

DEPT. OF PHYSICAL AND
ENVIRONMENTAL SCIENCE

DPES

DIGEST

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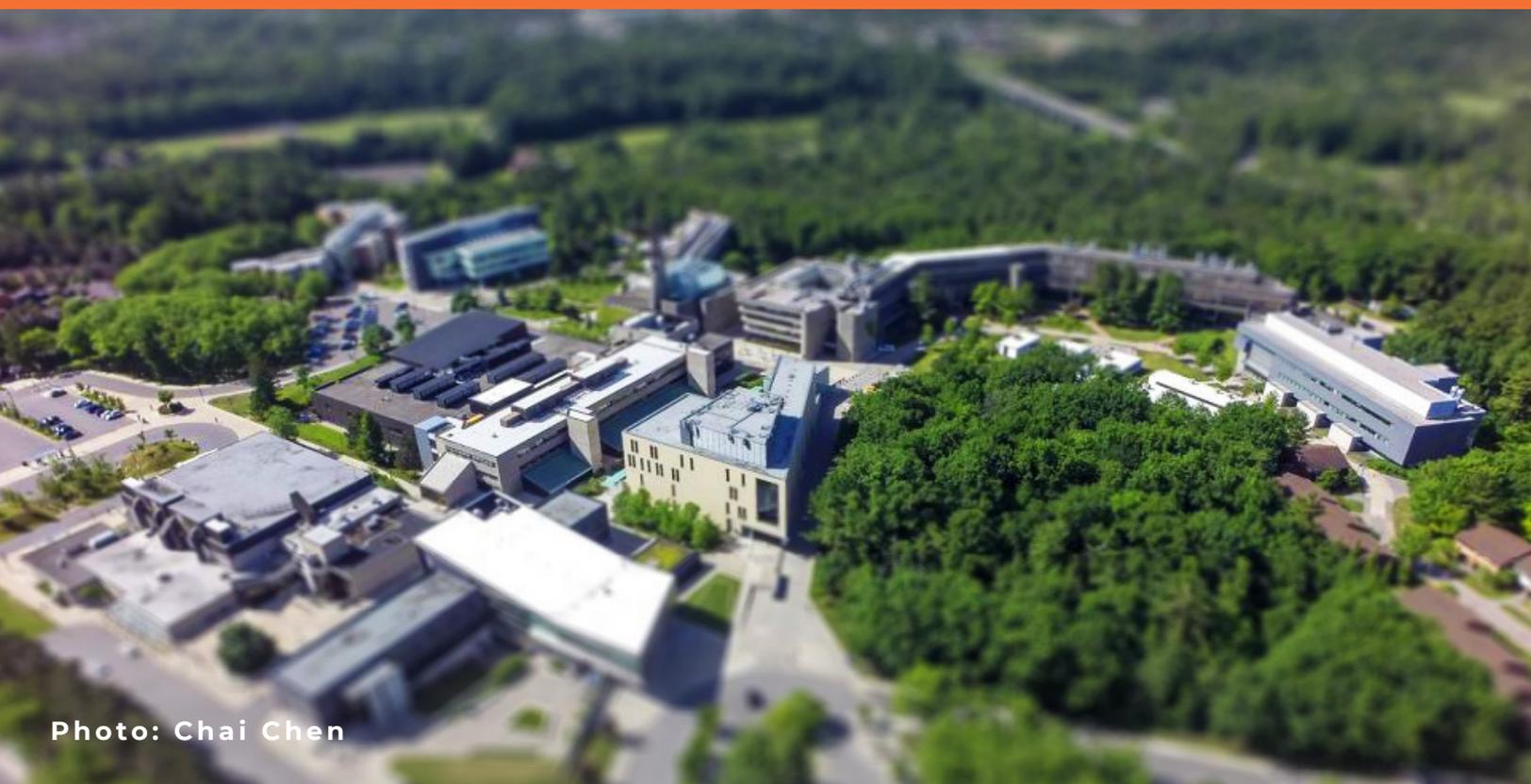
DR.
SHADI
DALILI

ANNA
GALANG



“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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LETTER FROM THE EDITOR

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Dear DPES Community,

I would like to acknowledge a concern that was brought to our attention regarding a contest in our last issue (August 2021). Some members of our community felt that it was not representative of the diversity present at our department and campus, and we want to acknowledge and thank the brave students that came forward with their concerns and we are very grateful for the opportunity to hear from them.

Thus, on behalf of myself and the DPES Digest Editorial team I wanted to apologize for the oversight, as it was a missed opportunity to recognize the significant contributions made by scientists from racialized and marginalized groups. We are committed to equity, diversity, and inclusivity in all aspects of our publication, and a core tenet of diversity competence is understanding intent vs. impact, and while it was not our intent, we now understand the individual impact each part of the publication can have, and are committed to ensuring issues of EDI are inherent in all aspects of our newsletter.

Without these conversations we cannot learn and grow together and now that we know, we can do better, and we take this as an opportunity to create a sense of belonging within our community. As such, I would like to form an advisory committee and encourage graduate and undergraduate students who are interested to volunteer, so that we can hear different perspectives and opinions on future submissions to the newsletter, through the lens of EDI and being mindful to ensure no one is excluded.

Thank you for your continued support and readership of the DPES Digest.

Sincerely,



Shadi Dalili, Editor-in-Chief

National Day of Truth and Reconciliation

September 30th was the first National Day for Truth and Reconciliation, a new federal holiday to honour survivors, their families, and communities of residential schools. It was one of the 94 calls to action of the Truth and Reconciliation Report published in 2015 by the Truth and Reconciliation Commission of Canada (TRC). The date was chosen on the pre-existing Orange Shirt Day started in 2013 by a residential school survivor Phyllis Jack Webstad to recognize and raise awareness about the history and legacies of the residential school system in Canada.

HISTORY OF RESIDENTIAL SCHOOLS

In July 2021, more than 160 unmarked graves were found in the southern Gulf Islands off the British Columbia coast near what once was Kuper Island Residential School (CBC). Operating from 1890 to 1970, it was one of many such schools across Canada that were operated by the Catholic Church and funded by the Canadian government following the Indian Act in 1876.

The 1876 Indian Act was the Canadian government's attempt to solve "the Indian problem" as later deputy superintendent of the Department of Indian Affairs Duncan Campbell Scott called it. It defined who by law could be considered Indian and restricted freedoms and rights to cultural and religious practices and self-governance.

After amendments to the Indian Act in 1894, residence school attendance was made mandatory. While the Canadian government called it assimilation, it is nothing short of cultural genocide as the TRC reports. Children were forcibly removed from their parents and reserves to attend boarding schools where they suffered physical, sexual, and psychological abuse. Poor conditions also led to outbreaks of diseases, notably tuberculosis. TRC research has confirmed the deaths of more than 6,000 children, with many more likely still unaccounted for. Those who did make it home often found it difficult to reintegrate into their community, with the loss of language and cultural identity.

Sources

CBC (Jul 12, 2021) B.C. First Nation says more than 160 unmarked graves found. <https://www.cbc.ca/news/canada/british-columbia/penelakut-kuper-residential-school-1.6100201>

Parotte, Zach. (2016, edited 2020). Indian Act. The Canadian Encyclopedia. <https://www.thecanadianencyclopedia.ca/en/article/indian-act>

Stolen Lives: The Indigenous Peoples of Canada and the Indian Residential Schools. Facing History and Ourselves. ISBN 9781940457154 <https://www.facinghistory.org/stolen-lives-indigenous-peoples-canada-and-indian-residential-schools/historical-background/building-indian-residential-schools-system>

Truth and Reconciliation Commission of Canada Reports. <https://nctr.ca/records/reports/>

Truth and Reconciliation Commission of Canada: Calls to Action. https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/indigenous-people/aboriginal-peoples-documents/calls_to_action_english2.pdf

RECONCILIATION & PROGRAMMING AT U OF T

The university remained open on September 30th but provided programming to recognize and reflect on this ongoing legacy. A video capsule was made by the U of T Scarborough community sharing their work to answer the 94 Calls to Action. It can be viewed at: <https://utscaction.capsule.video/>

On Tuesday, Sept 28, the Doris McCarthy Gallery and the Indigenous Outreach Program at UTSC hosted a talk with the Newfoundland Mi'kmaq painter Marcus Gosse. This was part of a series of talks hosted by Junita Muise from the Indigenous Outreach Program with Indigenous artists across Canada sharing their stories of cultural revitalization and the role it plays in their practice.

Gosse's landscape paintings often incorporate the ancient Mi'kmaq Star, Petroglyphs, Hieroglyphs, and various double curve designs. The Mi'kmaq use the eight-point Mi'kmaq Star to represent the districts of their nation which grew to eight districts with the addition of K'taqmkuk (Newfoundland). It is believed that this eight-point Mi'kmaq Star petroglyph is over 500 years old and it's used as a cultural symbol and design emblem on blankets, drums, clothing and paintings.

The Orange Shirt Beading workshop was held on Friday September 24th and on Wednesday, Sep 29 where participants learned about the practice and tradition of beading and discussed the origins of the orange shirt story.

Orange Shirt Day started when Phyllis (Jack) Webstad told her story of how at six years old, she was taken to residential school in an orange shirt.



Image Source: Gallery | <http://www.marcusgosse.ca/>

That orange shirt got taken away from her, along with her hair, language, culture, community, and rights. Her story has grown into a commemoration project and reunion event for residential school survivors. Orange Shirt Day is now recognized as the federal statutory holiday "National Truth and Reconciliation Day". This workshop honoured the purpose of the day, and promoted shared conversations in the spirit of reconciliation.

On Sept 30th (National Truth and Reconciliation Day), a Tri-Campus webinar was held to recognize the experiences of survivors of residential schools and included a keynote speech from Sto:lo poet and author and Order of Canada recipient Lee Maracle. The U of T Scarborough Indigenous Outreach Program, Office of Student Experience & Well-Being also hosted a webinar circle to Explore the 94 Calls to Action. The week ended with Juanita Muise, UTSC's Indigenous Engagement Coordinator, hosting the webinar UTSC'S Unity Celebration on Oct 1st to acknowledge the work being done on our campus around reconciliation and the calls to action.

For a full list of events and activities see: U of T Scarborough honours the National Day for Truth and Reconciliation and Orange Shirt Day

Orange Shirt Day 2021 <https://harthouse.ca/events/orange-shirt-day-2021>

Marcus Gosse <http://www.marcusgosse.ca/>



DR. HILDING NEILSON
[HTTP://HILDINGNEILSON.COM/](http://hildingneilson.com/)

A new course this fall is now being offered called “Indigenous Worldviews & Astronomy” by Professor Hilding Neilson at the Faculty of Arts & Science. The class explores the intersection of western astronomy and ongoing colonization and will present students with an Indigenous lens regarding space exploration.

“By embracing Indigenous and other knowledges, we bring more lenses – and that can only enrich our view and understanding of the universe,” Dr. Neilson tells UofT News.

Professor Neilson, a Mi’kmaw from the Qalipu First Nation, has also been working on an ongoing project to explore and compile astronomical knowledge from Indigenous groups from Canada and internationally with the Centre for Indigenous Studies.

“...Indigenous axioms can impact and inform our understanding of the Universe in ways that Western Science axioms can fail,” Professor Neilson writes on his personal blog.

The learning modules developed will be made freely available and jointly maintained by the Department of Astronomy & Astrophysics and the Centre for Indigenous Studies.

This work will be used to incorporate indigenous knowledge into astronomy courses with hopes that this methodology serves as a framework for incorporating Indigenous sciences into other science disciplines at the university.

Though the first Truth and Reconciliation day is a landmark moment, the work for equity and reconciliation has just begun.

“Equity and diversity discussion is marginally better than thoughts and prayers.” Professor Neilson writes on his blog. “My institution and department host a lot of great scientists, but I am the only Indigenous astronomer. I am one of the very few Indigenous people in my field in Canada...The great advances right now are holding sessions in Indigenous competency training, not hiring or supporting Indigenous people.”



Classical Cepheids, stars 4-20 times more massive than the sun and pulsates at regular intervals; one of Hilding Neilson’s research areas.

Image Source: https://en.wikipedia.org/wiki/Cepheid_variable

INDIGENOUS CULTURE & STEM

Other Indigenous STEM Faculty listed on U of T's [Indigenous dashboard](#) include Dr. Jason Bazylak, an Associate Professor, Teaching Stream within the Department of Mechanical and Industrial Engineering and Dr. Nicholas Spence, an Assistant Professor within the Interdisciplinary Centre for Health and Society at UTSC.

Professor Bazylak coordinates the first year first year design course “Engineering Strategies and Practice” and his research focuses on reducing the under-representation of women and Indigenous peoples in engineering, as well as education technology in and out of the classroom. He is currently the Dean’s Advisor on Indigenous Initiatives and has won the Hart Teaching Innovative Professorship for his work to increase engineering engagement with Indigenous students and communities.

Professor Spence focuses on social inequality and multiple determinants of health and well-being. He joined UTSC from Harvard University and Massachusetts General Hospital where he was a research fellow and is currently affiliated with Canadian Obesity Network and the Aboriginal Policy Research Consortium. He teaches SOCC49H3: Indigenous Health that examines the health and well-being of Indigenous peoples, given historic and contemporary issues. The course includes an overview of methodologies and ethical issues and developing programs and policies.



DR. JASON BAZYLAK
[HTTPS://JBAZYLAK.MIE.UTORONTO.CA/](https://jbazylak.mie.utoronto.ca/)



DR. NICHOLAS SPENCE
[HTTPS://WWW.UTSC.UTORONTO.CA/HEALTHSOCIETY/NICHOLAS-SPENCE](https://www.utsc.utoronto.ca/healthsociety/nicholas-spence)

Sources

Diversifying Astronomy: Introducing Indigenous astronomy and sky knowledge into the astronomy classroom.

<https://www.leaf.provost.utoronto.ca/diversifying-astronomy-introducing-indigenous-astronomy-sky-knowledge-astronomy-classroom/>

MacSween, Meaghan. (2021). U of T astronomy course gazes at the stars through an Indigenous lens. U of T News. <https://www.utoronto.ca/news/u-t-astronomy-course-gazes-stars-through-indigenous-lens>

Neilson, Hilding. (May 12, 2021). The soul-sucking day-to-day of being Indigenous in Academic STEM. [Blog] <http://hildingneilson.com/the-soul-sucking-day-to-day-of-being-indigenous-in-academic-stem/>

Neilson, Hilding. (January 28, 2021) Astronomy through two lenses: Thinking about Eurocentric and Indigenous methodologies [Blog]

<http://hildingneilson.com/astronomy-through-two-lenses-thinking-about-eurocentric-and-indigenous-methodologies/>

“[...]RECONCILIATION IS A WAY OF LIFE AND REQUIRES WORK EVERY DAY. RECONCILIATION IS GETTING TO KNOW ONE ANOTHER.”

- CANADA’S NEW GOVERNOR GENERAL MARY SIMON.

Interested in learning more about indigenous ways of knowledge or the peoples & cultures? Take a course with the [Centre for Indigenous Studies, Courses | Centre for Indigenous Studies](#)

For Indigenous related programming, check out the [Indigenous Outreach Program](#) at UTSC that works to support students, staff and faculty on and off campus while striving to inspire inclusive excellence.

Visit the Indigenous Garden at the [UTSC Farm](#)! A livestream of the garden from Sept 30th can be viewed [here](#).

Get to know the Council of Elders and Indigenous Faculty members at UofT, [Knowledge Keepers & Faculty](#)

Read the final report from University of Toronto’s steering committee, [Answering the Call: Wecheehetowin](#)

DPES EQUITY, DIVERSITY, AND INCLUSION MEETING REPORT

ON FRIDAY OCTOBER 15TH, DPES HELD ITS FIRST DEPARTMENTAL EQUITY, DIVERSITY, AND INCLUSION (EDI) MEETING WITH GUEST SPEAKERS KATHERINE LARSON, VICE DEAN TEACHING, LEARNING, AND UNDERGRADUATE PROGRAMS AND PROFESSOR AT THE DEPARTMENT OF ENGLISH, CHERILYN SCOBIE-EDWARDS, DIRECTOR OF THE EQUITY, DIVERSITY & INCLUSION OFFICE, AND NIRUSHA THAVARAJAH, ASSISTANT PROFESSOR, TEACHING STREAM, DPES. THEY SHARED THE CURRENT WORK BEING DONE AT UTSC AROUND EDI AND PROMOTING A DIALOGUE WITH THE DEPARTMENT ON INCORPORATING EDI INTO OUR CURRICULUM.

CURRICULUM AND PEDAGOGY: THROUGH AN INCLUSIVE LENS

Professor Katherine Larson, the Vice-Dean of Teaching, Learning, and Undergraduate Programs and Professor in the Department of English began the session by sharing the current work on curriculum renewal for the UTSC Strategic Plan (2020-2025). The EDI Working Circle, which follows an Indigenous circle-based model, is conducting a review to ensure that UTSC's commitment to inclusion, Indigeneity, and antiracism is reflected across programs and embedded in pedagogical approaches and supports. In particular, one of the priorities is to ensure that Indigenous and Black knowledges, racialized perspectives, and international and intercultural perspectives are reflected in the pedagogy.

Dr. Larson's presentation included a "definition of terms" for EDI and Intersectionality that we believe is important to note, as many are not familiar with the terms or may not fully understand what each represents. Thus, here we have included a brief summary of terminology used throughout the presentation and this article:

Equity: refers to processes and actions that recognize the unjust treatment of historically disadvantaged and systemically marginalized groups and that seek to ensure access and success of these groups

Diversity: the multiplicity of voices and perspectives that characterize human experience, the value of those differences, and the overlooked or, in some cases, violently erased histories and knowledges that they represent.

Inclusion: denotes the meaningful integration and recognition of these diverse perspectives and knowledges and the establishment of institutional structures and access pathways that enable all persons to thrive and experience belonging.

Intersectionality: Aspects of identity and of lived experience are often interrelated, or "intersectional", such that individuals or groups may experience overlapping areas of discrimination or disadvantage.

Decolonization: In the context of curriculum and pedagogy, we understand “decolonization” or uncolonization ” as a systemic critique and transformation of traditional academic disciplines, course content, and pedagogies that are often based in Western and Eurocentric principles and which have historically excluded and devalued Indigenous, Black, and racialized perspectives.

Indigenous knowledges: denotes the complex and varied epistemologies and teachings of Indigenous nations and communities.

Black knowledges: denotes Afrocentric critical and pedagogical approaches that resist and disrupt the violent erasure of Black history through slavery and colonialism, including in academic contexts

The review being conducted by the EDI Working Circle hopes to balance the overarching and ambitious goals with tangible examples and provide their preliminary recommendations and findings by Winter 2022.

“Even small changes in this area can make a big difference.” Professor Larson said in her presentation. “The way you communicate valuing [of] the diversity of student knowledges; it's a huge strength of our campus, the diversity of our student body, and awareness that those experiences are going to intersect with course material.”

Examples shared include providing a diversity of textual and visual material in the classroom, applying ‘Growth Mindset’ teaching practices like dropping the lowest quiz grade or providing flexible deadlines, and adapting syllabus language and self-positioning in the classroom.

Preliminary data shows the need to increase concentration of EDI-related courses and course content within DPES and within foundational courses. Nine out of ten of the EDI related courses are in the Social Sciences and Humanities. 550 of the more than 1900 courses offered at UTSC have EDI offerings, and only 5% of the 550 are with a Black or Indigenous knowledge component (Figure 1). Most are also in C & D-level courses, which are usually electives or special interest courses that do not run yearly (Figure 2).

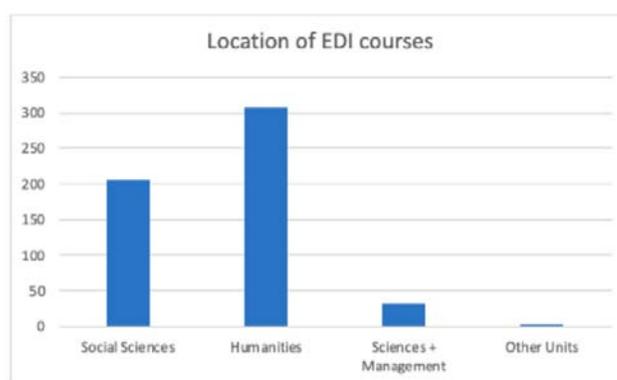


Figure 1: More than nine out of ten EDI-related courses are in the Social Sciences and Humanities. The breakdown of EDI-related courses by disciplinary areas is Humanities: 305 courses; Social Sciences: 207; Sciences and Management: 32; Other Units: 4.

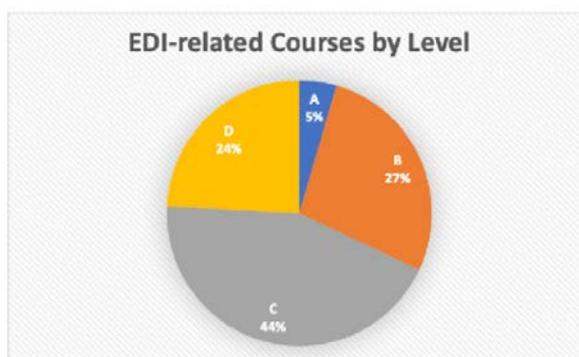


Figure 2: Students are most likely to encounter EDI-related courses in C-level courses, and very few students have the opportunity to take EDI-related courses in their first year. The breakdown of EDI-related courses by level is A: 5%; B: 27%; C: 44%; D: 24%.

Source: Larson, Katherine (October 15, 2021). Approaching Curriculum and Pedagogy through an Inclusive Excellence Lens. [Slides]. Note this is preliminary data based on calendar scans.

Emerging areas of recommendation for faculty on incorporating more EDI and Indigenous knowledges and Black knowledges into their courses and curriculum are summarized below based on Dr. Larson's presentation:

- Increased course content at introductory levels and in required courses across all departments
- Examination of existing course requirements in departments and scaffolding of those requirements
- Need to extend concentration of course content also into the Sciences and Management
- Potential role of foundational breadth requirements as a possible complement to discipline specific changes
- Development of dedicated programs (e.g. in Black Canadian Studies, Indigenous Studies)
- Expansion of opportunities for land based learning (e.g. through Campus Farm and Indigenous Garden)

This last recommendation, among all the others, is quite applicable to our programs in environmental science and potentially chemistry in the department and the EDI committee is encouraged to explore ways on utilizing campus resources such as the Campus Farm and Indigenous Garden in the courses and curriculum at DPES.

The EDI Working Circle is also working on recommendations for staff and institutional structure support. Emerging areas of recommendations include expansion of mentorship and training as well as educational opportunities focused on EDI, anti-racism and anti-colonialism, continued investment in staff and TA hires, strengthening connections across campus resources,

support and resources for development of new courses and programs, support and resources for rethinking of existing courses and programs and recognition of the labour this work entails. Within DPES, there has been a desire for discipline-specific resources and support in order to implement these changes into the courses and curriculum.

Thus, the EDI Working Circle is hoping to launch the Pedagogies for Inclusive Excellence Fund (PIE) to directly support faculty and academic units in regard to curriculum updates, program development, invitation of guest speakers and community partners. PIE aims to anchor inclusive excellence in teaching and learning at UTSC by:

- directly supporting faculty and academic units in their efforts to decolonize their curricula;
- enhancing faculty development in inclusive, accessible, and anti racist course and assessment design;
- prioritizing student well being as a key lens for teaching and learning;
- funding seed projects focused on inclusive teaching and learning;
- supporting and incentivizing the implementation of recommendations and action areas emerging from the campus wide curriculum review;
- and establishing dedicated staffing resources in CTL and the Dean's Office.

DPES faculty and all eligible members are encouraged to apply for this PIE fund once it becomes available to rethink and update their courses and curriculum around the recommended frameworks of the EDI Working Circle.

The EDI Working Circle members are set to finalize recommendations in December 2021 and produce a draft report and presentation by Winter 2022.

ROLE OF DEPARTMENTAL EDI COMMITTEE

Professor Larson acknowledged that different disciplines, individual courses, and individual faculty members will bring different perspectives and experiences to this work; departments and faculty are also at different stages of learning, which is understandable and okay!

This newly formed committee is an opportunity for intentional conversations and collective learning within the department, and can highlight the importance of building cross departmental connections.

The committee can learn from examples and challenges in other disciplines as we navigate the changing of our curriculum to be more inclusive, equitable and diversified.

There are opportunities on campus to expand our knowledge in this area and all DPES community members are encouraged to attend the upcoming seminars:

Equity Matters Seminar on November 12th
from 11am-1pm

Office hour for faculty on November 16th
from 10-11am

co-hosted by Vice Dean Jessica Fields and Vice Dean Katie Larson on bridging anti racism and EDI efforts across departments.

UPDATES FROM THE UTSC EQUITY, DIVERSITY, AND INCLUSION OFFICE

Cherilyn Scobie-Edwards, Director of Equity, Diversity, and Inclusion Office (EDIO) at UTSC, shared some of the work being done at the EDIO. She began by sharing her own experiences within post-secondary institutions and when she was working within the Toronto District School Board facing racism and barriers. To ensure inclusion in your class and course, she recommends you draw upon your own experiences by thinking of a time when you felt completely included. The question she asks is “When you've experienced inclusion, what were the behaviors that others showed towards you that made you feel like you were being treated as an insider and your uniqueness was valued?” This will allow you to embed practices in your class and course to ensure inclusivity.

Taking action is also essential. “[...] the recommendations state this, so for me as an individual that means I need to take the following actions and as a group we come together so that we can take the following actions.”

For the department, she outlines some steps to take towards inclusivity. The first is self-reflection. “Can you identify the individuals and groups missing from key conversations which influence system structures and planning processes? Are you holding people accountable for their discriminatory actions and communicating that?”

“Sometimes people don’t know there are initiatives in place and think there’s no reason to be trying [...] Every little step in the process needs to be communicated because it lets people know you are showing up.”

At the end of the month, the EDIO will be publishing equity modules to be accessed online. They are also looking to expand their website to be a resource hub and guide to further learnings. The learning objectives of these modules will be:

- Understand key concepts and principles of equity, diversity and inclusion
- Understand the barriers to inclusion and how to mitigate them in the workplace
- Understand the expectations and obligations of staff as they relate to the University's commitment to create and promote a working environment that is equitable, inclusive and free of discrimination and harassment; and
- Identify tools, strategies and resources to support efforts to enhance diversity, equity and inclusion in the workplace

One of her key recommendations for faculty trying to incorporate equity goals into their courses is to ask the following questions:

- How do you hold space for conversations about equity, diversity, inclusion, bias, power, privilege, and the marginalization experienced by individuals and groups within your area of focus?
- What individual steps can you take to increase diversity and inclusion within your area of focus?
- How do you embed diverse ways of knowing into the structures and systems which inform your daily practice?
- Knowing that individuals do not have the same access to resources, how do you use your knowledge, influence, and resources (financial and human) to improve opportunities and outcomes for all?
- Which practices should be stopped, started, and continued to increase a true sense of belonging for all?



Faculty should follow the steps outlined in the following diagram to start implementing EDI as a first step

This Photo by Unknown Author is licensed under CC BY-SA
 Courtesy of Cheryl Scobie-Edwards presentation (EDI meeting Oct 15th)

GET INVOLVED IN ANTI-BLACK RACISM

UTSC Anti-Black Racism and Black Inclusion Advisory Committee (ABR-BIAC) is currently being formed to assist the university leadership to address anti-Black racism and to promote Black inclusion. They are looking for faculty, staff, students and alumni and all are encouraged to submit recommendations by email cherilyn.scobieedwards@utoronto.ca.

There is an Anti-Black Racism Reading Group also being formed to read and discuss the Task Force report put out earlier this year by the Anti-Black Racism Task Force. The group will be looking at the recommendations and ensuring steps are being taken. If you are interested in joining this reading group, registration and more information is available online (<https://www.utsc.utoronto.ca/vpdean/workshops>)

Questions can be directed to Eileen Egan-Lee eileen.egan.lee@utoronto.ca.

CONCLUDING THOUGHTS: INTEGRATING EDI IN DPES

The work to incorporate EDI into our curriculum will not be done overnight, but Professor Nirusha Thavarajah, Assistant Professor from DPES shared how being part of the Listening & Conversations Sub-Circle has allowed her to re-think the second year undergraduate research course curriculum through an EDI lens.

The initial plan for the undergraduate research course was a mini-review on COVID-19 vaccine plans.

This was reshaped into a global classroom project that brought together chemistry, management, and international students from Sri Lanka, India, and USA, to develop a culturally relevant public health campaign to promote vaccine uptake.

The EDI integrated global classroom leveraged the ethnic diversity of UTSC students and connected them to the international community and Toronto based partners such as the Woman in STEM Leadership Program.

“...[t]he first step is having conversations like this kind of meeting.” Dr.Larson says. “[...] to think carefully about the existing curriculum and start to identify both holistic ways and steps where an individual course may be introduced...It's important to think about the core while also building additions.”

“There is a tendency in science to say ‘how does this connect to my work?’ To be prepared for that will be important. This is work that will look different in different disciplines, in different courses. Faculty members will have different approaches. [But] this is absolutely core relevant work for all of us.”

Thank you to Katherine Larson, Cherilyn Scobie-Edwards, and Nirusha Thavarajah for their presentations and all the faculty and staff who attended the meeting.

FEATURE ARTICLE

PHYSICS LAB RENOVATION PROJECT

by *Dan Weaver*

Recently, DPES set out on an exciting effort to modernize its physics lab courses, spearheaded by Dan Weaver. This is an update about this project provided by Dr Weaver:

In winter 2019, I taught our third-year physics lab course (PHYC11) for the first time. Most of the equipment was no longer functional or was badly outdated. The rooms were poorly lit and not in good condition. For example, I was concerned that damaged sections of the ceiling could fall on someone below in the largest of the lab rooms. Students noticed and commented on the unwelcoming character of the rooms. The learning environment did not reflect a world-class education institution. Moreover, the limited power and internet available in the rooms was not adequate to support modernizing the experiments. There was work to do!

The first task was to take stock of what was operational. There were six experiments that worked. Most were older than I was. A couple of new experiments were acquired, such as a Michelson interferometer, to ensure there were enough experiments to deliver the course (already in progress). Once the winter term was done, more detailed planning began for the future.

A methodical and careful process of sorting through equipment in storage took months of effort. A couple of additional experiments were acquired over the next year, e.g., an atomic force microscope that will also be used by chemistry was supported by a CTL grant.

In the spring of 2019, Scott Ballantyne identified a big opportunity to improve the situation: a Campus Design and Development (CDD) grant aimed at improving campus teaching spaces. Several months later, we were informed that the PHYC11 lab renovation proposal was successful. In winter 2020, Scott, Kevin, and I worked through the details with UTSC staff. Here are a few highlights of what the grant enabled us to do:

- The four small lab rooms would have their drop ceilings and lighting removed and replaced.
- The dark room would be properly set up for experiments that need low light.
- New furniture would create a significantly more functional space.
- Additional electrical and internet connections would be installed to support modern equipment and future experiments. These would be run along the perimeter of the rooms in a rail.
- Doors would be widened and an adjustable desk added to improve accessibility.
- New windows would be installed between one of the main lab rooms and the hallway. New windows would be installed in the graduate student room across the hallway. This would bring natural light into the hallway and the lab room. This would also enable the students to be visible from the hallway – useful for safety and monitoring progress.
- Access control through FOBs would be added to both entrances to the physics hallways.

PHYSICS LAB RENOVATION



HALLWAY OUTSIDE THE PHYSICS LABS, AFTER THE STORAGE CABINETS WERE REMOVED. THE HALLWAY IS ALREADY MUCH MORE INVITING, ESPECIALLY WITH THE ADDITION OF WINDOWS



BEFORE

H905MS



AFTER



BEFORE

SW506E



AFTER



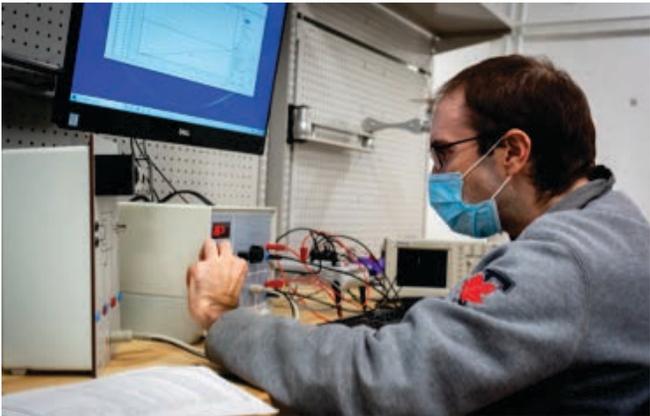
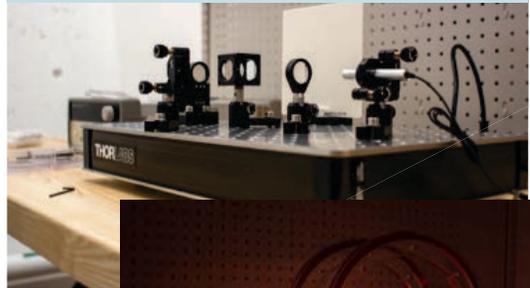
BEFORE

SW506B - THE DARK ROOM



AFTER

THE NEW MICHELSON INTERFEROMETER



KEVIN SETTING UP THE RECENTLY ACQUIRED FRANCK-HERTZ EXPERIMENT



THE E/M EXPERIMENT

PHYSICS LAB RENOVATION



BEFORE



SW506H
H905WS

DURING



SW506A IS CURRENTLY BEING USED AS A STAGING/TESTING AREA FOR PHYB10, THE SECOND YEAR LAB COURSE WHOSE COURSE CONTENT IS ALSO BEING REVITALIZED



SOON ALL OF THE EXPERIMENTS WILL BE MOVED INTO THE ROOMS AND SET UP. STUDENTS WILL HAVE A GREAT NEW LAB SPACE TO WORK IN WHEN PHYC11 STARTS IN JANUARY!



AFTER





FACULTY PROFILE

DAN WEAVER

*Associate Professor
Department of Physical and Environmental Science
Ph.D., University of Toronto - 2018*

About me and my career journey

My education background includes degrees that included astronomy (B.Sc.), physics (M.Sc., Ph.D.), environmental science (collaborative program in my Ph.D.), and education (B.Ed.). I've also taken some chemistry courses and spent several years on the board of a science policy NGO. This interest in multiple disciplines helped motivate my enthusiasm for joining DPES, where all these disciplines are found.

My Ph.D. was in atmospheric physics, supervised by Prof. Kim Strong at U of T's downtown campus physics department. My focus was on the use of a ground-based high-resolution Fourier transform infrared (FTIR) spectrometer and measurement techniques for water vapour and its isotopologues in the high Arctic. I participated in annual trips to the Polar Environmental Atmospheric Research Laboratory (PEARL) on Ellesmere Island. PEARL is one of the world's northernmost permanent atmospheric observatories. Measurements taken at PEARL make a unique contribution to research into the Arctic atmosphere, climate change, ozone chemistry, and air quality. In addition, PEARL is used as a key site for satellite validation measurements.

Given my background, I was keen to create an atmospheric physics course at UTSC, which recently was approved by the university. As an experimental physicist, I also enjoy teaching the physics lab courses. My teaching and science outreach background connect well with first year physics courses.

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

I spent a fair bit of time during my high school years and my 20s performing as a drummer in a variety of bands. I stopped performing at the start of my Ph.D. because I didn't have the time to do music and the Ph.D. and the science education and advocacy volunteering. There's only so much time.

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

Hopefully I can get through my current to do list.

What are the challenges of your current position?

There is never enough time to do all the things I would like to do. I have a 'to do' list that might take the next several years.

What are the most rewarding parts of your job?

I enjoy teaching. There are moments when a student asks about something they're confused about and I'm able to reframe the question or prompt them to think about it differently and their understanding 'clicks'. It doesn't happen every time. But when it does, it is a rewarding moment. Knowledge is empowering. The world is facing a great many challenges. Helping to equip people to think and solve problems is a worthwhile career.

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

During my undergraduate degree I had room for a physics elective course and was looking to try something different. I decided to take atmospheric physics. I had an interest in environmental issues and the course appeared to be a bridge between the physics and environmental worlds. I enjoyed it. My horizon of what physics could be was expanded. Though it wasn't clear at that time how to follow up on that experience and insight. It seemed like a one-off exploration into an interesting topic, not an obvious career path.

At the end of undergrad, a close friend of mine was involved in creating a large science outreach event, the first Science Rendezvous, which began at U of T's downtown campus. He recruited me into the effort. It was fun. I was tasked with creating a series of interactive problem-solving educational events. The event succeeded and grew. I contributed to it for a few years and became keen to be involved in science education. I wasn't sure exactly where to fit in. I decided to attend teacher's education at OISE.

During my B.Ed. my teachables were high school physics and civics. I knew I wanted to be involved in education and valued my experience and skills from the education degree. But I wasn't entirely convinced that a high school teacher job was what I was really wanted. I also felt like my science and research experience wasn't complete. I started seeking opportunity more widely. I happened upon an Environment Canada internship at the U of T physics department. The role was to help run the Toronto Atmospheric Observatory (TAO). I was reminded of the atmospheric physics course I had enjoyed a few years earlier. This was an opportunity to explore that interest in greater depth. I applied.

My year-long internship at the TAO was a major turning point for my career. I was responsible for running an FTIR spectrometer, as well as other duties and helping with data analysis. It gave me an opportunity to learn more about atmospheric physics, work with instruments, and improve my coding skills. The physics building's rooftop also offered a great view of the city!

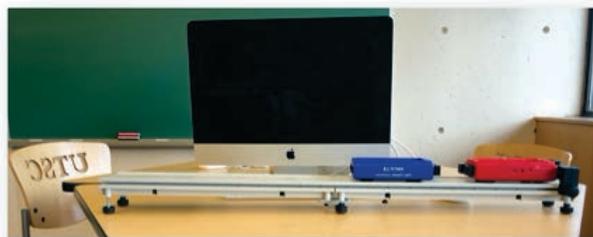


Most importantly, I decided that I wanted to continue being a part of that research community. About six months into the internship, in February, a team of grad students and technical staff departed for a month-long trip to the high Arctic to do atmospheric measurements at a lab on Ellesmere Island. I wanted in. I applied to graduate school to work with Prof. Kim Strong's experimental physics group, specifically to join her Arctic projects.

Any recent accomplishments and pictures?

I've done a lot of work creating new PHYA11 and PHYA22 labs. I haven't delivered the new labs in person yet, but I'm looking forward to it once we exit the pandemic.

New track and smart cart set up for kinematics and dynamics experiments :



There has also been a lot of effort into rebuilding the PHYB10 and PHYC11 physics lab courses. I'm still in the middle of my plan for these courses but it's coming together. In another year or two I'll be keen to look back on how far we've come.

FACULTY PROFILE

SALAM TAWFIQ

*Associate Professor
Department of Physical and Environmental Science*

Tell us about yourself

My name is Salam Tawfiq, I grew up in a small town called Anah on the famous Euphrates river side in Mesopotamia, what is now called Iraq. I still remember my grade 9 physics teacher. He was energetic, he plays basketball, also, he is a painter and likes theatre. He organized a small acting group of students and I was one of those invited to join the group. He, probably, was the reason why I decided to become a physicist since that early time. He discovered my passion for physics and continued to encouraged me since then.

I finished my undergraduate and graduate studies in Baghdad and went to work at the Iraqi Atomic Energy Commission (IAEC) for 5 years. Then I decided to move back to the university and left Iraq in 1989 to Italy to take part in a Summer school on High Energy Physics. This was at the so called ICTP or the International Centre for Theoretical Physics, in Trieste, Italy. There I decided to stay and pursue my Ph.D. study in High Energy Physics in Trieste, and after graduation I continued to work at the ICTP for about three years. In 1997, I decided to come to Canada and joined the St. George campus working with prof. Patrick O'Donnell's group, who was also teaching at UTSC. Eventually he encouraged me to officially move to UTSC, which I did in 2003.

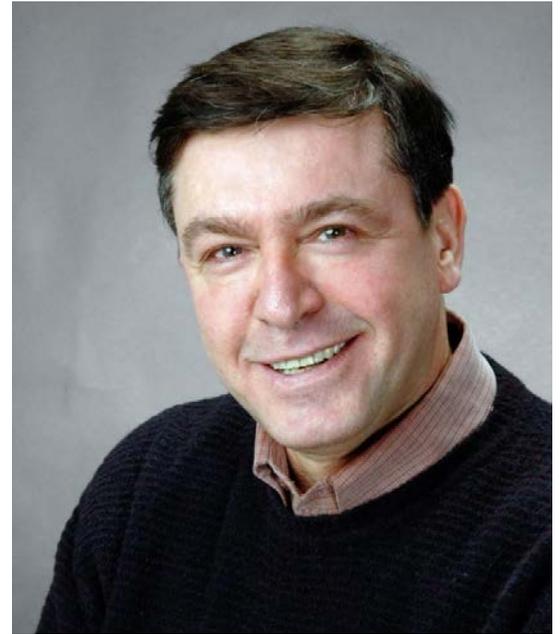
The real importance of the introductory physics courses, however, lies in those students who are not physics majors. Indeed, the vast majority of students in introductory courses at UTSC are likely to be premedical or life science students or humanities majors. These students constitute the educated electorate of the future, and their introductory physics courses are the only chance that we physicists have to plead our case with them. The dominant students perception of physics is that it is tedious, abstract, and fundamentally irrelevant; the challenge is to convince the audience that physics is rewarding, fun, useful, and most of all a worthwhile endeavor.

What are the challenges of your current position?

I UNDERSTAND THE CONCEPTS, I JUST CAN'T DO THE PROBLEMS, we (physics instructors) have heard this complaint from students at one time or another. All too often, however, what the student really means is the converse: "I can do (some of) the problems, I just don't understand the concepts." These are some of the main challenges of teaching physics that should be tackled head on. Since joining the Physics/Astrophysics group, which was the smallest group at UTSC, in 2003 we tried to improve students teaching and learning based on Physics Education Research (PER) and this requires that physics instruction must be modified.

What are the most rewarding parts of your job?

In September 2003, the UTSC Principle met with the new faculty members and I had a chance to talk to him about a new teaching tool called "Student Response System" now is called "iClickers", which I have discovered joining a conference on teaching in the US about a month earlier. He asked me to write a proposal and send it directly to him, which I did. He then put me in contact with the Teaching and Learning Services (TLS) director, at that time, to discuss the proposal.



The TLS director asked me to arrange for a demo in one of my classes, where the system was provided by a company selling these devices. She was impressed by the result and we start thinking about how the university can support the use of these technological systems in classes by instructors, who are interested, throughout UTSC. To this day, I still think that Clickers, where used properly, can promote student engagement, maintain student attention during large class, and foster discussions. Instructors gain a better understanding of how well students comprehend study material and can adjust their teaching approach.

The next major step for improving first year teaching and learning experience come in 2006. The proposal involved remodeling the physics Labs. In the past, we used to have two large rooms and students usually form groups and work on a number of experiments in a traditional manner. The proposal involved restructuring the Lab space into small rooms and redesigning the space to accommodate effective cooperative learning environment. Most active learning techniques involved the creation of student groups, but groups do not always work productively, and not all tasks are suited to group work. The traditional Lab time was used for tutorials & Lab activities, which are then called practicals. The administration, at that time, supported the proposal and, in couple of years, we were able to renovate our first year physics Lab space to support research-based teaching methods in physics including Lab activities.



STAFF PROFILE

KEVIN HURLEY

Physics Teaching & Research Lab Coordinator

Tell us about yourself

I've been at the department for 3 years (started 2018). I previously held a similar position at the downtown campus for 1 year previous to being hired here. I have worked in other industries before coming here. I did work in Geophysical prospecting for Vale Inco after graduating in 2007, and was a professional musician for approx. 10 years after that. My education history started at the University of Toronto with a Bachelor of Applied Science in Engineering Science Physics in 2007. Then in 2009, I obtained a certificate in Introduction to Commercial Music – Jazz at Humber College. I continued a Bachelor of Music in 2013 at Humber College and then a Bachelor of Education at Ontario Tech in 2017.

What led you on this career path?

Complete luck and opportunity. After getting my BEd, I was looking for jobs in education (high schools mainly) when a temporary position in the teaching labs opened up downtown and then this position was listed a few months before that contract ended.

What are/were your biggest milestones?

Being selected to attend a composer's workshop at the Banff Centre for Arts and Creativity. While there I got to work with many Grammy award winners, but the highlight was a performance with Ravi Coltrane. He is the son of John Coltrane. Growing up in an atheist household, John Coltrane was the closest thing to a "God" like figure we had, so playing with his son was like meeting Jesus.

What are your specific responsibilities and requirements of your job?

I run the physics teaching labs. That includes purchasing and maintaining the lab equipment as well as developing the curriculum for the equipment. I also maintain the physical lab space and do some other admin work for the physics group.

What are some of the challenges in your job?

Dealing with things that are out of my control. For example: not sure who decided it was a good idea to put a water intensive research facility on the 6th floor of SW, but I make sure to let them know it was a bad idea every time a leak has water coming in from our ceilings.

What are your favorite hobbies/past times?

I race Cyclocross, one particular flavour of offroad cycling.

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

Nothing. Things have worked out pretty well.

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

Not sure. I will continue to take opportunities as they come my way.

Any recent accomplishments and pictures?

I recently had my first child. She is just past 2 months old now... I'm just trying to get some sleep...

RESEARCH HIGHLIGHT

HANNO REIN

Associate Professor
Department of Physical and Environmental Science



Research Summary:

Professor Hanno Rein research focuses on his interests in numerical methods, in particular N-body codes and integration methods for planetary systems. Other research interests include planet formation, stochastic processes, planet migration, celestial mechanics, and Saturn's rings. He likes to explore the possibility of using novel high performance computing platforms for astrophysics.

See his webpage here: <http://hanno-rein.de/index.html>

Scores of internet-providing satellites will soon streak across Canada's skies

Alongside researchers at UBC and the University of Regina, this new research studies the light pollution that would be created over Canada by tens of thousands of new internet satellites scheduled to be launched in the coming years.



The night sky is going to get much busier thanks to thousands of new internet satellites set to launch over the next few years – and researchers say it's going to affect Canada more than most places on Earth. This means the skies near most large Canadian cities such as Toronto, Vancouver, Calgary, Regina and Winnipeg could be affected.

This flood of satellites presents a major challenge for astronomers (and amateur stargazers) who have to contend with light pollution from the thousands of new points of light. Rein says about eight per cent of all the light in the night sky might soon come from these satellites. What will be most noticeable for the average person is the hundreds of new lights slowly moving across the night sky at any given time.

While this technology has been touted by companies as a way to deliver high-speed internet to rural areas, Rein notes that the service is expensive and that only a relatively small group of people living in wealthy countries will enjoy the benefits.

“The light and environmental pollution impact, on the other hand, will be experienced by everyone,” he says. **Read more here:** <https://www.utoronto.ca/news/scores-internet-providing-satellites-will-soon-streak-across-canada-s-skies-what-cost>

AWARDS HIGHLIGHT

DIANA VALENCIA

Co-reipient of the PAOLO FARINELLA PRIZE

The Paolo Farinella Prize (<https://www.europlanet-society.org/paolo-farinella-prize/>) was established to honour the memory and the outstanding figure of Paolo Farinella (1953-2000), an extraordinary scientist and person, in recognition of significant contributions given in the fields of interest of Farinella, which span from planetary sciences to space geodesy, fundamental physics, science popularization, and security in space, weapons control and disarmament. The winner of the prize is selected each year on the basis of his/her overall research results in a chosen field, among candidates with international and interdisciplinary collaborations, not older than 47 years, the age of Farinella when he passed away on March 25, 2000.



Prof Valencia's pioneering work developed the first interior model and the first mass-radius relationship for rocky exoplanets (1-10 Earth masses) and stimulated high pressure-temperature experiments used to study how atoms bind together in the interior of super-Earths. She also began to address the question of the possibility of plate tectonics on super-Earths and triggered a controversial discussion that continues to this day. In addition, she addressed the issue of the composition of this new category of planets, essential for robustly comparing them to the Earth and other Solar System bodies. In particular, her work on the exoplanet GJ 1214 b has strongly motivated atmospheric observations of super-Earths to better determine their compositions.

'I am honoured to receive this prize, as it recognises my contributions to the field of super-Earths. I have seen the field grow from not knowing anyone else studying these planets when I was a PhD student, to a flourishing research field attracting numerous young scientists. It feels particularly special to be recognised in the research field I helped to grow from the beginning.'

Read more here: <https://www.europlanet-society.org/2021-farinella-prize-awarded-to-diana-valencia-and-lena-noack/>

<https://utsc.utoronto.ca/news-events/news-events/news-events/breaking-research/utsc-researcher-awarded-international-prize-work-exoplanets>

RESEARCH SUMMARY

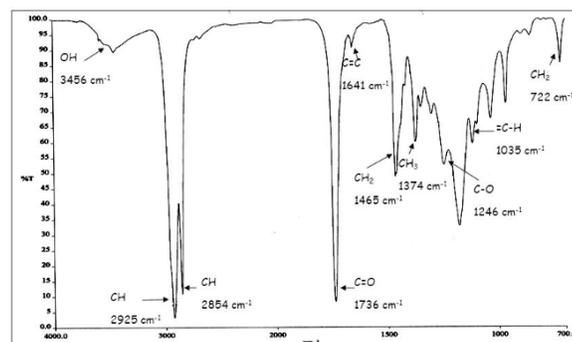
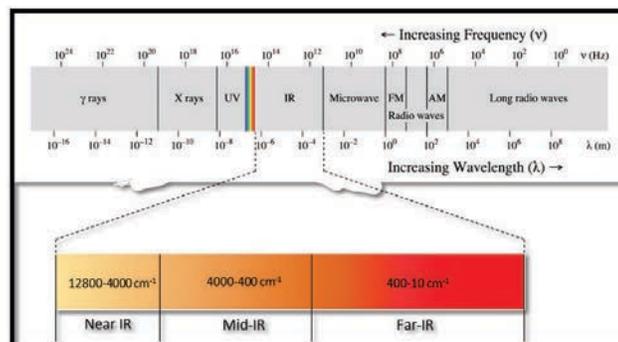
Professor Diana Valencia's research interests involve the characterisation of the low-mass planets: super-Earths and mini-Neptunes. The former are planets that are mostly solid, either rocky or icy in composition, while the latter possess also a volatile envelope. My goal is to determine if planets with masses between 1-15 Earth-masses are scaled up versions of Earth, or scaled-down versions of Neptune in terms of their composition, evolution and physical properties. See more at <https://www-n.oica.eu/valencia/index.html>

FROM THE TRACES CENTRE: INSTRUMENT FEATURE

FTIR: Fourier Transform Infrared

We have all heard or used this instrument. But what is it really? To understand the instrument, we need to understand the principles behind the technology.

Infrared (IR) spectroscopy is the study of the interaction between matter and IR radiation. The IR region is found between the visible and microwave regions in the electromagnetic spectrum and can be further sub-divided into the near-, mid-, and far-IR regions (Figure 1). When a molecule is exposed to IR radiation the absorbed energy is converted into a molecular vibration. Molecules have unique vibrational modes which can be used to identify them. Some bonds absorb IR radiation more strongly than others, while others do not absorb at all. For energy to be transferred from an IR photon to a molecule via absorption, the vibrational mode must cause a change in the dipole moment in the molecule bond(s). If a change in the dipole moment occurs during the vibration the vibrational mode is IR active, if no change to the dipole moment occurs the vibration mode is IR inactive. What important molecule in the air is IR inactive?



Fourier Instrumentation

Almost all IR spectrophotometers can be classified into one of two categories: (1) dispersive or (2) Fourier-transform (FT) instruments. Dispersive instruments were first introduced in the 1940's and consist of single and double-beam instruments. Dispersive IR systems use sequential scanning, meaning that they scan for only one frequency at a time resulting in slower measurement times. Dispersive instruments have been mostly phased out and replaced by FTIR systems which became commercially available in the early 1980s.

FTIR instruments offer significant advantages over their dispersive counterpart. All FTIR spectrophotometers are based on the Michelson interferometer which relies on the interference of IR light as it moves through the instrument. When the signal reaches the detector, it is recorded as an interferogram which is then converted mathematically by a Fourier transform into an IR spectrum.

The TRACES Centre and undergraduate chemistry teaching laboratories use Bruker ALPHA FTIR instruments. These are compact bench-top instruments which can be used for the analysis of various types of samples (e.g. solids, liquids, or gases). FTIR measurements may be acquired using a variety of different techniques depending on the sample, matrix or concentration. The most established FTIR techniques in the laboratory use the transmittance and attenuated total reflectance (ATR) modules.

Bruker produced an informative video on the basics of FTIR: <https://www.youtube.com/watch?v=KR0WMB3AR3s>.

FROM THE TRACES CENTRE

INFORMATION IR PROVIDES

- Identify unknown materials by their IR 'fingerprint'
- Determine the quality or consistency of a sample
- Determine the quantity of component(s) in a mixture

FTIR APPLICATIONS

- Identification of organic and inorganic material and the determination of molecular structures
- Identifying paint formulations for forensic and cultural samples
- Non-destructive method for screening illicit shipments
- Identification of minerals in a geological sample OR setting
- Polymer identification of sample and determination of film thickness

WHAT TECHNIQUES CAN WE PROVIDE AT TRACES?

TRANSMISSION MODE



Traditional mode of operation
Excellent for gases
Requires sample preparation for solids and liquids
The reference method for quantitative analysis

DIFFUSE REFLECTANCE (DRIFTS) MODE



Collecting scattered radiation of powders and rough surfaces
Fast measurement of powdered samples
Ideal for pharmaceutical and forensic applications



Preferred mode of operation in most modern laboratories
Well suited for liquids, gels, films, coatings and solids
Convenient for qualitative and quantitative analysis

ATTENUATED TOTAL REFLECTANCE (ATR) MODE



Acquiring reflectance data in a non-destructive manner
No interference with fluorescence
Ideal for cultural applications (i.e., paintings, sculptures, stones)

FRONT REFLECTANCE MODE

CONTEST OF THE MONTH



**WIN A \$50
STARBUCKS
GIFTCARD!**
EMAIL ANSWERS TO TONY
ADAMO
tony.adamo@utoronto.ca

- **Identify the DPES Faculty member shown in the picture and the instrument being used.**
- **Identify the Accession Number of the 11th Century Gospel article being analyzed in TRACES. The piece is from the Malcove Collection on display at the Art Museum of the University of Toronto.**

Poster day

SEPTEMBER 13, 2021

WRITTEN BY **DR. KAREN SMITH**

On September 13th, 2021, DPES virtually hosted 78 outgoing MEnvSc students for the fourth annual Masters of Environmental Science Internship Poster Day. The one-year professional MEnvSc program in DPES includes the option to complete either a summer internship or research project and the internship option is by far the more popular and is what attracts many students to the MEnvSc program.

The annual Poster Day provides an excellent opportunity for the outgoing MEnvSc students to share their experiences with faculty and staff, employers and with each other. In addition, the poster day introduces the incoming MEnvSc cohort to the internship process and the diversity of potential internships positions available. This year, we had 77 incoming MEnvSc students and 19 faculty in attendance.

Overall, the poster day was again a huge success! Special thanks to Wai Ying Lam and the MEnvSc Internship Team, Anisa Dilijohn Maraj and Joanna Ying-Fiss for their fantastic organization of this event. Keep an eye out for next year's poster day, hopefully, returning in-person to the Catalyst Centre.

Think. Shoot. Change Video Competition Winners

1st: Alicia Campbell - "[Our Home on Native Land](#)"

2nd: Tyler Lake - "[Why You CANNOT Recycle Coffee Cups \(and Why You Should Have a Reusable Mug\)](#)"

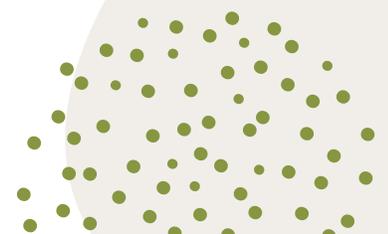
2nd: Michela Reinink - "[The Farm Next Door](#)"

3rd: Jessica Kassar - "[Modest Magicians: the hidden pollinators of our planet](#)"

3rd: Hao Mu - "[Road De-icing Salt: A Threat to Our Environment](#)"

More details about the competition can be found here:

<https://www.utscc.utoronto.ca/p/hyssci/think-shoot-change-video-competition>



MENVSC GRADUATE HIGHLIGHT

DANIEL SILVER

*Policy Analyst, Natural Resources Canada (NRCan)
MEnvsc in the Department of Environmental Sciences, UTSC '21*

About me

The research fellow position involved a keystone research project which was planned for in the spring semester and completed over the summer. My research was desktop-based, meaning I did not have to go into the field to collect data. I worked remotely from Montreal, connecting with my research partner and professors on a weekly basis. My research was supervised by Dr. Stuart Livingstone (Assistant Professor, Department of Physical and Environmental Sciences) and Dr. Nicholas Mandrak (Professor, Department of Biological Sciences).

My research project broadly looked at federal endangered species policy in Canada. More specifically, I assessed the interaction between recovery plans for different endangered species living in Rouge National Urban Park. This entailed comparing proposed actions for different endangered species and seeing where there were synergies versus conflicts in terms of how actions might affect non-target species. An important finding from the study was that many recovery actions were antagonistic to each other, meaning that a recovery action for one species could have negative ramifications for another listed species. This result highlights the importance of environmental management that takes an ecosystem-level perspective and considers the requirements of all endangered species inhabiting a given space.

My upcoming position at Natural Resources Canada will generally involve assessing and advising on federal environmental policy. The PARDP program emphasizes exposure to diverse policy files, and as part of this curriculum I will work on three different files over three years. My first assignment is in the area of environmental impact assessment. Impact assessment is a key facet of environmental planning that involves predicting the likely social and environmental consequences of a project. At its best, the impact assessment process can enhance the sustainability of development projects and flag proposed actions that pose unacceptable social and environmental risks. Impact assessment policy is currently an active and evolving area, and I hope in particular to contribute to policies that will better reflect indigenous land rights and the urgency of the climate and biodiversity crises. In future years, I am very interested in working on policy files pertaining to biodiversity conservation and transitioning to renewable energy.



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

I am really into wildlife photography, which has been a passion for pretty much my whole life. I recently purchased two trail cameras (motion sensor video cameras) which I have been learning how to use and have had an incredible amount of fun with.

What are the challenges of your current position?

Working remotely during my summer research fellowship had some challenges, including Wi-Fi and zoom cutting out at unfortunate times. I have to thank my professors for being so understanding about the inherent challenges of remote connection.

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

The MEnvSc program emphasizes practical training for professional employment, including roles outside academia. Compared to my more academically-focused undergraduate degree, the courses in the MEnvSc program taught me skills such as project management, data analysis, and policy/legal literacy, which all have direct applications to my upcoming professional job. Being able to speak intelligently about these topics was a huge asset during job interviews, and I owe that directly to the informative and practical courses offered in the MEnvSc program.

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

The MEnvSc program has a dedicated office devoted to identifying career opportunities and helping students attain internships and jobs. The internship office pitched NRCan's PARDP program to our cohort, which initially brought the position onto my radar. The MEnvSc internship staff later proof-read my written application and conducted a mock interview with me. All of this support was essential to my success in the job application process for the position.

I also participated in some programs offered through UTSC broadly, including, notably, the Partners in Leadership program. My mentor in that program was truly fantastic and also provided invaluable input into my application to NRCan.

What advice would you give to current students?

For MEnvSc students, take full advantage of the resources available through the internship office. The staff there are truly incredible and, at least for me, were a source of knowledge and support throughout the job application process. I think this advice extends more broadly to all students in UTSC – take advantage of all available resources and opportunities offered within and outside UTSC. While, of course, not every opportunity will lead directly to a job, these sorts of experiences can expand your knowledge and professional network which can end up being important assets down the road.

What are the most rewarding aspects of your current position?

Regarding the research position, it was very rewarding to take an idea and a research question and, in collaboration with my research partner, build a methodology from scratch to get an answer to it. Given the novel nature of our research questions, it was exciting to truly create something new in our methods, which we are hoping can be built on and replicated by future researchers.

Though I haven't started my policy analyst position yet, I am particularly excited about the wide array of experience I will gain from getting to work on three distinct policy files. While I was assigned to impact assessment as my first year's policy file, I will be able to decide which files I will work on for my next two years, allowing me to have an unbelievable amount of autonomy in my career journey.

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

Relax and stop overthinking career stuff. I spent a lot of time being anxious and stressed about whether I'd be able to find a job, make enough money, be in a position to do ethical work that matched my values, etc. I think there is a healthy level of attention to school/work, but I definitely surpassed that during certain periods in undergrad, and I wish I could go back and tell myself to spend more time smelling the roses as opposed to worrying about my career.

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

My goal – maybe a bit further out than ten years – is to work in an industry or government position where I am making meaningful contributions to protecting our environment. I feel my skills would be best used in areas such as environmental policy, consulting, and research in a main day job. A long term goal of mine is to eventually work (perhaps part time) in an educational role where I can engage with students and help them achieve their goals.



MENVSC GRADUATE HIGHLIGHT MAYURI SUMBHA

*Environmental Technologist, WSP Canada Inc.
MEnvSc in Terrestrial and Aquatic System, UTSC '21*

Brief summary of your role

Initially, I stated that I've been working as a Student Environmental Technician with WSP Canada from May 2021 to September 2021. As from October 2021, I am a full-time employee of WSP Canada Inc. working as an Environmental technologist.

My internship at WSP has been an amazing learning experience and I get many opportunities to learn new technologies, methodologies and roles. They hired me for a project called Annual lead in Drinking water sampling program. I am responsible for collecting drinking water samples to investigate the presence of Lead at all points of consumption within various school boards across GTA. Now I am also involved in various new projects which involves field work, coordinate various projects regarding phase I and phase II Environmental site assessment and reports preparations.

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

I absolutely love going on trails and exploring new places. Due to the hectic schedule, it all had to stop, and I was not too happy about it. Fortunately, I got into a project which involved me going to Algonquin every month. I could not be happier to visit my favourite place and getting paid for it.

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

If I could go back 10 years, I would advise myself to be patient and to believe in myself, never to lose hopes and everything is going to work out just fine.

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

If we had to form a connection between what we learn in the class and what is needed for the work, I would say that it has helped me a lot. The case studies, examples and experiences of guest speakers are very much relevant to real life, and they gave us a very through insight with the actual field. the group discussions, team assignments and group presentations also helped me to develop my skills for teamwork, coordination and effective communication.

All the courses are amazing, I personally found the course that was most relevant to my work were Brownfield Redevelopment. That course taught me procedures for sample collection, Groundwater Monitoring, paperwork labels and chain of custody for lab and also to transport samples to the lab. At WSP I am doing exactly the same work which I learned in the MEnvSc course. The technical skills that I learned during the course, helped me a lot during my internship and now as well.

What are the challenges of your current position?

In this aspect, I would say that I have been lucky. I truly enjoy working at WSP. There is a lot to learn, and this field is ever evolving. I am working on multiple projects and keeping track of them all becomes challenging. I was never an early riser but since joining WSP, my day starts at 5am. It was a bit frustrating in the beginning, but one gets used to it very soon. One more challenge that I face is the lack of weekends. The water samples that I collect from the different schools have to be done over the weekends so planning for a weekend getaway or going on trails had to stop.

What are the most rewarding parts of your job?

People at WSP were very helpful, accommodating and excited to guide me at every step. The role is very informative, and I am able to learn something new almost every day. My reporting manager is an awesome person. He insisted that I work on varied projects for the first few months just so that I can explore the different fields and then make an informed decision about the field where I would like to make my career in. Overall, I am very glad that I am a part of WSP, and I am excited for what lies ahead.

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

Environmental science is a multidisciplinary subject and currently I am just exploring different fields. In a period of 10 years, I see myself heading multiple projects and training new graduates from UoFT that we would be hiring.



What advice would you give to current students?

My advice for MEnvSc student would be to stay motivated and focused. The phase of job search is tough, but one has already taken the right first step of being part of Master of Environmental Science program at University of Toronto. One more piece of advice I would give is that once one gets into an internship program, work hard and seek out networking opportunities whenever possible. I can vouch that networking has helped me a lot and it is networking that has got me to WSP for internship. There is a lot of competition in one's career and one must be willing to go the extra mile to stand out to your employer. The extra effort one puts in now will pay off in the long run.

Work-Life Balance?

I continue to struggle with this, between work and personal life. I am still figuring it out as I am working on field projects almost every day. I started my internship on a school project that required getting up at 5:00 am and weekend water sampling and thus, I am not even able to enjoy the weekends anymore. Anyhow, I am enjoying this phase of life and learning something new almost every day. I am sure that things would change and eventually I will figure it out.



CHEM AID CENTRE

CHEM AID TUTORS FALL 2021 SCHEDULE

EPISA CHEMISTRY SOCIETY

| EST | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
|----------|--------|---------|-----------|----------|---------|
| 9-10 am | ADNAAN | | ANINDRO | | |
| 10-11 am | ADNAAN | DANIEL | ANINDRO | FATIMA | SANJANA |
| 11-12 pm | ANNAM | DANIEL | ANINDRO | FATIMA | SANJANA |
| 12-1 pm | ANNAM | | | | ANNAM |
| 1-2 pm | | | | FATIMA | |
| 2-3 pm | | ADNAAN | DANIEL | | SANJANA |

■ All courses
 ■ CHMA10
 ■ CHMA10/41
 ■ CHMA10/16

check out our previous events

CHEMISTRY SOCIETY

WATERLOO PHARMACY ADMISSION SEMINAR

FEATURING SPECIAL GUEST SPEAKER
KAITLIN BYNKOSKI

Director of Admissions and Undergraduate Affairs at the Waterloo School of Pharmacy

THURSDAY, 23RD OF SEPTEMBER
5-7PM VIA ZOOM

Sign up using the google form on our link tree!

CHEMISTRY SOCIETY

CSU PRESENTS

EXAM DE-STRESSOR MOVIE NIGHT

Friday, October 15th 5:00-7:30pm

SEE YOU THERE!!

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US



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The Chemistry Society at UTSC

DPES PROGRAMS SUMMARY

TOTAL PROGRAMS: 16

COOP PROGRAMS: 9

CHEMISTRY

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

COMBINED DEGREE PROGRAMS: 3

PHYSICS AND ASTROPHYSICS

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

ENVIRONMENTAL SCIENCE

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

ENVIRONMENTAL STUDIES

Environmental Studies Major

CO - OP

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

COMBINED DEGREE PROGRAMS

HONOURS BACHELOR OF SCIENCE / MASTER OF ENGINEERING

HONOURS BACHELOR OF SCIENCE / MASTER OF ENVIRONMENTAL SCIENCE

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



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Interested in assisting with the DPES newsletter?
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