

DPES DIGEST

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DPES AWARDS!

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4TH ANNUAL DESC COLLOQUIUM

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graduate winners on pg. 6

SCIENCE RENDEZVOUS AND LTS CHALLENGE

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UNIVERSITY OF
TORONTO
SCARBOROUGH

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LET'S TALK SCIENCE

- Amy Jenne, LTS Coordinator

LTS Challenge

Let's Talk Science is a national organization providing free STEM outreach to classrooms and in community events. We were in full swing this month with several large events resulting in outreach to over 1200 students!

On May 8th we opened our doors to 30 teams and a total 115 students ranging from grade 6-8 for the annual Let's Talk Science Challenge.

This is an event where students take part in a full day competition. In the morning students participated in a science quiz show with questions in Math, Earth and Environmental Science, Astronomy, Biology, Chemistry, Engineering, and Physics. In the afternoon the students partake in a design challenge where this year's task was to build the tallest free-standing structure that could also support the most weight with only post-it notes and tape. The students had a wonderful time and built some incredible structures. Most importantly they learned that working as a team is always the best policy. We look forward to hosting the event in the future.



First Place
Winners of the
Let's Talk Science
Challenge

LTS Science Rendezvous

On May 12th we hosted our annual Science Rendezvous at the Toronto Zoo. This event is an important partnership between the Office of the Vice-Principal Research at UTSC, the Toronto Zoo, and Science Rendezvous (an annual event that provides free STEM outreach across the country). For this event we created eight stations throughout the zoo each with a different theme and brought together science education with the animals that the participants see at the zoo. For example, we discuss the concept of heat transfer and insulation by creating a 'fat glove' for participants to wear as an example of how polar bears stay warm in the artic. Participants also complete a scavenger hunt by answering a multiple-choice question at each station reflecting on the information that they learned. We had three faculty members join us for the day as well and give accessible talks to the participants. These members include Maydianne Andrade, Marc Cadotte, and Tod Thiele. We also welcomed two local politicians to the event: MP Gary Anandasangaree, and Councilor Jim Hart. This event was an incredible success with over 750 of patrons, and 75 volunteers participating in the day. We will do this event next year, and any faculty who would be interested in coming to speak are encouraged to get into contact with us.



Outreach in the Yukon

From May 13-17th five members of the Let's Talk Science team travelled to Yukon to conduct outreach in rural areas. Over three days we visited 21 classrooms, in 5 schools reaching over 400 students! Some of these events even happened outside on a campground beside a lake. While there was very little sleep to be had, the students all enjoyed having visitors from another part of Canada, and all members of the team had a blast working and exploring Yukon in our down time (even though it was minimal). We hope to hold another rural outreach event next year.



We are always looking for dedicated volunteers to help with our program, and volunteering could result in trips to exciting Canadian locations. If you are interested in sharing your knowledge feel free to sign up as a volunteer at <http://volunteer.letstalkscience.ca/registration>. If you have any questions about the program, please feel free to contact us at utsclts@gmail.com.



Volunteers at Sign Post Forest in Watson Lake, Yukon.



Award winners with DESC organizing committee.

From left to right: Cindy Yang, Conor I. Anderson (winner in Fundamental Science), Ariola Visha, Emily Chenery (winner in Applied Science and Technology), Brian Pentz, Noelle Stratton (winner in Environmental Science and Policy) and Ellen Gute

4TH ANNUAL DESC COLLOQUIUM

- Ellen Gute on behalf of the DESC IV organizing committee (Brian Pentz, Ariola Visha, Cindy Yang, Ellen Gute)

On May 3rd-4th, our Department celebrated the research conducted by PhD students at the 4th Annual Doctoral Environmental Science Colloquium (DESC IV). During the two full days, PhD students from the 1st to final year of their PhD program presented their latest research topics and results. The colloquium highlighted the diversity of the research projects ranging from Fundamental Research on plant components to Applied Science to predict Asian carp spawning from modeling and Environmental Social Sciences that compared achievements of nations towards the Paris agreement. With this wide variety of topics, the colloquium stimulated outside-the-box-thinking; and a “wine-and-cheese” reception at the end of the first day offered space for discussions across traditional academic disciplines.

This year, the colloquium hosted two invited speakers. On the evening of May 3rd, Dr. Daniel Pauly from the University of British Columbia gave a public seminar on global fishery activities and their severe negative effects on marine ecosystems and biodiversity. Having Dr. Pauly as a speaker was a great opportunity for students to learn from his tremendous experience and knowledge in science and especially in fisheries. Our second invited speaker, Dr. Susannah Burrows, an Atmospheric Scientist from the Pacific.

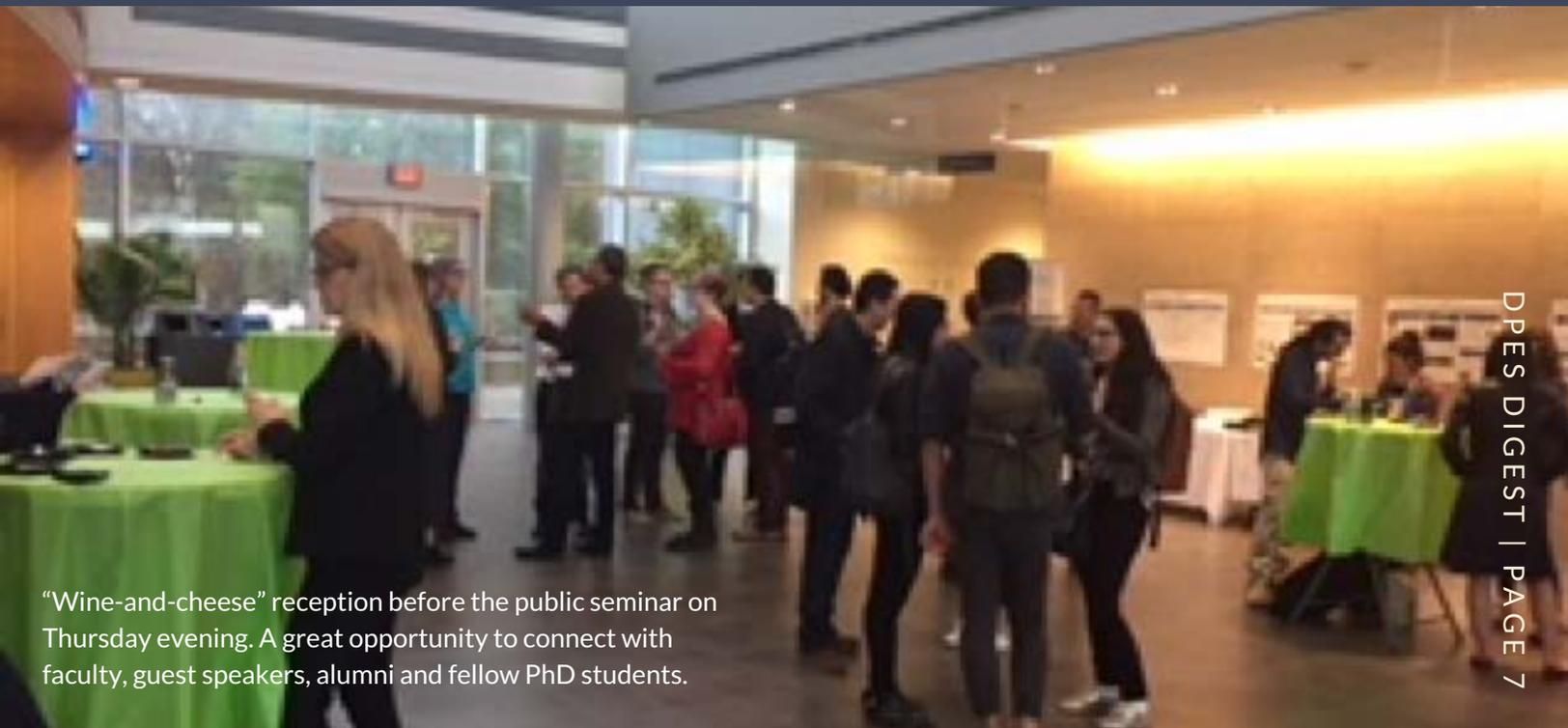
Northwest National Laboratory (PNNL), gave a seminar on Earth System Models as an integrative tool to better understand our Earth's dynamics through interdisciplinary research. Having Dr. Burrows as an accomplished young female scientist at the colloquium was a great opportunity for the PhD students to connect and chat about science and career opportunities.

At the end of the colloquium, the best student presentations in three research categories were determined by a jury of students and faculty. Each of the selected presentations was awarded a monetary prize of \$350. The winners in each category were:

Conor I. Anderson (Fundamental Science), Emily Chenery (Applied Science and Technology), Noelle Stratton (Environmental Social Science)

The winner of the DESC cover art competition this year was Patricia Anne Miller, who was awarded \$75. Congratulations to all the winners!

To continue the success of the annual DESC colloquiums, we are looking for 1-2 volunteers to join the organizing committee for next year. Join the team by contacting any of the current committee members!



“Wine-and-cheese” reception before the public seminar on Thursday evening. A great opportunity to connect with faculty, guest speakers, alumni and fellow PhD students.

DPES SENIOR UNDERGRADUATE RESEARCH AWARDS

- Shadi Dalili (on behalf of George Arhonditsis)

These awards aim to recognize outstanding research from an upper-year undergraduate student taking part in an one-term or two-term research project course under the supervision of DPES faculty. Usually one award will be available for students in each of 1) Chemistry, 2) Environmental Science/Studies, and 3) Physics and Astrophysics. Unfortunately, we did not receive a nomination from Physics and Astrophysics this year, but we did receive some excellent nominations from Chemistry and Environmental Sciences. The DPES Research Committee thus decided to recognize two top papers for each of the two disciplines.

In Chemistry, the winners are:

1. **Celia Ferrag** - Project Title: "High-swelling hydrogel polymers of Polyacrylamide and Polyvinylpyrrolidone cross-linked with N-methylenebisacrylamide and their biological applications" supervised by Prof. Lana Mikhaylichenko.
2. **Billy Deng** - Project Title: "Optimized synthesis of pyridine porphyrin complexes for homogeneous electrocatalytic reduction of CO₂" supervised by Prof. Xiao-an Zhang.

In Environmental Sciences, the winners are:

1. **Aisha Javed** - Project Title: "Detection of spatial and temporal hydro-meteorological trends in Lake Michigan, Lake Huron, and Georgian Bay" supervised by Prof. George Arhonditsis.
2. **Ian Zhang** - Project Title: "A cross-disciplinary approach to decoding drumlin formation" supervised by Prof. Nick Eyles.

Awards will be given out June 8th at our end of term departmental function. Congratulations to Celia, Billy, Aisha and Ian!

DPES EXCELLENCE AND LEADERSHIP AWARDS

Sponsored by TRACES-Chem Stores, these awards aim to recognize undergraduate students that demonstrate both academic excellence and leadership within the Department of Physical & Environmental Sciences. The following students have distinguished themselves both academically and for their leadership and contributions to the DPES community through their participation in student organizations (e.g., EPSA, Chemistry Society, Chem-Aid Centre, Physics-Aid Centre, etc) or other volunteering work related to DPES!

Chemistry

Recipient: Daniel Lysak

With a perfect CGPA, Daniel has been awarded the Vincent Bladen Award (twice), the U of T scholar program (twice), NSERC USRA (also twice), the Esther Mitchell Chemistry Prize, the William Peek Biology award, and the President's Scholar of Excellence Award. Daniel is described as a mature, deep thinker, and genuinely interested in research. In terms of leadership experience, Daniel is a Facilitated Study Group (FSG) leader, as well as an FSG leader trainer, for a number of Chemistry courses (CHMB42, CHMB20/23, CHMA11). He is also currently a Discussion Session Leader at DPES, with Prof. Nirusha Thavarajah, leading discussion sessions of Introductory Chemistry courses. In addition, he is a volunteer with "Let's Talk Science" events.

Environmental Sciences/Studies

Recipient: Karyna Hanif

In addition to her stellar academic performance in the environmental science program, Karyna has been an exemplary interdisciplinary citizen within DPES. Karyna has been a long-standing member with our Chemistry Society student group, holding multiple positions including Vice President, and Director of Marketing. Karyna has also served on multiple occasions with "Let's Talk Science" events, and was the Science Director for the UTSC Co-op students association. As a co-op student, Karyna represented DPES programs as a clinical researcher in orthopaedic surgery at Sunnybrook hospital, and is currently on a UofT research exchange in Singapore. She has also been a huge asset with the DPES Newsletter for the past few issues and took the Initiative to reformat the layout and make it look much more "professional".

Physics/Astrophysics

Recipient: Fergus Horrobin

Fergus has been identified as an outstanding student, who is consistently among the top in his classes. He is praised for organizing a course to teach programming to his peers, when he noticed their weaknesses. He literally just asked for a room he could use, and then started to design lectures without any faculty contribution!! Fergus is already heavily engaged in research and even travelled to international conferences to present his work. He is one of the few undergraduates who consistently attend CPS events. He is also a very active contributor to the Physics-Aid Centre.

Physics/Astrophysics

Recipient: Daniel Douglas

Daniel has been praised as one of the best students academically in our P&A programs. In addition, he is the most active student in terms of organizing student-faculty events. He recently organized an event for Prof. Lorincz's retirement - a "thanks for everything Mr. Lorincz" event! Daniel's all around activity and standard of academic excellence embodies the spirit of this award!



DPES TEACHING AWARDS

Natashya Falcone and Brian Pentz are the two recipients of the DPES Teaching Assistant Awards this year! These awards aim to recognize individuals, who have a significant impact on student experience in the context of their role as teaching assistants.

Natashya is praised for her passion for teaching, excellent organization and interpersonal skills. She is an extremely knowledgeable TA, who genuinely cares about students in her practicals or tutorials. Her students submitted extremely positive comments in the unofficial course evaluations, highlighting her willingness to help, preparedness for each laboratory, friendly attitude, guidance for the future, etc. Her nominator, Prof. Lana Mikhaylichenko, stated that she is clearly one of the best TAs she ever had in her laboratory and tutorial courses!

Brian has made important contributions to both the content and delivery of Environmental Science and Technology in Society (ESTC35). He updated and revised the syllabus to reflect the new guidelines of the revised Media Analysis Assignment and edited the layout and context of the course's Blackboard page. He also facilitated guest lectures given to the class, by coordinating logistics with speakers and facilitating discussion during guest talks. These actions have contributed positively to the learning environment of students in ESTC35. His nominator, Prof. Nicole Klenk, also praised him for his dedication to organizing our department's Doctoral Environmental Science Colloquium and serving on the Department of Physical and Environmental Science's Research Committee. He is truly an exceptional departmental citizen!



HECHMET IS COMING TO UOFT

Scott Ballantyne

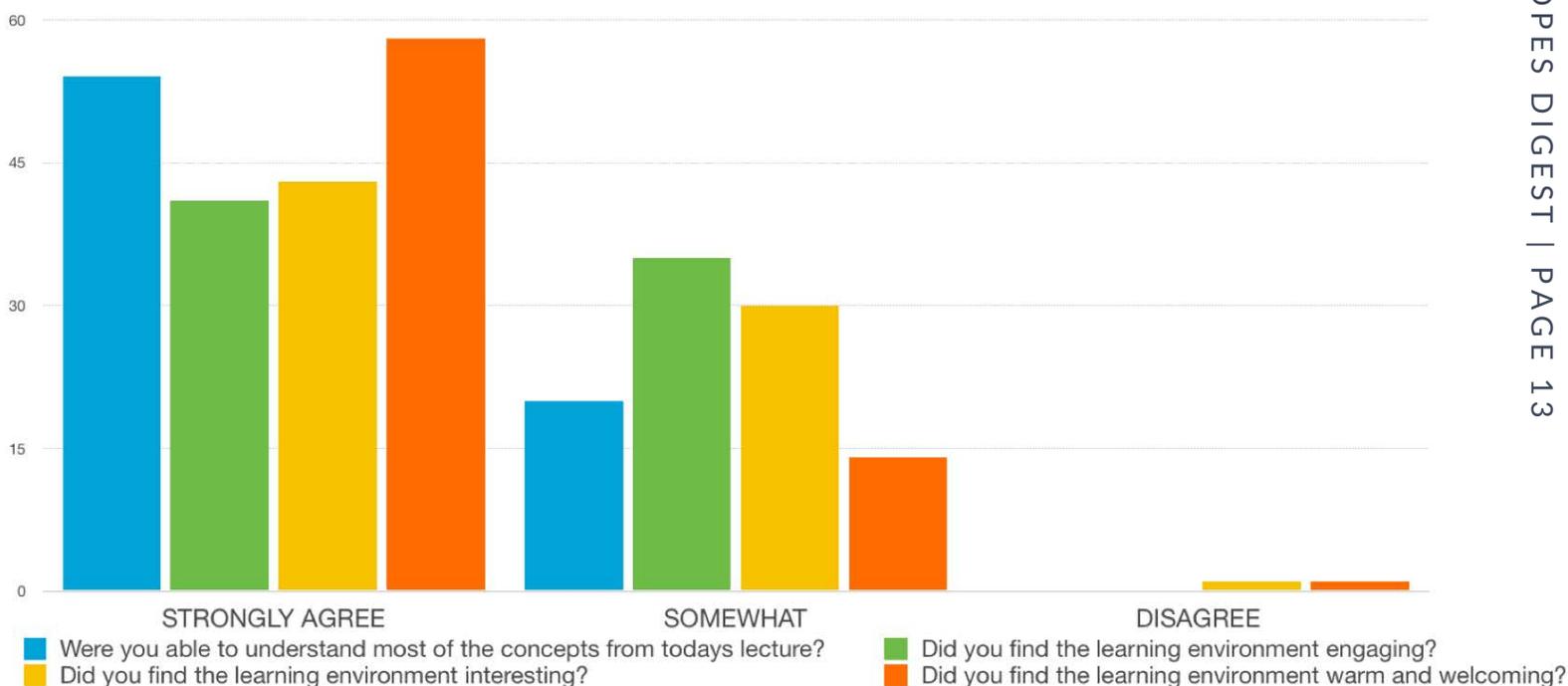
The Higher Education Cooperative for Hazardous Materials and Equipment Tracking, or HECHMET for short, is a comprehensive hazardous material inventory management system, powered by Vertére software, currently being used by a number of Canadian academic institutions. Recently the University of Toronto has made an investment to join those other institutions, some of which include the University of Ottawa, Queens, RMC and Ryerson.

The goal is to have HECHMET implemented across all 3 campuses by the end of this year. Here at UTSC, CHMStores has already begun implementing the HECHMET system for the North Campus, while EHS will be overseeing a pilot project to determine the best way to implement HECHMET for the South Campus over the summer.

Unfortunately, given the increased security and quality control measures, we will not be able to port our current department inventories over to the HECHMET system, thus our technical staff will once again have to visit each lab in order to manually tag and input all current inventories. Staff will be reaching out to all Principal Investigators and Facility Managers to arrange a convenient time for this large undertaking.

We thank everyone for their cooperation. We will provide regular updates regarding the implementation status, and there will be announcements about training sessions for faculty, staff and students once they are available.

Figure 01: Student Survey Feedback On The Lecture



OUTREACH WITH PROFESSOR THAVARAJAH

Anna Galang

On May 1st, Professor Nirusha Thavarajah delivered a mock chemistry lecture to a group of students from a local high school. Like these young students, I sat among the chairs of AA112 listening to a review of the basics of chemical bonding. They enthusiastically engaged in peer instructions, asked questions and enjoyed learning in a new environment. Students found Professor Thavarajah's simple powerpoints filled with examples and diagrams informative and engaging, allowing them to visually see the concepts. Majority of the students found the concept to be understandable and interesting. This lesson was another building block to their classroom learning and allowed them to review for their upcoming final. Many students expressed their difficulties concentrating for a long period of time and taking notes fast, a common issue in the transition to university.

However, they also wrote about "developing a deeper understanding for chemistry" and "a curiosity to know more about electron configuration." After the lecture was finished, each student filled a survey pertaining to the delivery of the topic and the atmosphere. According to the feedback, seen below, majority of the students agreed that this new teaching style was interesting and welcoming. Furthermore, all the students understood the concepts and were aware of the topics taught in this lecture. This day allowed future generation students to experience the nature of university lectures while examining the theories behind the bonding of molecules.



Winning Team
(left to right):
Paras Kapoor,
Saranya
Naraentheraraja,
Bhairavei
Gnanamanogara
n and Nayha
Eijaz
(biochemistry co-
op, 3rd year).

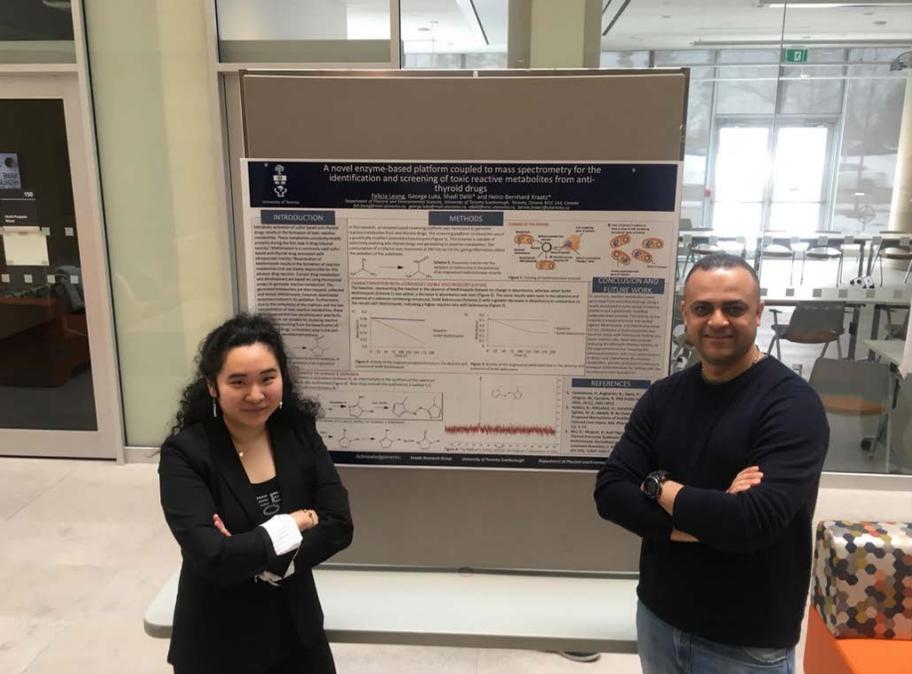
DPES BIOCHEMISTRY STUDENT AND TEAM WIN AT SCINAPSE CASE COMPETITION

Effie Sauer



DPES student Nayha Eijaz (biochemistry co-op, 3rd year) along with UTSC teammates, Bhairavei Gnanamanogaran, Paras Kapoor and Saranya Naraentheraraja won first place in their division at this year's SciNapse competition. This annual challenge invites undergraduate students in the sciences to submit original research proposals related to a unique theme. This year's theme was fracking. Nayha's team proposed a method for quantifying Radium-226 levels in fracking fluid by exploiting the biomagnification of this radioactive isotope

near fracking sites. More than a hundred teams from universities across Ontario participated in the competition. Of the 92 submissions at the upper division level (3rd and 4th year students), the top 26 were invited to present a poster at the SciNapse Conference in Ottawa this March. As the winning team in their division, Nayha, Saranya, Bhairavei and Paras will have their proposal published in The Undergraduate Research in Natural and Clinical Sciences and Technology (URNCST) Journal this summer. Congratulations Nayha and your teammates!



NOVEL ENZYME BASED
METHOD FOR:

METABOLITE DETECTION

*by Felicia Leung (left) and
George Luka (right)*

Researchers at the University of Toronto Scarborough are working on developing a novel enzyme-based platform for the identification and screening of toxic reactive metabolites from anti-thyroid drugs. This directed research project (CHMD90) is conducted by George Luka and Felicia Leung and co-supervised by Professor Heinz-Bernhard Kraatz and Dr. Shadi Dalili.

Anti-thyroid drugs such as Methimazole and Propylthiouracil are used to treat hyperthyroidism. These drugs act on the thyroid gland to inhibit thyroid peroxidase, an enzyme involved in the synthesis of the thyroid hormone. They induce side effects including nausea, liver damage, and the possibility of developing agranulocytosis.

Techniques that have been widely used in drug discovery include high

performance liquid chromatography and liquid chromatography coupled with mass spectrometry. However, these methods are expensive and not immediate. As such, there is a need for new efficient platforms that are capable of reliably screening metabolites in real-time, particularly those from anti-thyroid drugs.

The aim of this project is to develop an enzyme-based screening platform for anti-thyroid drugs. The novel platform will enable the establishment of new efficient synthetic compound libraries in real-time. Our findings show that the novel enzyme-based screening platform can be used to analyze toxic reactive metabolites, and can potentially be further developed to a high throughput screening of large libraries of compounds which will aid in drug discovery.

BRING OUR CHILDREN TO WORK DAY

Karyna Hanif



On April 26th, children from UofT staff joined us at DPES to participate in a fun day of science and chemistry. Executed by professor Lana Mikhaylichenko and Wanda Restivo with the help of CHMC42 students and Chemistry Society volunteers, students had a blast learning about polymers! Join us next year for another round of fun chemistry!