- Environmental Studies Major

Physics and Astrophysics
- Physics and Astrophysics Specialist
- Physics and Astrophysics Major
- Physical and Mathematical Sciences Specialist
- Physical Sciences Major

Co-op
- Chemistry Specialist - Coop
- Chemistry Major - Coop
- Biochemistry Major - Coop
- Biological Chemistry Specialist – Coop
- Environmental Chemistry Specialist – Coop
- Environmental Biology Specialist-Coop
- Environmental Geoscience Specialist-Coop
- Environmental Physics Specialist-Coop
- Environmental Science Major-Coop

Combined Degree Programs

Honours Bachelor of Science / Master of Engineering

Honours Bachelor of Science / Master of Environmental Science

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