



Dr. Guojun Liu

Dr. Guojun Liu Awarded a Queen's Prize for Excellence in Research

Congratulations to Dr. Guojun Liu for receiving a Queen's University Prize for Excellence in Research!

Dr. Liu presented his award-winning research to the university community in a public lecture on the evening of Monday, April 11th.

Since joining Queen's University as a Tier 1 Canada Research Chair in Materials Science in 2004, Dr. Liu has been the recipient of the Captain Alfred E. Hung Award from the Society of Tribologists and Lubrication Engineers in 2011, the Macromolecular Science and

Engineering Division Award from Chemical Institute of Canada in 2007 and the Distinguished Overseas Chinese Young Investigator Award from the Chinese Academy of Sciences in 2006. Dr. Liu has authored 100 refereed journal publications since 2004 and the Liu group's publications have garnered more than 5000 citations during this time period. In addition, two of the Liu group's developed technologies have been licensed for commercialization.

Dr. Liu's early research was focused on general methodologies for creating

intricate nanostructures from polymers. Since 2004, his research has gradually shifted towards developing applications for these nanostructured polymer materials. In collaboration with a major US oil and additives company, his group's first venture along this direction was to explore the application of nanometer-sized polymer particles for friction reduction. With a smart polymer design, adding a small amount of their nanoparticles to automobile engine oil reduced the friction coefficient of the oil in the boundary friction regime (encountered during city driving) by 85%. This coefficient represented a further reduction of 66% than what was achievable with the commercial additive in widespread use at that time. The use of this new additive should greatly reduce automobile fuel consumption and engine wear, helping to reduce costs and benefitting the environment.

His group was contracted to work on oil- and water-repellent coatings because the Canadian military wanted to develop a coating that would protect their equipment from contamination by chemical warfare agents. Without prior experience in self-cleaning coatings, the Liu group initially followed the mainstream approach and tried to accomplish liquid repellency by developing coatings that exhibited high contact angles with different liquids. One key requirement was that the coatings would have a lower surface energy than the liquids encountered in order to prevent them from spreading on it. The spreading would be further reduced by creating coatings that were rugged and possessed large surface areas. While this approach yielded coatings on which oil and water droplets possessed high contact angles, a severe shortcoming was that the rugged or rough coatings were neither wear-resistant nor durable. In addition,

expensive fluorinated polymers were required to meet the low surface tension requirement for the coatings.

Taking a path much less travelled, the Liu group has recently developed more practical slippery coatings, which they have nicknamed NANOGLIDE Coatings. On these coatings, the contact angles of test liquids are not necessarily high. However, most test liquids can cleanly slide off these surfaces without leaving a trace, even at slight tilting angles of less than five degrees. These coatings work because their surfaces are covered with a thin layer of a covalently bound liquid polymer that possesses both a low friction coefficient and a low surface energy. An example of such a liquid polymer is poly (dimethyl siloxane) (PDMS), which is non-fluorinated and inexpensive. Test liquids readily slide on PDMS because the liquid PDMS, unlike a solid surface, does not grab other liquids well. Through innovative nanoengineering, PDMS has been incorporated into commonly used commercial coatings such as polyurethane and epoxy to yield optically clear coatings. These coatings can be applied using methods traditionally used to apply polyurethane and epoxy coatings and bind strongly to most substrates. The coatings are also wear-tolerant because PDMS is present not only on the coating surface but also exists as nanoreservoirs that are dispersed throughout the coating.

As the surface wears down, the PDMS nanoreservoirs within the coating matrix are ruptured and the newly released PDMS replenishes the worn coating surface and thus renews the coating's repellent properties. These new coating materials will have far-reaching applications in addition to possibly meeting the initial objective of the Canadian military, and they have thus attracted global attention.

2015-2016 Departmental Highlights

JUNE 2015

- Adeela Manzoor (Baird group) is awarded a Dalton Transactions Poster Prize at the CSC Conference in Ottawa, June 13-17, 2015. Her presentation was entitled "An Investigation of $\text{NiCl}(\text{PPh}_3)_3$, a Nickel(I) Cross-coupling Catalyst".



JULY 2015

- Congratulations to Philip Jessop on becoming a Fellow of the Royal Society of Chemistry in the U.K.

AUGUST 2015

- Annette Keyes retires as the Graduate Assistant after 17 years in the Department of Chemistry.
- Michelle Boutilier transitions to the Graduate Assistant role.
- The CREATE Chiral Materials Symposium is held on August 13th and 14th. Symposium speakers include Dr. Kenichiro Itami, the Director of the Institute of Transformative Bio-Molecules at the Nagoya University in Japan, and Dr. Chris Baddeley from the University of St. Andrews, UK.

SEPTEMBER 2015

- Congratulations to Suning Wang on becoming a newly elected Fellow of the Royal Society of Canada.
- Elisa Bulak joins the main office staff as the department's Office Assistant.
- The Queen's Chemistry Graduate Symposium run by the chemistry graduate students is September 11th. The Harrison/MacRae Lecturer, Dr. Bernard Kippelen from the Georgia Institute of Technology, is the keynote speaker.

OCTOBER 2015

- As part of Homecoming activities, a presentation and a reception to honour Walter Szarek's 50 years as a member of the Chemistry department are held on Oct. 24th in Chernoff Hall.
- A study by Prof. Ruibing Wang (Queen's Ph.D 2007) and co-workers at the University of Macau, and Professor Donal Macartney, Ian Wyman and Jessica Liu (NSERC USRA student) on the ability of the macrocyclic host molecule cucurbit[n]uril to reverse general anesthesia in a zebrafish model is published in RSC Advances and featured in RSC Chemistry World.
- Gang Wu and co-workers solve a 170-year-old chemical mystery regarding the reaction between nitroprusside and sulfide. The work was highlighted in C&EN. Nitroprusside is used to treat hypertension and the new findings could aid understanding its mode of action.

NOVEMBER 2015

- Angela Lyon (M.Sc. 1996) with Donal Macartney becomes a Fellow of the Intellectual Property Institute of Canada. Angela has been a practicing Patent Agent for more than seven years at Queen's University's technology transfer office, PARTEQ Innovations.

2014-2015 Departmental Highlights

DECEMBER 2015

- The annual holiday potluck lunch is held Dec. 10th in the 4th floor lounge.
- An Organometallics publication by Mike Baird and Alex Dunlop-Brière, "[Cp₂TiCH₂CH₂(SiEt₂CHMe₂)]⁺, an alkyl-titanocene(IV) complex containing an unconventional TiC(b)-Si mode of bonding" is selected as an ACS Editors' Choice. Under ACS Editors' Choice, articles are sponsored for immediate open access by ACS due to its potential for broad public interest, an honor given to one article each day of the year.
- Guojun Liu is awarded \$364,000 from the NSERC Collaborative Research and Development program to develop oil and water repellant industrial coatings in collaboration with Lorama.
- Congratulations to M.Sc. student Zijie Wang of Dr. Guojun Liu's group. Under the lab supervision of Ph.D. student Yu Wang, Zijie has functionalized cotton fabrics so that they can separate oil from oil-in-water emulsion rapidly and cleanly. This task was achieved with fabric pore sizes of 200 µm despite emulsion droplet sizes of 4 µm. His results have been published in Angew. Chem. Int. Ed. and a patent has been filed on this technology.
- The Department of Chemistry congratulates Dr. Françoise Sauriol on receiving a Queen's University Staff Recognition Award at the Principal's holiday reception. This award recognizes staff members who consistently provide outstanding contributions during their workday, directly or indirectly, to the learning and working environment at Queen's University at a level significantly beyond what is usually expected. Françoise is the NMR Instrumentation Manager in the Department of Chemistry.

JANUARY 2016

- Congratulations to Dr. Gregory Jerkiewicz and his research team on receiving a \$4,000,000 Discovery Frontiers grant from NSERC on Friday Jan. 8th.



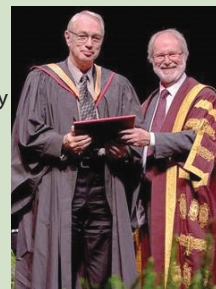
FEBRUARY 2016

- Suning Wang's former Ph.D. student Zac Hudson, now an Assistant Professor at the University of British Columbia, is awarded a Tier 2 Canada Research Chair in Sustainable Chemistry for his work on efficient lighting technologies. Minister of Science Dr. Kirsty Duncan and Parliamentary Secretary for Science Terry Beech were on hand for the announcement.
- The Oleschuk lab and their collaborators at the Center for Optics, Photonics and Lasers (COPL) in Laval publish ground breaking work in Scientific Reports. This work highlights the possibility of using microstructured fibers with predefined doped regions to produce functional microstructures at a fiber facet with differential chemical etching.



MARCH 2016

- The Chemistry Department Student Council banquet is held on March 20th. Dr. Nick Mosey receives the Graduating Class Award for Excellence in Teaching Chemistry, Jason Rygus (Crudden group) receives the TA of the Year Award, and Lyndsay Hull receives the Staff of the Year Award.
- Congratulations to Soren Mellerup, a Ph.D. student in Suning Wang's group who is the recipient of a prestigious Vanier CGS Award.
- Emeritus Professor Mike Baird is awarded the 2015 McMaster University Distinguished Alumni Award.



APRIL 2016

- The 4th year project presentations are held on April 4th. The Smith and the Sullivan Prizes for outstanding achievement in fourth year research projects are awarded to Rebecca Forward and Owen Larsen, respectively. The judges for both competitions were Kevin Stamplecoskie and Ralph Whitney.
- The following students win national NSERC graduate scholarships for the 2016/2017 academic year: Christene Smith (PGSD, Crudden group), Yagya Prasad Paudel (CGSD, Ross group).

- Ontario Graduate Scholarship recipients for the 2016/2017 academic year are: Jasime Buddingh (Liu), Joshua Clarke (Crudden), Marco Gibaldi (Jerkiewicz), Timothy Wright (Evans), Kyle Bachus (Oleschuk/Liu), Kyle Boniface (Jessop), and Kaitlyn Pinkett (Zechel).
- Dr. Kevin Stamplecoskie is awarded a grant for \$130,000 from the Canadian Foundation for Innovation. The grant will be used to purchase an ultrafast laser system. The group will be equipped with the tools to determine the excited state properties of unique photonic materials, and gain important information like how materials can use the energy absorbed from light in applications like solar cells and advanced optics.

MAY 2016

- Len Rose, Undergraduate Laboratory Technologist, announces his retirement as of August 31, 2016. Len joined the Department of Chemistry in the analytical group in 1974. He transitioned to working in the organic labs for a few years and, since then, has tirelessly worked to keep our undergraduate first year labs running smoothly. We thank Len for his tireless dedication to our many students, their TAs, and the Department!
- Under the supervision of Prof. Guojun Liu, PhD student Yu Wang's research on block copolymer encapsulated air nanobubbles is highlighted by Nature Nanotechnology.

Message from the Head



is to develop new photonic materials with optical properties tailored to applications that include chemical sensing, biomedicine, optical electronics, light-harvesting and solar energy.

Two long-time staff members have retired. Graduate Assistant Annette Keyes retired in 2015 and Len Rose, Laboratory Technician, retired in 2016. Over the years, their many contributions have been honored with Queen's University Staff Awards - Annette in 2009 and Len, as part of the Chemistry Dream Team, in 1997. Annette has been a knowledgeable and kind resource person for all of our graduate students, but her supportive guidance has been most essential for students new to Queen's. Len has been with the department for over forty years, with the last twenty years serving as the technician for our first year program. Our first year students have benefitted from Len's tremendous knowledge and years of experience, ensuring that the laboratory is ready and runs smoothly every day. On behalf of the whole department, a huge thanks to Len and Annette for their many years of service!

The Department was in the news in 2016, starting with the announcement of a Discovery Frontiers grant led by Dr. Gregory Jerkiewicz, and including Drs. Nick Mosey, Diane Beauchemin, Andy Evans and Mark Daymond (Mechanical and Materials Engineering) from Queen's. Distinguished guests, including Minister of Science Dr. Kirsty Duncan, NSERC President Dr. Mario Pinto and Member of Parliament Mark Gerretsen, toured the Jerkiewicz lab and the Surface Analysis Facility in Chernoff Hall before the official announcement to a standing-room-only audience in Richardson Hall. In March, Drs. Richard Oleschuk and Rob Knobel (Physics) hosted a tour of the Kingston Nanofabrication Facility at Innovation

Park by Ontario Premier Kathleen Wynne, MPP Sophie Kiwala and Mayor Bryan Patterson.

Chemistry faculty, students, staff, and alumni received a number of awards in the past year. Dr. Guojun Liu received a Queen's University Prize for Excellence in Research, Dr. Suning Wang was elected Fellow of the Royal Society of Canada, Dr. Philip Jessop was elected to the Royal Society UK, and Emeritus Professor Dr. Mike Baird received the 2015 McMaster Distinguished Alumni Award. Dr. Françoise Sauriol was the recipient a Queen's Staff Award in recognition of her outstanding management of our NMR facility. Soren Mellerup, a graduate student working with Dr. Suning Wang, received an NSERC Vanier Canada Graduate Scholarship. Alumna Angela Lyon is now a Fellow of the Intellectual Property Institute of Canada and alumnus Dr. Zac Hudson has been awarded a Tier 2 Canada Research Chair in Sustainable Energy at the University of British Columbia.

Our first year program has been growing and changing. We welcomed our largest cohort into CHEM 112 last year, with nearly 1200 students completing the course. Last Spring and Summer saw the inaugural offering of online first year chemistry at Queen's. The launch went very well and we are offering the online course again this year, with an enrolment that has almost doubled. In the Fall, first year chemistry was part of the science curriculum at the Bader International Study Center, located at the beautiful Herstmonceux Castle, UK. It's a small world; an alumnus, Dr. Geoff Nelson was part of the BISC Chemistry teaching team.

The Queen's Quality Assurance review of the department is well underway, with the department preparing a detailed self-study of our graduate and undergraduate programs, student

feedback, research milestones, facilities, and many other aspects of our operations. The self-study is a team effort and, with that in mind, the process was launched with a retreat in September 2015. A two-day site visit will occur in 2016/2017 to continue the review process. In conjunction with the review, our undergraduate programs are due for re-accreditation by the Canadian Society for Chemistry. Thankfully, the re-accreditation visit will occur concurrently with the quality assurance process.

Several Chemistry faculty have hosted conferences here at Queen's over the past few months. Dr. Jean-Michel Nunzi organized and co-chaired this year's "Energy and the City of the Future" conference. The conference included around 25 participants, and was sponsored by the French Embassy in Canada. The "Boron in the Americas (BORAM)" conference, a biennial research conference focusing on boron chemistry, took place for the first time in Canada! Professor Suning Wang was the host of the 2016 conference held in Chernoff Hall. It was the largest BORAM conference ever, with attendees from Canada, the United States, Germany, Great Britain, Japan, China, and elsewhere. Immediately following the BORAM conference, Drs. Suning Wang and Cathleen Crudden hosted the Core-to-Core symposium involving research teams from Queen's, Nagoya and Kyoto Universities in Japan, and Muenster University in Germany, with about 60 participants. This symposium was supported by a Queen's grant for "Collaborative Research on Catalysis and Materials".

This issue of QChem Chronicles highlights some of the events within Chemistry over the past year. Enjoy! Thank you always for your ongoing support of the department. We hope to see you at Homecoming this year; Queen's is celebrating its 175th anniversary!

Greetings Alumni and Friends!
The past year has been chock full of news, awards, and events.

First, I have some sad news to share. Emeritus Professor Ken Russell passed away this spring. He will always be fondly remembered by department members, past and present. Dr. Ralph Whitney has prepared some reflections and reminiscences of Dr. Russell's career and many years at Queen's (see Page 16). The inaugural Russell Lectureship was held on April 15th, with Professor Krzysztof Matyjaszewski from Carnegie Mellon University presenting a talk on "Macromolecular Engineering by Taming Free Radicals". Sadly, Dr. Russell passed away the week before the lecture but we are comforted in the knowledge that he was pleased that the inaugural lecture was approaching, with Dr. Matyjaszewski as the speaker. A heartfelt thanks to our alumni for your support of the Russell Lectureship.

The department welcomed new faculty member Dr. Kevin Stamplecoskie in January. Since his arrival, Kevin has been busy setting up his lab, meeting his colleagues in the department, and welcoming students to his group. Dr. Stamplecoskie's research mission

Message from the Manager



Greetings Q-CHEM Chronicles Readers! This year has been an exciting year for the department, with a number of positive advances and challenges. Some highlights:

- **The Quality Assurance Process (QUQAPs) Review** – Currently, and over the past 9 months, the Department has been preparing for our departmental QUQAPs review. This review is a quality review framework mandated by the Council of Ontario Universities (COU) and ensures the continuing high quality of both existing and new undergraduate and graduate programs. The Department's faculty and staff have all been tirelessly aggregating, reviewing, and assessing data to no end! We're nearing the home-stretch and will all celebrate once the final report is submitted and the review complete.
- **Improvements to Science Stores** – I'm delighted to report that our Science Stores has been undergoing some technological updates and recently added Interac Debit to our existing point-of-sale system. While it may seem like a small change, it aims to streamline and provide added convenience to better serve our students. We are also gearing up for

the next academic year, which typically brings more than 1300 students to the counter purchasing their lab supplies. Additionally, in order to further move us along the procurement evolution curve and into real-time payment processing abilities for orders, Science Stores has recently started working with Strategic Procurement Services to review the potential adoption of a new e-Procurement system that should improve the procure-to-pay procedures of its operations.

- **Staff Retirements** – Annette Keys, our Graduate Assistant, paddled off into retirement in August 2015. She joined the department in 1997 and was instrumental in establishing the Graduate Secretary position that later evolved into the Graduate Assistant position. We definitely miss her professional, approachable and caring personality in the department. Additionally, it is with mixed emotions that I report the retirement of Len Rose this summer. Len joined the Department of Chemistry in 1974. His dedication to the many students, their TAs, and the Department will always be remembered. Although we will miss him, we wish Len all the best as he starts a new chapter in his life.

These are just a few notable highlights on the operational side. Furthermore, I would like to take this opportunity to acknowledge the incredible faculty and staff in our department that contribute to our ongoing success – Thank you! I look forward to continuing to support the teaching and research endeavors of our students, staff, and faculty, working collaboratively with everyone in the department. I also look forward to the opportunities and challenges that will undoubtedly arise over the next year.

Many thanks!

Congratulations to Dr. Françoise Sauriol

By Dr. Suning Wang

Congratulations to Dr. Françoise Sauriol for winning a Queen's University Staff Recognition Award!

Françoise completed her PhD in 1978, under the direction of Maurice St-Jacques at the Université de Montréal, in conformational studies by dynamic NMR. Subsequent post-doctoral studies were at Dalhousie University with Prof. T.B. Grindley. From 1981 to 1999, Françoise was the NMR manager in the McGill Chemistry Department where she also taught advanced NMR courses. In August 1999, Françoise moved to the Queen's Department of Chemistry, to become the NMR manager here and to develop a web site to show different aspects of NMR. In addition, Dr. Sauriol teaches two graduate courses focused on the identification of organic and organometallic compounds using 1D, 2D and 3D NMR. Dr. Sauriol is a co-author on more than 100 publications.

As the Instrumentation Manager for the NMR facility, Françoise has done a wonderful job in maintaining and managing the facility. Because of her dedication, experience, and sound judgement, our six NMR spectrometers have been running mostly trouble free for the past 17 years. Besides doing an outstanding job in the daily operations of our NMR facility, she has done an excellent job training and educating our researchers on NMR spectrometry and its applications in modern chemical research. The NMR spectrometers are a key research tool for organic, inorganic, physical and analytical chemistry and are routinely used by undergraduate students (4th year research thesis, or summer research), graduate students, and postdoctoral fellows in our department. Dr. Sauriol has done an outstanding job in training about 100



researchers per year in the knowledgeable, competent, and safe use of the spectrometers.

Françoise has made a big difference in enriching students' learning and training experience! The research of many graduate students and faculty members has greatly benefited from her exceptional efforts in helping to solve difficult research problems, above and beyond the expectations for a facilities manager. Many students from our department (and others) have become highly skilled at NMR because of the outstanding training they obtained from Dr. Sauriol. The skills and knowledge they have learned has enabled them to carry out independent NMR analysis as part of their research here at Queen's and, afterwards, working at academic institutions or in industry.



Dr. Françoise Sauriol in the NMR facility

Undergraduate Life

By Christina Diaz and Morgan Lehtinen

As another academic year comes to an end, the Department Student Council (DSC) co-presidents Morgan Lehtinen and Cristina Diaz are honoured to share the successes and adventures the DSC has had during the 2015/2016 academic year. The Chemistry DSC, made up of undergraduate students from each year of study, meets weekly throughout the school year; the purpose of the DSC is to promote a comfortable, enjoyable learning environment for all students as well as to create a sense of community between undergraduates, graduates, faculty and staff. Queen's University is incredible but, for some students, it can also be daunting and our goal is to make each undergraduate's four years at Queen's as fulfilling as they can be. Every year the DSC hosts educational, social, and informative events for the department to raise funds for a celebratory end of year banquet and to provide students with an opportunity to relax and socialize. The social events held throughout the year include pub-crawls, "Pool with Profs", departmental clothing sales, and two coffeehouses in conjunction with the Chemistry graduate students.

The 2015/2016 end of year banquet was held at the Renaissance and it was an incredible night of dining and dancing to celebrate our accomplishments. Departmental awards were given out to a Prof, a staff member, and a TA who have gone above and beyond for the students this year; Nicholas Mosey received the Graduating Class Award for Excellence in Teaching Chemistry, Lyndsay Hull received the Staff Member of the Year, and Jason Rygus, the TA of the Year.

Additionally, the DSC held multiple academic events and information sessions to help the students with their current and future studies. The events offered included a first year information session to aid with



the decision of choosing a major (hopefully chemistry!), a session for third year students regarding thesis projects in the department, and finally an introduction meeting to the very exciting dual Master's degree with the University of Stuttgart. The Chemistry DSC also volunteered with the annual "Majors Night" for first year students and the Open House events for high school students who are entering post-secondary education.

The Chemistry DSC also completes many administrative duties each year including teaching evaluations, meetings with other departmental DSCs, reporting to ASUS, and participating in monthly Faculty Board meetings. We took on the additional challenge this year by tackling QUQAPs, the Queen's University Quality Assurance Process. We worked very hard to create surveys and receive feedback from all undergraduate students to find out how to improve the department in the future. We truly did appreciate the opportunity to assist the department in creating this document and helping to create positive change.

We are extremely honoured to have been your DSC Co-Presidents this year and we could not have imagined a more rewarding way to end our incredible time at Queen's University. We want to thank our DSC members from the bottom of our hearts for their hard work and dedication; we could not have done it without each and every one of you. We would also like to thank the QGCS and the Chemistry department administration for their support and guidance. We look forward to seeing what the new DSC Presidents, Karim Gordon and Kasia Donovan, have in store.

Graduate Student Life in the Department

By Lacey Reid

At the end of the Spring term, the Queen's Graduate Chemistry Society (QGCS) can reflect back on the vibrant graduate student life in the department this past year. The QGCS executive is the "finger on the pulse" of the chemistry graduate student group, and strives to hold a mix of social, educational and charitable events throughout the year to bring students, staff and faculty together. As the President (aka "Prez") this year, I am proud to have led such a dedicated and creative team of leaders and am compelled to introduce you to the rest of the outgoing executive committee: Lily Huang, VP Internal; Nakkiran Arulmozhi, VP External; Amy MacLean, VP Finance; Edi Cieplechowicz, 5th Floor Rep; Jiahui Shen, 4th Floor Rep; Hao Chen, 3rd Floor Rep; Ahmed Al Hejami, Union Rep; Josh Clarke, Sports Rep; and Zach Ariki, Secretary.

Our biggest event of the year was the Graduate Symposium, a full day of research talks from summer undergrads, graduate students, and post-docs. Held during orientation week, this was also a welcome event to introduce new students to the department and the exciting research happening here. This year we offered cash prizes for every session and also held a poster session and a Three-Minute-Thesis competition. We're passionate about the continuity of this annual event, and additionally excited that graduate students were able to nominate and invite Prof. Don Tilley (UC Berkeley) for next year's Jones Lectureship.

The QGCS celebrated National Chemistry Week in style, with chemistry trivia, pizza and a periodic table of cupcakes. For charity we've raised funds through Run for the Cure, and also donated over \$100 to



Almost Home in Kingston, a support facility for families with children being treated at local hospitals, from the proceeds of our Pie(π)-Your-TA event. During Career Week we all learned valuable networking skills and got to practice them with the Queen's Chemistry Innovation Council (QCIC) as they helped us answer an important question: What should I do next? We also have fun while we work, having organized several fundraisers throughout the year. You might have noticed us dancing in the courtyard enticing you to "Have a burger!" at our fundraiser BBQs, or proudly wearing our QGCS T-shirts, designed in house, and sporting the elements of the earth.

We work hard and we play hard. This year the QGCS continued the Holiday Banquet at the Grizzly Grill with a three-course meal, plenty of door prizes, and great conversation. We also love being outdoors, particularly if it's kayaking or hiking in the

Summer and Fall, or sledding and ice skating in the wintertime. This year marked the launch of our Coffeehaus series where we held an "open-mic" over snacks and coffee here in the department, where many of us got to explore our musical side (and got front row seats to a rendition of "If My Prof Had a Million Dollars"). Our expression through song or T-shirt designs might seem trivial, but I think it's important to highlight the abundance of creative and original content generated within the department because it serves to complement our chemistry work. This was certainly evident in the quality of talks at the Symposium, and the quality of hallway conversations and "back-of-the-napkin" ideas they inspired. The QGCS strives to inspire ideas by fostering the kind of positive environment where these spontaneous interactions can take place. With this, I pass the torch to the next executive, and I'm excited to see what they have in store for us!



The 2016/2017 elected executives of Queen's Graduate Chemistry Society (QGCS) are: Zach Arik, President; Josh Clarke, VP Internal Affairs; Sarah Piotrkowski, VP President External; Amy MacLean, VP Finance; Jaddie Ho, Sports Rep.; Lucas Choma, 3rd Floor Rep.; Marshall Timmermans, 4th Floor Rep.; Jenny McLeod, 5th Floor Rep.; Kelsey Viner, Secretary.

The Walter A. Szarek Lecture Series

by Jason Z. Vlahakis

In the 2017/2018 academic year, the Chemistry Department will be officially launching the Walter A. Szarek Lecture Series in honour of Emeritus Professor Walter Szarek. We look forward to the inaugural lecture! In connection with the establishment of this endowed lectureship, the Department hosted a presentation and reception honoring Professor Szarek during Homecoming 2015 and would like to thank everyone who attended that event last fall. We were pleased to greet many students, colleagues, fellow scientists, alumni, and friends at the event!

The speakers offered captivating reflections of their time spent in the Szarek Lab and only the kindest of words to say with respect to the man of the hour. The department thanks former Szarek students Drs. Mario Pinto (President of NSERC), Dinesh Vyas (Bristol-Myers Squibb), and Allan Rey (Apotex PharmaChem), and collaborator

Dr. Ian Crandall (University of Toronto) for their contributions to the event, and of course to Walter for giving the final heart-felt speech of the day.

Dr. Szarek's research is at the interface of chemistry and medicine, in particular focusing on drug discovery and development. Those that know him usually mention his involvement in the establishment of Neurochem (now Bellus Health, Inc.) and successful drug candidates such as K1ACTA for the treatment of Amyloid A Amyloidosis, Alzhemed for the treatment of Alzheimer's Disease, and the nutraceutical VIVIMIND for the protection of memory function. All these drug candidates were synthesized in the Szarek Laboratory at Queen's University.

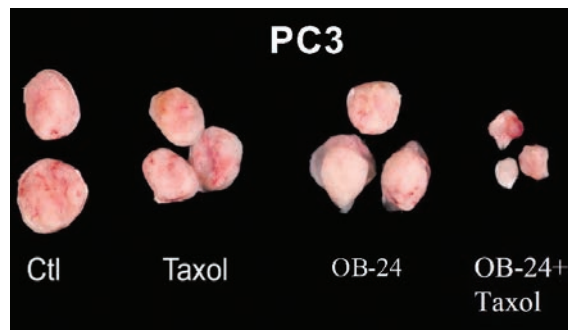
I would like to draw attention to another category of compounds developed by Walter in connection with Osta Biotechnologies and the Department of



At the reception on Oct. 24, 2015. Left to right: Mario Pinto, Jason Vlahakis, Dinesh Vyas, Walter Szarek, and Inka Brockhausen.

Biomedical and Molecular Sciences here at Queen's University. The project initially involved the design of inhibitors of heme oxygenase-1 (HO-1), an enzyme responsible for the regulation of many physiological processes. Using strategic chemical structure modification and biological testing, with a dash of X-ray crystallography and seasoned scientific intuition, the first highly selective HO-1 inhibitors were developed. With the realization that HO-1 expression is much higher in hormone refractory prostate cancer cells (such as PC3), Walter's team focused on treating these drug-resistant, aggressive, and metastatic cancer cell lines with the HO-1 inhibitors. With continued effort, the project succeeded and a suite of compounds that displayed wide-spectrum anti-tumor activity was synthesized. By 'suite' I mean a set of nearly 500 compounds, one in particular was called OB-24.

This compound impressively reduces tumor size, reduces metastatic activity, and induces apoptosis with effects comparable to the well-known drug Taxol. The true highlight however, is the ability of this compound to work synergistically with Taxol against aggressive tumors; the combination of OB-24 and Taxol being especially effective. Sometimes, a picture is all you need to describe great research:



Dramatic decrease in tumor size upon treatment with the combination of OB-24 and Taxol (right) compared to the size of the control (Ctl) tumors (left). Results are from in vivo studies of human PC3 cells implanted in mice. For more info see: *Cancer Research* 2009, 69, 8017–8024.

Contributions towards the Walter A. Szarek Lecture Series to bring world-renowned scientists to Queen's University to talk about their scientific discoveries can be made at www.givetoqueens.ca/ProfSzarek.

Queen's Chemistry Innovation Council

The 2015 Innovation Council meeting started off with a welcoming reception and dinner on October 22nd. This year we had the honor of hosting Dr. Mario Pinto, President of NSERC, as our after-dinner speaker. The annual general meeting began the next day, where council members heard from student representatives, and learned about recent events, new initiatives, and upcoming challenges in the department. The council members also met new faculty members Drs. Avena Ross and Kevin Stamplecoskie and learned about their research interests. Prior to the official start of the meeting, several council members met with students and post-doctoral researchers to discuss careers in chemistry and offer career advice. As in the past few years, we have scheduled the AGM to coincide with Homecoming, allowing our Council members to extend their stay and enjoy the weekend events.

Steve Leach, an alumnus of the Engineering Chemistry program, has taken on the leadership of the Innovation Council as Dr. Wayne Schnarr stepped down after two years as the Council Chair and 10 years of dedicated service as a member of the Council. The Department of Chemistry thanks Wayne for his commitment to the department, contributions to CHEM 894: Business Skills in the Chemical Industry, leadership on the QCIC, and sound advice over the years. On behalf of the department, thank you Wayne!

Dr. Will Rogers and Eleanor Barker kindly led the CHEM 894 class in 2015. Around fifteen graduate students learned about financial accounting, organizational design, marketing and business strategy, R&D project management, and other topics. Student groups applied their knowledge by



From left to right, QCIC members Allan Rey, Wayne Schnarr, and Peter Kazmaier greeting new faculty member Kevin Stamplecoskie.

undertaking technology assessments for discoveries from chemistry researchers in the areas of forensic analysis of human hair (Dr. Diane Beauchemin), improved solar cells (Dr. Jean-Michel Nunzi), anti-smudge coatings (Dr. Guojun Liu), and phosphorescent light-emitting diodes (Dr. Suning Wang).

In 2016, we look forward to a new format for the annual general meeting. Council members will be inviting guests to attend the meeting to learn about the department, and most importantly to hear from a few chemistry faculty on their latest research. Alumni interested in assisting the QCIC should contact depthead@chem.queensu.ca.

About the Council: The Queen's Chemistry Innovation Council is an advisory group of alumni and friends serving to enable "greater interaction among the Dept of Chemistry, Queen's University, Industry, Government and Society to the benefit of the Dept of Chemistry and its people. The Council [works] with the Department to achieve recognized leadership, excellence and innovation in the fields of scientific discovery, development and education." <http://www.chem.queensu.ca/people/queens-chemistry-innovation-council>

Kenneth Edwin Russell

Professor Emeritus of Chemistry, Queen's University, 1924-2016

By: Ralph Whitney



On Sunday, April 10, 2016, Professor Ken Russell passed away at home in Kingston, Ontario at the age of 91. For more than 60 years, Ken Russell was a colleague, mentor and friend to faculty, staff and

students in the Department of Chemistry. Born in England, he received his formal education in chemistry at the University of Cambridge (B.A. '45, M.A. and Ph.D. '48) where he completed graduate research on the kinetics of the cationic polymerization of isobutylene under the supervision of Professor R.G.W. Norrish, recipient of the 1967 Nobel Prize in Chemistry. His interest in polymer chemistry arose through wartime work on commercial production of butyl rubber. This led to a Ph.D. thesis on isobutene polymerization by Friedel Crafts catalysts, including kinetic studies of the effects of various co-initiators.

Ken came to Queen's in 1954, having had research experience in polymer chemistry at Cambridge and Princeton, in thermodynamics of rocket fuels at Penn State and in kinetics of atom recombination at Manchester. His research at Queen's led to an understanding of the dual role of a wide range of co-initiators. His other main research areas, inspired in large measure by parallel work at DuPont Canada, consisted of structural studies of polyethylene and the grafting of vinyl monomers to polyethylene. He, along with colleagues in the Chemistry Department and collaborators at DuPont, were instrumental in bringing the first high-field NMR spectrometer to Queen's in 1981 through an unprecedented university-industry collaboration.

In addition to cationic polymerization, Ken developed further research interests in radical-mediated processes and their relevance to polymer chemistry. In particular, this included hydrogen atom abstraction reactions, their effect on radical polymerization and on polymer graft modification reactions.

Ken will be well remembered by many of our alumni for his lectures in first-year chemistry, and for upper year courses in polymer chemistry and industrial chemistry in Canada, as well as his supervision of many alumni as graduate students and postdoctoral fellows. Retiring officially in 1990, Ken remained research active for more than a decade, with his research publications in polymer science spanning 55 years, from 1947 to 2002.

In 2014 to recognize his many contributions to the Department and the University, the Chemistry Department established the Russell Lectureship, intended to feature distinguished researchers in polymer chemistry and related areas of material science, as visiting speakers. The inaugural Russell Lecture, "Macromolecular Engineering by Taming Free Radicals", took place on Friday, April 15, and was delivered by Professor Krzysztof Matyjaszewski, Carnegie Mellon University, one of the most distinguished polymer chemists of our time.

I last spoke with Ken in March of this year. He was both delighted and honoured that Kris Matyjaszewski was to be the inaugural Russell Lecturer. On behalf of the Department I would like to thank all of our alumni who so generously contributed to the endowment for the Russell Lectureship, allowing us to establish this tribute to our much respected colleague.

Minister of Science Kirsty Duncan announces \$4-million NSERC Discovery Frontiers Grant

2016 kicked off with the department and its researchers in the news. On January 8th, a \$4,000,000 NSERC Discovery Frontiers grant the title of which is Engineered Nickel Catalysts for Electrochemical Clean Energy (Ni Electro Can) was announced. The Ni Electro Can research team is led by Dr. Gregory Jerkiewicz, and includes Drs. Diane Beauchemin, Nick Mosey, and Andy Evans from the Chemistry Department, and Dr. Mark Daymond of the Department of Mechanical and Materials Engineering.

Queen's and the Chemistry Department had the honour of welcoming distinguished guests, Minister of Science Dr. Kirsty Duncan, Member of Parliament Mark Gerretsen, and NSERC President Dr. Mario Pinto. The official visit began in Chernoff Hall with a tour of the Jerkiewicz laboratory and the surface analysis facility. The official announcement was hosted by Vice-Principal (Research) Dr. Steven Liss and held in Richardson Hall, with a large crowd gathered for the event.



Dr. Gregory Jerkiewicz, the Ni Electro Can research team, and distinguished guests.



Minister Duncan tours the Jerkiewicz lab in Chernoff Hall.

Only one Discovery Frontiers proposal is selected every two years and the Ni Electro Can project was the successful proposal in the 2015 competition, which had thirty letters of intent and six full applications. The Discovery Frontiers program funds high-risk high pay-off research initiatives that "address national research priorities and global challenges" * The full research team includes 14 researchers from Canadian universities – Queen's, University of Victoria, Simon Fraser, INRS Université de Recherche, University of Toronto, University of Ottawa and McMaster – with a global team of collaborators – from Brazil, France, Germany, Israel, Japan, Norway, and the US – and a number of industry partners, Ballard, AFCC, Nissan, Mantra Energy, ZincNyx, Calera, and CNEM. The project is managed by Dr. Titichai Navessin of Pacific Rim Research. Following the official launch, with the Ni Electro Can team on hand, the researchers met later

in the day to begin their work with inaugural meetings of the Scientific Steering Committee and the Project Management Committee. The Ni Electro Can team in our Department will grow to include a postdoctoral researcher, several MSc and PhD students, and several undergraduates supporting the work during the summer months.

The Ni Electro Can project aims to develop the next generation of nickel-based materials for alkaline water electrolyzers and alkaline fuel cells, which will give Canada's clean energy sector a competitive advantage.

Canada is a major producer of nickel, and this research has the potential to boost the national nickel industry with the development of new, innovative nickel-based nanomaterials. The Ni Electro Can team will be developing these new materials to reduce waste by converting glycerol, a by-product of biodiesel production, into value-added chemicals, to develop new fuel cells for clean energy production, and to improve hydrogen-based energy storage.

* http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DF-FD_eng.asp.

Premier visits the Kingston Nanofabrication Laboratory

On March 31st 2016 Dr. Richard Oleschuk (Chemistry) and Dr. Rob Knobel (Physics) welcomed Ontario Premier Kathleen Wynne, MPP Sophie Kiwala and Mayor Bryan Patterson for a Lab Tour at the Kingston Nanofabrication Laboratory. The facility housed at Queen's Innovation Park was constructed and outfitted with a combination of federal, provincial, University and Industrial funding. The laboratory is being managed by CMC microsystems and Dr. Graham Gibson, a Queen's Chemistry graduate, is overseeing its operation. The laboratory contains highly specialized equipment (photolithography, laser micromachining, e-beam lithography etc.) and advanced expertise that provides users with more automated, faster and cost-effective methods and processes for transforming innovation research into physical



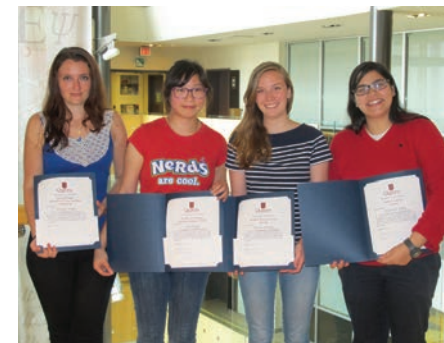
prototypes. Prototyping is an expensive but crucial step in developing the materials, components and circuitry that drive the future of technological innovation. Several Queen's chemistry students and faculty are now using the facility on a regular basis for fabrication and characterization.

Please join us on
Saturday, October 15th

Starting at 10 am
 for department tours
 and a BBQ
 hosted by
 the Chemistry
 graduate students.

TA Teaching Awards

Promoting Excellence in Chemical Education



TA Award recipients (left to right): Daniela Negru, David Thomas Teaching Assistant Award for Synthetic Laboratory; Lily Huang, Friends of Chemistry TA Award for Excellence in Teaching; Annica Freytag, William Patrick Doolan Prize in Chemistry; Nausheen Sadiq, Fisher Scientific Teaching Award for Chemistry Tutorials.

Congratulations to the Class of 2016!



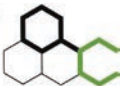
2016 Departmental Picture



We are pleased to announce that the following speakers have been confirmed for our 2016-2017 Seminar Series. For more information and dates, please visit our website at

<http://www.chem.queensu.ca/departamental-seminar-series>

Friends
of
Queens
Chemistry



Prof. Jens Müller, University of Saskatchewan
Prof. Francoise Winnik, Université de Montréal, Quebec
Prof. John Montgomery, University of Michigan, USA
Prof. Gary Hieftje, Indiana University, USA
Prof. Alán Aspuru-Guzik, Harvard University, USA
Prof. Piotr Zelenay, Los Alamos National Laboratory, USA
Prof. Daniel Mindiola, University of Pennsylvania, USA
Prof. Steven Holdcroft, Simon Fraser University, USA
Prof. Garnet Chan, Princeton University, USA
Prof. Don Tilley, University of California



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