



THE DPES DIGEST



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Message from the Chair

ARchemy: Exciting New Organic Chemistry App Developed at DPES

by Maryam Abdinejad & Dr. Shadi Dalili

Archemy is a new educational tool in development by UTSC scientist Maryam Abdinejad and Carleton University digital media computer scientist Hossein Qorbani, to help students understand chemical interactions by using tactile augmented reality (AR) markers to simulate molecular bonds in a 3D digital environment. Archemy is the first program of its kind to harmonize technology and chemistry, allowing students to use their phone/tablet camera with the Archemy app to visualize 2D molecules drawn on paper, in 3D form. They plan to include all fundamental molecules and chemical reactions in organic chemistry textbooks on this ARchemy app. The app is currently being developed for Android devices with future plans to expand it to the iOS/Apple platform.



Snapshots of 3D augmented reality demonstration

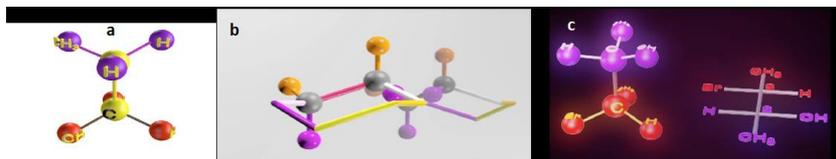
Welcome to the inaugural issue of our new e-newsletter! We hope you enjoy this new way to keep you informed of the exciting news of the faculty, staff, students, and alumni of the Department of Physical and Environmental Sciences at the University of Toronto, Scarborough. The department offers a variety of undergraduate programs in chemistry and physics, undergraduate and graduate programs in environmental sciences.

Enrollment in the department's programs has grown considerably over the last five years. We currently have over 1,550 undergraduate and 150 graduate students. Students come here from across Canada and around the world to study astrophysics, environmental/biological chemistry, geoscience, conservation & biodiversity, climate change impact assessment and other programs dedicated to improving our understanding of the Earth's history and its future - its changing climate, and the challenges of sustainability. Our department takes pride in its research and teaching excellence, cutting-edge research facilities, outstanding and award-winning faculty members and students as well as the impeccable professionalism of our administrative and technical personnel. We have a very dynamic community that is engaged in many exciting research, teaching, and outreach activities. Our newsletter will offer the opportunity to highlight our accomplishments, promote our aspirations as a department, and update our community members about our upcoming events.

I hope you will enjoy our stories and news!

George Arhonditsis

Maryam first worked with 3D visualization of different organic chemistry reactions using animations under the supervision of Professor Lana Mikhaylichenko in 2016. Since then, she has collaborated on the development of the ARchemy app with Hossain Sam Qorbani from Carleton University, under the supervision of Professor Shadi Dalili. Dr. Dalili has been pursuing the development of new technology for teaching complex organic chemistry concepts, such as stereochemistry and 3D visualization, for many years. Dr. Dalili has been able to secure several grants for the development of new animations and augmented reality for organic chemistry applications, and has used the Newman, Fischer, and Cyclohexane Chair conformation animations developed by Maryam in her CHMB41H organic chemistry class.



Snapshots of developed animations on different organic chemistry reactions videos

Feedback from students has been extremely positive in regards to the impact of these animations on their ability to visualize molecules in 3D and in helping them understand chemical reactivity as it relates to molecular structure. With Dr. Dalili's guidance, Maryam and Hossain are rapidly developing more animations and AR for content material covered in our 2nd year undergraduate chemistry curriculum.



Maryam Abdinejad (left) and Hossein Sam Qorbani (right) presenting at 44th College Chemistry Canada (C3) Conference, 2017

Maryam Abdinejad is a PhD candidate in the Department of Physical and Environmental Sciences specializing in synthesis of organic and bio-organic molecules with various applications such as capturing and reducing carbon dioxide (CO₂) using different catalysts.

For more information and to test out the ARchemy app, please access the following website: <http://www.viewport.ca/archemy>

Additionally, you can download the AR-media™ Player app, which allows users to display augmented reality files created with AR-media tools. You can download AR-Media Player for your mobile device by searching "ARmedia" player on Apple Store or Google Play. The standard player is also freely available for the Windows® and OS X operating systems.

You will be able to view molecules, given on the website as pdf files, in 3-D using the downloaded AR media player app on your phone.

For more information, please contact Dr Dalili at sdalili@utsc.utoronto.ca or Maryam at maryam.abdinejad@mail.utoronto.ca

Meet Our Student Associations!

by Vithusha Coomaran & Melani Suseenthiran



In September, EPSA and CSU planned a DPES mix and mingle event! Students were able to meet DPES professors and meet other students in their respective programs. The event was a huge success! Here are some highlights from the event.



A few of our professors in DPES!



Dr. Nirusha Thavarajah having an in-depth conversation with some of her chemistry students!

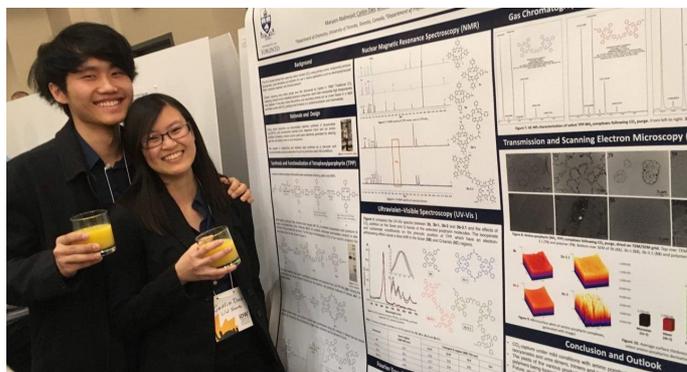
Directed Research Students Win Top Poster Prize

The 50th annual Inorganic Discussion Weekend, hosted at Ryerson from November 3-5, has recently announced their top poster. The team of two 5th year undergraduates, Caitlin Dao and Billy Deng, showcased their project in Arcadian Court, and among more than 60 undergraduate and graduate posters, were crowned winners.

"We presented our work on behalf of University of Toronto at Scarborough, so this win belongs not just to us, but to the whole scientific community here at UTSC.", the duo proclaimed. Caitlin and Billy are research students under the mentorship of Ph.D. candidate Maryam Abdinejad, and jointly supervised by professors Bernie Kraatz and Xiao-an Zhang. Their project describes using environmentally-friendly reagents to capture carbon dioxide, yielding polymers. The reagents are porphyrins – species of stable ringed molecules that appear naturally in biological systems. "We showed that we can remove CO₂ from the atmosphere without using excessive energy or chemicals, and I believe that is amazing.." the duo's mentor, Maryam, commented.

As Caitlin and Billy have graduation in their sights, their research carries on. "We would like to thank our co-supervisors Dr. Zhang and Dr. Kraatz for their support, and all our love to our mentor Maryam, for helping us through the rocky road that is so often overlooked in scientific research".

Congratulations Billy and Caitlin!



CSU Outreach Event

by Karyna Hanif & Lana Mikhaylichenko



CSU volunteers at Malvern Library Science Outreach Event

National Chemistry Week (from October 14-21) is a week dedicated to celebrating the chemical sciences in Canada. This past October, the Chemistry Society along with the help of Professor Lana Mikhaylichenko, created a day to show young future scientists various exciting chemical demonstrations at the Malvern Library.

We explored the science of chemical reactions such as making elephant toothpaste and observing how detergent interacts with milk in a rainbow milk experiment. We also showcased hands-on polymerization reaction activities such as making slime and creating hydrogels from extracting sodium polyacrylate from baby diapers.

The astonishment and intrigue the participants had was overwhelming!

For inquiries regarding collaboration with CSU in the future, please contact: utsc.chem.society@gmail.com

Peer Instructions in First Year Chemistry

by Michael Clement

Peer instruction (PI) is an active learning methodology being used in first-year chemistry (CHMA10) by Professor Thavarajah to enhance student engagement. The purpose of PIs is to help students have a better understanding of difficult concepts and allow them to identify weak areas in their chemistry knowledge. The PI model contains the following three stages: a) content delivery is chunked into 10-15 min, b) concept testing (using clickers) immediately after each concept is delivered and c) discussion on the concept test. PIs provide a stable platform for students to use when they explore new concepts while doing the homework or studying for exams. The PIs and Professor Thavarajah's passionate way of teaching first year chemistry makes learning almost infectious!

"a valuable addition to the course"

"I enjoy having this interactive portion of the lecture as it creates an engaging environment"

"An excellent way to self-check my learning"



STEM Outreach with Let's Talk Science

by Lucy Yam & Dr. Shadi Dalili

Let's Talk Science is an award-winning national organization that provides programs of science, technology, engineering and mathematics (STEM) outreach to children across several sites in Canada, free of charge. These programs primarily target children from JK to Grade 12 and are demonstrated by volunteers in classrooms, and in both small and large-scale community events. They allow the youth to gain a hands-on experience and to learn the science behind the experiments and activities. By doing so, we promote critical thinking, creativity, as well as educating and nurturing curious minds to engage in the vast world of opportunities in the STEM fields.



The University of Toronto Scarborough outreach site is coordinated by Dr. Shadi Dalili, who oversees volunteer recruitment and the "Science with Impact" training for all new volunteers. Student coordinators from DPES are Amy Jenne, who is responsible for Finance, Partnerships, and Community events, Lucy Yam, who curates First Nations, Metis, and Inuit (FNMI), Rural, and Community events, and Monica Farag, who organizes all aspects of classroom events. Our volunteers are a group of many undergraduate and graduate students who are enthusiastic and dedicated individuals who have a passion for the sciences and giving back to the community to inspire young minds.

LTS held a new event this year at the end of October, which was the Harry Potter themed "Wizarding World in the Burrow" in collaboration with the UTSC Quidditch Club and the ScarBurrow Harry Potter Alliance club. Our Harry Potter themed event provided a fun opportunity for students and families of all ages to learn about various science activities, such as Elephant Toothpaste for "Potions class", which addressed the concept of chemical reactions, formation of gas, and catalysts.



Chemist Creation Corner

by Felicia Leung & Dr. Ronald Soong

The Chemist Creation Corner is a workshop that involves the collaboration between the UTSC Chemistry Society (CSU) and Dr. Ronald Soong. These workshops, held in the UTSC Library Makerspace aim to broaden the creativity and skills of students, along with the building upon different aspects of chemistry, coding and 3D printing. With only three workshops that have passed, students have learned how to do some coding with a digital calorimeter, and are currently in the process of building a field instrument! So far, the workshops have been a huge success, getting feedback from multiple students on how much they appreciate these workshops, with it broadening their opportunities in the future, and a great destressor from school.

It's not too late to sign up for upcoming workshops! Stay tuned with CSU on their facebook page, or email them at utsc.chem.society@gmail.com if you have any questions!

C3 WORKSHOP: 3D PRINTING



How real can this be?

Date: TBA

Time: TBA

Venue: UTSC MakerSpace

Hosted by  CHEMISTRY SOCIETY and Ronald Soong



Upcoming

Join the CSU execs & other members at our annual Distillery District event where Dr. Lana will be giving a tour and enjoying the Christmas decorations!



More Outreach!

EPSA's Space Week

by Daniel Douglas



To celebrate space week, EPSA hosted a telescope event on October 4th, 2017. During this exciting event we welcomed all students to watch a documentary on super-massive black holes and check out the UTSC's observatory. One of our astrophysics professors, Professor Artymowicz, provided a talk highlighting and explaining some of the exciting details mentioned in the documentary. Afterwards, students had the opportunity to eat pizza and chat with professors from the physics and astrophysics department to ask questions and to learn about their current research interests. It was a great turnout and we are looking forward to hosting another telescope viewing in the winter term.



Pharmacy Seminar

by Aliya Shafi



EPSA hosted the Pharmacy Seminar on November 8th featuring UofT's Leslie Dan Pharmacy School. The event was a success, with a great turnout and an informative Q&A session featuring our expert speakers. The speakers included Professor Ian Crandall, and Admissions Assistant Sandra Parna directly from the Leslie Dan School of Pharmacy! Also, a pair of UTSC alumni currently enrolled at Leslie Dan shared a wealth of advice to students hoping to follow in their footsteps. Representatives from Kaplan gave valuable advice on how best to prepare for the PCAT. The samosas were a hit and students left the seminar with a great comprehension on how to approach their next steps to becoming a pharmacist. We wish the best of luck to UTSC's aspiring pharmacists with their applications and their journey to pharmacy school!

APGO Seminar

by Jacob Mastin

On October 18th EPSA hosted its annual APGO (Association of Professional Geoscientists of Ontario) information session. This was an event for environmental science and geoscience students to get to know the APGO and their mission, as well as their requirements. Our two guest speakers, François Campbell and Aftab Khan, spoke not only of the course requirements but also of the APGO's work experience requirements, the benefits of being a geologist, and their own journeys towards being certified geologists. It was a pleasure to see so many students attend!



CSU's Liquid Nitrogen Event

by Kelly Ray



On October 2nd 2017, CSU hosted a liquid nitrogen event where professor Lana made delicious ice cream using milk and liquid nitrogen! Students really enjoyed watching the liquid nitrogen turn gaseous as it hit the cold delicious cream. Whether it was the amazement of our faculty in our students' eyes or the taste of our delicious ice cream, CSU's exam destressor was truly a success!



New Pharmacy Association!

by Samantha Jagasar and Shayna Sanicharan



The University of Toronto Scarborough Pharmacy Association (UTSPA) promotes a welcoming community of like-minded students who are interested in pharmacy as a possible career path. The organization provides students with several opportunities to achieve this goal, from information about recent drug discoveries to meet and greet with pharmaceutical professionals. It is UTSPA's goal that by hosting social and educational events for students we may contribute to a growing community of individuals passionate in pharmaceutical endeavours. We have maintained this goal by conducting events such as mock multiple mini interviews (MMI), Coffee with a Pharmacist, and Pathways to Pharmacy. We hope to continue providing students with more opportunities to learn about the pharmaceutical industry.



EDITOR'S NOTE

It is my pleasure to present our inaugural issue of the DPES newsletter to our community of dedicated and talented faculty, staff, students and alumni. In this issue, we introduce you to our various student organizations, our numerous outreach activities in the community, accomplishments of our undergraduate research students, and new technology and pedagogy being implemented by faculty in our first and second year chemistry courses. I would like to sincerely thank those faculty and students who contributed content to this issue of the DPES newsletter, as well as Vithusha Coomaran from EPSA and Felicia Leung from CSU who helped in compiling, editing, and formatting of the newsletter. They are unofficially my editors-in-chief and this newsletter would not have been possible without them! Last, but most importantly, thank you to our visionary Chair for the idea and support of a DPES newsletter.

For future issues, I hope to hear from more faculty and students in our different disciplines about their research, teaching, innovations, outreach, awards, etc. I hope you enjoy the stories and content we have gathered here in our first issue. There is so much happening in our department and I am so proud to be part of such a vibrant, talented, and hard-working group of people!

- Shadi Dalili

