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Photo: @utsc_dpessgrad
“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
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About me:
Hello! My name is Jessie Liu and I have been the editor of the DPES Digest for the past three issues. I am currently in my first year at UofT in the Life Sciences program. Outside of academics, I enjoy reading science fiction, watching anime, and making vector art.

What made you decide to apply for an editor position for the DPES Digest?
I was a writer on a news magazine team in my high school but always really admired the layout editors who put together the content! I've also had some layout experience designing posters and presentations for Science Research competitions, as well as making vector portraits on my own time. When I saw the posting for a newsletter editor, I figured it would be a new and fun thing to do! Plus, I would gain working experience (albeit remotely)!

What has been the most enjoyable part of the experience?
I love seeing everything come together at the end of the month! Downloading the completed PDF is magical.

Anything else you would like to share or any closing remarks?
I've really enjoyed working on the newsletter with the rest of the team, from corresponding with people within the department to creating new layouts! I wish everyone the best moving forward! And to any students reading this, please consider applying as an editor (more details below)! :)

Thank you for all your contributions! And thank you to fellow editor Jia Yi Fan who has also departed from the team this year. We appreciate all your work that makes the newsletter possible.

Are you interested in communication, graphic design, and teamwork? The DPES Digest Newsletter is looking for an Editor! This role entails:
- Communicating with faculty, alumni, clubs, and other groups for newsletter submissions
- Formatting content with fresh and appealing designs for publication
- Coordinating with other members of the newsletter team

Join our team to not only foster your verbal and visual communication skills, but to learn more about and spotlight the amazing people in our department! This position will also be available as a Work Study for the Summer term.

Contact the Editor-in-Chief, Shadi Dalili, sh.dalili@utoronto.ca, to apply or to learn more. To view our past issues, follow this link: https://www.utsc.utoronto.ca/physsci/dpes-digest-newsletter
Dr. Percy Lavon Julian

Dr. Percy Lavon Julian was an American chemist, entrepreneur, and civil rights leader. Throughout his illustrious career, he was awarded dozens of patents, 18 honorary degrees, and membership to the prestigious National Academy of Sciences (Tyson, 2007). Julian was born in 1899 in Alabama and faced racial discrimination and challenges throughout his personal and professional career (Tyson, 2007). Harvard University, where he completed his master’s degree, refused him admission to its doctoral program due to bias against African-Americans teaching other races in the 1920s (Library Resource Kit, 2007).

Dr. Julian made many contributions to organic synthesis throughout his career. Julian and colleague Josef Pikl were the first to achieve the total synthesis of physostigmine, a highly toxic active component of the Calabar bean, used to treat glaucoma and a precursor to the synthesis of progesterone (Science History Institute, 2020). He was made Director of Research at the Glidden Company in 1936 (Library Resource Kit, 2007), where he developed a method for mass scale production of steroids from soybeans. Many industrial syntheses still begin along the same synthetic route that Julian pioneered (Science History Institute, 2020).

Later in life, Julian established Julian Laboratories to produce synthetic steroids, switching to the Mexican yam as a cheaper source of artificial steroids (Forgotten Genius, 2007). In his time at Glidden and later in his own company, he helped break down barriers for aspiring young African-American chemists, and was a prominent civic and civil rights leader (Library Resource Kit, 2007). Despite facing racial barriers at every stage of his academic life, and even surviving dynamite and fire-bomb attacks on his home in Illinois, Dr. Julian went on to leave a legacy in science and society.

Dr. Marie Maynard Daly

Born in 1921, Dr. Marie Daly was an American biochemist and the first African American woman in the U.S. to obtain a doctorate in chemistry from Columbia University in 1947. She taught at Howard University in Washington for two years and then joined the Rockefeller Institute in New York, where she studied the cell nucleus and its constituents (Marie Maynard Daly, 2018). She was a professor at the Albert Einstein College of Medicine until her retirement in 1986 (Marie Maynard Daly, 2018).

Her early research on cholesterol and the mechanics of the heart found a strong correlation between high cholesterol and high blood pressure, which served as a foundation for research into atherosclerosis and other high blood pressure-related diseases (Li, 2020). At the Rockefeller Institute, she worked on characterizing histones, contributing to the basic understanding of DNA organization (Li, 2020).

She was also committed to developing programs to support minority students. In 1988, she established a scholarship fund in memory of her father, for African-American physics and chemistry majors at Queens College, where she had completed her undergraduate degree (Marie Maynard Daly, 2018). Daly was a member of the prestigious board of governors of the New York Academy of Sciences and in 1999, she was recognized by the National Technical Association as one of the top 50 women in Science, Engineering and Technology.
**Dr. Shirley Ann Jackson**

Dr. Shirley Ann Jackson is an American theoretical physicist, with a career spanning academia, government, and industry. Born in 1946, she is the second African-American woman to earn a doctorate in physics in the United States, and the first African-American woman to earn a Ph.D from the Massachusetts Institute of Technology with a dissertation on a new way to model complex collisions in particle physics (Schaffer, 2017).

She has worked at Fermilab, CERN, and AT&T Bell Laboratories’ in the 1970s and 80s. Since 1999, Dr. Jackson has been president of Rensselaer Polytechnic Institute in Troy, New York (Schaffer, 2017). She was the first woman and first African American to hold this position. Her research includes optical and electronic properties of layered materials such as transition metal dichalcogenides, electrons on the surface of liquid helium films, and polaronic aspects of electrons in two-dimensional space (Biography, n.d.).

Her career has also influenced public policy and academic leadership, in her role as Chair of the U.S. Nuclear Regulatory Commission and as co-chair in the President’s Intelligence Advisory Board under President Obama (Biography, n.d.). In 2002, Discover magazine recognized her as one of the 50 most important women in science and in 2014, she was named a recipient of the National Medal of Science.

**Dr. Warren Morton Washington**

Dr. Warren Morton Washington is an atmospheric scientist and climate modeling expert born in Portland, Oregon in 1936. Washington was the second African-American to earn a doctorate in atmospheric sciences at Pennsylvania State University (Warren Washington, n.d.).

At the National Center for Atmospheric Research (NCAR), Washington and coworker Akira Kasahara developed one of the first atmospheric computer models which used fundamental laws of physics to predict future states of the atmosphere (Warren Washington, n.d.). These climate models allow scientists to better understand climate change and its effects, which now incorporate oceans, sea ice, surface hydrology and vegetation (Warren Washington, n.d.). His current research involves using the Community Earth System Model (CESM) to study the impacts of climate change in the 21st century (Warren Washington, n.d.).

In his long career in research for over 50 years, Dr. Washington has been a member of the President’s National Advisory Committee on Oceans and Atmosphere, served as Chair of the National Science Board (2002-2006), and has more than 150 publications to his name (Warren Washington, n.d.). He was awarded the National Medal of Science by President Obama, the United States’ highest science award (Warren Washington, n.d.) and in 2007, shared in the Nobel Peace Prize as a member of the Intergovernmental Panel on Climate Change (Warren M. Washington, n.d.).

“We’re going to have to face up to something [Climate Change] that’s going to affect our children and grandchildren. I think what really wins out over time is that the science will speak for itself.”

- Warren M. Washington
Dr. Ulric “Neville” Trotz

Born in Guyana in 1937, Dr. Ulric “Neville” Trotz has dedicated his life to advancing science education and fighting climate change in the Caribbean (Dr. Ulric Trotz, 2013). Dr. Trotz obtained a BSc in Chemistry from The University of Edinburgh before arriving at the University of Toronto in the late 1960s to work on his PhD in Organic Chemistry with Professor Emeritus Stewart McLean (Grainger, 2016).

After completing his studies, he returned to Guyana and established a number of institutions that are still thriving today, including the Chemistry Department at the University of Guyana and the Institute of Applied Science and Technology. Dr. Trotz is now the Deputy Director and Science Adviser at the Caribbean Community Climate Change Centre in Belize (Dr. Ulric Trotz, n.d.). But one of his most passionate involvements has been the establishment of the Iwokrama International Centre for Rainforest and Conservation Development. Iwokrama was established in 1996 to manage the forest area, following an international agreement between the Guyana Government and the Commonwealth Secretariat. He hopes that collaboration between Iwokrama and the University of Guyana could make Iwokrama "a global 'Centre of Excellence'" for managing forests (Grainger, 2016).

Read more about this esteemed alumni of UofT at:
https://www.kaieteurnewsonline.com/2016/06/26/esteemed-scientist-dr-ulric-trotz-is-a-special-person/

Dr. Raychelle Burks

Dr. Raychelle Burks (@DrRubidium) is a public-scientist extraordinaire. She is currently an Associate Professor of Chemistry at the American University (AU) in Washington, D.C. (Missouri State University, n.d.) and was recently awarded the 2020 American Chemical Society Grady-Stack award for her public engagement excellence (St. Edward’s University, 2019). She is a captivating science communicator, whom you may have heard on TV or podcasts, or read her science-meets-true crime column called “Trace Analysis” for Chemistry World (Missouri State University, n.d.). She has appeared on the Science Channel’s Outrageous Acts of Science and Reactions, the video series for the American Chemical Society (Science Channel, n.d.; YouTube, n.d.).

As an analytical chemist, her research team focuses on developing colorimetric and luminescent sensors to detect an array of analytes of mainly forensic and national security interests, including explosives and illicit drugs. To maximize portability in the field, her group focuses on transforming smart phones into detection devices (American Chemical Society, 2019).

Dr. Burks is a strong advocate for women and underrepresented groups in science, speaking from her experiences as a black woman in STEM. The citation for her American Chemical Society Grady-Stack award read, “Raychelle is a public-scientist extraordinaire... She inspires a love of chemistry by bringing chemistry directly to where her audience is. This direct engagement — her commitment to finding chemistry that can entertain and enlighten people who wouldn’t normally think of science — is nothing short of phenomenal” (St. Edward’s University, 2019).

In 2020, Burks appeared in the Tribeca Film Festival in the film "Picture a Scientist," which was recently screened by FASE Office of Diversity, Inclusion, and Professionalism here at U of T (Picture a Scientist, n.d.).

To learn more about Dr. Burks’ research and writing see
- https://www.american.edu/cas/faculty/burks.cfm and
- https://www.chemistryworld.com/trace-analysis/785.subject/
The 2020 Nobel Prize in Chemistry was awarded to Emmanuelle Charpentier, Founder and Director of the Max Planck Unit for the Science of Pathogens (MPUSP), and Jennifer A. Doudna, Professor at the University of California, Berkeley for the development of a method for genome editing—the CRISPR/Cas9 genetic scissors (Nevelius, 2020). Like some of history’s most impressive scientific discoveries, this was built on past research, good science, and collaboration. CRISPR systems were spotted since 1987 and the term was coined by Jansen and Mojica in 2002 to "to unify the description of microbial genomic loci consisting of an interspaced repeat array" (Hsu, Lander & Zhang, 2014). Since then, research in this area has grown exponentially.

In 2011, while studying Streptococcus pyogenes, a bacteria group that causes pharyngitis, scarlet fever, and other infections in humans, Charpentier discovered the molecule tracrRNA, a part of ancient bacteria’s immune system CRISPR/Cas, that is able to disarm viruses by cleaving their DNA (Nevelius, 2020). Together with RNA expert and biochemist Doudna, they succeeded in recreating the bacteria’s genetic scissors and simplifying the molecular components (Nevelius, 2020). Then, they reprogrammed it such that the CRISPR/Cas9 can be controlled to cut any DNA molecule at a predetermined site, and multiple guide RNAs can be used to target several genes at once (Hsu, Lander & Zhang, 2014).

Since its discovery in 2012, CRISPR/Cas9 has been pivotal to many important discoveries in basic research in all areas, from botany to agriculture to medicine and much more. In medicine, clinical trials of new cancer therapies are underway, and the dream of being able to cure inherited diseases is about to become reality. These genetic scissors have taken the life sciences into a new era and, in many ways, are bringing the greatest benefit to humankind. Charpentier says in the 2020 Nobel Lecture, CRISPR/Cas9 is “a really powerful tool to study...cells and organisms of interest and do genetics in a way that was not possible 20, 25 years ago” (Nobel Lecture, 2020). She wants to maintain the importance of research in bacteria and viruses, not only from a health perspective (as we are currently experiencing in a global pandemic), but also because “the last 50 years have shown that bacteria and viruses are a valuable source for the development of novel biotechnologies” (Nobel Lecture, 2020).

See the excellent video where Professor Emmanuelle Charpentier explains how CRISPR works: https://www.youtube.com/watch?v=3POrtQEpV2s&t=393s&ab_channel=NobelPrize

Read more about current research on how CRISPR is being used to treat diseases: https://www.nature.com/articles/d41586-019-03919-0

D I V E R S I T Y  I N  S T E M :
IN HONOUR OF INTERNATIONAL DAY
OF WOMEN AND GIRLS IN SCIENCE

2020 Nobel Prize in Chemistry:
Charpentier and Doudna

The 2020 Nobel Prize in Chemistry was awarded to Emmanuelle Charpentier, Founder and Director of the Max Planck Unit for the Science of Pathogens (MPUSP), and Jennifer A. Doudna, Professor at the University of California, Berkeley for the development of a method for genome editing—the CRISPR/Cas9 genetic scissors (Nevelius, 2020). Like some of history’s most impressive scientific discoveries, this was built on past research, good science, and collaboration. CRISPR systems were spotted since 1987 and the term was coined by Jansen and Mojica in 2002 to "to unify the description of microbial genomic loci consisting of an interspaced repeat array" (Hsu, Lander & Zhang, 2014). Since then, research in this area has grown exponentially.

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References
In celebration of the International Day of Women and Girls in Science on February 11th, 2021, BioSA (The Biology Students’ Association) and EPSA (Environmental and Physical Science Association) worked in collaboration to host a “Women in Science” event, which I had the honour of being invited to as a panelist. The event was held on Zoom with over 60 attendees and many women STEM faculty from across UTSC. The panelists were Aarthi Ashok, Maydianne Andrade, Eliana Gonzales-Vigil, Ivana Stehilk, Nirusha Thavarajah, Ruby Sultan and myself (Shadi Dalili).

The event was aimed at recognizing and celebrating women in science, promoting gender equality, and inspiring young female students to pursue studies in STEM fields. It was an opportunity for us as women in STEM and researchers in science to showcase ourselves in this light. We elaborated upon our areas of research, accomplishments, and experiences as women in science with the UTSC students, while at the same time sharing our many hardships, biases and discrimination we had faced, and how we overcame them.

It was inspiring to hear the countless accomplishments of the women in the panel and their resilience in overcoming challenges to attain the positions they have today. We shared stories of our academic backgrounds, our role models and inspirations, the difficulties we encountered reaching our goals, and barriers we still have to overcome. Many talked about how family and/or cultural expectations clashed with their academic aspirations, while others discussed how attaining their academic positions and advancements were attributed to “meeting institutional quotas for hiring women”!

At the same time, it was quite refreshing and reassuring to see the large number of male attendees at the event, and their desire to be part of the change in culture in academia; to notice and call out instances of bias and gender discrimination where and when they see it, and to provide the necessary sense of allyship for their female identifying colleagues, coworkers, and peers. The consensus among us female panelists was the need for male colleagues and counterparts to notice and take action in instances of putdowns, lewd and snide remarks, being overlooked for promotions, being ignored in meetings, and being left out of emails and collaborations. We need them to be aware of instances of hostility, inappropriate communications and comments, not getting credit for our work, and having our competence questioned.

Although women have come a long way in the STEM fields and academia in the last 20 or so years, there is still much more work to be done to achieve equality. Many of the inequalities have come to light during this pandemic, where women have been disproportionately forced out of their jobs and had to take on roles as caregivers for their children and elders. The pandemic has forced out four times more women than men from the workforce (https://www.npr.org/2020/10/28/928253674/stuck-at-home-moms-the-pandemics-devastating-toll-on-women) and this has decidedly turned back the clock of progress by at least a generation, with the share of women in the workforce down to levels not seen since 1988. It will now require a concerted effort to support these women who want to get back into the workforce to find positions and help them stay and thrive in the workforce.

In honour of International Day of Women and Girls in Science, UofT News featured several prominent women scientists in a video titled “We are Scientists”, which you can view at the link below, along with the accompanying article about the women featured:
What is something interesting the department doesn’t know about you?
Played alto sax in high school and was asked to play in the school band but stayed on the sports teams instead.

What are your favorite hobbies/past times?
Hiking and spending time in the forest. I love looking at rocks and fossils. Going down east and sitting by the ocean watching the whales go by. Getting my telescope out and looking at the sky. Walking Mitch the dog in the early morning and hearing the birds.

What advice would you give yourself if you could go 10 years in the past?
I would have been a trades woman and got my hands dirty. Nothing more rewarding than to say I built that on my own or with family/friends. I may have also run for President of our Steel Workers Union.

What will you miss the most about the department? What will you miss the least?
I will miss the people, the chats on the second floor with my co-workers. The banker girls, going for coffee at La Prep/Tim’s. Talking to the students about life and giving advise that I would give my
own daughter. Talking to the Professor’s about the research they’re working on and thinking about how they will make a difference with their discovery. Assisting with the Outstanding High School Award and meeting the award recipients.

Going into the cold mailroom, except on those hot summer days.

I then came back to UTSC working in the Dept. of Physical and Environmental Sciences as the Undergraduate Administrator and will end my career on April 30, 2021. When I was selected for the Patrick Phillip Staff Award it was a great honour and will always be special to me. I have had an amazing career at UofT and am ready for the next chapter of life.

What led you on this career path?
I lived in the city with my cousin and she told me to apply to the University of Toronto in the computer department because they had been looking for people and willing to train. For anyone who knows me, that’s hard to imagine me working in the computer department. For me, it was a job working at the University of Toronto.

What are/were your biggest milestones?
Getting a job at UofT with a grade 13 education and providing 40 years of service. Learning accounting, purchasing, sales, acting as business officer, counselling students, managing departments.

What were your specific responsibilities and requirements of your job?
Coordinating the hiring of the Teaching Assistants, Course Instructors and Sessional Instructors. Building the timetable for the department. Advising students with curriculum and life. Understanding Collective Agreements and how they are interpreted in so many different ways. Tracking the Teaching Assistant training needs. Understanding the requirements, priorities, working with people, listening to the student’s requests, sell our programs to students by getting them excited to learn about the subjects and what it has to offer.

What were some of the challenges in your job?
Creating a conflict free timetable without an automated system. I hear, one is coming in the near future. Making Teaching Assistant offers without an automated system. It’s coming as well.

Any recent news?
No news, just packing up the house to sell and move. Well, after winning the lottery with the next draw, traveling/ buying a forest for the log home or a sailboat.

What were the most rewarding aspects of your job?
Meeting all the wonderful people. Working with the students and listening to them on how they saw life. When the students got their Master’s or Ph.D. or just graduated and being proud of themselves is the most rewarding and better yet, when they started to believe in themselves. Working with scholarly faculty. Reading the submissions for the Outstanding High School Award and assist with selecting the winners.

What were your plans for retirement and where do you hope to be in 10 years?
We plan to move north and for me, go back home. We hope to get a place near Lake Huron and do a bit of golfing, hiking, bird watching, kayaking, canoeing, dinner parties with friends. Connect with our youth and see if I can help in some way. I hope to make a dug-out canoe with my brother down east. Hold our politicians accountable. In 10 years, I hope to live near the water and still be living life to its fullest. I plan to laugh often.
RETIREMENT BIO
ELAINE PICK
Graduate Program Assistant
Dept. of Physical and Environmental Sciences

Tell us about yourself:
Empathy, Trust, Care, Listen and Help: these speak to the heart of who I am.
With a nursing background, I spent a good many years working at Toronto East General Hospital (now known as Michael Garron Hospital) in the Department of Pathology.
In 1987 I stepped away from my work to take care of my children full time.
My journey with the Department of Physical & Environmental Sciences began in February 2010.
Life is timing.

What led you on this career path?
What was initially slated to be a 3 week contract position to assist with the MEnvSc turned into a full-time position in 2012 as the PhD Graduate Programs Assistant with DPES and the Office of the VP and Dean.

I have Julie Quenneville, Shelley Eisner and Bill Gough to thank for giving me the opportunity to re-enter the work force at a time in my life that I did not dream would be possible.

What are/were your biggest milestones?
I am proud to say that the department has had 42 PhD students successfully defend and receive their doctorate degree since 2013. It has been an honour and a privilege to attend convocation and celebrate the culmination of the dreams, goals and aspirations of these students with their families.

What were some of the challenges in your job?
Managing multiple Final Oral Examinations during COVID this past year.

What were the most rewarding aspects?
Supporting the students in their challenges as they worked to complete their PhD. I also received the True Blue Award.

What is something interesting the department doesn’t know about you?
I once rode down Yonge Street on the back of a convertible as Miss Macedonia...

What are your favorite hobbies/past times?
I love to cook and have been told that I should compete on Masterchef Canada. (LOL)

What advice would you give yourself if you could go 10 years in the past?
Life is Timing.

What are your plans for retirement and where do you hope to be in 10 years?
Although the decision to retire is bittersweet: Life is Timing and I look forward to see where my path and timing take me now.

What will you miss the most about the department?
I will dearly miss the students, my dear colleagues and friends, faculty and of course-the FOOD 😊.

My deep heartfelt gratitude and thanks go to DPES and the Office of the VP & Dean for allowing me the opportunity to continue to learn and to grow. Dreams do come true.
AWARDS FEATURE

DR. RUBY SULLAN

Assistant Professor, Department of Physical and Environmental Science
Ph.D., University of Toronto

Professor Ruby Sullan from the Department of Physical & Environmental Science has been named as one of this year’s Cottrell Scholars. The Research Corporation for Science Advancement names 25 teacher-scholars in chemistry, physics, and astronomy every year as Cottrell Scholars. This award recognizes those early in their careers with innovative research programs and outstanding academic leadership potential. We are proud to highlight Dr. Ruby Sullan as a 2021 Cottrell Scholar!

Research Overview

Dr. Sullan’s research takes an innovative approach to combating drug-resistant pathogens by using nanoparticles. These nanoparticles are made from a naturally-occurring hormone and neurotransmitter called polydopamine. “Since the mechanisms that this therapy uses is different from most antibiotics, we envision that they can be designed and developed to target other drug-resistant bacteria,” Dr. Sullan explains.

Read the full article: https://utsc.utoronto.ca/news-events/breaking-research/innovative-technique-using-nanoparticles-show-hope-defeating-deadly-drug

Congratulations Dr. Sullan! We are proud of you and your achievements and wish you continuing success!

Links for more info

- Dr. Sullan’s Profile in the Oct 2019 DPES Digest, p.3-4 https://www.utsc.utoronto.ca/physsci/sites/utsc.utoronto.ca.physsci/files/u35/DPES%20Digest%20October%202021%20Newsletter.pdf
- https://www.sullanlab.com/research
- https://rescorp.org/news/2021/02/rcsa-names-2021-class-of-cottrell-scholars
Prof. Kagan Kerman of the Dept of Physical and Environmental Sciences is the recipient of the highly prestigious McBryde Medal from the Chemical Institute of Canada. The award is presented to a young scientist working in Canada who has made significant achievements in pure or applied analytical chemistry.

Prof. Kerman is a bioanalytical chemist, with a research focus on electrochemistry and biosensors. After foundational training in his native Turkey, Prof. Kerman completed a PhD in Materials Science at the Japan Advanced Institute of Science and Technology (JAIST) in 2005. Following postdoctoral positions at the University of Saskatchewan and Western University, he joined UTSC as an Assistant Professor in 2008 and was granted tenure in 2015.

Prof. Kerman's research output is phenomenal, with 199 publications to date, which have received well over 8800 citations. Prof. Kerman is among the most cited researchers at UTSC, with an extraordinary quantity of high quality publications.

Several of his contributions have been featured on the cover of journals, including Analyst, Analytical Methods and ACS Chemical Neuroscience. Prof. Kerman has been previously honored by receiving the Young Investigator Award of the Alzheimer Society of Canada and the Early Researcher Award of the Ontario Ministry of Research and Innovation. He is also one of our three Canadian Research Chairs.

His current projects range from post-translational protein modifications, drug screening for neurodegenerative diseases, synthesis of bioconjugates using nanomaterials, developing biosensors for the detection of various analytes, and discovery of new applications for hydrogels.

Congratulations to Prof. Kerman on this award! We are very proud of you and your achievement and wish you continued success.
If you could give a brief summary of your role, what would that be?
I currently work at a clinical research organization (CRO) as a project coordinator in the Project Management department. I support activities related to bioequivalence/bioavailability, phase 1 and human abuse liability studies. Working within project managements means I have the opportunity to dip my hands in all parts of the business, leaving my work dynamic with lots of opportunities to learn. Some of my day-to-day tasks range from drafting various project plans for our clients, tracking financial milestones, supporting project meetings, responding to client questions about our business operations and following up with our internal teams for project deliverables.

What are the challenges of your current position?
It is always a struggle for the team to find a balance between meeting the demands of our clientele and ensuring our own teams are not burning out. Working remotely also added challenges in building connections with my team members.

Most rewarding aspects of your current position?
CRO’s are a pivotal part of the drug development journey. We play a part in ensuring drugs (generic or first in human) being released to markets worldwide are safe for the population. This makes my work incredibly rewarding!

What experiences while at UTSC did you find were helpful in getting you to where you are now?
CO-OP! I strongly encourage students who have the opportunity to do so, to enroll into a co-op program. The skills you learn can be directly translatable to a career post university or even into a Masters/PhD program. I did my first placement working as a clinical research assistant at Sunnybrook and my next in Industrial Affairs at Sanofi Pasteur. Both of these gave me the necessary skills to work in the CRO industry.

What advice would you give to current students?
Take as many opportunities as you can to develop, make friends, connections, and of course have fun during your undergraduate years. There are so many opportunities and programs within our reach as a UofT student. One of the best moments for me was taking on an international placement for my CHMD90 project.

Work life balance?
Being able to work from home has given me more time back. The best way to relax after work is catching up on my sleep or jumping on zoom to chat/watch shows with my friends.

What is something interesting the department doesn’t know about you?
I am a huge travel fanatic! On my bucket list for the next few years is the Canadian east and west coast, Japan, and Switzerland.

What advice would you give yourself if you can go 10 years in the past?
10 years back I would be 14! But I would have to say to take time to enjoy life. An important teacher of mine once said: you shouldn’t live to work, you should work to live.

Where do you hope to be career-wise in 10 years?
Still asking myself that very question! It would be interesting to try business development or drug market access in pharma.

A L U M N I  H I G H L I G H T
KARYNA HANIF
Project Coordinator, BioPharma Services Inc.
Hons. B.Sc. (2020) - Major in Biochemistry (coop) and Minors in Environmental Science and International Development Studies

If you could give a brief summary of your role, what would that be?
I currently work at a clinical research organization (CRO) as a project coordinator in the Project Management department. I support activities related to bioequivalence/bioavailability, phase 1 and human abuse liability studies. Working within project managements means I have the opportunity to dip my hands in all parts of the business, leaving my work dynamic with lots of opportunities to learn. Some of my day-to-day tasks range from drafting various project plans for our clients, tracking financial milestones, supporting project meetings, responding to client questions about our business operations and following up with our internal teams for project deliverables.

What are the challenges of your current position?
It is always a struggle for the team to find a balance between meeting the demands of our clientele and ensuring our own teams are not burning out. Working remotely also added challenges in building connections with my team members.

Most rewarding aspects of your current position?
CRO’s are a pivotal part of the drug development journey. We play a part in ensuring drugs (generic or first in human) being released to markets worldwide are safe for the population. This makes my work incredibly rewarding!

What experiences while at UTSC did you find were helpful in getting you to where you are now?
CO-OP! I strongly encourage students who have the opportunity to do so, to enroll into a co-op program. The skills you learn can be directly translatable to a career post university or even into a Masters/PhD program. I did my first placement working as a clinical research assistant at Sunnybrook and my next in Industrial Affairs at Sanofi Pasteur. Both of these gave me the necessary skills to work in the CRO industry.

What advice would you give to current students?
Take as many opportunities as you can to develop, make friends, connections, and of course have fun during your undergraduate years. There are so many opportunities and programs within our reach as a UofT student. One of the best moments for me was taking on an international placement for my CHMD90 project.

What advice would you give yourself if you can go 10 years in the past?
10 years back I would be 14! But I would have to say to take time to enjoy life. An important teacher of mine once said: you shouldn’t live to work, you should work to live.

Where do you hope to be career-wise in 10 years?
Still asking myself that very question! It would be interesting to try business development or drug market access in pharma.

Work life balance?
Being able to work from home has given me more time back. The best way to relax after work is catching up on my sleep or jumping on zoom to chat/watch shows with my friends.

What is something interesting the department doesn’t know about you?
I am a huge travel fanatic! On my bucket list for the next few years is the Canadian east and west coast, Japan, and Switzerland.
Each year as part of the EES1100 — Advanced Seminar class, the MEnvSc Internship Team hosts an Alumni Panel to give current MEnvSc students an opportunity to connect, learn from, and network with former MEnvSc students.

This year’s panel included:

**Katrina Furlanetto**
General Manager, Cataraqui Conservation  
MEnvSc Class of 2015  
https://www.linkedin.com/in/kfurlanetto/

**Daniel Filippi**
Climate Change Program Manager, ICLEI  
MEnvSc Class of 2016  
https://www.linkedin.com/in/daniel-filippi-248b57112/

**Kimberly Asemota**
Project Coordinator, Canadian Nuclear Laboratories  
MEnvSc Class of 2018  
https://www.linkedin.com/in/kimberly asemota/
Each alumni panelist shared their career journey, from their time in the MEnvSc program to the present, along with information about their current organization and their advice and insight on how to enter and build a successful career in the environmental sector.

During the event, there were many valuable and insightful pieces of advice shared. The top 3 takeaways from the event were:

**Be Brave!** — Don't be afraid to take risks in your career. Step out of your comfort zone. Volunteer for new projects. Try something you have never done before. Learning often comes from new and uncomfortable situations.

**Persistence and Resilience Will Pay Off!** — Job search can come with a lot of rejection, don't take it personally. Learn from each application and interview. If your job search strategy is not getting you to where you want to be, try something different. Keep moving forward. The right opportunity with the right organization is out there.

**There is Value in Every Experience!** — Most people don't start their careers in their dream job. Look at each role as an opportunity to learn, build new skills and expand your professional network. Each role is a stepping stone that will get you closer to your dream role!
What advice would you give to current students?
I know it’s hard and everyone says it, but do your best to try and get out of your comfort zone and reach out to people who’s work interests/inspires you. There is so much going on in the environmental science space and to be honest there’s no better time than the present to be in this field. You have countries that now require mandatory climate risk reporting in line with TCFD reporting recommendations, you have large corporations now hiring sustainability experts to figure out how to make their business operations or supply chain more ‘green’ and less carbon intensive than ever. There is also a renewed investment in “green projects” by our government, research centres, NGOs and local foundations enacting positive change in our communities across Canada.

All that said, when reaching out to someone in industry and networking, always ask them about what recent projects they’re working on and what has them the most excited currently with their job. It’s always a great conversation starter and people love talking about themselves (hence why I’m responding to this alumni article request)!

Could you give a brief summary of your role?
As a Program Manager, I help advance ICLEI’s national role on the country’s climate adaptation file through the management and development of various programs and projects.

My current work focuses on the various emerging, implementable actions, and climate-resilient approaches available to communities to help mitigate widespread climate-related impacts, which are quickly becoming the new norm across Canada. Throughout the numerous programs/projects I run, I focus on applying industry best practices, initiatives and standards to develop successful on the ground campaigns.

My work on a day-to-day basis emphasizes the need for increased understanding, practice and adoption of climate adaptive approaches/actions for homeowners, governments and private industry alike. My role also allows for me to sit on several technical boards/committees to ensure new national/provincial policies, standards and regulations possess current climate change adaptation and vulnerability planning information and can be implemented by an assortment of users with varying levels of capacity.

What experiences while at UTSC did you find were helpful in getting you to where you are now?
The experiences that come to mind that have really helped me in my professional career while studying at UTSC include:

Academia: Developing technical skills (scientific writing, data analysis, and proper research abilities) that helped me write my thesis while working with the MOECC and gave me the opportunity to be published within the Journal of Environmental Pollution based off of my initial research on the environmental impacts of the funeral industry on receiving sewersheds and waterbodies.

Extracurricular: Developing relationships with my classmates was a huge part of my time while at UTSC. I made friends in all 3 streams and even took electives in each of them to provide myself with a good base understanding of what it meant to leave a Master’s program and call oneself a “climate change professional/practitioner”. I was able to join U of T’s Tri-Campus Rugby Team for UTSC and it allowed me to meet people outside of the program as well who I still keep in touch with today. Being able to make friends with other M.Env.Sc students in my year’s cohort outside of the classroom in retrospect helped me broaden my professional network, but just as importantly allowed me to get involved in off campus events (attending conferences, sporting events, Friday Night Live events at the ROM, going out for dinners and chatting about potential work opportunities).

Work Opportunities: The other big piece that comes to mind is how open and approachable the professors were during my year. I ended up reaching out to one of my professor’s and working in his lab studying invasive fish species’ responses to alternative deterrent methods to ensure the Great Lakes weren’t treated as extensively with widely used
What is something interesting the department doesn’t know about you?
Drake stepped on my foot one time at a bar... Didn’t even say sorry, suffice to say I was in my feelings that night.

What advice would you give yourself if you can go 10 years in the past?
Don’t be afraid to reach out for help, especially when it comes to your mental health. I personally took too long to come around to this advice myself and I would strongly advocate for anyone having a tough time to reach out to someone to help you work through whatever issues you may be facing.

Secondly, try not to worry so much about what others ‘may’ think of you or your work. Stressing over something and having anxiety about an upcoming deadline just makes you put yourself through it twice. When you can look back on something you’ve done, more times than not you’ll generally say “that went okay”, or “that went a lot better than I expected!”

Finally, my grandfather always used to say, “There’s a probable chance for profuse precipitation” and would then end it by saying “…and it might rain too”. In other words don’t overthink it, generally the simple explanation or answer is just as good as the overly complicated, technical one.

What resources did you find helpful in getting you to where you are now?
As I mentioned, being able to take a variety of courses that included, Freshwater Ecology & Biomonitoring, Project Management, Environmental Challenges in Urban Areas, and Biophysical Interactions in Managed Environments allowed me to interact with and learn from professors with years of experience in both industry and academia. Many of these courses provided me with content that I still use with me in my day-to-day work and the freshwater course in particular allowed me to obtain my Ontario Benthos Biomonitoring Network (OBBN) Certification. This not only provided me with a provincially recognized certification that assisted me in some of my work with stakeholders and clients but was an icebreaker in an interview with one of my former bosses who studied benthic invertebrates for his PhD. Over 25 years ago. Having that added piece made me a prime candidate for the position and gave me something to talk with him about over lunch reminiscing about being in the hot sun in waders instead of a temperature-controlled building.

What are the challenges of your current position?
AT ICLEI Canada my role has me wear many hats; I lead various projects that vary in scope, content and project outcomes/goals. With this comes the requirement of being extremely organized, on-task, and the ability to drop one thing and jump to another seamlessly as deadlines change. My role also has me manage a small team and has me collaborate with numerous clients from varying sectors. Being an effective communicator and confident public-speaker is something I’m constantly working on. The ability to adequately understand various climate change metrics, actions and science and then to be able to effectively synthesize, communicate and report on them to project partners/stakeholder is a constant requirement for me in my role. Although at times it can be tough to keep up with competing tasks, the role allows me to better improve my project management skills, and the payoff of completing worthwhile projects that see on the ground implementation and receive positive feedback is what keeps me heavily invested in the work I do.
Where do you hope to be career-wise in 10 years?
To be frank, in a position where I feel I’m making a difference in Canadians’ lives and being able to better protect our finite natural resources from climate change. If I could be in a position where I had the ability to reach down to pull others up, similar to what people have done for me so far in my career, that would be the proverbial cherry on top.

Work life balance?
Yah, it can be tough – especially when you’re in a consulting role like I am. The best way to do it though is to carve out some time for yourself to pursue hobbies in your downtime and take care of yourself mentally and physically. Occasionally I’ll let myself slip in that regard, but you always have to remind yourself no matter how much you get done, there will always be more work tomorrow (ugh, that ended on a rather somber note).

What are the most rewarding aspects of your current position?
The ability to collaboratively work with municipalities, communities, businesses and research institutions across the country and internationally. There’s always some aspect of my job that I’m learning more about, whether that is learning from Indigenous communities and their centuries of work sustainably managing this country’s land and water systems, to learning from our European partners on sustainable benchmarking programs and collaboratively developing online tools and databases for Canadian municipalities to ensure their climate vulnerability plans become internationally recognized. Finally, to being out in public and presenting on research ICLEI has conducted with our partners for clients across Canada and internationally.

All of this and more allows me to feel like I’m helping promote the benefits of climate adaptation and preparedness and putting into action the work and research our team has worked so hard on developing over several months/years.

Check out Daniel’s LinkedIn Profile: https://www.linkedin.com/in/daniel-filippi-248b57112/
The Academic Advising & Career Centre at UTSC will be hosting the Choosing Your Program Virtual Fair on Tuesday, March 2nd from 10-11 am & 3-4 pm on Zoom. ALL departments will be attending! Many will have student representatives as well! This will be a great chance for students to get their program related questions answered as they decide on what program(s) they will study. Registration is required. To register and for more information on Choosing Your Program month, please refer to our website at uoft.me/choosing.

You can also try the following links:
Apply now!
The MEtvSc program is receiving applications for the Sept 2021 start date.

Final Deadline: April 30, 2021
(supporting documentation due May 15).

PLANNING YOUR APPLICATION TO THE MEtvSc PROGRAM
By Physical and Environmental Sciences at UofT

JOIN US ON WED, MARCH 17, 2021 FROM 1:00 PM – 2:00 PM EST
UTSC’s Master of Environmental Science (MEnvSc) program has a long history of successfully helping students secure meaningful summer internships in the environmental sector. And this past summer was no different – despite the pandemic.

The MEnvSc program started in 2006 with the aim of providing an advanced curriculum in environmental sciences, complemented by professional skills development and workplace training in a condensed 12-month program. Over the years, the program has grown at a steady state of about 100 students each year with a network of almost 1,000 alumni.

Since its inception, the MEnvSc program has built a diverse network of valued employer and faculty partners to develop enriching internship and research opportunities for students. This collaboration has advanced the MEnvSc program as the centre of gravity for environmental education in the Greater Toronto Area.

Although the pandemic presented many challenges to the 2020 MEnvSc cohort, the MEnvSc program staff helped secure internships for all of the students. Here are five students who not only survived, but thrived, in their internships this year.

Raymond Co

In May of this year, recent grad Raymond Co attended a LAUNCH networking event open to arts and science co-op students at UTSC, where he learned about an internship position with Ontario First Nations Technical Services Corporation (OFNTSC). He’s now working as a junior environmental scientist intern with the non-profit organization, which provides technical and advisory services to First Nations of Ontario.

“I found this to be an interesting opportunity to be able to work directly with First Nations throughout Ontario,” he says. A workday for Raymond can include a visit to a community to assess their landfill and transfer stations, developing guidelines to help operators and field staff on monitoring groundwater wells, or provide guidance on available funding and waste diversion opportunities that are available to communities.

Because of the pandemic, he faced many challenges. “There have been many discussions with our federal funding partner, Indigenous Services Canada,” he says, “which has lead to the creation of new projects, some of which are more office-based now, such as the development of promotional and educational materials for our clients bringing up solid waste management awareness.” However, he adds, “Covid-19 has affected us all, not necessarily in a negative way, but in a different way, on how we target, operate, and carry out projects.”

Raymond is happy to have lucked into this opportunity through a MEnvSc internship. In the future, he sees himself working in a mix of both public and private sectors. “I’m delighted that the work and services I provide can be a direct, positive influence on my clients and the environment.”

Source: https://utsc.utoronto.ca/news-events/university-news/opening-doors-internships
Kevin Yang
What’s the power of an internship in these challenging times? Just ask Kevin Yang, who graduated in November. “I’m currently working at the federal government with the Canadian Wildlife Service as a habitat data officer,” says Kevin, who started the position in May as an intern in the program.

In fact, this position was almost tailor-made for someone like Kevin, who is particularly interested in issues concerning nature, including wildlife protection, biodiversity conservation, and environmental policy. Kevin’s responsibilities consist mainly of researching, report writing, geospatial analysis and data management for projects concerning wildlife protection and biodiversity conservation.

But it wasn’t all easy for Kevin. “It was challenging in the beginning because I did not have access to a lot of our work, due to being a student,” he says. “Instead, I focused on working hard on the tasks that were available to me.”

Added to that, in other circumstances, Kevin would be working in an office setting. But because of the pandemic, he has been working remotely the entire time, so he misses out on person-to-person interactions. “That has been one of the biggest challenges,” he adds. But his team does a good job of communication, which is one of the barriers to working remotely, he says.

Kevin is so happy that he is continuing with CWS after graduation. “Thankfully, Covid-19 has not significantly affected my ability to conduct work in this role,” he says. “I also find it helpful to look on the bright side – there is no commute and plenty of money saved!”

Nuha Anwer
In today’s work environment, getting a foot into an organization can really open doors. That’s what happened to Nuha Anwer, who was able to get a 16-week internship that has been extended into a position at the Climate Risk Institute (CRI), where she is now working as a consultant/subcontractor.

It was stressful, though. Unfortunately, Covid-19 hit hard in March, when she was supposed to join CRI. “It made my onboarding uncertain and left me scrambling to find other possible internship opportunities during an already difficult time,” she says. But with the help of the internship coordinators and Nuha’s supervisor, who urged her to apply for external funding to support her financially, things fell into place.

Her work revolves around providing support, research and reports for projects, so they are able to move forward. And things are looking up: the non-profit organization has recently been chosen by the Ontario government to conduct the province’s first-ever multi-sector climate change impact assessment. Although working from home wouldn’t be her first choice, Nuha is making the best of it. “The eventual onboarding process was smooth – and working for CRI has been a great experience!” she says enthusiastically.

Now Nuha is looking ahead to the future. “I know climate change is going to be a hot topic that will be of concern to anyone in any field of work – having the knowledge and getting a glimpse of working in the realm of climate change, I see myself continuing to work in this field, while making contributions,” she says.
Flavia Santiago

Life takes some interesting twists and turns sometimes. Take Flavia Santiago, who graduated this fall. To graduate, however, she needed to do an internship as part of her Master’s program, which was already set up (consulting at a private company), but ended up on hold because of Covid-19. In a fantastic turn of events, however, she ended up getting an internship at Metrolinx – the one she really wanted, her dream job!

“It was a four-month temporary contract that recently turned into a permanent position,” says Flavia. She’s working as a project coordinator on the environmental team, working on the environmental aspect of the transit projects. “I ensure projects are in adherence with environmental management plans and applicable legislation, review environmental reports and coordinate activities with various consultants and stakeholders,” she adds.

As well as Flavia, a few other UTSC alumni work at Metrolinx. And when she started, her manager was a UTSC alumni too. Navigating the workplace is different now, with Covid-19, of course. “But there are ways to mitigate it, we do have a lot of [virtual] meetings and that does make it easier,” she says.

And there is a lot of opportunity at Metrolinx, she says. It worked out much better for her than if she had received the first internship. “I’m so happy to be at Metrolinx, there are many different projects and lots of opportunities to grow,” she adds. “I think I got lucky, she says. “I was worried that I wouldn’t be able to graduate because I wouldn’t be able to find an internship during the pandemic, but it all worked out.”

Farheen Kadwa

Farheen Kadwa is grateful. Early in the year, she landed a research opportunity with the Canadian Wildlife Federation (CWF), working on a project assessing the threat to right whales in the Maritimes region.

When her Program Director asked what kind of research she was interested in, she told him that ideally she’d like to work in marine conservation. He put her in touch with the CWF and she got the opportunity, working on data analysis and writing a report for this specific project. “It was a good fit for me – right whales are getting a lot of attention, and it’s just a hot topic for research.”

Currently, she’s still working with the CWF. “It was a long graduate project and now we’re just finishing up the writing for publication.”

Everything worked out just the way she wanted, she says, and everything was confirmed early. “So even in February, I knew I would be working, and I knew I would be working remotely,” she says. Still, some of the opportunities that a pandemic takes away from someone include the ability to network and attend conferences, which all had to go online. “I even feel bad telling people that, because at least I had secured a good position, while others were in tougher situations,” she adds.

Farheen is job hunting now, looking for something related to conservation and research. “But I’m also looking in other areas, such as communicating science, or translating it into policies,” she says. “I’m open to doing other things,” she says happily.
FROM THE TRACES CENTRE:

UV-VIS SPECTROSCOPY

Ultraviolet visible (UV-Vis) spectroscopy is a quantitative analytical technique which measures how much a chemical substance absorbs light. This can then be related to the concentration of that chemical. Instrumentation is affordable and simple to operate making UV-Vis highly desirable for both industry and research applications such as:

- Detecting impurities
- Studying optical properties
- Characterizing biomaterials
- Monitoring fermentation

ADVANCES IN INSTRUMENTATION:

- **1930s**: The American government recognizes that UV-Vis can be used to study vitamin content in soldiers' rations.

- **1940s**: UV-Vis spectrophotometers are launched commercially. The Beckman DU spectrophotometer gives analysis results in minutes! Previously this was hours or weeks...

- **1950s-1970s**: The first mass produced, low-cost instrument, the SPECTRONIC 20 UV-Vis spectrophotometer, is launched. Analysis time is reduced from minutes to seconds!

- **1980s-1990s**: Use of personal computers improves data acquisition and instrument control capabilities. Advances in technology allow for smaller instruments to be manufactured.

- **2000+**: Manufacturers begin to produce miniature application specific instruments. Technology advancements continue focusing on portability, ease-of-use, and application growth.

UV-VIS SPECTROSCOPY AT TRACES:

Are you interested in completing UV-Vis analysis? The TRACES Centre houses three Agilent 8453/4 UV-Vis spectrometers offering a wide range of analytical capabilities including thermal denaturation and kinetics studies. Visit our website to view instrument specifications, current rates, and booking information.

utsc.utoronto.ca/~traceslab/
FROM THE TRACES CENTRE:

WORDSEARCH CONTEST

Send a photo of your completed crossword to melanie.snow@utoronto.ca by March 16th to be entered to win one of our new TRACES touques!

CONGRADULATIONS TO DECEMBER CONTEST WINNER YAN YAO!
## DPES Programs Summary

**Total Programs:** 16

### 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
- Honours Bachelor of Science or Honours Bachelor of Arts / Master of Teaching
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