

Q-CHeM CHRONICLES

Ultimate defence against metal degradation **\$24M from New Frontiers in Research Fund-Transformation** **(NFRF-T) helps launch Carbon to Metal Coating Institute.**

Metals are widely used in daily life, from transportation, infrastructure, electrical wiring, consumer electronics, to medical treatments. Surface treatments and coatings are used to slow down metal degradation, however, the metals inevitably oxidize, change shape, and break down through exposure to oxygen, changes in pH, and heat. This problem is estimated to cost over US\$2.5 trillion dollars worldwide annually. “Chemists have known for a long time that carbon-metal bonds can be very strong, but our group at Queen’s was the first one to look at whether this could be used to create strong coatings on metal surfaces as well,” said Dr. Cathleen Crudden, Tier 1 Canada Research Chair in Metal Organic Chemistry at Queen’s University, and

Principal Investigator of the new grant. This new approach for protecting metal surfaces by making them more organic through Dr. Crudden’s unique molecular coatings are being examined to improve adhesion of existing, well-manufactured coatings to the metal. Developing carbon-on-metal coatings to slow or halt metal corrosion and degradation has the potential to transform the sustainability and environmental footprint of industries worldwide, save billions in infrastructure and manufacturing costs and support our commitment to the UN Sustainability goals. This work was called game-changing by chemistry and physics experts, and has resulted in \$24M of investment over six years through the New Frontiers in Research Fund-Transformation (NFRF-T) stream. In addition to corrosion applications, the new technology is also being examined for medical treatments. Using the coating for targeted deployment of metal nanoparticles in cancer treatments is also being explored. This approach may improve the impact of radiation therapy such that the damage to healthy cells can be minimized while increasing the effect of radiation on the cancerous tissues.



*Drs. Cathleen Crudden, Kevin Stamplecoskie,
Chantelle Capicciotti.*



**CARBON TO METAL
COATING INSTITUTE**
at Queen’s University

The NFRF-T project brings together a team of physicists, chemists, engineers, medical researchers, nano scientists, clinical and industrial collaborators from Canada, the UK, USA, Finland, and Japan. Locally, the team includes several Queen's University colleagues: Dr. Chantelle Capicciotti, Queen's National Scholar and Assistant Professor of Chemistry and Biomedical and Molecular Sciences, joins Dr. Crudden as a co-principal investigator on the project, while Dr. Kevin Stamplecoskie, Assistant Professor in Chemistry, and Dr. Alastair McLean, Professor in Physics, Engineering Physics and Astronomy, are co-applicants. Queen's Office of Partnerships and Innovation will be working with the team to ensure research translation and potential commercialization opportunities.

The Carbon to Metal Coating Institute (C2MCI) was launched on May 25, 2022, to provide the team with administrative infrastructure to advance research, develop highly qualified personnel, and support the international network of collaborators. The C2MCI is headed by Professor Crudden as Scientific Director and Jyoti Kotecha as Managing Director. The team has already hosted its first annual research meeting and looks forward to providing enriched interdisciplinary and international training opportunities for undergraduate, graduate, and postgraduate students with partner institutions around the world.



Message from the Head Dr. Richard Oleschuk

The 2021 academic year was yet again noteworthy as many departmental members chronicled the immense impact that COVID-19 had on teaching, research, and operations as the world continued to wrestle with the effects of a global pandemic. Although we can certainly

focus on the negative consequences of COVID-19, the pandemic also highlighted the fact that the Queen's Chemistry department houses some truly remarkable people, many of whom have "stepped up" and met the challenges of the academic years head on.

Faculty are at the core of the department. After 20 years at Queen's, Dr. Gregory Jerkiewicz announced his retirement. "Dr. J. Will, however, continue his high-impact electrochemistry research as a Professor Emeritus. Dr. Lucia Lee, recently joined Chemistry as an Assistant Professor after finishing her postdoctoral work at the Weizmann Institute. We look forward to seeing her push the boundaries of sustainable chemistry. Dr. Pascale Champagne and Dr. Abebaw Jemere were named as new Adjunct Professors of Chemistry. Both actively collaborate with several faculty and will strengthen our governmental links. The departmental manager is the glue that keeps the department together and functioning. We were fortunate to recruit Lindsay Lee as our new Departmental Manager. Despite an incredibly steep learning curve, Lindsay has done great job improving facilities and operational efficiencies.

Our graduate students have been busy! As for examples, the group founded a local chapter of the American Chemical Society, and hosted the annual Queen's Graduate Chemistry Society symposium. This year the event featured, Dr. Alison Flynn (U. Ottawa) and Dr. Warren Chan (U. Toronto), and roundtable discussions titled "Indigenous Practices and Diversity in Chemistry and STEM" and "Non-traditional Career Paths from Chemistry." As an indicator that things are slowly returning to normalcy, the undergraduate students were able to host "Pool with Profs" once again, and conduct the annual Chemistry banquet (two Queen's Chemistry traditions), and in-person convocation was held for the first time in two years!

The department continues to be a teaching and research leader! Some highlights include Dr. Crudden (lead), and Drs. Capicciotti and Stamplecoskie being awarded a New Frontiers

in Research Fund grant for \$24 million. Furthermore, Dr. David Zechel co-led a multidisciplinary team toward a successful \$7.9-million grant from Genome Canada. In addition, nine research groups received “Wicked Ideas” funding from the Queen’s Vice-Principal Research to tackle high-risk/high-reward research projects. Several faculty members were also recognized with awards including Dr. Farnaz Heidar-Zadeh, who won the prestigious Polanyi Prize, and Dr. Anne Petitjean, who received the 2021 Alumni Award for Excellence in Teaching.

This is only a glimpse of the exciting changes, news, and impacts of Queen’s Chemistry (you will see much more as you flip through the Q-Chem Chronicles) and speaks to the strength of a department that continues to influence science and society on local, national, and international fronts! I would like to thank our community members for their participation and financial donations, of which provides continuous support to our department. I wish you all an excellent year and good health.

Message from the Departmental Manager Lindsay Lee



Lindsay Lee

When I started this position in 2021, I was told that the Department of Chemistry was a dynamic and innovative unit that would keep me busy and interested with a fast-paced environment. Truer words have never been spoken! This past year has been a whirlwind of activity as we navigated the pandemic, while increasing our research, teaching, administration, and services throughout the department. I want to say a huge thank you to our amazing staff who have been the backbone of the department, while continuously pivoting directions and adapting to emerging guidelines over the

past few years as a result of the pandemic. Our staff have demonstrated the highest resiliency throughout these challenging times, and I wanted to acknowledge their accomplishments over the past year.

In 2021-22, we welcomed three new staff to the Department of Chemistry in a variety of roles. Nancy Wu was hired as the Financial Coordinator in January 2022 to oversee the financial and stores responsibilities within the department. Ian Gillespie was hired in June 2022 as our new Technical Support Assistant to help with triaging service requests, facilities support, and stores assistance. We also welcomed Abed Abu Hijleh, who is an undergraduate kinesiology student, as our casual stores support person. We said farewell and thank you to Dawn Free (former Financial Coordinator) and Ben Geiger (former Instrumentation Technologist) for their contributions to the department and wished them luck in their new roles!

The Department of Chemistry had substantial facilities updates over the past year. We have just commenced our \$1.6-million "Strategic Laboratory Fume Hood Revitalization Project" to reduce Chernoff Hall's greenhouse gas emissions by 781 tonnes of carbon dioxide per year. This reduction is equivalent to shutting off 40 idling cars, running 24 hours/day, for 365 days per year. In addition, we have also renovated several laboratories, constructed a helium recovery system, initiated the development of a new 3D printing facility, and are in the process of purchasing new air compressors to support our research and teaching activities. We have also made an investment into our services by purchasing new analytical equipment (TEM Cooling Stage, GC-TOF Mass Spec, Sputter Coater, TEM Cooling stage, Stereomicroscope, Digital VHX-7000 Microscope), upgrading the teaching lab computers, and installing videoconferencing technology in our meeting rooms. Furthermore, we have also redesigned our website and updated our visual identity to improve our departmental branding and communications.

Our focus for the upcoming year will be to prepare for our Queen's University Quality Assurance Processes and Chemical Institute of Canada accreditations. We will also continue to focus on navigating a post-pandemic environment and ensuring staff have the supports required to adjust during this time. In that vein, I want to recognize and thank the incredible chemistry staff members, faculty members, and students who pulled together to support the mission and vision of the department during these unprecedented times. It has been an incredible and rewarding year to work alongside our dedicated and innovative team who ensure that our department continually prospers.

Queen's Welcomes Additional Sustainable Chemical Research

By Dr. Lucia Lee



Dr. Lucia Lee

It is my great pleasure to introduce myself as the newest faculty member in the Department of Chemistry at Queen's University. I am a Korean-born Canadian and did my PhD. in chemistry at McMaster University (Canada), where I studied the fundamentals of sigma-hole interactions centered on chalcogens. As a post-doctoral researcher, at the University of Geneva (Switzerland), I broadened my interests to pnictogen and halogen bonds in transmembrane ion transport. I then joined the Weizmann Institute of Science (Israel) to study nanomaterials and MRI imaging probes. I am now excited to be part of Queen's University in Kingston!

As a science educator, I am eager to work closely with colleagues, staff, postdocs, and students here at Queen's, while building my research and teaching expertise in pioneering sustainable chemical research to combat major environmental problems.

My research group will investigate the utilization of sigma-hole interactions in a wide range of applications, from climate solution to catalysis, complementing the research efforts of the Department of Chemistry at Queen's. Anthropogenic climate change has become an alarming issue in recent years, and there is an increasing demand for solutions. My group will be integrating sigma-hole interactions to construct porous materials that could enable practical applications in carbon capture and storage. Additionally, my group will specialize in synthesizing macrocyclic catalysts based on sigma-hole interactions to perform metal-free catalysis via an anion trapping strategy. In all cases, a sigma-hole located on the heavy main group element would serve a key role in guiding the assembly of these structures, as well as introducing the desired functionality.

I look forward to contributing to the community of Kingston, as well as advancing Queen's dedication to exceptional research and teaching. See you soon!

Professor Gregory Jerkiewicz Retires

By Dr. Nick Mosey



Dr. Gregory Jerkiewicz

The Queen's Chemistry community is happy to celebrate the accomplishments and contributions to the department by Professor Gregory Jerkiewicz, who is moving to the next phase of his career as a Professor Emeritus. Professor Jerkiewicz joined the Department of Chemistry at Queen's as a tenured Associate Professor in 2002 and was quickly promoted to Full Professor in 2005. Prior to joining Queen's, Professor Jerkiewicz earned tenure at the Université de Sherbrooke, after completing his PhD. at the University of Ottawa and MEng. and BSc. work in Poland.

Professor Jerkiewicz is recognized for the groundbreaking and landmark outcomes of his research program, which has been characterized as a genuine quest for deep comprehension of the physical nature of electrochemical processes. His significant contributions in this area include (i) electrochemistry and electrocatalysis of hydrogen, platinum, and nickel; (ii) very challenging and meticulous temperature-dependent research employing single crystal electrodes; (iii) interfacial electrochemical thermodynamics; (iv) electro-oxidation and electro-dissolution of transition materials; (v) electrochemical quartz-crystal nanobalance (EQCN); (vi) preparation of multi-coloured layers on titanium and zirconium that reversibly switch their coloration; (vii) interfacial behaviour of platinum and palladium nanomaterials; and (viii) the development of instrumentation for the preparation of monocrystalline materials for interfacial electrochemistry and electrocatalysis research. He received the Electrochemistry Award of La Société Française de Chimie in 1997, the W. A. E. McBryde Medal of the Canadian Society for Chemistry in 2004 and the R. C. Jacobsen Award of the Electrochemical Society, Canada Section, in 2012. In 2012, the president of Poland conferred on him a Knight's Cross of the Order of Polonia Restituta (the Order of Polonia Restituta is equivalent to the Order of Canada). In 2018, the president of Poland bestowed on him the title of Professor of Chemical Sciences. In 2018, he was awarded the Eminent Visitor Award by the Catalysis Society of South Africa for his contributions in interfacial electrochemistry and electrocatalysis. Most recently, in 2022 he received the Rio Tinto Award from the Chemical Institute of Canada.

During his career, Professor Jerkiewicz established several successful collaborations with scholars and industrial partners worldwide. He has published 152 scientific contributions and supervised 10 post-doctoral scholars, 15 PhD students, 14 MSc students and numerous undergraduates.

In addition, he contributed to his field as Editor-in-Chief of *Electrocatalysis*, as a section editor for *Analytical Chemistry* and *Electrochemistry*, and by serving on boards and committees of many bodies. Prof. Jerkiewicz has also been a dedicated instructor, offering courses at all levels, including popular courses on electrochemistry and surface chemistry. We wish to thank Professor Jerkiewicz for his many contributions to the department and the scientific community. Of course, the rank of Professor Emeritus will allow Dr. Jerkiewicz to continue work in all these areas, and we look forward to supporting him so he can continue to be an excellent scholar, supervisor, instructor, and member of the department and larger academic community in the years ahead.

Farewell to Lyndsay Hull

By Dr. Igor Kozin and Tom Hunter



Lyndsay Hull, undergraduate laboratory technologist.

It is hard to accept that after so many years (over 30!) of service Lyndsay Hull – our wonderful and irreplaceable LYND SAY – has retired in August this year!

Lyndsay Hull has been the rock of the Chemistry Department in so many areas: being our lab tech for synthetic organic chemistry courses, he not only prepared and maintained numerous experimental



Dave Simon, Julie Deichert, Prashant Agrawal and Lyndsay Hull enjoying a game of ping pong.

benches and equipment for our teaching labs, but he was also committed to helping undergraduate and graduate students, Queen's faculty, and other researchers with his expertise in experimental chemistry and spectroscopy.

Lyndsay is a Queen's Chemistry graduate, and obtained his direct research experience while working as a Research Assistant for Dr. Jeffrey Wang.

In addition to his experience at Queen's, Lyndsay has built his trove of skills through of his professional involvement with various jobs in industry (e.g., Via Rail and Bombardier etc.).

Lyndsay is passionate about everything related to fixing various machinery and equipment, as well as hunting, and sports (karate, soccer and even ping-pong – he has got a vicious backhand!).

We all wish Lyndsay Hull a fantastic retirement, but also hope that he will continue to give us his help and advice,

in troubleshooting and improving our undergraduate Chemistry labs.

Happy Retirement Lyndsay!

Equity, Diversity, and Inclusion Committee By Dr. Amanda Bongers

The department's Equity, Diversity, and Inclusion (EDI) committee was founded in 2020 to promote a welcoming environment for all department members and ensure equitable and inclusive policies, processes, curricula, and events. The committee comprises faculty, staff, and students. It serves the department in several ways, including evaluating policies and practices, providing training opportunities and addressing EDI issues, through several initiatives.

One of the committee's first initiatives was creating an EDI award, granted to a student who demonstrates EDI leadership in our department. The award funds the student

to attend the Leaders Overcoming Great Inequalities in Chemistry (LOGIC) retreat and the Canadian Chemistry Conference and Exhibition. This award was first made possible thanks to the Faculty of Arts and Science Equity, Diversity, Inclusion & Indigenization fund. The committee is also working closely with the Human Rights and Equity Office and the department's student-led Inclusivity, Diversity, Equity, and Awareness Society (IDEAS) to bring better anti-racism and related safety training to our students.

The committee's first priority was to understand the department's current environment and culture. To do this, they are using the university's new Diversity and Equity Assessment and Planning (DEAP) tool. This self-audit tool provides a demographic profile of our students, staff, and faculty, and scores it against national workforce statistics. These data show how inclusive we are and highlight areas for improvement. This tool, along with conversations with department members, will help the committee develop an action plan and evaluate how our initiatives are working to improve EDI.



2022 EDI Awardee Jennifer McLeod

Undergraduate Life By Julia McPhail and Thea Babalis

Hello from the Chemistry Departmental Student Council (DSC)! The purpose of the DSC is to create a sense of community among students, staff, and faculty, as well as to promote safe and inclusive spaces for all undergraduate chemistry students. This year we had the absolute pleasure of working with our team of 20 undergraduate students in planning social and academic events. As life began to feel more "normal", we had the opportunity to host much-loved past events, such as "Pool with Profs," and create new traditions.

One such new tradition was the "Exam Care Package Delivery" program which emerged in response to the return of in-person extra-curricular events toward the end of the fall semester. Our team quickly adapted and prepared free exam care packages for undergraduate chemistry students. Once we launched our registration, the kits were gone in under an hour! The DSC braved the cold streets of the student district (it was December after all) to provide students with some fun snacks and study essentials.

For the first time in two years, undergraduate students, graduate students, faculty, and staff were able to connect and involve themselves in some friendly competition at our annual "Pool with Profs" at the Grizzly Grill. Despite needing to push the event to the winter semester, the department had an incredible time! Due to the fantastic turn-out for the event, the DSC decided to host a free "End of Year Social" at the Grizzly Grill. Both events had over 100 participants!

In addition to social events, the DSC hosted a plethora of virtual academic events. These included our "Year Nights," which allowed students to prepare for the coming

academic year in terms of required courses and summer/research opportunities, and “How to Write a Lab Report” talk, where upper-year students provided a general overview of first-year labs along with some tips and tricks.

Overall, despite setbacks due to COVID-19, the DSC had a more than successful year! We would like to thank all for their support and attendance at our events. Please connect with us on Instagram (@chemistryDSC) to stay updated on the DSC’s initiatives and events for the upcoming academic year!

Graduate Life

By Dianne Lee

What a rollercoaster ride this 2021-2022 academic year has been! In the beginning of the year, the campus was lively again, students were back, and classes were in-person. Our team was very excited and had high hopes of starting the year with in-person events, but alas, COVID-19 was not in our favour this year. I definitely felt incredibly helpless being a president of a student society during COVID-19 from time to time. New rules and protocols were popping up here and there to which we would abide. I am incredibly grateful to have the Queen’s Graduate Chemistry Society (QGCS) team by my side to get through the difficult times of maintaining our chemistry graduate student community. Even when the future was uncertain for

hosting events, we as a team kept up with meetings and brainstorming ideas. It is my pleasure to introduce the QGCS executive team for the year 2021-2022, shown below.

We started the year with donating \$100 each to the Indian Residential School Survivors Society and the True North Aid organizations. June was National Indigenous History Month as well as the time when the unmarked graves were discovered at the Kamloops Indian Residential School site. We asked the students to nominate two organizations in hopes of bringing support to the indigenous community as well as to spread the awareness. In fall 2021, we hosted our own virtual trivia event to get to know the new graduate students joining the department. In November, we hosted our annual QGCS Symposium with two keynote speakers, Dr. Alison Flynn from the University of Ottawa and Dr. Warren Chan from the University of Toronto. We also hosted two roundtable discussions titled “Indigenous Practices and Diversity in Chemistry and STEM” with speakers Dr. Michelle Hogue, Lydia Toorenburgh and Alex Veinot, and “Non-traditional Career Paths from Chemistry” with speakers Dr. Fatme Dahcheh, Stephanie Melnychuk, and Dr. Matthew Zamora. The symposium highlight was of course, the students, where 11 students participated. We would like to thank our sponsors, GreenCentre Canada and DuPont Kingston, for their generosity.



Dianne Lee
President



Samantha Hollands
VP of Internal Affairs



Monica Ayachit
VP of External Affairs



Ishwar Singh
VP of Finance



Emily Albright
Secretary



Viveka Kulkarni
Outreach Coordinator



Julie Jia
Union Representative



Phung Nguyen
International Student



Jennifer McLeod
EDII Liaison



Jess Deng
3rd Floor Rep



Emily Steele
4th Floor Rep

2021-2022 Queen’s Graduate Chemistry Society Executive Team

To end the fall term, we planned to host an amazing winter formal, but it was unfortunately cancelled due to the rising cases of COVID-19. After the set back, in February, we hosted our virtual McRae Lectureship, a “student’s choice” seminar, with Professor Michael Monteiro. We also hosted the global women’s breakfast 2022 in collaboration with QC-IDEAS. Our very first in-person event, “Pool with Profs,” was hosted in collaboration with DSC chemistry! We had about 100 attendees and the event was a huge success. The last two in-person events were QGCS Trivia Night and QGCS Euchre Tournament, where everyone had a really good time.

As our last event, we hosted our first in-person Annual General Meeting (AGM) and election since the beginning of COVID-19. I would like to give a huge thanks to those who nominated the candidates, and to the candidates who accepted the nomination. I would also like to congratulate everyone who has been elected. I can’t wait to sit back and see what these future executives have planned for next year!

Last but not least, I would like to give a huge thank you to the QGCS executives of 2021-2022. This year would not have been possible without your support. I wish you all the best in the future.



Queen's Graduate
Chemistry Society

'E Pluribus Unum' – Queen's University Student Chapter of the American Chemical Society

By Daniel (Dan) Reddy

Present in more than 140 countries, the American Chemical Society (ACS) is recognized as one of the world's largest scientific organizations, and Queen's is proud to host the third Canadian International Chapter. With the assistance of many Queen's community members and the ACS, the chapter applied for and received an ACS Student Chapter Charter grant, which was matched by the Queen's Chemistry Department. An International Student Chapter Application was also submitted with six members, most of whom covered costs through the department's Student Recognition Reimbursement program.

ACS offers significant funding and programming “to support excellence in chemistry, celebrate achievements, and advance the chemical sciences through research, education, and community projects.” During the first month of activity and with the support of many Queen's community members, the local chapter implemented the ACS Graduate Student & Post-doctoral Scholars Recognition Program and hosted a 95th Anniversary of the Women Chemists Committee (WCC) event.

The thing that has stood out to me as an American in Canada, especially in the department, is a welcoming sense of community/oneness, as opposed to the individualistic “me-versus-you” attitude to which I had become accustomed in most of the chemistry settings I previously experienced. The Latin title “*E Pluribus Unum*” is a traditional motto of the United States, “Out of many, one.” I chose this phrase because even though the official name is the “Student Chapter of the ‘American’ Chemical Society,” I believe this discussion of the chapter evidences the many contributions of diverse individuals, the collection of

which transcends any one particular culture/nationality and is unified by mutual interest in chemistry. It is my hope that by starting this Chapter, I can contribute to our departmental community, especially by connecting our membership and affiliates with relevant opportunities.

I hope to see the chapter membership grow this fall within the department, as well as to recruit from related departments/faculties. The chapter is off to a good start, but I am excited to see the chapter's continued growth and progress; please reach out if you would like to contribute (daniel.reddy@queensu.ca).



The American Chemical Society recognizes the formation of Queen's University- Kingston International Student Chapter.

An absolute 'dill light' for Queen's Chemistry at Science Rendezvous

By Jess Deng and Dr. Graeme Howe

First beginning as a joint program between the University of Toronto, Toronto Metropolitan University, formerly known as Ryerson University, York University, and Ontario Tech University in 2008, Science Rendezvous was created to engage the general public in the boundless possibilities of science, technology, engineering, art, and math (STEAM). Since its creation, Science Rendezvous has grown to 30 cities

across 10 provinces and two territories. Serving as a platform to promote science awareness and increase science literacy, the event works to engage the public through hands-on science experiments, and demonstrations to show how science affects our daily lives, standards of living and global competitiveness.

In Kingston, the Queen's Chemistry department returned to Science Rendezvous on May 7 for in-person activities at the Leon's Centre. The department had many experiment stations that (safely) enticed the community, including but not limited to glowing dill pickles, flame tornadoes, and elephant toothpaste. The elephant toothpaste was especially a hit because of the chemical reaction producing a squirting, foamy interactive mess out of a tube. It makes sense as only an elephant could use toothpaste this large. It is, of course, not real toothpaste. Though harmless, it certainly wouldn't taste very good! Our volunteers were also kept busy throughout the day with other thought-provoking questions from roughly 2,000, guests, which included questions from what colour a pickle glows (orange because of the 3p to 3s transition of sodium) to "what exactly is dry ice?" (solid, frozen CO₂).



A fire tornado created with isopropyl alcohol, a mesh garbage can, and a lazy Susan, with two departmental volunteers Daniel Whalen and Jess Deng looking on.

Fueling innovation

By Morgan Lehtinen

Kingston, Ontario is deeply rooted in chemistry and chemical processing. Our ecosystem is built on an 80-year history, housing industry leaders such as DuPont, which opened its doors in 1942 to Kingston Process Metallurgy and GreenCentre Canada, both founded by Queen's alumni or with initial university partnership, supported by the world-leading research and education within Queen's Chemistry and Chemical Engineering/Engineering Chemistry. Beyond history and talent, Kingston's growing start-up ecosystem, billed as the "Top Small City in Canada," ranks among the Top 10 nationally, strategically positioning us to become Canada's leader in chemical technology innovation, and commercialization.

We, as scientists, know the importance chemistry plays in combatting issues like climate change and navigating the energy transition. In response, Kingston's chemical community teamed up with the city of Kingston, alongside provincial and federal players, to build Reaction (RXN) HUB. RXN HUB is a public/private facilitated hub for cleantech commercialization, unlike anything in North America, with the power to collaboratively bring the best infrastructure, financial, business, and technical resources together to support the commercialization of chemistry that can positively impact the world. RXN HUB aims to address Canada's innovation gap by providing chemistry start-ups custom piloting and scale-up support in a 1,858-square-metre facility, access to 200+ trained chemical commercialization experts and specialized equipment on an as-needed basis, and chemistry-specific business development programming alongside

a network of investors, corporate end-users, and experienced mentors. The mission is simple: get innovative chemistry-based technologies into the world and solving pressing problems faster while saving the hard-working teams behind them time, energy, and money.

Queen's Chemistry is excited to be engaging with RXN HUB, co-led by Morgan Lehtinen. She spent her last 10 years in the department, from undergrad through PhD, commercializing her own research and building opportunities for students to engage in experiential learning, mentorship, and broader chemical ecosystem connections. This collaborative project will fuel impact-driven educational opportunities and establish Kingston as Canada's hub for chemical innovation. We look to our alumni for their help, support, and insight as we bring RXN HUB to life with an anticipated launch in Fall 2023.

For more information about how you or your company can be involved, check out www.rxnhub.org or contact morgan.lehtinen@rxnhub.org.

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CHEMTECH
COMMERCIALIZATION
HUB**



2021-2022 Departmental Highlights June 2021- June 2022

June 2021

- **The Royal Society of Chemistry declares Igor Tadeu da Cunha's paper in Green Chemistry a Hot Paper**

– Igor Tadeu da Cunha (PhD student, Jessop Group) reported a new low-energy way to separate organic products from water. That's important because biomass conversion to organic products usually produces a mixture of product and water. Removing the water is the most energy-costly step in the entire conversion process.

- **Dr. Philip Jessop's Canada Research Chair in Green Chemistry** was renewed.

July 2021

- **Nature Chemistry Publication by Matt Sanger & Kyle Boniface**

– Matt Sanger (PhD Student, Jessop Group) and Kyle Boniface (PhD alumnus, Jessop Group) are celebrating the publication of their work in *Nature*



Matt Sanger

Chemistry in a joint paper with Walter Leitner and his team at RWTH in Germany. The paper describes a heterogeneous catalyst that switches its selectivity when CO₂ is introduced or removed, even

though CO₂ is not involved in the catalyzed reaction.

- **2021 SGS Award in Leadership, Innovation, and Community Engagement Awarded to Morgan Lehtinen**

– Morgan Lehtinen (PhD Student, Liu Group), is the recipient of the 2021 School of Graduate Studies Award in Leadership, Innovation, and Community Engagement. This award recognizes exceptional graduate students who are making a meaningful difference in the world while also demonstrating the highest standards of academic excellence.

- **\$7.9M grant from Genome Canada awarded to a multidisciplinary team of Queen's researchers co-led by Dr. David Zechel**

– A multidisciplinary team of Queen's researchers made up of Dr. Laurence Yang (Chemical Engineering), Dr. David Zechel (Chemistry), Dr. George diCenzo (Biology), and Dr. James McLellan (Chemical Engineering) received a \$7.9 million grant from Genome Canada for a new project exploring a microbial platform for breaking down and valorizing waste plastic, which can then be repurposed to produce recycled products.



Dr. David Zechel

- **First place in the 2021 National Young Persons' Lecture Competition awarded to Hannah Ramsay**

– Hannah Ramsay (PhD Student, Stamplecoskie Group), won the 2021 National Young Persons' Lecture Competition, hosted by the Arthur B. McDonald Canadian Astroparticle Physics Research Institute and the Institute of Materials, Minerals & Mining (UK). See her results at the Young Persons' World Lecture Competition in the November 2021 section below.

August 2021



Hannah Ramsay (PhD Student)

1st Place

- **Lindsay Lee is welcomed as the Department Manager.**

- **NSERC Discovery Grant awarded to Dr. Cathleen Crudden for breakthrough work in novel organic coatings**

– The Natural Sciences and Engineering Research Council (NSERC) awarded Dr. Cathleen Crudden the highest value Discovery Grant in Canada this year. Dr. Crudden and her team will work to discover the implications of carbon-to-metal bonds by analyzing films 100,000 times thinner than a human hair.



Dr. Cathleen Crudden

September 2021

- **1st Place in the Graduate Student Competition awarded to Timothy Salomons**

– Timothy Salomons (MSc Candidate, Oleschuk Group) placed first in the graduate student poster competition at the Canadian Chemistry Conference and Exhibition.

- **American Chemical Society's Lasting Encounters between Aspiring and Distinguished Scientists (LEADS) conference attended by Dan Reddy**

– Dan Reddy (PhD student, Oleschuk Group) was accepted to attend the American Chemical Society's Lasting Encounters between Aspiring and Distinguished Scientists (LEADS) Conference with funding, held in Washington, DC. LEADS is a three-day event conceived by ACS past president Luis Echegoyen that brings together highly esteemed chemists, scientists, professionals, and Nobel laureates for networking, career exploration, and technical discussions.

October 2021

- **Open Plastic, Writer-in-Residence**

– During the Summer of 2021, Larissa Zhong participated in the Student-in-Residence Program, funded by the Department of Chemistry and Experience Ventures. Ms. Zhong worked as a writer-in-residence with the Open Plastic research group led by Dr. Laurence Yang, Dr. George diCenzo, Dr. David Zechel, and Dr. James McLellan.

November 2021

- **Canadian Society for Analytical Sciences and Spectroscopy (CSASS)'s 2021 Gerhard Herzberg Award presented to Dr. Gang Wu**

– Dr. Gang Wu is the recipient of the 2021 Gerhard Herzberg award from the Canadian Society for Analytical Sciences and Spectroscopy (CSASS). This award is given to a Canadian



Dr. Gang Wu

spectroscopist in recognition of distinguished scientific contributions to the field of spectroscopy, either fundamental or applied. Dr. Wu gave his award presentation entitled "Listening to the Faintest Music from Molecules: 170 NMR Spectroscopic Studies of Organic and Biological Systems."

January 2022

- **Dr. Farnaz Heidar-Zadeh is one of five young Ontario investigators to win the John C. Polanyi Prize**

– These prestigious prizes are awarded in honour of Ontario's Nobel Prize winner John C. Polanyi,

to recognize outstanding researchers in the early stages of their careers. This is a fabulous recognition of Dr. Heidar-Zadeh's ambitious research in advancing innovative computational molecular design techniques.



Dr. Farnaz Heidar-Zadeh



Nancy Wu

- Nancy Wu is welcomed as our Financial Coordinator.

February 2022

- Queen's Chemistry Innovation Council Member and Queen's Chemistry alumna, Josephine Tsang, named Executive Director of the Chemical Institute of Canada (CIC).



Dr. Josephine Tsang

March 2022

- Canadian Society for Chemistry 2022 Rio Tinto Award presented to Dr. Gregory Jerkiewicz

– This award is presented to a scientist who has made a distinguished contribution to the fields of inorganic chemistry or electrochemistry while working in Canada.



Dr. Gregory Jerkiewicz

- Canadian Society for Chemistry 2022 Alfred Bader Award Presented to Cathleen Crudden

– Dr. Congratulations to Cathleen Crudden who is the first woman to win the Canadian Society for Chemistry Alfred Bader Award. It is presented to a scientist who has made a distinguished contribution to the field of organic chemistry.



Dr. Cathleen Crudden

- Queen's Chemistry designates adjunct Appointment to Dr. Abebaw Jemere

– Dr. Jemere brings a wealth of chemical research experience with start-ups, non-profits, and university-led projects. Currently Dr. Jemere is a senior research officer at the National Research Council of Canada (Nanotechnology) in Edmonton, Alberta. His access to cutting-edge nanofabrication tool sets will provide unique opportunities for graduate students, while his research, mentoring and perspective, will connect the Department of Chemistry with potential research funding and collaborative opportunities.



Dr. Abebaw Jemere

- **“For the Future” invites chemistry student Morgan Lehtinen, as a panelist to explore Queen’s strategic goals for student learning and global impact** – Morgan Lehtinen (PhD candidate, Liu Group) was invited to speak and represent the Queen’s student body at the launch event for the Queen’s Strategic Plan titled “For the Future: Re-imagining Education for Impact” alongside Principal Patrick Deane, Smith School of Business, and Dean Wanda Costen, and alumnus Ushpreet Mehta.



Jess Deng



Left to Right - Principal Patrick Deane, PhD Candidate Morgan Lehtinen, alumnus Ushpreet Mehta and Dean Wanda Costen, Dean of the Smith School of Business.

- **Agnes Benidickson Tricolour Award presented to Morgan Lehtinen** – Morgan Lehtinen (PhD student, Liu Group) received the Agnes Benidickson Tricolour Award and was inducted into the Tricolour Society in recognition for her work supporting the chemical sciences and entrepreneurial communities within Queen’s and the greater Kingston region. This award is the highest honour bestowed on a Queen’s student, for valuable and distinguished service to the university in non-athletic, extra-curricular activities.

April 2022

- **Teaching Assistant Excellence Award presented to Jess Deng** – Jess Deng (MSc Student, Oleschuk Group) won the Teaching Assistant Excellence Award. The Arts and Science Undergraduate Society award is considered the highest level the society attributes to a student in a teaching position.

The award is presented to deserving individuals who have demonstrated their interest in bettering the educational experience of others by encouraging participation, offering novel feedback, and offering significant contributions to the learning process.



Morgan Lehtinen

- **Harvard University Press will publish the book *Which is Greener?* by Dr. Philip Jessop**

– Harvard University Press will publish the book, *Which is Greener?* by Professor Philip Jessop. Have you ever stood in a store, looking at two competing products, wondering which one is better for the environment? This book will show you the greenest choice for each purchasing decision you make.



Dr. Philip Jessop

- **Lishen Zhang accepted into American Chemical Society's Postdoc-to-Faculty (P2F) workshop**

– Dr. Lishen Zhang (Postdoc, Oleschuk Group) was accepted to attend P2F with funding, held in Portland, Oregon, USA. For those post-doctoral fellows interested in a faculty position, the workshop compares positions in undergraduate and graduate departments, assists with application materials, and creates a network of early-career faculty along with mentors.

May 2022

- **A Second Hot Paper for Igor Tadeu da Cunha**

– For the second time in a year, Igor Tadeu da Cunha (PhD student, Jessop Group) had one of his papers declared a Hot Paper by the Royal Society of Chemistry. His latest paper describes fatty acids and their sodium salts as nonvolatile organic solvents that can be used, removed, and recycled without causing smog, inhalation risks, or flammability, and without any need for distillation. Undergrad students Meghan McKeeman, Kayleigh Hayashi-Mehedy and Alana Lloyd-Smith and PDF Maedeh Ramezani contributed to this major paper.

- **Early Researcher Award presented to Dr. Avena Ross**

– This award provides early-career scholars across the province with funding to build research teams. Dr. Ross received \$100,000 to support her program investigating the therapeutic potential of molecules produced by marine bacteria. Ross' team will develop laboratory cultivation conditions to mimic the native habitat of *Pseudoalteromonas*, a family of marine bacteria. Their program could lead to the discovery of new molecules to treat bacterial infections, addressing the global challenge of antibiotic resistance, as well as establishing a platform to advance the broader field of bioactive natural product discovery for drug development.



Dr. Avena Ross

June 2022

- **People's Choice Award in Queen's University's Art of Research Photo Contest Presented to Dan Reddy**

– Dan Reddy's (PhD Student, Oleschuk Group) submission "Crystalline Acid" was selected as the winner of the "People's Choice" category in the Queen's University Art of Research Photo Contest. The photo was taken with scanning electron microscopy in Chernoff Hall.

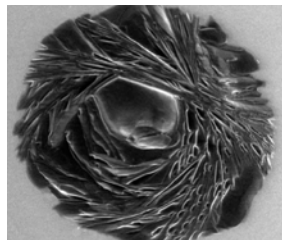


Image of crystallized organic acid taken with a scanning electron microscope.

The image depicts a nanoliter-sized volume of crystallized organic acid.

- **Dr. Nicholas Mosey appointed as Deputy Provost (Academic Operations and Inclusion)**

– Effective July 1, 2022, Dr. Nicholas Mosey has been appointed as Deputy Provost (Academic Operations and Inclusion). Dr. Mosey will work closely with the senior leadership team at Queen's to advance the university's academic, operational, and budgetary goals, including overseeing academic appointments, directing the Office of Planning and Budgeting, and chairing several senior university committees.



Dr. Nicholas Mosey

- **2022 Prize for Excellence in Research Awarded to Dr. Chantelle Capicciotti**

–Dr. Capicciotti is one of three recipients of the highest internal research award at Queen's University. The Excellence in Research Award recognizes advancing research and discovery and celebrates Dr. Capicciotti's interdisciplinary research in glycobiology and carbohydrate chemistry.



Dr. Chantelle Capicciotti

- **Ian Gillespie welcomed as Technical Support Assistant.**



Ian Gillespie, Technical Support Assistant

4th Year Undergraduate Thesis Projects

- **Jacqui Higgins - (Crudden Group)** won the Walter MacFarlane Smith Prize in Chemistry for her thesis, "Synthesis of Enantiomerically Enriched Triarylmethanes by Enantiospecific Suzuki-Miyaura Cross-Coupling Reactions."

- **Adam Fell - (Cao Thang Dinh Group)** won the M. Sullivan and Son Limited Scholarship for his thesis, "Electrochemical Conversion of CO₂ to formate."



Adam Fell (left) and Jacqui Higgins (right)

Congratulations to Internal Award Winners

- International Ontario Graduate Scholarship (OGS) - Yu Pei (She Group)
- Queen Elizabeth II Graduate Scholarship in Sciences and Technology (QEII-GSST) - Michael Trolio (Beauchemin Group), Adekunle Omoboye (She Group)
- R.S. McLaughlin Fellowship - Dianne Lee (Crudden Group), Neil Grenade (Ross-Howe Groups), Hailey Tomm (Ross Group), August Sullivan (Crudden Group)
- Nancy Simpson Scholarship in Genetics - Neil Grenade (Ross-Howe Groups)

Congratulations NSERC and OGS recipients

- Natural Sciences and Engineering Research Council of Canada (NSERC) - Vanier Canada Graduate Scholarship Program
– Joshua Kofsky (Capicciotti Group)
- Natural Sciences and Engineering Research Council of Canada (NSERC) - Canada Graduate Scholarship- Master's Program
– Neoklis Neokleous (Stamplecoskie Group)
- Ontario Graduate Scholarship Program
– Kristen Harrington (Stamplecoskie Group), Shauna Schechtel (Bongers Group), Viveka Kulkarni (Crudden Group), Jennifer McLeod (She Group), Alex McDonald (Jessop Group), Sam Hollands (Zechel Group), Margaret MacConnachie (Beauchemin Group)



Chernoff Hall

Congratulations to the Class of 2022



Class of 2022

First Column: Carolina Wu, Shannon Whitty, Chanhee Park, Jacqui Higgins, Vivien Gandolfi; Second Column: Becky Richardson, Ben Smith, Kailey Browne, Julia Tropak; Third Column: Joel Heyman, Carly Widmer, Alex Parker, Emma Whitten; Fourth Column: Behzad Khuwaja, Cameron Aerts, Yuxin Liu, Thea Babalis; Fifth Column: John Habib, Xiaoyu Fei, Abby Smilestone, William Hachey; Sixth Column: Kristin Drescher, George Kay, Huidong Wang, Yuying Huang; Seventh Column: Julia McPhail, Hannah Fortin, Kael King, Kayleigh Hayashi-Mahedy; Eighth Column: Ethan Begel, Mariangela Casarella, Zhonghao Yu, Helen Lord; Ninth Column: Kevin Chan, Alysa Evans, Allyson Smith, Emily Armstrong, Jordan Rensing

2022 Departmental Group Photo



Friends of Queen's Chemistry Seminar Series



We are pleased to announce the continuation of our speaker series into the 2022-2023 academic year with support from the Friends of Chemistry and GreenCentre Canada. We encourage our community to attend when possible. For more information and dates, please visit our website regularly:

<https://www.chem.queensu.ca/about/news-events/departmental-seminar-series>

Professor Karen Wooley – Texas A&M University (2021 – 2022 Russell Lecture)

Professor Squire J Booker – Pennsylvania State University (Robert S. Brown Lecture)

Dr. Caitlin Miron – X-Chem, Inc.

Professor Jennifer Kohler – UT Southwestern Medical Center (Szarek Lecture)

Professor Uwe Bornscheuer – University of Greifswald (Inaugural OpenPlastics Lecture)

