

**DEPT. OF PHYSICAL AND  
ENVIRONMENTAL SCIENCES**

# DPES

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**EDITORS:**

**DR.  
SHADI  
DALILI**

**YAO YAN  
HUANG**

**Photo: Observation Night with Dr. Hanno Rein**



*“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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# C O N T E N T S

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NMR

Contest of the Month

# CELEBRATING PRIDE MONTH 2022 AT THE UNIVERSITY OF TORONTO

04

The month of June is celebrated annually as Pride Month, an opportunity to celebrate the excellence and resilience of the 2SLGBTQ+ community while actively combatting homophobic and transphobic discrimination. Toronto has an extensive history of contributions from 2SLGBTQ+ individuals. To celebrate these individuals and their community, the University of Toronto held multiple Pride Month events across the three campuses.

Pride celebrations were born out of the Stonewall riots in 1969. This series of protests and demonstrations was held in response to the police raids at Greenwich's Stonewall Inn. Pride is multifaceted: it is an opportunity to celebrate the resilience, history, and diversity of the 2SLGBTQ+ community, but it is also a call to action against ongoing discrimination and harassment to which members of the community are subjected. Beyond the month of June, these celebrations remind us to continue to work against transphobic and homophobic violence and all forms of racism, while giving space for Indigenous and Two-spirit, queer and trans-Black, and racialized queer and trans individuals to share their stories.

Toronto's Pride celebrations evolved from a rich history of community advocacy and support. One such inspiration is the protests following Operation Soap, the bathhouse police raids that occurred in 1981. 286 men were arrested in one of the largest ever mass arrests in Toronto. These raids and the following protests became a critical point for Toronto's gay community.

Students, faculty, and staff at the University of Toronto organized numerous events to celebrate Pride month. All three campuses held Progress Pride Flag raising events on June 1st. The Progress Pride Flag includes an arrow that specifically emphasizes trans individuals and the intersectionality, representation, and unique experiences of Indigenous, Black, and racialized trans and queer individuals.



Image by Seyran Mammadov

Pride Pub was co-hosted by the Sexual & Gender Diversity Office (SGDO) and Hart House at the St. George campus on June 9, 2022. This event featured powerful performances by trans and queer individuals from the Toronto community. The third annual Pride Pitch event was held at UTM on June 15th. This competition encouraged students, faculty, and staff to gather and pitch their start-up ideas, empowering 2SLGBTQ+ entrepreneurs by celebrating and rewarding their ideas. The Display Your Pride event was also held across the tri-campus on June 15th. Members of the University of Toronto community shared pictures of what Pride means to them with the hashtags #DisplayYourPride and their respective campus hashtag #UofT, #UTM, or #UTSC.

## LINKS:

Read about the Pride Pitch event winners:

<https://entrepreneurs.utoronto.ca/entrepreneurial-voices-of-the-u-of-ts-2slgbtq-community/>

Access the SGDO's resources and support on their website: <https://sgdo.utoronto.ca/>

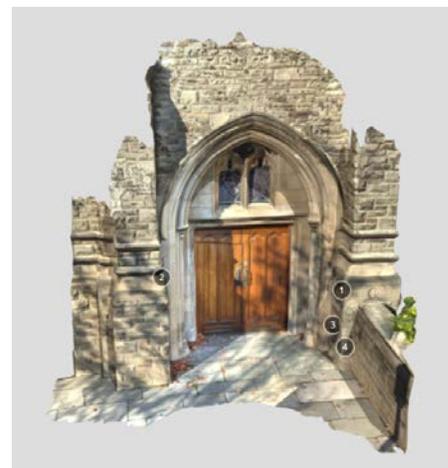
Learn more about the history of Pride in Toronto: <https://www.pridetoronto.com/>

# URBAN GEOTRAIL:

## Experience the geology of the University of Toronto's St. George Campus!

The APGO education foundation recently partnered with the University of Toronto St. George Campus, with support from the Canadian Geological Foundation, to present their first ever Urban Geotrail. This feature allows individuals to discover the geology within the historic campus using their mobile phone, tablet, or computer. The Geotrail presents unique information about the campus buildings including building materials, the location of various quarries used to source these materials, and the rock types used in the buildings' construction.

Seven of the campus' buildings are highlighted within the Urban Geotrail: Knox College, Simcoe Hall, Convocation Hall, Gerstein Science Information Centre, the Legislature Building, University College, and Trinity College. The information is presented using ArcGIS technology from ESRI's latest Story Map Platform. Each building and its unique history can be explored through images, videos, and 3D LiDAR imaging. These interactive 3D models of the buildings contain embedded information to read while examining the structural features of each location.



### HOW IT WORKS:

Open the [Urban Geotrail link](#) on your mobile phone, tablet, or computer. From the home page, read how to use the website features, or click on one of the tabs at the top of your screen (computer or tablet) or the home button (mobile phone) to select one of the seven Geotrail sites. An interactive map is present on the home page to direct users on the walking path that connects each of the campus buildings. For each site, scroll to read about the unique features of these historic buildings. Be sure to follow along with the accompanying images and 3D models, many of which

can direct you to a specific location on the building to see the fascinating geologic phenomena first-hand.

The APGO education foundation is a registered charitable organization supporting students learning and professionals practicing geoscience. For more information on the foundation and their activities, visit: <http://www.apgoedfoundation.ca/>. For more virtual fieldtrips with exciting examples of geoscience in action, visit the foundation's new GeoscienceINFO website : <http://www.geoscienceinfo.com/>.

# CANADIAN CHEMISTRY CONFERENCE AND EXHIBITION: CALGARY 2022



**CCCE** is the premier conference for the Canadian Society for Chemistry. Over 2400+ delegates from Canada and around the world come together to share and promote global perspectives and developments in chemical sciences and their role in solving global challenges. This year, after 2 years of virtual gatherings, the CCCE was held in person in Calgary, Alberta from June 13-17.

We are proud to announce that in the poster presentations student competition, **Saim Imran** from our department won the 1st place award in the undergraduate poster competition in the Analytical Chemistry division! He was competing against all the other undergraduate analytical chemistry students from across Canada!

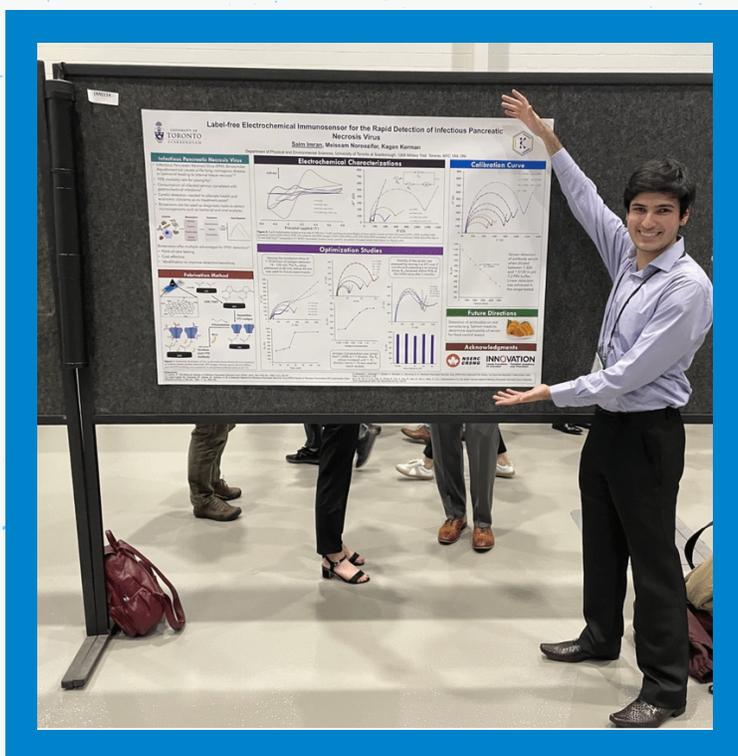
His project, “*Label-free electrochemical immunosensor for the rapid detection of infectious pancreatic necrosis virus*”, focuses on developing diagnostic tools for the detection of infectious pancreatic necrosis virus (IPNV). Infectious pancreatic necrosis virus (IPNV) is a major disease-causing pathogen affecting farmed salmon

worldwide. A single outbreak can substantially reduce salmon populations leading to a heavy loss in the aquaculture industry; hence, a simple diagnostic tool is required to circumvent an IPNV outbreak.

Through Dr. Kagan Kerman and his lab, Saim focused on the use of electrochemical biosensors as a point-of-care diagnostic tool against IPNV. Biosensors convert a biological interaction into a measurable signal that can be used to determine whether and how much of an analyte is present. In this regard, Saim immobilized VP2, an antigenic outer coat protein on IPNV onto the surface of a carbon screen-printed electrode (SPE) using graphene oxide monolayer and carbodiimide/N-hydroxysuccinimide coupling chemistry. He then detected anti-VP2 antibodies, the analyte expected to specifically bind to VP2 through antigen-antibody interactions, using electrochemical impedance spectroscopy. Successful binding was achieved, and he further conducted optimization studies and a calibration curve to validate the sensor for real-world use.

## BIOGRAPHY

**Saim Imran** is a MSc candidate starting in September 2022 with Dr. Kagan Kerman's group. He completed his BSc from UTSC in molecular biology and biochemistry and worked on his undergraduate thesis with Dr. Kerman as well. Since joining Dr. Kerman's group, Saim has worked on various projects relating to the development of electrochemical sensors and biosensors for the detection of various analytes to develop effective diagnostic and research tools. He won the NSERC CGS-M award to fund his Master's studies and hopes to continue to explore the applicability of biosensors in developing diagnostics.



WE WISH SAIM MANY MORE FUTURE AWARDS AND GREAT SUCCESS IN HIS GRADUATE PROGRAM!



# ENVIRONMENTAL CHEMISTRY COLLOQUIUM



The 21st Environmental Chemistry Colloquium (ECCXXI) at the University of Toronto was held 30-31st May in a two day event at the Toronto Zoo and Lash Miller Chemical Laboratories. Graduate students at all campuses involved with Environmental Chemistry presented their current research and were able to interact with peers and faculty while touring the zoo on a hot May day.



Group photo in the Lash Miller Laboratories courtyard.



# BEST PAPER AWARDS

The DPES Graduate Student Best Paper Award was established in 2016 as a celebration of the excellent scholarship present among our graduate students. This year six exceptional papers were nominated and judged on the following criteria: the significance of each paper to the corresponding discipline, the student's role in conceiving and carrying out the research, and any other evidence (e.g., quality of the journal) for each paper to be considered for the award. It was a difficult decision that was weighed in by two (external) editors of journals. This year, the award will be shared between two students, **Yuhao Chen** and **Amy Jenne**. They will each receive \$1,250 that could be used to attend a conference or to support any other activity pertinent to their research. Congratulations to both recipients!

## YUHAO CHEN

Yuhao Chen is a PhD student in the Wania group and has developed a new method to study how polychlorinated biphenyls (PCBs) accumulate inside polar bears from contaminated food by analyzing the diet and fecal samples of polar bears from the Toronto Zoo to see how much PCBs get trapped compared to how much gets excreted. His paper titled "*Probing the thermodynamics of biomagnification in zoo-housed polar bears by equilibrium sampling of dietary and fecal samples*" was published in *Environmental Science & Technology* and was named as the ACS Editors' Choice as well as featured on the cover of the journal.

His supervisor, Frank Wania remarks that the study "... demonstrates how a completely noninvasive approach succeeds in quantifying the biomagnification of hydrophobic organic contaminants in higher organisms. It indicates that the polar bear's exceptionally high biomagnification capabilities are the result of the combination of a high-fat diet with an exceptionally high assimilation efficiency for dietary lipids...."

In the Environmental Chemistry Colloquium, PhD student Desmond Ng also with the Wania group presented one future direction of this research. Using the approach developed by Yuhao, they plan to add

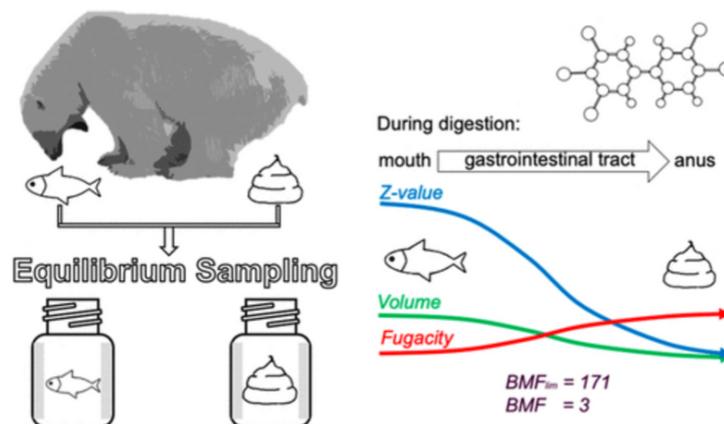
microplastics containing benzotriazole UV-328 to polar bear diets and feces from the Toronto Zoo which already contain polychlorinated biphenyls (PCBs), to investigate the role of microplastics on the biomagnification of organic contaminants.

Congratulations to Yuhao and excited to hear more about this work in the future!

## ABSTRACT

In a proof-of-concept study, we recently used equilibrium sampling with silicone films to noninvasively derive the thermodynamic limit to a canine's gastrointestinal biomagnification capability (BMFlim) by determining the ratio of the products of the volume (V) and fugacity capacity (Z) of food and feces. In that earlier study, low contaminant levels prevented the determination of contaminant fugacities (f) in food and feces. For zoo-housed polar bears, fed on a lipid-rich diet of fish and seal oil, we were now able to measure the increase in f of nine native polychlorinated biphenyls (PCBs) upon digestion, providing incontestable proof of the process of gastrointestinal biomagnification. A high average BMFlim value of ~171 for the bears was caused mostly by a remarkable reduction in fugacity capacity driven by a high lipid

assimilation capacity. Lipid-rich diets increase the uptake of biomagnifying contaminants in two ways: because they tend to have higher contaminant concentrations and because they lead to a high Z value drop during digestion. We also confirmed that equilibrium sampling yielded similar Z values for PCBs originally present in food and feces and for isotopically labeled PCBs spiked onto those samples, which makes the method suitable for investigating the biomagnification capability of organisms, even if native contaminant concentrations in their diet and feces are low.



### LINKS:

<https://utsc.utoronto.ca/news-events/breaking-research/what-polar-bear-poop-can-tell-us-about-how-chemicals-can-get-trapped-inside-body>

Chen, Y., Lei, Y. D., Wensvoort, J., Gourlie, S., & Wania, F. (2022). Probing the Thermodynamics of Biomagnification in Zoo-Housed Polar Bears by Equilibrium Sampling of Dietary and Fecal Samples. *Environmental Science & Technology*, 56(13), 9497–9504. <https://doi.org/10.1021/acs.est.2c00310>

### AMY JENNE

Amy Jenne is a PhD student with the Andre Simpson group and to quote from the nomination “represents the most important work to come out of his group.” Amy’s paper titled “*DREAMTIME NMR Spectroscopy: Targeted Multi-Compound Selection with Improved Detection Limits*” was published in *Angewandte Chemie International Edition* and introduces a new approach to Nuclear Magnetic Resonance (NMR) spectroscopy. Using complex spectral filters and an approach called “multi-spectral focusing” to increase signal strength, signals from an unlimited number and type of target molecules can be observed. For example, imagine having a tube of human blood and being able to observe only disease biomarkers of interest to you, while all other molecules become invisible. Other added benefits include it being completely non-invasive, meaning it can be applied to living species, providing a tailorable molecular window into living systems.

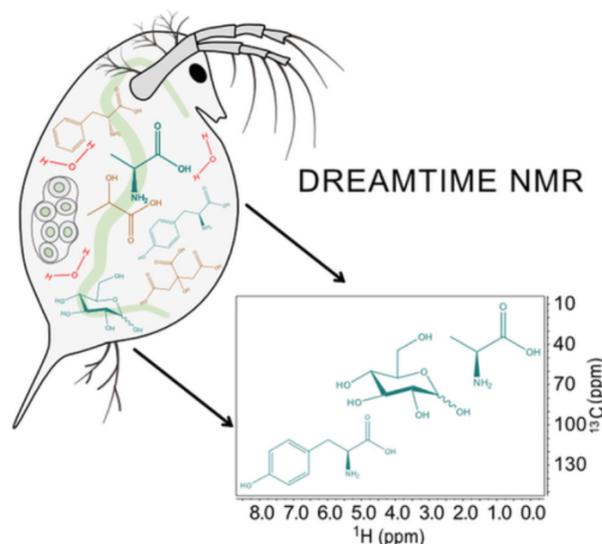
Prof. Simpson adds in the nomination that “...As soon as the work was published Sunnybrook Hospital contacted me so they can be the first to get it implemented on humans...”

Congratulations to Amy! It was a pleasure to hear her talk about this research at the Environmental Chemistry Colloquium.

### ABSTRACT

NMR/MRI are critical tools for studying molecular structure and interactions but suffer from relatively low sensitivity and spectral overlap. Here, a Nuclear Magnetic Resonance (NMR) approach, termed DREAMTIME, is introduced that provides “a molecular window” inside complex systems, capable of showing only what the user desires, with complete molecular specificity. The user chooses a list of molecules of

interest, and the approach detects only those targets while all other molecules are invisible. The approach is demonstrated in whole human blood and urine, small living aquatic organisms in 1D/2D NMR, and MRI. Finally, as proof-of-concept, once overlap is removed via DREAMTIME, a novel “multi-focusing” approach can be used to increase sensitivity. In human blood and urine, sensitivity increases of 7–12 fold over standard  $^1\text{H}$  NMR are observed. Applicable even to unknowns, DREAMTIME has widespread application, from monitoring product formation in organic chemistry to monitoring/identifying suites of molecular targets in complex media or in vivo.



**LINKS:**

Jenne, A., Bermel, W., Michal, C. A., Gruschke, O., Soong, R., Ghosh Biswas, R., Bastawrous, M., & Simpson, A. J. (2022). DREAMTIME NMR Spectroscopy: Targeted Multi-Compound Selection with Improved Detection Limits. *Angewandte Chemie International Edition*, 61(19), e202110044.

<https://doi.org/https://doi.org/10.1002/anie.202110044>

**CONGRATULATIONS TO OUR WINNERS!**



Amy Jenne

Environmental Chemistry Graduate Student



Yuhao Chen

Environmental Chemistry Graduate Student

# AWARD HIGHLIGHT



Congratulations to Professor Kagan Kerman as a renewed Canada Research Chair, Tier Two in bioelectrochemistry of proteins! The Canada Research Chair program supports research excellence in Canada, and recently announced an investment of more than \$102 million, in support of 119 new and renewed Canada Research Chairs at 35 Canadian research institutions.

## PROFILE

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. Dr. Kerman is among the most cited researchers at UTSC with over 200 publications to date with over 8800 citations. He was recently awarded the highly prestigious McBryde Medal from the Chemical Institute of Canada in 2021 and featured in the February 2021 DPES Digest issue.

## RESEARCH OVERVIEW

Dr. Kagan Kerman's research focuses on the analytical detection of biological events on surfaces. They modify surfaces with nanoparticles and biomolecules to observe and detect various recognition events. Current projects include biosensing of neurodegenerative diseases, biosensing of environmentally hazardous compounds and bacteria, and the synthesis of bioconjugates using nanomaterials. A recent 2022 publication looked at the potential of Pyrroloquinoline Quinone (PQQ) and its derivatives as a therapeutic agent toward Parkinson's disease therapy (Li et al., 2022).

## CONGRATULATIONS TO PROFESSOR KERMAN!

### OTHER LINKS:

- <https://www.utoronto.ca/news/u-t-researchers-awarded-20-new-and-renewed-canada-research-chairs>
- <https://www.canada.ca/en/research-chairs/news/2022/06/government-of-canada-announces-119-new-and-renewed-canada-research-chairs.html>
- Li, S. P., Raja, A., Noroozifar, M., & Kerman, K. (2022). Understanding the Inhibitory and Antioxidant Effects of Pyrroloquinoline Quinone (PQQ) on Copper(II)-Induced-alpha-Synuclein-119 Aggregation. ACS CHEMICAL NEUROSCIENCE, 13(8), 1178–1186. <https://doi.org/10.1021/acscchemneuro.1c00703>

# RESEARCH HIGHLIGHT

Dr. Myrna Simpson received her BSc and PhD from the University of Alberta and is currently a Professor of Environmental Chemistry. She is also the Associate Director of the Environmental NMR Centre and the Canada Research Chair (Tier 1) in Integrative Molecular Biogeochemistry. Dr. Simpson's research interests include Molecular Biogeochemistry, Environmental Chemistry and Environmental Metabolomics. Dr. Simpson conducts research at the Simpson Lab at the University of Toronto Scarborough.



## MICROBES IN NUCLEAR WASTE?

In a news article published in University of Toronto Scarborough News, Dr. Myrna Simpson introduces a novel study which aims at investigating whether bentonite clay could support microbial life. This research is being conducted as Canada begins to transfer all used nuclear fuel to a deep geological repository (DGR). The DGR is being built by the Nuclear Waste Management Organization (NWMO). The ultimate plan is to use bentonite clay to surround the fuel containers.

The facility that will be storing the fuel will be around 500-800 metres underground, with every room being secured with bentonite clay. This clay is known for reducing the movement of water and mitigating heat. The bentonite clay is being mined from a natural deposit, which will no doubt contain organic matter. Additionally, there will be microbes in the groundwater and rocks enclosing the DGR. This poses a risk because some microbes can produce sulfide, a chemical capable of corroding metal—including the metal that will be holding the nuclear fuel.

The solution was for the NWMO to recruit Dr Myrna Simpson, along with Professor Josh Neufeld (University of Waterloo) and Professor Greg Slater (McMaster University) to study whether microbes can thrive in the conditions present in the proposed DGR. Dr. Simpson mentioned how this study could help mitigate threats to the DGR.

**“If we find conditions that promote microbial growth, then this information can be factored into the DGR’s design to minimize potential risks,”** said Myrna Simpson to UTSC News (Battler, 2022).

This proposed study has received \$3 million of funding from the NSERC Alliance grant program. The plan is to replicate the underground conditions of the DGR to understand microbial life. Dr. Myrna Simpson will specifically be analyzing how microbial life could impact organic matter in the bentonite clay. In the end, this study will inevitably produce new data on microbial life underground.

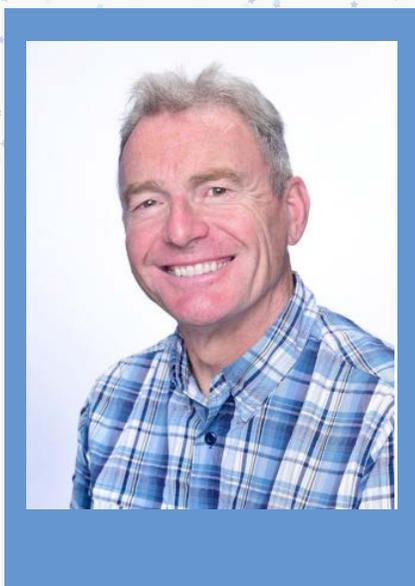
**“Working with professors Neufeld and Slater will yield new and integrated knowledge regarding how microbes can grow and cooperate underground, and what conditions prevent their activities,”** Simpson said to UTSC News (Battler, 2022).'

### OTHER LINKS:

- **Read the full UTSC News article:**  
[https://utsc.utoronto.ca/news-events/breaking-research/28-million-study-test-if-microbes-can-grow-canadas-national-facility-nuclear?](https://utsc.utoronto.ca/news-events/breaking-research/28-million-study-test-if-microbes-can-grow-canadas-national-facility-nuclear?utm_content=bufferffc0c&utm_medium=social&utm_source=twitter&utm_campaign=buffer)  
[utm\\_content=bufferffc0c&utm\\_medium=social&utm\\_source=twitter&utm\\_campaign=buffer](https://utsc.utoronto.ca/news-events/breaking-research/28-million-study-test-if-microbes-can-grow-canadas-national-facility-nuclear?utm_content=bufferffc0c&utm_medium=social&utm_source=twitter&utm_campaign=buffer)
- **Profile:**  
<https://www.utsc.utoronto.ca/physsci/myrna-simpson>

# FACULTY AWARDS

## UTSC ASSOCIATE/FULL PROFESSOR TEACHING AWARD



**Professor Nick Eyles** is the recipient of the UTSC Associate and Full Professors Award. Professor Eyles has been an outstanding academic, ambassador of UTSC and university citizen, combining a prolific research program with first-class teaching, tireless outreach, and public engagement. He has used his unique charisma to create the most successful course in the history of our department, Introduction to Planet Earth (EESA06), which attracts nearly 2,000 students every year. Based on a unique combination of thought-provoking lectures, virtual labs, and videos, his students partake in a global field trip that has proven to be a highly attractive introduction to our programs. His educational strategies breathe life into some of the more theoretical aspects of his courses by providing “real world” context to what is covered in the classroom.

Professor Eyles's most broadly encapsulating work has been his scientific leadership and starring role in the CBC Geologic Journeys television series. Professor Eyles was the main scientific advisor for the 5-part “Geologic Journeys-Canada” series that aired on CBC in 2007 and was subsequently turned into a widely used teaching resource for Canadian universities and high schools. In 2010, Professor Eyles starred in, and was the principal scientific advisor, for the 5-part CBC series “Geologic Journeys-World” which was nominated for three Gemini awards in 2011. The series was also picked up in the U.S. and the North American viewership is estimated at >25 million. The Geological Association of Canada stated that ‘no other single Canadian earth science outreach effort has reached as many people, or has had as great an impact as the Geologic Journey series.’

The list of accomplishments of Prof Eyles is very long and impressive, along with his impeccable professionalism and unwavering 40+ year commitment to our teaching enterprise. He immensely deserves the UTSC Associate and Full Professors Award. Congratulations Nick on this outstanding achievement!

## CONGRATULATIONS TO PROFESSOR EYLES!



## UTSC ASSISTANT PROFESSOR TEACHING AWARD

**Professor Karen Smith** is the recipient of the UTSC Assistant Professors and Lecturers Award. Professor Smith joined the Department of Physical and Environmental Sciences as an Assistant Professor-Teaching Stream in July 2017. Her position is unique for our campus in that her primary mandate has been to support our Professional Master's of Environmental Science program, specifically to teach graduate courses and serve as the Director of the Climate Change Impacts and Adaptation field-of-study of the program. She is involved in a multitude of activities related to the day-to-day operations of the program, curriculum development, recruitment and outreach events (e.g., graduate fairs, webinars, open houses), admissions, co-curricular workshops, business development for summer internship positions and student counseling around course selection, research projects and supervisors, internships, stress and time management and career mentoring.



Professor Smith has impressively met all the requirements of her position and has brought enormous energy, enthusiasm, and creativity to our program. She is a popular and highly regarded course instructor, with outstanding course evaluation metrics and comments. To facilitate her endeavours, she has also been very successful in obtaining a number of grants, including the prestigious “*The Impact of the Stratosphere on Arctic Climate*” grant, in which she is a primary investigator. She has also participated in numerous professional development activities. We are also extremely impressed by her new outreach endeavour, the interview-style podcast titled “*Emerging Environments*”, together with Dr. Stuart Livingstone. This initiative promotes the impactful work of environmental scientists and conservationists with the public, our students, and alumni.

Professor Smith's passion and love of teaching is inspiring and is clearly demonstrated in all that she does. She has been an invaluable asset to our Department, this campus, and to the Environmental Sciences community at large.

CONGRATULATIONS KAREN FOR THIS OUTSTANDING RECOGNITION!

**CHECK OUT THE EMERGING ENVIRONMENTS PODCAST**

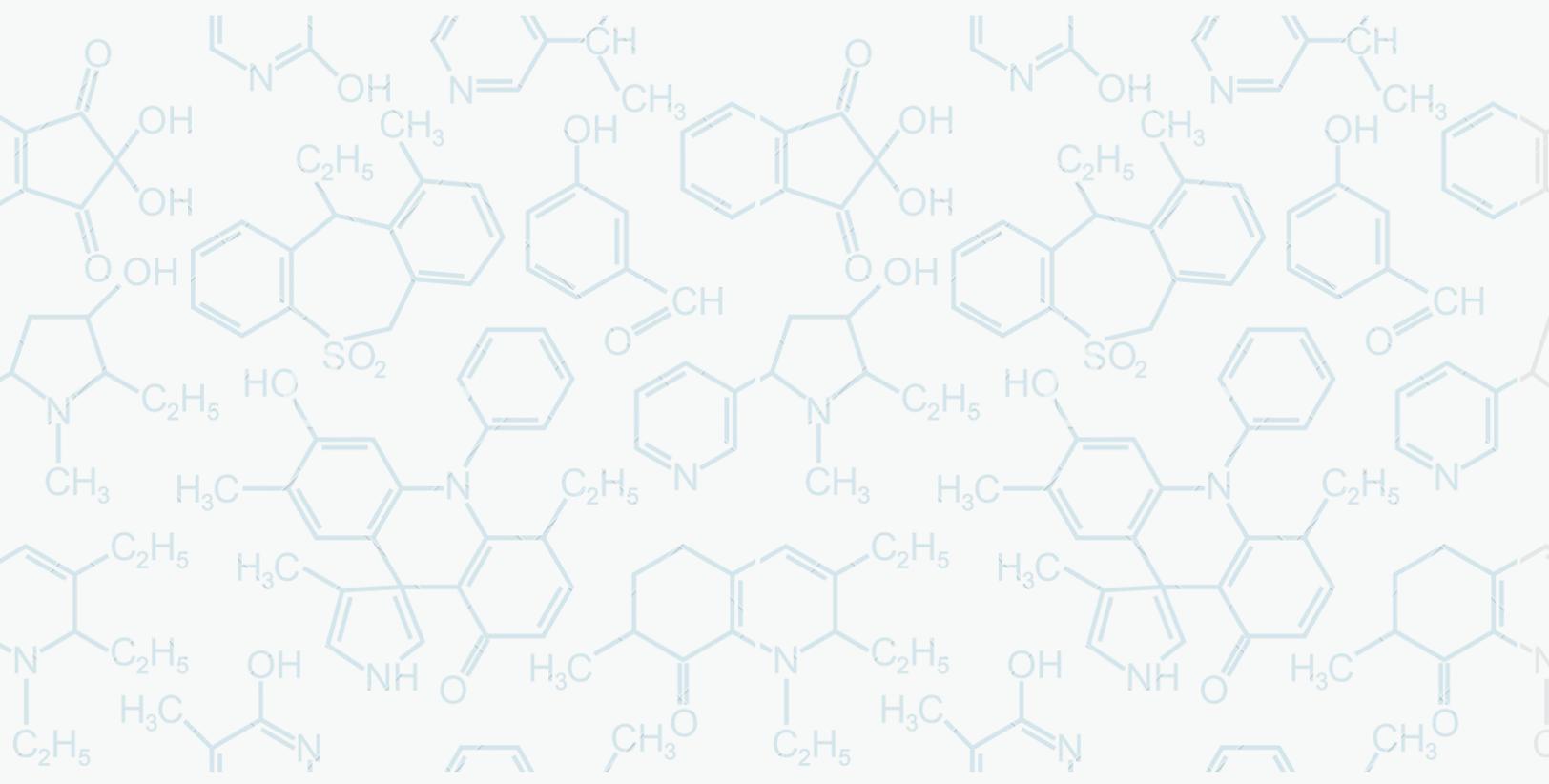
<https://podcasts.apple.com/ca/podcast/emerging-environments/id1560839043>

## UTSC UNIT 1 GRADUATE TEACHING ASSISTANT AWARD

**Celia Ferrag** is the recipient of the UTSC Teaching Award (Unit 1 Graduate Teaching Assistant). Also a recipient of the DPES TA Award, Celia has been supporting some of our most challenging courses (e.g., CHMC47H3) for several years now and her work is truly outstanding. Celia's nominator (Prof. Mikhaylichenko) praised her profusely for her knowledge, friendly personality, attention to details, and organizational skills that make her perhaps one of the best TAs that we have had in our courses for the past 15 years or so. She is knowledgeable, always well-prepared, has excellent time management, and a passion for teaching. Her evaluations for all of the courses she has supported are nothing short of excellent! Celia also displayed an aptitude for research supervision of our undergraduate students.

All the projects she is responsible for are completed successfully with interesting results, and one of her mentees was recently accepted (direct entry) into the PhD program in Chemistry at St. George. The solicited letters from students boasted a wide range of superlatives about Celia's commitment, impeccable work ethic, and knowledge. Our warmest congratulations Celia.....we are grateful for your unwavering commitment to our teaching enterprise!

## CONGRATULATIONS CELIA!



# TEACHING ASSISTANT AWARDS

First established in 2013-2014, the DPES Teaching Awards aim to recognize individuals who demonstrate excellence in teaching and have had an impact on the student experience in the context of their role as teaching assistants. This award is always very competitive and our Teaching & Curriculum Committee has seen some outstanding nominations over the years. The recipients of the DPES TA awards for 2021-2022 are as follows:



**Rajshree Biswas** who has excelled as a TA for both chemistry (CHMC47) and environmental science courses (EES1102). She was instrumental in converting labs to an online format as well as in developing video tutorials and adaptive learning exercises for advanced bio-organic chemistry. In anonymous surveys, the students profusely praised Rajshree's organizational skills, approachability, and ability to create an inclusive environment.

**Erik Dean** is recognized for introducing extremely comprehensive material for on-line teaching tools in EES1111, as well as for providing extensive support to students with the invertebrate identification exam for the Ontario Benthos Biomonitoring Network certification. He is praised for being approachable and for creating an inclusive and accessible environment. His contributions to the organization of field trips and assistance to our students are also recognized with this award. Erik was the president of GSAS in the previous year, and advocated for a foosball table in the SW graduate lounge seeing how much fun the EV foosball table had provided in DPES! He strongly believes grad students need to have more opportunities to have fun together, and that it is deeply beneficial to their work and health. His favourite quote is "what is adventure but an attitude towards trouble?" from Andre Kukla, Prof Emeritus from UTSC.

Each award is valued at \$350. Warmest congratulations Rajshree and Erik!  
We very much appreciate your great work with our courses!

# DPES DEPARTMENT EXCELLENCE AWARD

The recipients of the DPES Excellence and Leadership Awards 2021-2022, sponsored by our **TRACES Centre** and **Chemical Stores** facilities, are the following four students recognized for their excellent academic performance, as well as their proven record of leadership and contributions to our community through their participation into student organizations or other volunteer work related to DPES.

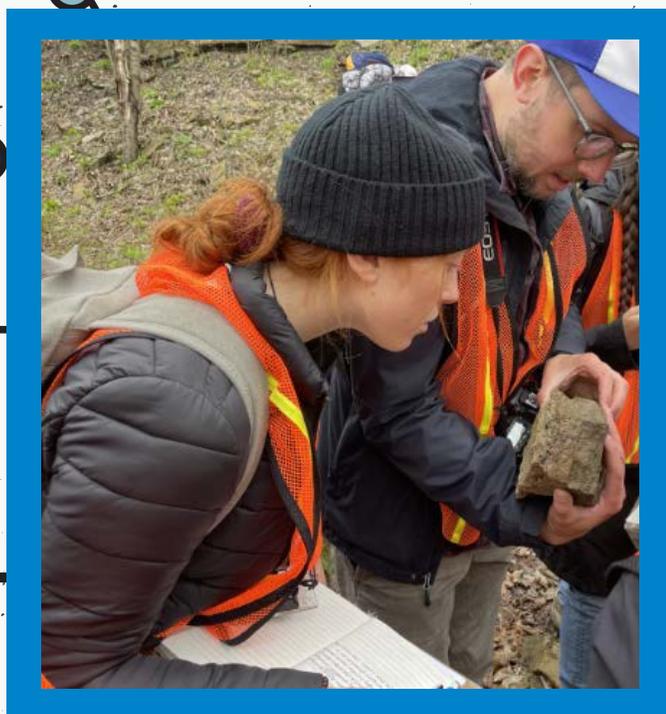
## Patricia Lumanto, CHEMISTRY

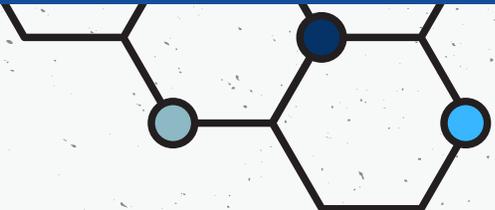
Patricia is a third year student specializing in Biological Chemistry with a minor in Natural Sciences and Environmental Management. She has played an active role in EPSA and the UTSC Chemistry Society, holding several positions over the years including first year representative, graphic designer and director of marketing.



## Charlotte Wargniez, ENVIRONMENTAL SCIENCES

Charlotte is the geoscience representative for EPSA with an outstanding academic record. She is also part of the Fossil Club and has helped repeatedly in organizing field trips. Charlotte is involved in multiple student-run environmental clubs on campus such as co-president for Regenesis, an environmental awareness organization, and now Vice President of Academics with EPSA. She also helped organize many educational tools for students within DPES including CHMA10/11 review sessions, EESA06 review sessions, and created the DPES Environmental Help Centre for environmental science courses, which will start operations this Fall.





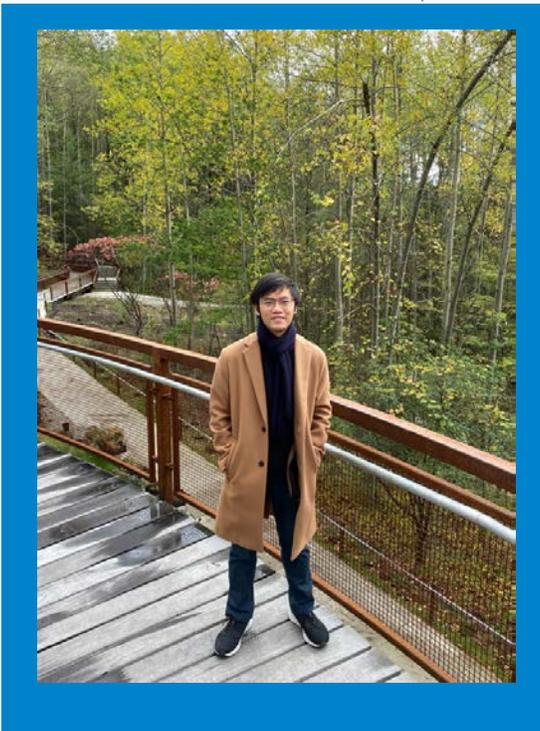
**Feiyu Quan,**  
**PHYSICS AND ASTROPHYSICS**

Feiyu has an excellent academic record and impeccable service to the department as a tutor at UTSC EPSA, Physics Study Centre, helping students understand concepts and solve problems in first-year physics (PHYA10/A11, PHYA21/A22).



**Chris Choi,**  
**ENVIRONMENTAL STUDIES**

Chris is a third year student double majoring in Environmental Science and Environmental Studies. He has been extremely active in environmental sustainability initiatives, including the 17 rooms at the UTSC Sustainability event, the UofT's Environmental Action Club and Students' Environmental Resource Network, which he is currently the club's Network Executive Liaison. Chris is also an External Relations Specialist for the Sustainable Innovation Group, a student business sustainability group under the Management department at the university. Chris has been committed to environmental leadership, raising environmental awareness by organizing environmental events and conferences with other universities, and doing outreach work with university students



# ALUMNI FEATURE



## Zofia Holland, MEnvSci Graduate

Zofia graduated from the Master of Environmental Science Program in May 2022. Her focus was in the Climate Change Impacts and Adaptation (CCIA) stream, with the option for co-op. Read more about Zofia's journey below!

### What is the title/position you hold now and how long have you been there?

Engineering Intern (EIT) in the land development department at C.F. Crozier & Associates. I have been at the company since 2019 when I started as a co-op student during my undergraduate degree (Environmental Engineering) at the University of Guelph. I came back full time in the summer of 2020 after graduation and have been there ever since.

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

The day-to-day tasks change frequently, but as an EIT in the land development department, my work focuses on helping to complete the sanitary, water and stormwater management designs for new subdivisions.

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

The courses that allowed the students to complete projects on topics that were chosen by the students. It allowed students to learn more in areas they are interested in and could hopefully apply their knowledge again in the future.

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

The co-op program in my undergrad. There were 3 work terms of varying length in my undergrad co-op program which allowed for more opportunities to enter the professional sector and explore different jobs, companies and environments. This variety in jobs allowed me to both find a job that I really enjoyed, as well as discover that I still wanted to expand my knowledge in the environmental, and specifically climate change, field. This led to me applying to the CCIA program while continuing to work at my job.

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

My advice to students who are seeking employment is to apply to jobs even if you do not have all of the listed required qualifications on the application. In reality, no one ever meets every requirement. Most entry level jobs will teach you the skills that are required to complete the position successfully.

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

Enjoy school for the non-academic opportunities and experiences it brings – extracurricular activities, relationships etc. There is much more to gain from school than solely academic knowledge.

# GRADUATE PROFILE

## Hannah Tosello, MEnvSci Candidate

**She:kon! Hello!** My name is Hannah Tosello and I am Mohawk with mixed settler ancestry. My family is from Six Nations but I grew up in Burlington, Ontario. I completed my undergrad in biology at Queen's University and was heavily involved in the Queen's Native Student Association and the Queen's Journal of Indigenous Studies. It allowed me to reconnect to my culture, traditions and community. I graduated in 2020 at the beginning of the pandemic. It made me think about what I wanted to do with my life and after working on a small organic family farm it pushed me to learn further about our plant and animal kin. This desire to further my knowledge is what compelled me to apply and come to UofT. I am currently completing my internship portion of my Master of Environmental Science in Conservation and Biodiversity. I am working as an aquatic ecologist for 4 Directions of Conservation Consulting Services, which is an Indigenous owned and run consultation business. Our focus is partnering with First Nations to build their capacity for consultation and engagement projects in their territory. For now, our focus is the Williams Treaty First Nations as we work for Curve Lake First Nation and Hiawatha First Nation. A lot of what we do consists of reviewing projects, writing environmental reports, site visits, construction monitoring, and bird and amphibian surveys. We also complete Indigenous Engagement Plans and Cultural Competency Training for a wide range of proponents. I have loved every second of being a part of this team, being out on the land and knowing that what we are doing will ensure the original stewards to this land can continue to exercise their rights and practice their culture.

### What led you to graduate school and graduate studies?

After graduating from Queen's University with my biology degree I knew that I wanted to further my studies. I have always been very passionate about conservation and biodiversity but viewing them from a Mohawk perspective. I thought it was critical to bring this perspective to Western Science and to an institution like UofT.

### What is your field (stream) of study/research area/focus? Why did you pick this field of study?

For my Masters I chose the conservation and biodiversity stream. I wanted to learn more about how we as humans interact with biodiversity as a whole and how we can further conservation initiatives. I also wanted to dive deeper into the policies surrounding environmental conservation or lack thereof.

### What are the challenges of your current project(s) at work?

Currently a lot of the challenges for me is having settlers understand and listen to us as First Nations. Working in the Williams Treaty First Nations territory as a Haudenosaunee guest, these Nations are the rightful treaty holders and have been here since time immemorial. It is frustrating when proponents do not respect this, and it makes consultation and engagement that much harder.

### What are the most rewarding parts of your graduate experience?

Meeting my colleagues and creating new friendships. It is great to have people around you who understand what you're going through. It makes graduate school fun and social. It is also awesome seeing them succeed in their placements and enjoy what they're doing!

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

I started a beading business in the summer of 2020 after spending time learning and reconnecting to the medicine that is beadwork. My beading business is called goldenrod beading to tie my love for plants (goldenrod is my favourite plant kin) and my love for beadwork.



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

Don't worry about what everyone else is doing with their life. You are on your own path in life. Just do what brings your joy and brings you closer to community.

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

In 10 years, I hope to continue working with 4 Directions as an aquatic biologist. I hope we continue to work with Curve Lake and Hiawatha First Nation and that 4 Directions enters into working relationships with more First Nations. My goal is to protect the earth for the next 7 generations and allowing First Nations to build capacity to engage in meaningful consultation and engagement is one way to do that.

### Advice on graduate school?

Try not to stretch yourself too thin. It is so easy to say yes to all extracurriculars, conferences, extra research projects etc., but graduate school is a lot of work. It becomes easy to overextend yourself and for your studies to become a second thought. I had to learn that sometimes its ok to say no to things! You are only one person and can only do so much until you wear yourself out.

### Work life balance?

Working in consultation is extremely fast paced and can be tense. After days working from home, I like to walk around the lake and the forest to ground myself in the earth and remind myself why I do what I do. It's for the earth and for everyone. I also try to plan to do something for fun each day after work whether that's beading, learning how to use my roommates pottery wheel, exploring my neighbourhood or learning Mohawk. I find that I need to plan things in advance so I have things to breakup my life and work.

### Pictures from the Field



**Green Frog**



**Blandings Turtle**



**Grey Jay**



**Woodcock**

# FROM THE TRACES CENTRE: INSTRUMENT FEATURE

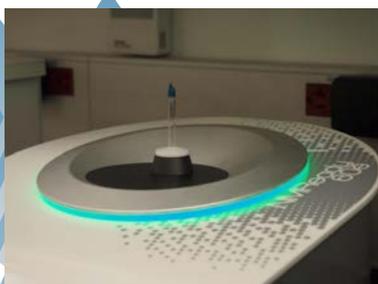
## BENCHTOP NMR

The TRACES Centre has teamed up with Professors Lana Mikhaylichenko and Effie Sauer to successfully acquire a Benchtop NMR Spectrometer that will be used for teaching our undergraduate lab courses. The purchase was partially funded by this year's CTL Grant. The instrument has been provided proudly by Nanalysis. This Benchtop NMR company has been designated as Frost & Sullivan's Global Portable NMR Company of the Year three times in a row, meeting our departments needs.

### WHY BENCHTOP NMR?

With the price of helium tripling in the last two years, and helium itself being a limited resource, many companies have moved towards offering a benchtop version that does not require cryogenic liquid, thus reducing the overall cost of ownership of an NMR.

Furthermore, spectrometers have been fixed in a single desktop area where they cannot be moved. However, with the emergence of portable NMR spectrometers, these important devices can easily be moved. This is convenient for DPES labs as the instrument will come to the student, not the other way around. Your new 60 MHz benchtop NMR spectrometer can be moved to the area or laboratory where it's needed. This allows the maximum exposure of NMR use and data evaluation to students who may view the instrument as a 'black box'. It can also be easily transported to a different site, a bonus for future field trip centered labs.



### KEY BENEFITS OF THE 60 PRO BENCHTOP NMR:

- 1.** *Gold standard for robust multinuclear NMR performance*
- 2.** *Smallest footprint ensures minimal bench space required*
- 3.** *No routine maintenance*
- 4.** *Engaging user-friendly interface, designed with you in mind*

# FROM THE TRACES CENTRE

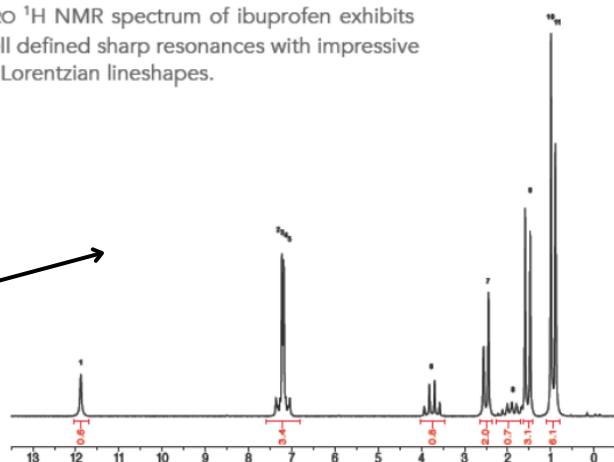
## BENCHTOP NMR

### NMR PERFORMANCE

Superior resolution and sensitivity ensure the highest quality spectra with optimal lineshape. Convenient automated and standby shimming routines keep the instrument always running at peak performance. The capabilities of the 60PRO allow acquisition of  $^1\text{H}$ ,  $^{19}\text{F}$ , and  $^{13}\text{C}$  spectra in as few as 4 seconds. Here we find an example the 60PRO  $^1\text{H}$  NMR spectrum of ibuprofen exhibits well defined sharp resonances with impressive Lorentzian lineshapes.

See more  $^1\text{H}$  spectra here: <https://www.nanalysis.com/1h-spectra>

60PRO  $^1\text{H}$  NMR spectrum of ibuprofen exhibits well defined sharp resonances with impressive Lorentzian lineshapes.

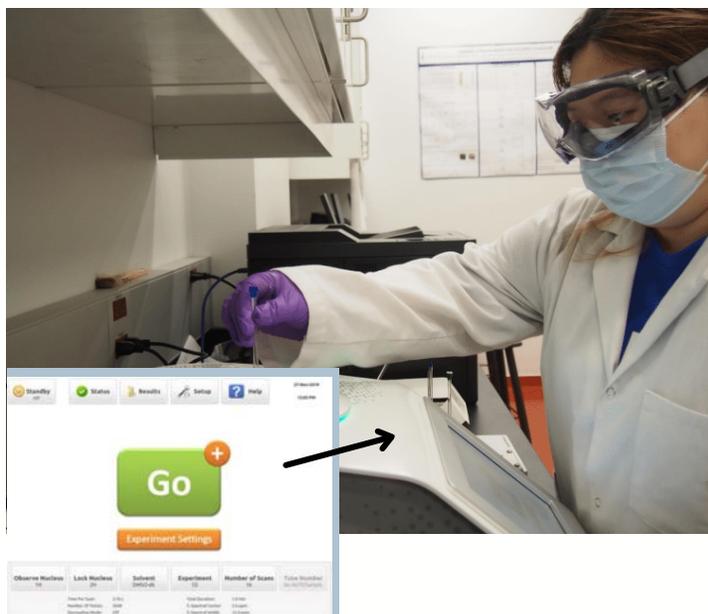


### NMR FOOTPRINT

Intuitive interface makes acquiring 1D or 2D NMR data simple. The state-of-the-art software makes data analysis trivial with simple 1D, 2D, and multi-spectral processing parameters including: phase, baseline correction, apodization, chemical shift reference, and manual integration. The software empowers the lab users by incorporating hands-on access to NMR directly in your laboratory. You can personally acquire & process NMR spectra, monitor & assess reaction completeness, and determine purity and/or relative composition easily.

### NMR FOOTPRINT

Nanalysis 60 is the only available all-in-one benchtop NMR spectrometer in its class. With the magnet, electronics, and the computer in a single enclosure it is a lightweight, easy-to-use instrument that can withstand the rigors of a busy DPES laboratory environment. With the built-in touchscreen, **no additional computer is required**, although one can be used if desired.

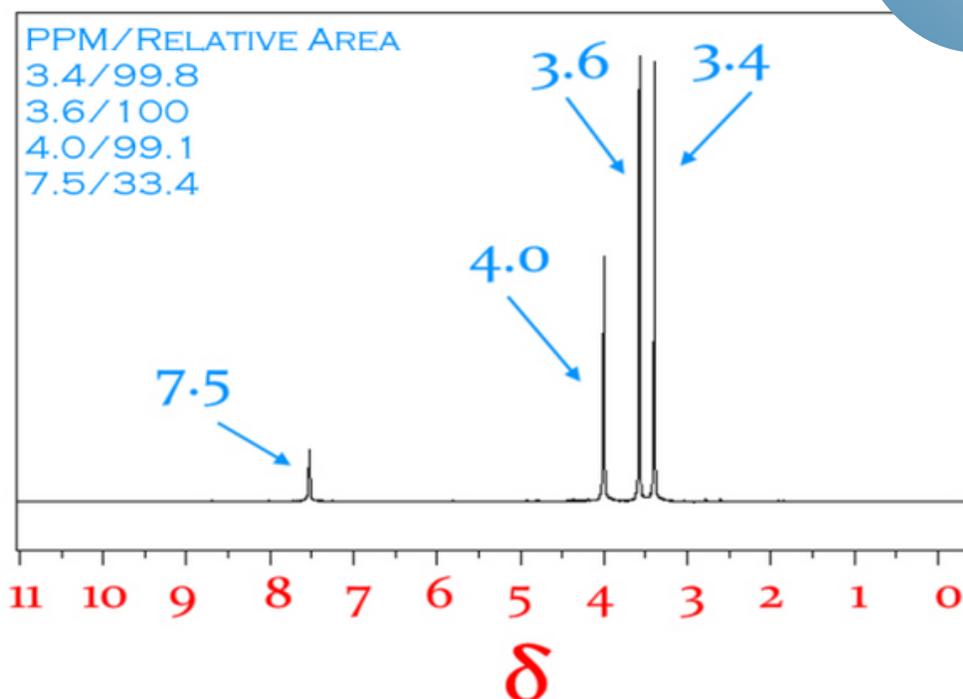


# FROM THE TRACES CENTRE

## CONTEST OF THE MONTH

Be the **FIRST** to answer all the following questions correctly for a **\$25 Starbucks Gift Card**:

1. Why are NMR's referred to by their MHz resonance signal? What is the strength of the TRACES NMR in Tesla?
2. How many possible orientations do spin  $3/2$  nuclei have when they are located in an applied magnetic field?
3. When nucleus with  $1/2$  spin located in a magnetic field absorbs radiation energy, what occurs?
4. Explain the difference between a FT-NMR and CW-NMR experiment?
5. Is the TRACES NMR a CW or FT NMR?
6. The proton NMR provided is from a common ingredient found in many beverages. Please identify.

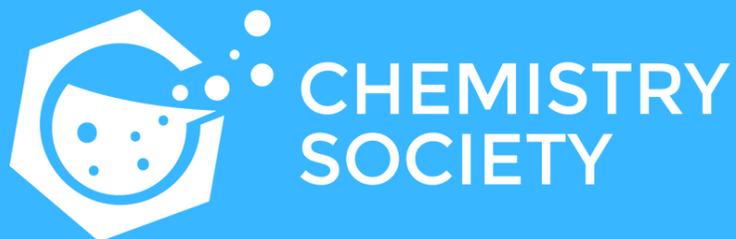


SEND CORRECT  
ANSWERS TO:  
TONY.ADAMO@UTORONTO.CA

# DPES END OF YEAR CELEBRATION

The DPES End of Year Celebration was held in person for the first time after 2 years of pandemic isolations and lockdowns, on June 14th, 2022. It was a beautiful sunny day with tasty (but not really Persian!) food, fun games, and even a pinata! We were delighted to see some of our retired colleagues and excited to relax and reconnect with each other. Thank you to Anna, Aerin, Julie, Rose, Annie, Scott, George and everyone else in the admin team for organizing this wonderful event. Thank you to Chai Chen for capturing the moments with his memorable photos. Looking forward to next year's party!





**CHEMISTRY SOCIETY**



## Lab Notebook Sales!

Get your lab notebooks in 3 easy steps!

Feb 28th - March 11th - in SW 164  
After March 14th - EV 264

**CHEMISTRY SOCIETY**

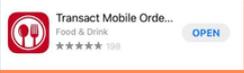
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- 2 Book an appointment for pick up
- 3 Arrive on time with a Tcard



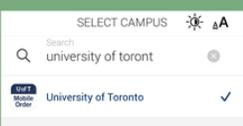
## HOW TO USE THE MOBILE APP

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The Chemistry Society at UTSC

# DPES PROGRAMS SUMMARY

**TOTAL PROGRAMS: 17**

**COOP PROGRAMS: 9**

## **C H E M I S T R Y**

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

**COMBINED DEGREE PROGRAMS: 3**

## **P H Y S I C S   A N D   A S T R O P H Y S I C S**

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

## **E N V I R O N M E N T A L   S C I E N C E**

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

## **E N V I R O N M E N T A L   S T U D I E S**

Environmental Studies Major

## **C O - O P**

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

## **C O M B I N E D   D E G R E E   P R O G R A M S**

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!

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

Email: [yaoyan.huang@mail.utoronto.ca](mailto:yaoyan.huang@mail.utoronto.ca) or  
[sh.dalili@utoronto.ca](mailto:sh.dalili@utoronto.ca)

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