



UNIVERSITY OF  
**TORONTO**  
SCARBOROUGH

**DECEMBER 2020**

**DEPT. OF PHYSICAL AND  
ENVIRONMENTAL SCIENCE**

UNIVERSITY OF  
**TORONTO**  
SCARBOROUGH

# DPES

**DIGEST**

Mental Health and  
the Pandemic  
p. 04

CTL Teaching  
Awardees  
p. 06

Profiles  
p. 10

DPES Publications,  
TRACES & GSAS  
p. 16

**EDITORS:**

**DR. SHADI  
DALILI**

**JESSIE  
LIU**

**JIA YI  
FAN**

**Photo: UTSC**





*“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



Photo: Chai Chen

---

# C O N T E N T S

---

04

## **MENTAL HEALTH AND THE PANDEMIC**

Current Research  
Mental Health Resources  
Tips for Keeping Connected & Combating  
Social Isolation  
DPES and General Campus Clubs

## **CTL TEACHING AWARDEES**

Dr. Heidi Daxberger  
Dr. Stuart Livingstone

06

10

## **PROFILES**

Staff: Dr. Pasquale Benvenuto  
Alumni: Arnon Ho  
Alumni: Ashley McGrath  
Graduate Student: Ariola Visha

## **DPES PUBLICATIONS, TRACES, & GSAS RECRUITMENT**

2020 DPES Publications List  
Research Facility Profile: TRACES  
GSAS Executive Recruitment

16

# MENTAL HEALTH AND THE PANDEMIC

## Impacts of Social Isolation



WRITTEN BY

YAO YAN HUANG

The holidays are usually a time for friends and family gatherings. This year, however, as the COVID-19 pandemic is still raging with over 2000 new daily cases in Ontario (as of December 16th, 2020), strict lockdowns have been implemented in the attempt to curb infections and protect the most vulnerable populations. This measure means that, for many of us, vacation plans have to be cancelled and family members are grounded overseas. For some people, this situation is a good thing. Not all of us have ideal family conditions or like to be thrown around crowded Christmas parties and New Year ball drops. But with the financial burden from job losses, closed businesses, and the ever-present health concerns, the psychological impacts of isolation only compounds on existing stresses. For many students, these circumstances may mean that after a stressful semester of studying in isolation, the holidays will not be much different.

### Current Research

Symptoms of depression and other mental illnesses are common following disasters and pandemics (Saltzman, Hansel & Bordnick, 2020). The psychological impacts of COVID-19 are still being studied, but several early studies have shown that, in addition to carrying the highest mortality risk (WHO, 2020), the elderly suffer the greatest impacts from social isolation. In a recent review of 41 documents on the impact of social isolation due to the COVID-19 pandemic on the mental and physical health of older people, the main outcomes reported were anxiety, depression, poor sleep quality, and physical inactivity during the isolation period (Sepúlveda-Loyola et al., 2020). In addition, another study found that “the impact may be disproportionately amplified in those with pre-existing mental illness, who are often suffering from loneliness and social isolation prior to the enhanced distancing from others imposed by the COVID-19 pandemic public health measures” (Hwang et al., 2020), like the elderly who may also have difficulties connecting through technology.

These findings do not mean that young people are unaffected. A study on Chinese college students (n=992) has shown that young people also experience poor sleep quality, greater loneliness, depressive symptoms, and family conflicts due to

being confined with their relatives at close quarters (Chen, Sun & Feng, 2020). Once again, there is a greater impact on those with pre-existing mental illnesses, especially OCD, hypochondria, depression, and neurasthenia (Chen, Sun & Feng, 2020). However, the opposite has also been reported. A survey done by the University of McGill and University of Toronto (n=773) found that students *without* pre-existing mental health concerns experienced greater psychological impacts than those *with* pre-existing problems (Hamza et al., 2020). This difference may be influenced by other factors like sample bias, established mental health services and support, and the extent of quarantine measures and cultural differences around mental health. The current literature may not be definitive, but nonetheless, social isolation caused or exacerbated by the pandemic is having detrimental effects on our collective mental health.

### Mental Health Resources

The Health and Wellness Centre provides students with mental health support and resources at UTSC:

<https://www.utoronto.ca/hwc/mental-health-resources-0>.

You are still eligible for this service even if you have opted out of the SCSU Health & Dental plan.



You can also book same-day virtual and in-person appointments with the Health and Wellness Center at 416-287-7065 or email [at\\_health-services@utsc.utoronto.ca](mailto:at_health-services@utsc.utoronto.ca). These appointments are approximately 30-45 minutes in length.

They also offer Group Therapy sessions, with weekly teaching Dialectical Behavior Therapy skills and drop-in sessions around various topics like managing anxiety, self-acceptance, and a LGBT+ support group. See the schedule and list of programming here: [www.utsc.utoronto.ca/hwc/group-therapy-schedule](http://www.utsc.utoronto.ca/hwc/group-therapy-schedule)

In addition, UTSC provides all students with immediate and/or ongoing 24/7 counselling support using the MY SSP App (MY Student Support Program), which you can download, or call 1-844-451-9700.

Ontario has currently dedicated \$12 million to mental health during COVID-19, which includes funding to support frontline workers and virtual services like Internet-Based Cognitive Behaviour Therapy (iCBT) and Kids Help Phone. This and other COVID-19 support can be found on their site: [www.ontario.ca/page/covid-19-support-people#section-4](http://www.ontario.ca/page/covid-19-support-people#section-4)

## Tips for Keeping Connected & Combating Social Isolation

Here are some ways to feel connected despite social distancing (adapted from CDC resources, CAMH, Hwang et al., 2020 and others).

**Maintaining social connections with technology:** Technology has luckily enabled us to talk face-to-face with others from the comfort of our home. Zoom and other video and voice calling platforms are a great way to keep in contact with friends and family while staying safe. You can still spend time together through online social activities like watching movies or playing

games. Many student clubs on campus are hosting games nights too.

**Structured days:** With most classes moving online and companies enacting work from home policies, it can be difficult to stay focused throughout the day. Keeping a regular structure can help maintain a sense of normality. Creating a separate workspace, either a room or the kitchen table, can also help keeping focus. Remember to also take breaks, stretch your legs, and physically exercise between all the screen time!

**Maintain physical activities:** Gyms are closed, but you can work out in your home even without fancy equipment. Exercising with a friend on video call can also be a great way to keep motivated and you'll forget any awkwardness by the time your legs are aching, and you are still clueless about how to do the new BTS dance. Brief outdoor activities are still encouraged if you wear a mask and retain an appropriate two-meter distance.

**Stay informed but avoid overexposure:** It's important to keep up with the newest health regulations and updates from reliable sources, but overexposure can increase anxiety and feelings of helplessness. Take a break from social media and the news.

## DPES and General Campus Clubs

- EPSA is running physics and chemistry tutoring online as well as social events. Link to their Discord server: <https://discord.gg/SWPexY8>
- CSU also runs tutoring, alumni panels, and professors panels. Their Discord server: <https://discord.gg/SWPexY8>
- Regenes UTSC has a community Discord server and will be running another Games Night in January: <https://discord.gg/2yvXMUJfZ4>
- U of T GradLife also hosts events advertised on their Facebook page: <https://www.facebook.com/groups/uoftgradlife>

## Conclusions

The impacts of isolation may seem minor compared to the cataclysmic repercussions of the pandemic, but they must be talked about. Social support and community ties play a crucial role in mental health recovery and promoting resilience following disasters (Saltzman, Hansel & Bordnick, 2020). Universities, governments, and other institutions need to consider the impacts of reduced or changed social connection and needs during recovery. We may be physically separated, but as a community, we must continue to stay connected and work together. This holiday season, follow public health guidelines, be kinder than usual, and reach out to the more vulnerable, and know that the people around you are looking out for you.

## References

Chen, B., Sun, J., & Feng, Y. (2020). How Have COVID-19 Isolation Policies Affected Young People's Mental Health? – Evidence From Chinese College Students. *Frontiers in Psychology*, 11(June). <https://doi.org/10.3389/fpsyg.2020.01529>

Hamza, C. A., Ewing, L., Heath, N. L., & Goldstein, A. L. (2020). When Social Isolation Is Nothing New: A Longitudinal Study Psychological Distress During COVID-19 Among University Students With and

Without Preexisting Mental Health Concerns. *Canadian Psychology*. <https://doi.org/10.1037/cap0000255>

Hwang, T. J., Rabheru, K., Peisah, C., Reichman, W., & Ikeda, M. (2020). Loneliness and social isolation during the COVID-19 pandemic. *International psychogeriatrics*, 32(10), 1217–1220. <https://doi.org/10.1017/S1041610220000988>

Saltzman, L. Y., Hansel, T. C., & Bordnick, P. S. (2020). Loneliness, Isolation, and Social Support Factors in Post-COVID-19 Mental Health. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12, 55–57. <https://doi.org/10.1037/tra0000703>

Sepúlveda-Loyola, W., Rodríguez-Sánchez, I., Pérez-Rodríguez, P., Ganz, F., Torralba, R., Oliveira, D. V., & Rodríguez-Mañas, L. (2020). Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. *The Journal of Nutrition, Health & Aging*, 1–10. Advance online publication. <https://doi.org/10.1007/s12603-020-1469-2>

WHO. (2020). Coronavirus disease 2019 (COVID-19) Situation Report – 89. [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200418-sitrep-89-covid-19.pdf?sfvrsn=3643dd38\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200418-sitrep-89-covid-19.pdf?sfvrsn=3643dd38_2)

# CTL TEACHING AWARDS

The UTSC Teaching Awards from the Center for Teaching and Learning honour nine educators every year with exceptional teaching accomplishments or promise. We are proud to highlight the 2020 awardees from our own department, **Dr. Heidi Daxberger** and **Dr. Stuart Livingstone**!

## DR. HEIDI DAXBERGER

Assistant Professor, Department of Physical and Environmental Science

Ph.D., McMaster University - 2013

My name is Heidi Daxberger and I have been a teaching stream faculty member in the Dept. of Phys. & Env. Sci. since 2014. I am a geologist and I am specialized in Structural Geology (Masters, PhD).

I am German (from Southern Bavaria in the South of Germany) and after finishing my undergraduate-masters diploma in Erlangen (Geo-Center Northern Bavaria, University of Erlangen, Germany), I came to Canada to do my PhD at McMaster University in 2010. I finished in mid-2013, and as I liked Canada, I stayed. Before I started teaching for DPES, I taught for one term at McMaster (Winter Term 2014).

I love to learn about rocks and I love hiking, so geology just fit nicely. I enjoy being outside and go mapping. I find it fascinating how old rocks can be and what ancient events they record. And they are often just stunning with their colors and patterns. I enjoy teaching the students about minerals, rocks, and fossils, as it often opens their eyes to what is around them. The interested students walk differently through their environment after taking the courses. For example, they often say afterwards that they go out more often for hikes and to investigate sites in the region (Badlands, Escarpment, Niagara Gorge etc.). They start looking at limestone blocks and try to find fossils.

It is also a pleasure to take the students out for field trips and get them to enjoy the outdoors. It is one of the best way to see and learn about geology. And the most fun way! We get to know our students well during these trips.



### What led you on this career path?

When I was an undergraduate student, I had a couple of great instructors that focused on teaching. I had moments when I thought “I want to be like them”. They were so much fun, and they loved what they did. That helped immensely with being engaged and learning. I also noticed during my PhD, when I ran all my supervisors’ laboratories/tutorials and a few classes, that I really enjoyed teaching. It is the best when students start to understand new and complex concepts and procedures.

So when the teaching position at DPES came up with all the courses I loved (Earth History, Mineralogy, Sedimentology, Petrology and Structural Geology) and was trained for (undergrad, Masters – PhD), I needed to apply. It was amazing when I heard back that I was chosen for an interview and then also for the position.

### What were your biggest milestones?

My biggest milestones was to set up the first iterations of all my courses in 2014-2015. It was a challenging year, but also quite fun.

And I would say 2020, when we had to shift all the hands-on labs and field trip for the geology courses online. Getting through this year and seeing what we accomplished feels good (now that the term is almost over).





## What are the challenges of your current position?

Normally, we would do all our geology labs with the students in the lab by using hand samples. Due to the pandemic, this is not possible. So, everything (microscope work, hand samples, etc.) had to be switched to a digital version or we needed to find samples that we could ship to students (for the next term).

It all worked out, but the “trial and error” phase of creating virtual 3D models of rock samples (photogrammetry, see a sketchfab example: <https://sketchfab.com/3d-models/fossil-sample-78ee1aa69f4a46d1afa7cd0c58b81367>); getting a virtual microscope set up ([https://planetearth.utoronto.ca/VirtualMic/?fbclid=IwAR3kuoWFzq\\_bjgq-qG2\\_Mmd2go-djoNBOZivcgROUiJ7DYrmnNvzEE4y8Uc](https://planetearth.utoronto.ca/VirtualMic/?fbclid=IwAR3kuoWFzq_bjgq-qG2_Mmd2go-djoNBOZivcgROUiJ7DYrmnNvzEE4y8Uc)) that we can use for Mineralogy and Petrology classes took a long time and was frustrating. However, due to the hard work of a couple of my colleagues (Dr. Kirsten Kennedy, PhD Candidate Shane Sohkan, collaboration with Dr. Rebecca Moublow at McMaster University and Dr. Paul Ashwell) we accomplished many things. I learnt a lot this year (photography, photogrammetry, 3D modelling, HTML programming, how to best utilize Quercus for online teaching....).

Before the pandemic, it was challenging to find ways to help the students advance their 3D visualization skills by using physical teaching objects. So, we utilized our 3D printer or just simple crafts. The pandemic brought this to a whole new level.

## What are the most rewarding parts of your job?

This ties right into what I mentioned earlier. I love when students understand and succeed in their studies, one little step at a time. And I also love when projects like the virtual 3D rock models and the virtual microscope came together. It seemed unrealistic for a long time, but all of a sudden, it works. This is much due to the great work of my colleagues (including our lab technicians Tom Meulendyk and Chai Chen, without their support, willingness to brainstorm and hard work, not much would happen).

Tom also added another great experiential learning exercise to our virtual and in person labs. He built a large analogue modelling box with which we can model what structures form during mountain building events. The students love it. I really enjoy collaborating with my peers on these projects.

Also, it was rewarding to hear that I was able to secure a few grants (Leaf Seed grant, Dean's Experiential Learning Funds, CTL teaching enhancement grant) over the spring and summer, that enabled us to create the new materials for online teaching.

## Something interesting the dept. doesn't know about you?

When I was doing my two PhD field work seasons in the Argentinian Andes (2010-2011), I thought about settling in South America.

## Advice to yourself if you can go 10 years in the past?

Don't worry so much.

## Where do you hope your career takes you in 10 years?

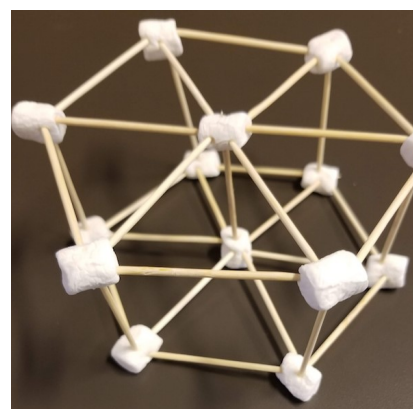
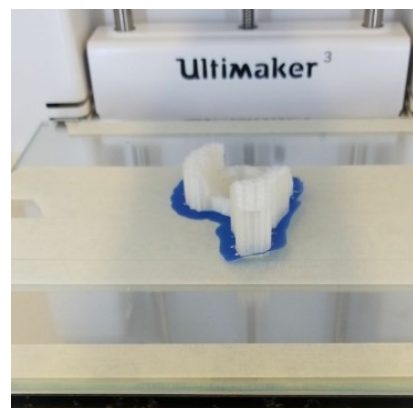
I hope to be in the same place, teaching my courses.

I hope we can go back to the field soon, because I miss that a lot. And it would be great to do some mapping/research field work in the Argentinian Andes again.

## Any recent accomplishments?

Surviving 2020 and getting through the Fall courses.

I am astonished how much we actually produced in terms of virtual teaching materials (3D models, virtual microscope, online introductory modules, etc.) that we can also use in an in person setting. As overwhelming as this year was, it will make the years to come easier.





## DR. STUART LIVINGSTONE

Lecturer, Department of Physical and Environmental Science

Conservation & Biodiversity Acting Program Director  
Ph.D., University of Toronto - 2017

### Tell us about yourself:

After returning to university as a “mature student” (i.e. 32 years old), I completed my BSc. in Environmental Science at U of T-St. George in 2012. I then went directly onto my PhD at UTSC under the excellent supervision of Professors Marc Cadotte and Marney Isaac, where I studied the ecology and management of the invasive “dog-strangling vine”. I began teaching Professional Scientific Literacy and Conservation Policy in UTSC’s Professional Masters of Environmental Science (MEnvSc) program in 2015, towards the end of my PhD. I quickly developed a passion for engaging with Environmental Science students, discussing emergent topics in the subject, and taking students out to the field to learn about and explore Rouge National Urban Park. In my classes, I’ve been able to host top scientists, authors, and communicators with the goal of giving students a sense of what those careers look like and how to best position themselves for the job market. Science, policy and environmental advocacy are all moving so quickly these days, and it’s a joy to keep diving into these topics with students and hear their own experiences and perspectives on how to move forward. I’m also lucky to currently hold the position of Acting Director of the Conservation & Biodiversity stream of the MEnvSc program, filling the huge shoes of Professor Nick Mandrak, who’ll be taking the reigns back in 2021.

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

I think the most rewarding part of teaching at UTSC is hearing from students that engaging with course material or discussions has increased their self-confidence and allowed them to better articulate their perspective on a topic. And of course seeing students take off in their careers in amazing positions is always incredible.

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

Good question. Probably the fact that before coming back to university to finish my BSc. in 2010, I spent the better part of a decade making music, releasing albums, and touring North America in a band. I refer to this now as my “past life”, but I try to bring some of that creativity to my teaching when I can.

### What advice would you give yourself if you can go 10 years in the past?

Ooooh. Hmmmm... I would probably tell myself to take more risks and speak up in class discussions, as that’s really the best way to deal with social anxiety and imposter syndrome; both are challenges that I had to navigate as a grad student.

### What led you on this career path? What were your biggest milestones?

In terms of the teaching side of my career, I think that particular path stemmed from trying to “unpack” prominent concepts in the environmental science literature. In my undergraduate degree, while much of the content was focused on biophysical analyses, I also minored in Environmental Anthropology, where that body of literature presented critical perspectives on a lot of the science I was learning about, and then Conservation Biology courses acted as a confluence of all of those ideas. So essentially, in trying to wrap my head around that complexity and articulate my own perspective on many of those topics, the prospect of being able to continually engage with those ideas and hear students’ perspectives was very attractive. Receiving a UTSC teaching award for my work as a sessional instructor has been a huge milestone. I plan to carry that positive feedback forward and keep working to improve my courses and my teaching.

### What are the challenges of your current position?

Certainly, the biggest challenge of my current position has been adapting courses and course delivery for online learning, and trying to make the experience engaging and rewarding for students. This past semester I’ve tried to be creative to come up with ways to diversify the visual experience of students. One thing I’ve really enjoyed has been recording interviews with guest speakers at locations that reflect the content of the guest talk. For example, I got together with Colin Cassin, a Policy Analyst from the Invasive Species Centre, and we took his boat out on Lake Scugog to talk about aquatic invasive species policy. I was able to put together several of these “guest lectures from the field” by learning the basics of video editing, and got some great feedback from the students.



### Where do you hope your career takes you in 10 years?

Tough question! I'm still conducting research as a postdoc in addition to my teaching, and I still have an interest in pursuing research, but I feel that I'm on a path to focus mostly on teaching in the coming years. So really, I hope that I can stay on that path and continue to engage in emergent science and policy by bringing that knowledge to students to prepare them for the job market.

### Summary of your research:

I've been involved in a variety of research projects on a few different topics, but the majority of my research has focused on trying to understand the causes and consequences of plant invasion. I began my PhD looking at plant invasion at a relatively small scale in Rouge National Urban Park, but I'm now working with Marie-Josée Fortin to develop an invasive species risk assessment framework for protected area networks in Canada.





# STAFF PROFILE

## PASQUALE BENVENUTO

*Chemistry Technician, Department of Physical and Environmental Science  
Ph.D., University of Toronto - 2015*



### Tell us about yourself:

My interest in science began as a kid and was initially born out of science fiction because my Dad and I would watch a lot of movies and shows together from this genre, and particularly Star Trek. I really enjoyed chemistry, biology and physiology in school and decided to pursue them in university. I ended up doing both my undergrad and graduate studies in Chemistry at U of T. I received my Ph.D. in Analytical Chemistry from the Michael Thompson group in 2015, where I worked on the development of biocompatible coatings for medical implants. I was also heavily involved and interested in sensor development at that time. Right after graduating, I started working in an industrial setting, within the field of environmental analytical testing. My first position was as a Chemist in a small private lab, where I analyzed client samples for indoor air quality assessments. I then took a position as a Scientific Specialist in Research and Development at Bureau Veritas Laboratories (formerly Maxxam Analytics), where I worked on method development for PFAS, metals, and surfactants-related testing in water and soil. After four years in that field, I decided to make the move back to academia. While I enjoyed and valued my time working in private labs, I noticed increasingly that I missed the teaching-related activities that I was part of in university. This brought me to my current position as a Chemistry Laboratory Technician, where I will reach my 1st-year anniversary this December.

### What are your biggest milestones?

My most significant academic/professional milestones were earning my Ph.D and having my work patented.

### What are the specific responsibilities and requirements of your job?

I'm responsible for ensuring that the chemistry teaching labs run safely and smoothly by communicating with TAs and students, prepping reagents, maintaining and calibrating equipment, and acting as a technical resource for various projects.

### Challenges in your job?

You have to be able to quickly adapt and react to changing situations in the lab. At one moment you might be troubleshooting problems with a particular experiment and in the next, you're dealing with equipment issues. The pandemic also really highlighted this. With a shutdown and labs pivoting to an online delivery, I had to learn how to create and edit lab videos. While it was challenging as I had no prior experience with this, I ended up developing a new skillset that I never knew I enjoyed.

### Most rewarding aspects of your job?

I would say being a part of helping students get a better understanding of chemistry and the skills required for a professional career in this field.

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

I'm not sure if it's interesting, but it will likely be infuriating to some; I'm a Montreal Canadiens fan. Go Habs Go!

### What are your favorite hobbies/pastimes?

Going to concerts, watching movies and hockey, playing soccer, video gaming and golfing (or at least trying to golf).

### What advice would you give yourself if you could go 10 years in the past?

Aside from winning lotto numbers over the last 10 years, I would tell myself to embrace and enjoy the "now" of life more and not to worry as much about the future. A decade goes by faster than you think!

### Where do you hope your career takes you in 10 years?

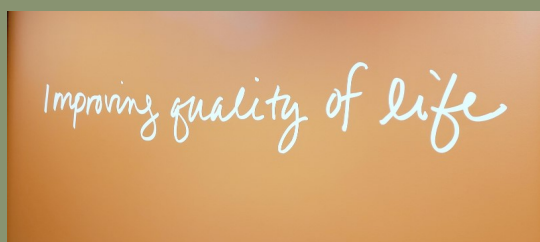
I'd like to direct it towards teaching.



# ALUMNI HIGHLIGHT

## ARNON HO

Senior Health Physicist, Arcadis  
Master of Environmental Science, UTSC - 2014



### Advice to yourself if you can go 10 years into the past?

Start networking early as it may probably be where you will find new opportunities. Networking can be achieved with peers at school or work and by attending industry events. My current position at Arcadis was introduced to me by a friend. Another piece of advice I would give to myself is that while it is good to have a plan, be open to trying something new and steer off-course a bit. You may be surprised with what you find off the beaten path.

### Criteria that mattered to you when you were job-seeking?

When I was searching for a job, criteria that were important to me were location and private versus public sector. Location was important because I wanted to be close to my friends and family. My preference was to start my career in the private sector based on my experience from my co-op work terms.

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

I am happy with my current company and the industry that I am in. I see myself staying in this industry but advancing to a more senior position. I also hope that I can collaborate with others by joining industry groups.

### Could you describe your current position?

I am a Senior Health Physicist at Arcadis (an environmental consulting firm) and have been working at the firm since 2006. My area of expertise is in radiation protection and radiation safety. I assist and advise clients on projects as a subject matter expert in my field. My day-to-day at work is always different depending on the projects that I have which makes it both fun and challenging. Most days, I am working on more than one project. There are projects where I work independently and others where I work as part a larger team. Being in a senior position, I have the opportunity to work with and coach junior staff which makes my work very rewarding.

### What resources did you find helpful in getting you to where you are now?

When I started my university studies, I started with the intent of majoring in Biochemistry. Towards the end of my first year, I attended a session when I was introduced to the Medical and Health Physics program (Co-op) and decided that I wanted to change my major. I had to enrol in summer school after my first year of undergraduate to ensure I had the courses to change my major. Since the Medical and Health Physics program was also a co-op program, I had the opportunity to intern in both the private and public sector. The experience I gained from my work terms helped me decide on where I wanted to start my career.

### What are the challenges of your current position?

One of the biggest challenges of being a consultant is to manage time effectively. I am usually working on more than one project and sometimes the projects may have close or same deadlines. It is important to respect the timelines specified in the contracts.

### Which skills are important to do well in your job?

In addition to being knowledgeable and staying up to date with current industry trends, communication skills (verbal and writing) are important in my job. One must be able to effectively communicate with clients to understand their needs in meetings (in person and teleconferences). Also, writing skills are important as written reports are usually the deliverable(s)/product to clients. Sometimes the written reports are made available to the public or may be submitted to regulators for review.

### How would you compare working in the private (current job) vs the public sector (Research Assistant at Health Canada)?

I have work experience in the private and public sectors and both are very different with its pros and cons. The public sector from my work term co-op experience has longer term projects, therefore, the day to day has a slower pace compared to my current job in the private sector. In addition, working in the private sector has given me the opportunity to work with a wider range of clients in both private and public sectors as well as domestic and international clients.

# ALUMNI HIGHLIGHT

## ASHLEY MCGRATH

*Junior Wildlife Biologist, SNC-Lavalin Inc.  
Master of Environmental Science, UTSC - 2014*

### If you could give a brief summary of your role, what would that be?

My work helps to reduce, mitigate, and monitor the effects of development on fish and wildlife and their habitat. I conduct a variety of biological field surveys to learn about the habitat, lifecycle, and species diversity at field sites, ranging from aquatic life such as fish and benthic macroinvertebrates, to terrestrial animals, such as reptiles, amphibians, birds, as well as small and large mammals. My work takes me where the wildlife is, so I could be conducting remote fieldwork in Northern Ontario via helicopter one day, and sitting at my computer the next day preparing permit applications, planning logistics for upcoming field programs, analyzing field data, or preparing technical reports associated with regulatory approvals or compliance requirements.

### What experiences at UTSC did you find were helpful in getting you to where you are now?

The Master of Environmental Science (MEnvSc) internship program helps develop practical career-oriented skills, such as resume writing, interviewing, and networking. The networking events organized for the program exposed me to different environmental companies and organizations that offer opportunities for new graduates. Developing my networking skills was essential during my early days in the environmental consulting industry as contract work is common for young professionals.

### What programs/resources/opportunities did you find helpful in getting you to where you are now?

The field skills I developed in the Freshwater Ecology and Biomonitoring course offered in the MEnvSc program was the reason I fell in love with aquatic ecology. I learnt vital field skills to identify freshwater aquatic sites and evaluate the conditions of aquatic systems by surveying for benthic macroinvertebrates, fish communities, and fish habitat that are crucial in becoming an aquatic ecologist. Many of the courses offered by the program are taught by industry professionals who design assignments that mimic real-world projects. Connecting with these professionals helped me get started in the environmental consulting industry.



### What advice would you give to current students?

Be open to new opportunities to gain as much experience as possible. There are many pathways to success in environmental science, and no one can ever have too much experience! The environmental industry is always evolving based on new research and legislation, so personal and professional development is an ongoing journey.

### What are the challenges of your current position?

Fieldwork is a core component of my job, and it's always a unique challenge. Fieldwork happens in the pouring rain, in extreme heat and freezing cold, in the early mornings before sunrise, at midnight, or where the bugs are worse than you can imagine. Nonetheless, I would rather be in the field any day than sitting at my computer in the office. Fieldwork is a lot of fun, very rewarding, and gives me the opportunity to work in the best office: nature!

### What are the most rewarding aspects of your current position?

The wildlife experiences I have had in my position are truly special. I've conducted aerial surveys from a helicopter looking for signs of wildlife including caribou, moose, marten, snowshoe hare, wolverine, wolves, fox, and lynx, and have held reptiles, amphibians, and small mammals in my hands.





Most people I know have never been in a helicopter, yet I've been in one so many times I've lost count - and am like a kid in a candy store during every ride! I get paid to look for wildlife and get to explore remote areas of Ontario that many people never get the opportunity to see, all while enjoying the comradery that comes with working in a close-knit field team.

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

In the 3rd year of my undergrad degree at McMaster University, I studied abroad for a semester in Glasgow, Scotland! I was able to travel to 10 countries around Europe and have amazing experiences that I'll never forget.

### What advice would you give yourself if you can go 10 years in the past?

Learn about the kind of work environmental companies and organizations do! The world is so much bigger than any one single academic stream or discipline, and there are entire careers that are not well-known. Reach out to people in the industry to learn how they got to where they are now so you can learn how to gain applicable skills to land your dream job someday.

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

In 10 years, I hope to be in a more senior role being involved with project management, designing and leading field programs, and mentoring

junior staff on the ecological aspects of environmental consulting projects.

### Work-life balance?

In my downtime, I love exploring the outdoors, whether I'm hiking, camping, birding, or herping looking for reptiles and amphibians. I also love singing, dancing, and baking!



### On Mentoring Current MEnvSc Students

*These last couple weeks I've been mentoring lots of MEnvSc students currently in the @utsc\_dpescgrad Masters program I graduated from by doing informational interviews with them. It's making me realize how hard it is for current students to gain necessary field and lab skills needed to get some jobs in the environmental industry during this pandemic. Some courses are now entirely virtual that were 90% field based when I took them!*

*Students have been asking me how they can get the skills needed to do what I do, especially during these tough times. On top of many virtual workshops and webinars being offered, there's lots of certification courses and tons of volunteer opportunities still out there if you look hard enough! I'm so proud that my mentees have taken my advice to reach out and volunteer with various organizations and thesis Masters students to gain SOME field experience - every little bit helps! Maybe someday they'll be like me, collecting benthos samples from streams and putting them into sample jars in the middle of nowhere like I was doing a few weeks ago. So happy to help budding ecologists however I can, I know how hard it can be since I was in their position once! Excited to see what internships they score for next summer. 😊*

View Ashley's post on Instagram here:  
<https://www.instagram.com/p/CHb8e9Rpcv1/>



# GRADUATE STUDENT HIGHLIGHT

## ARIOLA VISHA

*PhD Candidate, Department of Physical and Environmental Science, UTSC  
Masters, Department of Geography, UTSG  
Bachelors, Environmental Science, York University*

### Tell us about yourself:

I did my undergraduate at York University, in Environmental Science at the department of Geography. My program was a specialized honours program, which allowed me to take courses from different departments (biology, chemistry and environmental studies). I had the opportunity to take field courses (like studying bees!) as well as to undertake a year round undergraduate research thesis course. This undergraduate research thesis course allowed me to explore whether I wanted to continue into graduate studies, as it allowed me to experience independent research first hand. I carried out field and laboratory analysis of DOC (dissolved organic carbon) and DIC (dissolved inorganic carbon), and constituent ions (Na, K, Cl, etc.) in the Don and Humber Rivers in Toronto, and compared them to Coppermine River data from the Northwest Territories. I defended my findings through an oral examination (along with a written paper submission) to obtain my grade. This undergraduate experience was very important as it prepared me well by providing a simulation of what I would experience later in grad school. I did my Masters at U of T with the department of Geography at the downtown campus. I had a very positive experience, so I decided to continue onto my PhD with the department of Physical & Environmental Sciences at UTSC. Here at UTSC, I have been a teaching assistant for several courses, but my favourite to date remain first-year chemistry and human health and the environment.

### What led you to graduate studies?

I have always wanted to pursue a career in science. Growing up, I was very much influenced by my maternal grandfather, who taught biology, botany, and biochemistry (yep the 3 Bs). I spent some of my most memorable childhood summers with him, identifying plants, collecting seashells, and just exploring the outdoors. As I grew older, I guess it was a natural inclination for me to eventually pursue higher education in environmental science. I simply followed my childhood dream.

### What is your field of study? Why did you pick it?

I am part of the ecological modeling lab. Therefore, by training, I am an Environmental Modeller. This means that I apply statistical models to evaluate multiple environmental conditions. My primary area of focus is the assessment of



legacy contaminants (mercury and PCBs) across multiple fish species in all of the Canadian Great Lake Water bodies. The implementation of basin-wide fish consumption advisories as well as the assessment of the fish tumour occurrence rates in heavily polluted areas of concern.

I chose to be part of the ecological modeling lab because modelling as an environmental assessment tool can be very versatile. Through modeling, you can learn so much about the past, present, and future conditions of a certain environment. You can also apply modelling to any type of environment, be it a freshwater lake, a marine ecosystem, or even caribou populations in the Canadian Arctic. Through modeling you can merge the three main universal fields: biology, chemistry and mathematics.

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

I can fully understand Italian. I picked it up when I was 3 years old watching Japanese anime (which was dubbed in Italian at the time). Who says TV can't be educational? It is actually very useful. I can easily understand my 80 year old neighbor when she gives me gardening advice in Italian.



### Challenges of your current project(s)?

I am in my last year, so my projects are in their final stages. However, I can confidently say that the path of true research was never smooth, for anyone really. I spent a considerable amount of time trying to make sure that my models were running correctly and that the information obtained corroborated with findings in current literature.

### Most rewarding parts of your graduate experience?

The most rewarding part of my graduate experience has been the people I have met and gotten to know. I was lucky enough to belong to a department whose administrative body truly cares and supports its students (in all stages of their studies). The shared experiences and memories I have made with my fellow graduate students, have transformed into solid friendships that have kept on going even during COVID times and I hope will continue post graduation as well.

### What advice would you give yourself if you can go 10 years in the past?

The same advice that Polonius gave to everyone in 1609: "To thine own self be true".

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

Career-wise, I am considering either pursuing a university teaching-stream position or a career in the government as a Research Policy Analyst. I'm the type of person that is driven and goal-oriented, but the one thing I have learnt from my training as a modeller is to always account for uncertainty. Life can be unpredictable, so regardless of which path I take, I hope that 10 years down the line, I am happy and making use of my training and education.

### Work-life balance?

Like everything else in life, the answer is simply: 42.

### Graduate Project summary/ How would you describe your research to a first-year student?

I look at long-term contaminant trends in fish from the Great Lakes. I determine the probability of fish developing tumours as a result of these contaminants and I also create fish consumption advisories to reduce contaminant exposure through diet.

### Advice on graduate school and how to know if research is for you?

Do not rush. Take your time to explore. To any undergraduate students, I would highly recommend that you work in a few labs as either a research assistant or by completing a research project (such as an undergraduate research course). It is something I did myself as an undergrad at York and it helps in learning which fields are best suited to you as an individual. To my fellow graduate students, I would advise that you should try to not feel pressured to compare yourself to someone else's success (# of papers published, scholarships, etc.). Everyone has their own path, focus on you and never underestimate or undervalue your own efforts. It will keep you sane in the long run. At the end of the day graduate school is a marathon and not a sprint.

### Awards/Papers/Conferences

### Highlights, any other accomplishments during your Masters/PhD?

As of right now, I have a total of 10 peer-reviewed publications (8 have been published and 2 have been recently submitted for publication). All my papers are available on the Ecological Modelling Lab website. During my tenure, I have been awarded 4 scholarships, the details of which can be found on my LinkedIn, should anyone be interested.



*"Life can be unpredictable, so regardless of which path I take, I hope that 10 years down the line, I am happy and making use of my training and education."*

# 2020 DPES PUBLICATIONS

Congratulations to all those who published their research this past year! Even with the ongoing global pandemic, the DPES community has found ways to remain ever productive, maintaining its excellent research reputation. To highlight this achievement, we have compiled a list of publications from Scopus, which includes over 180 entries.

To access the 2020 DPES faculty publications list, [click here](#).

## 2020 DPES Faculty Publications List Compiled from Scopus Please note this is not a comprehensive list.

- Abdinejad, M., Dao, C., Deng, B., Dinic, F., Voznyy, O., Zhang, X., & Kraatz, H.-B. (2020). Electrocatalytic reduction of CO<sub>2</sub> to CH<sub>4</sub> and CO in aqueous solution using pyridine-porphyrins immobilized onto carbon nanotubes. *ACS Sustainable Chemistry and Engineering*, 8(25), 9549-9557. <https://doi.org/10.1021/acssuschemeng.0c02791>
- Abdinejad, M., Dao, C., Deng, B., Sweeney, M. E., Diehlmann, F., Zhang, X., & Kraatz, H.-B. (2020). Enhanced electrochemical reduction of CO<sub>2</sub> to CO upon immobilization onto carbon nanotubes using an iron-porphyrin dimer. *ChemistrySelect*, 5(3), 979-984. <https://doi.org/10.1002/slct.201904580>
- Abdinejad, M., Dao, C., Zhang, X., & Kraatz, H.-B. (2021). Enhanced electrocatalytic activity of iron amino porphyrins using a flow cell for reduction of CO<sub>2</sub> to CO. *Journal of Energy Chemistry*, 58, 163-169. <https://doi.org/10.1016/j.icheem.2020.09.039>
- Abdinejad, M., Hossain, M. N., & Kraatz, H.-B. (2020). Homogeneous and heterogeneous molecular catalysts for electrochemical reduction of carbon dioxide. *RSC Advances*, 10(62), 38013-38023. <https://doi.org/10.1039/d0ra07973a>
- Abdinejad, M., Mirza, Z., Zhang, X., & Kraatz, H.-B. (2020). Enhanced electrocatalytic activity of primary amines for CO<sub>2</sub> reduction using copper electrodes in aqueous solution. *ACS Sustainable Chemistry and Engineering*, 8(4), 1715-1720. <https://doi.org/10.1021/acssuschemeng.9b06837>
- Abdinejad, M., Talaie, B., Qorbani, H. S., & Dalili, S. (2020). Student perceptions using augmented reality and 3D visualization technologies in chemistry education. *Journal of Science Education and Technology*. <https://doi.org/10.1007/s10956-020-09880-2>
- Addo-Danso, S. D., Defferné, C. E., McCormack, M. L., Ostonen, I., Addo-Danso, A., Foli, E. G., ... Prescott, C. E. (2020). Fine-root morphological trait variation in tropical forest ecosystems: An evidence synthesis. *Plant Ecology*, 221(1) <https://doi.org/10.1007/s11258-019-00986-1>
- Ahmad, S., Hossain, M. N., Ahmadi, S., Kerman, K., & Kraatz, H.-B. (2020). Electrochemical detection of neuronal extracellular phosphorylation by PKA, PKC and Src. *Analytical Biochemistry*, 608 <https://doi.org/10.1016/j.ab.2020.113892>
- Ahmadi, S., Fini, H., Ho, T., Nadoushan, P. J., Kraatz, H.-B., & Kerman, K. (2020). Development of an electrochemical sensor using pencil graphite electrode for monitoring UV-induced DNA damage. *Journal of Chemical Education*. <https://doi.org/10.1021/acs.jchemed.9b01065>
- Ahmadi, S., Wu, B., Song, R., Zhu, S., Simpson, A., Wilson, D. J., & Kraatz, H.-B. (2020). Exploring the interactions of iron and zinc with the microtubule binding repeats R1 and R4. *Journal of Inorganic Biochemistry*, 205 <https://doi.org/10.1016/j.jinorgbio.2019.110987>
- Akbar, L., Zuk, A. M., Martin, I. D., Liberda, E. N., & Tsuji, L. J. S. (2020). Potential obesogenic effect of a complex contaminant mixture on Cree First Nations adults of Northern Québec, Canada. *Environmental Research*. <https://doi.org/10.1016/j.envres.2020.110478>
- Akbar, L., Zuk, A. M., & Tsuji, L. J. S. (2020). Health and wellness impacts of traditional physical activity experiences on Indigenous youth: A systematic review. *International*

## GSAS EXECUTIVE RECRUITMENT



*The Graduate Students' Association at Scarborough (GSAS) is a student-run non-profit organization working to improve the student life for all graduate students at UTSC. Established in 1978, the purpose of GSAS is to bring graduate students from all academic departments together and ensure all the needs of graduate students are being met.*

Interested in joining the GSAS executive team? We currently have three positions open:

- **DPES Representative**
- **Events Coordinator**
- **Sports Representative**

Please email GSAS ([gsas.uts@utoronto.ca](mailto:gsas.uts@utoronto.ca)) if you are interested in joining the team!



# RESEARCH FACILITY PROFILE

## TRACES CENTRE

### About

TRACES is a state-of-the-art analytical facility available for use on the UTSC campus. It contains all the modern analytical instruments required for a leading-edge chemical, biological and physical science department. The Centre was made possible by the joint efforts of the TRACES staff, Agilent, Bruker, UTSC, DPES, and the respective Chairs.

### What is your role in the department?

TRACES provides a wide range of services to support the department in achieving both its educational and research goals. These offerings include:

- Hands-on instrumentation training
- Research project support
- Laboratory instruction and demonstrations
- Access to essential analytical instrumentation
- Managing the departmental cryogenic facility

### Is your facility open to external users?

Yes, TRACES is open to all internal and external users as long as they obtain the proper training. Get in touch with the TRACES team to learn more about access for external users.

### Some fun facts about the facility?

Each year, TRACES sponsors the DPES Excellence and Citizenship Awards. These awards recognize exceptional undergraduate students in the department.

We also like to incorporate fun into our science! Throughout the year, we host mini events in our undergraduate labs, where students can compete for awards such as the "hottest pepper of the year" and "best calibration curve" to win a gift card or pizza party for their class.



### What are your research specialties?

As a multi-user facility, we complete research and support projects across numerous specialties. Some of our key areas of interest include:

- Environmental media and contaminants
- Pharmaceutical and medicinal applications
- Physical and chemical changes

### What does your staff enjoy the most about working at TRACES?

Currently, TRACES is operated by two full-time staff members:



**Melanie Snow**  
TRACES Centre Technician

*"My favorite part about working at TRACES is getting to know and interact with all of the students who use the facility"*



**Tony Adamo**  
TRACES Centre Manager

#### We want to hear from you!

Submit a quote for Tony's favorite part about working at TRACES to [melanie.snow@utoronto.ca](mailto:melanie.snow@utoronto.ca) for a chance to win a \$25 Tim's card\*

## CONTEST ALERT

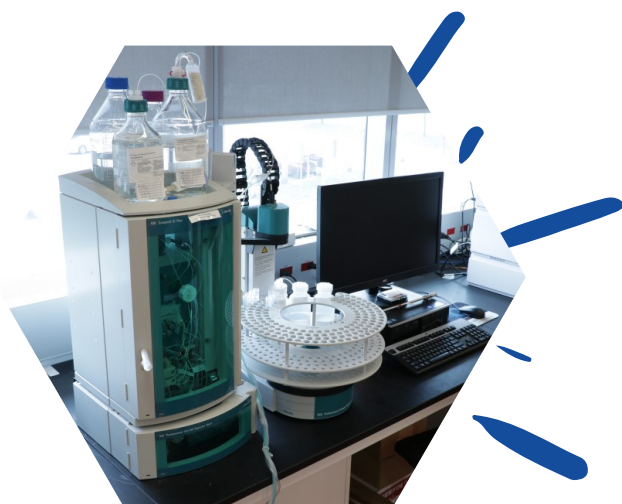
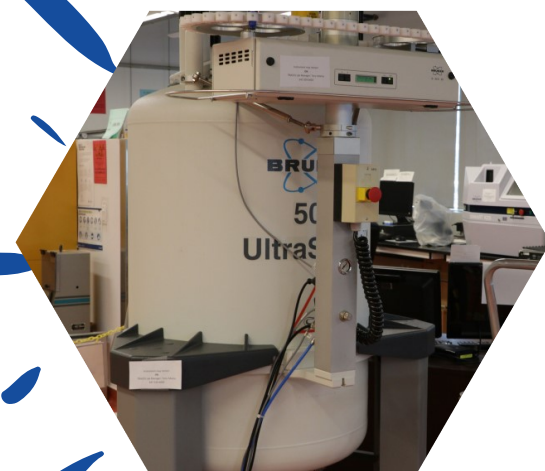
\* Submissions open until Jan 15th  
winner will be announced on Jan 18th via e-mail

# INSTRUMENTATION BREAKDOWN

## IN THE LAB

### NMR & OPTICAL SPECTROSCOPY

- (x1) Flame atomic absorption spectrometer
- (x1) Fluorometer
- (x3) Fourier transform infrared spectrometers
- (x1) Graphite furnace atomic absorption spectrometer
- (x1) Nuclear magnetic resonance spectrometer
- (x1) Polarimeter
- (x1) Raman spectrometer
- (x3) Ultraviolet-visible spectrophotometers
- (x1) Refractometer



### MASS SPECTROMETRY & CHROMATOGRAPHY

- (x1) Ion chromatograph
- (x2) Gas chromatographs
- (x1) Gas chromatograph mass spectrometer
- (x3) High performance liquid chromatographs
- (x1) Liquid chromatograph single quadrupole mass spectrometer
- (x1) Liquid chromatograph quadrupole time-of-flight mass spectrometer

### ELEMENTAL ANALYSIS & SAMPLE PREPARATION

- (x1) Elemental analyzer
- (x1) Hand-held x-ray fluorescence analyzer
- (x1) Microwave digestion system
- (x1) Total organic carbon analyzer
- (x1) Total reflection x-ray fluorescence analyzer



All photos by Tom Meulendyk



HAPPY HOLIDAYS AND A  
HAPPY NEW YEAR FROM  
THE EDITORS!



Shadi Dalili



Jia Yi Fan



Jessie Liu



Yao Yan Huang



"Group" picture from Microsoft Teams meeting

WISHING YOU A BRIGHT  
2021

# DPES PROGRAMS SUMMARY

## TOTAL PROGRAMS: 16

### COOP PROGRAMS: 9

#### CHEMISTRY

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

### COMBINED DEGREE PROGRAMS: 3

#### PHYSICS AND ASTROPHYSICS

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

#### 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

#### 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

HONOURS BACHELOR OF SCIENCE OR HONOURS BACHELOR OF ARTS / MASTER OF TEACHING





# DPES DIGEST IS LOOKING FOR YOU!

---

Interested in assisting with the DPES newsletter?  
Have any great ideas you want to see come to light?  
Send us your resume!

Email: [jessiej.liu@mail.utoronto.ca](mailto:jessiej.liu@mail.utoronto.ca)

**EDITORS:**

**DR. SHADI  
DALILI**

**JESSIE  
LIU**

**JIA YI  
FAN**