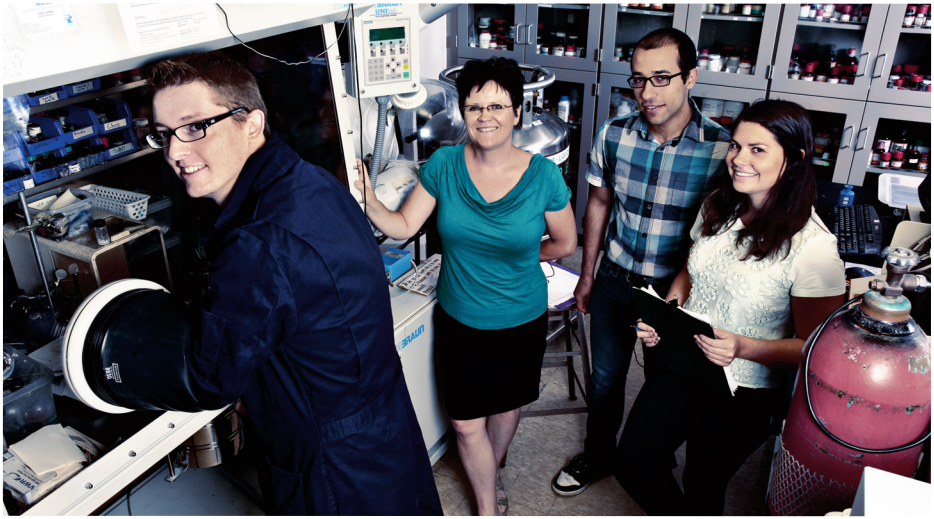
Q-CHeM CHRONICLES
Queen's UNIVERSITY
AUGUST 2015



Dr. Crudden second from right, and her group working in her research lab

Dr. Cathy Crudden Awarded a Prestigious Killam Research Fellowship

It's been another busy and exciting year in the Crudden group. After last year's research successes, we've continued to expand collaborations at Queen's, across Canada, and internationally. This has led to many exciting developments for both Dr. Cathy Crudden and her group.

A noteworthy culmination of the hard work of the entire group is Dr. Crudden's recent Killam Research Fellowship; one of only six awarded this year. This award, funded through the Canadian Council for the Arts, will relieve her of teaching and administrative duties for the next two years. She looks forward to the opportunity to spend more time actively involved in the research side of her duties at Queen's.

Of equal import for the department was the May 29th announcement of this year's Canadian Foundation for Innovation awards. The proposal submitted last spring by Dr. Crudden as the Project Leader was successfully funded! This is a great opportunity for both the chemistry and physics departments, as the funding is earmarked for the purchase of multiple pieces of new equipment including an

atomic force microscope, an x-ray photoelectron spectrometer, a transmission electron microscope, a new X-ray diffractometer and a 700 MHz solid-state NMR spectrometer to add to the pre-existing equipment available for use here at Queen's. This equipment will not only be extremely useful to the current students and staff conducting research here, but will help attract new talent in future years.

May was also a busy month for Dr. Crudden's satellite lab at the world premier Institute of Transformative bio-Molecules (ITbM) at Nagoya University where she is cross-appointed. On May 25th, the new building that will be the home of the institute was officially opened. Queen's Principal Daniel Woolf and Vice-Principal Steven Liss along with Charles Sumbler and Mary-Rose Lalande traveled to Japan to participate in the opening ceremonies. Chemistry Nobel Prize winner and Nagoya University Professor Dr. Ryoji Noyori also attended and helped cut the ribbon at the new building.

That's all good news for the Crudden groups, as they are jointly working their way towards some exciting advancements in the fields of boron catalysis, triaryl methane synthesis and self assembled N-heterocyclic carbene monolayers on gold. Over the last couple of years, the group has published 14 papers and three patents. As a result of these efforts, Dr. Crudden has been invited to speak at many international symposia, including many invited lectures. Not only has she lectured extensively through Japan as part of her appointment at Nagoya University with the Institute of Transformative bio-Molecules (ITbM), she has also travelled extensively through Great Britain, Korea, and the United States this year. Visits to Maine, Hawaii, Michigan, Spain, Quebec City and Japan are also confirmed to the end of this year.

Not only is she busy presenting the findings of the group, but students and Post-Docs alike have had opportunities to attend conferences and exchanges to help further their own careers as well. The group traditionally sends a number of students to the annual Canadian Society for Chemistry conference, and this year was no different. Over half of the group presented as part of the poster session at this year's conference in Ottawa. There is also a small number of students travelling to Hawaii in December for the Pacifichem Conference, not to mention the Gordon Conferences, overseas conferences in the UK, Spain and Japan, and student exchanges to Japan and Switzerland that are in store.

Through increasingly strengthened collaborations the group has had the good fortune to add new members from the Universities of Lethbridge and Bristol, and had the pleasure to see former group members move on to roles at the University of Edinburgh, University of St Andrews, Memorial University and ETH Zurich.

While Dr. Crudden will be lecturing during her upcoming travels, she is also busy helping with administrative duties associated with the Pacifichem 2015 Symposium, where she is on the Canadian team, as well as the upcoming Boron in the Americas Conference held at Queen's in June 2016. She also serves on the Editorial Advisory Board of Chemical & Engineering News, and on the Editorial Advisory Board of Chemical Record, a Japanese publication.

None of these opportunities would be available without the continued support of the Natural Science and Research Council of Canada. Dr. Crudden has been involved in two successful strategic grants in the 2014 NSERC competition, as well as a JSPS Kakenhi Award in Japan to provide funding for her Japanese lab. While the funding may draw to a close soon, the research and hard work continues. We look forward to sharing our news with you as it unfolds!

2014-2015 Departmental Highlights

JUNE 2014

- Jean-Michel Nunzi and co-investigators James Stotz and Dominik Barz are awarded $400,000 through MEDI for their research on portable multidimensional micro-nano biological sensing devices.
- Erwin Buncel is elected to the Fellowship of the Royal Society of Canada, one of the highest recognitions for a Canadian academic. Erwin has had a deep influence on current chemical thought through his seminal contributions.

AUGUST 2014

- Philip Jessop is profiled by the Globe & Mail for the series *Innovators at Work*. Each person thus profiled is a nominee for a Globe & Mail competition to identify the top innovators in Canada.
- Michael MacLean receives the Materials Chemistry Student Oral Competition General Symposium Award through the Canadian Society for Chemistry.

SEPTEMBER 2014

- Tim Wright (Crudden group) is the inaugural recipient of the 1960's Chemistry Scholarship, which was established by members of chemistry classes from the 1960s to acknowledge the outstanding education they received in the chemistry department.
- Sean McDonald (Wang group) receives the McAdie Doctoral Student Award.

OCTOBER 2014

- Heather Drouillard joins the department as the new Departmental Manager.
- Tucker Carrington is the 2014 recipient of the J. C. Polanyi Award. This prestigious national award recognizes research excellence in physical chemistry, chemical physics, theoretical chemistry, or computational chemistry.
- Simon Hesp speaks to the Toronto Star about his research collaborations with MTO and the City of Kingston regarding why Ontario roads are showing so much distress these days. This article is followed by three television interviews and as many as 10 radio interviews.
- The Queen's Chemistry Innovation Council Annual Meeting is held on October 17. The QCIC Welcoming Dinner speaker is Dr. Ian Mc Walter the President and CEO of CMC Microsystems.

DECEMBER 2014

- The departmental holiday celebration is held on December 18.

JANUARY 2015

- Tucker Carrington's Tier 1 Canada Research Chair in Computational Quantum Dynamics is renewed.
- The LAUNCH System Challenge, sponsored by NASA, USAID, and the US Dept of State, announces the 2015 winning innovators. They include Forward Water Technologies, the spin-off from Queen's that has a low energy process for recovering fresh water from wastewater. This technology was developed in the lab of Dr. Jessop with advice from Dr. Stephen Brown.
- Eric Keske, PhD student in Crudden group, wins NSERC Post-Doctoral Fellowship Award. This is a highly competitive program, and only a small number are awarded every year. Winners are selected based on their research skill and potential, as well as communication, interpersonal and leadership abilities.
- Michael Dalziel (MSc student co-supervision Evans-Snieckus) and Suneel Singh (Post Doc) in the Snieckus laboratories have discovered a reaction that is effectively a molecular dance which allows a jump of a group from one position of the molecule to another. The reason for the excitement? For the group, because it is a new reaction; in practical terms, it will give pharmaceutical industry chemists a tool which will make life easier to make molecules of interest in drug discovery programs more efficiently and faster.

Message from the Head

Greetings Queen's Chemistry Alumni! It was my first time at the helm of the department in the Acting Head Role. What a busy year indeed. I have included some of the noteworthy achievements of our faculty, staff, researchers and students.

Dr. Whitney a.k.a. the "Orgomeister" is hanging up his test tubes this year after a distinguished teaching and research career. Dr. Whitney has had several of his patents pertaining to polymer chemistry licensed to Canadian and international chemical companies. Those of you who were fortunate to have had him as an instructor will no doubt fondly remember his dry wit and storytelling ability.

On the faculty renewal front Dr. Avena Ross joined the department in January 2015. The chemistry department was also granted permission to advertise an assistant professor position in October which, following a lot of hard work from our appointments committee, resulted in the hiring of Dr. Kevin Stamplecoskie (currently at the University of Notre Dame). Kevin will be joining us as an Assistant Professor in January 2016 to begin building a new materials chemistry research laboratory.

Dr. Cathleen Crudden and six others were awarded a $9 million Canadian Foundation for Innovation Grant that will bring the following state of the art instrumentation to the department: 700 MHz NMR spectrometer, X-ray crystallography, surface analysis and mass spectrometry equipment. This equipment will continue to propel the department and solidify its spot among the top chemistry departments in the country.

In April the Kingston Nanofabrication Laboratory opened its doors to researchers at Queen's University. This was the culmination of almost five years of work but has resulted in a state of the art clean room facility that boasts electron beam lithography, laser micromachining, the ability to "print" a variety of chemical reagents and both standard and "maskless" photolithography. The lab will enhance the design, make and test cycle for micro and nanoscale materials and devices.

The rather boring sounding, but perhaps the most important development to the department is the move of the university to an "activity-based" budget model. Under this model the department becomes a master of its own domain where any revenue developed within a unit like chemistry, results in that money remaining in the unit. We have a number of initiatives under development that look to enhance "activity" in the department… stay tuned.

The first year chemistry 2015-16 class of CHEM 112 will most likely be the largest ever. The university will have two brand-spanking new residences finished for the start of the fall term, one immediately adjacent to the south end of Chernoff Hall, and the other immediately across from it on Lower Albert St. The enhanced first year intake will have us bursting at the seams with the CHEM 112 class having in excess of 1300 students!

Building on our previous success in developing endowed lectureships we have had seed donations to establish the Walter Szarek Distinguished Lectureship series.

To acknowledge Walter's many contributions over his career at Queen's, the department is pleased to host a reception during Homecoming (Saturday, 24 October 2015, 10am, Chernoff 117).

In October we welcomed the Queen's Innovation Council for its annual meeting. The event began with a career development afternoon session. This was followed by a welcoming dinner at the Kingston Yacht Club with chemistry's own band-in-house "The Band Gaps" who provided entertainment and Dr. Ian Mcwalter talked about "innovation". As a heads-up the Innovation Council dinner will be held on Thursday October 22, 2015 and Dr. Mario Pinto (President of the Natural Science and Engineering Research Council and Queen's chemistry alumnus) will be our guest speaker.

In closing, these are just a sampling of some of the developments within chemistry over the last year. We will continue to strive to enhance the research and teaching facilities at Queen's. We hope that you will continue to support the chemistry department by contributing to the Chemistry Gift Trust, the Chemistry Seminar Program, student prizes and Scholarships and/or by donating your time/energy on the Queen's Innovation Council. The department is truly a fantastic place to both research and learn, where faculty, staff and students continue making chemistry matter.

Message from the Manager

Hello QCHeM Chronicles readers! I would like to take this opportunity to introduce myself as the Department Manager for the Department of Chemistry.

In October 2014, I had the pleasure of joining the department coming from the University of Toronto. With over 14 years' experience at UofT, I look forward to applying my experience in administration, finance, and human resources management in this challenging and evolving role. There are many changes coming our way with the university's new budget model, heightened departmental administrative responsibilities, financial monitoring and reporting requirements, etc. These changes bring an opportunity to look at our existing processes and identify where we might be able to do things differently in an effort to further enhance the operations of our department and the excellent support that we strive to provide to our students. I would also like to take this opportunity to acknowledge the incredible faculty and staff in our department, and thank everyone who helped ensure a smooth transition into my role. Thank you! I look forward to the future, enhancing the teaching and research experiences for students. I'm excited to work collaboratively with everyone in the department, and welcome any comments or feedback that you might have.

Dr. Kevin Stamplecoskie Joins the Department

by Jean-Michel Nunzi

The department opened this year a new Assistant Professor's position with specialization in Organic, Materials, Environmental or Physical Chemistry. Dr. Kevin Stamplecoskie was nominated. The breadth of his research spans the four areas of specialization above. Kevin grew up in Wilno, Ontario. He received an honours BSc cooperative chemistry degree at the University of Waterloo in 2008. As part of the cooperative chemistry program Kevin worked in research and development of renewable fuels for one year at Natural Resources in Ottawa under the supervision of Dr. Michio Ikura. As part of the same cooperative chemistry program Kevin worked at Waterloo as a researcher under the supervision of Dr. Pavle Radovanovic, who later became his undergraduate research supervisor. The work at the University of Waterloo was focused on electronic and magnetic properties of nanomaterials with a focus on spintronics and multiferroics. Kevin joined the Scaiano group at U. of O. in 2009 as a Masters student and transferred to the chemistry PhD program in 2010. His research at U. of O. focused on the synthesis and applications of silver nanomaterials in Raman sensing, enhanced polymerizations for lithography, biological applications of silver nano materials and advanced optoelectronic materials. It resulted in the publication of 15 journal articles, which contributed significantly to the development of the very actual field of plasmonic photonics. Kevin is currently a Post-Doctoral Research Fellow at the Radiation Laboratories at the University of Notre Dame, in Prashant Kamat's lab. He is investigating the excited state dynamics of a new class of metal cluster sensitizers for enhanced light absorption in solar cell applications. He is also learning the art of solar cell fabrication in one of the best places to do so in the world. In addition to federal fellowships, Kevin has received the 2011 Gerhard Closs Student Award of the Inter-American Photochemical Society.

Kevin joins the Department of Chemistry in January 2016.

2014-2015 Departmental Highlights

MARCH 2015

- Hans-Peter Loock and his research team receive over $250,000 from ABB, from GasTOPS and from OZ Optics for collaborative research projects. All three projects involve the development of new micro-optical sensors for chemicals.
- The undergraduate DSC banquet is held on March 20th, Richard Oleschuk receives the Faculty of the Year Award, Jason Rygus (Crudden group) receives the TA of the Year Award, and Meredith Richards receives the Staff of the Year Award.

APRIL 2015

- The Kingston Nano-Fabrication Laboratory's official opening is April 24th. This 3,000 square-foot state-of-the-art facility is celebrating the "power of the nano", the capability of its infrastructure and its academic and industrial users puts science and technology to work. Dr. Richard Oleschuk and his team in the Department of Chemistry were the first to explore the use of optical fibres for use in nanoelectrospray emitters.
- Alumnus Anton Toutov's research is highlighted in the Kingston Whig Standard with a discovery many chemists previously thought impossible.
- The 4th Year Project Presentations are held on April 6th. The Walter MacFarlane Smith Prize in Chemistry is awarded to Derek Esau and the M. Sullivan & Son Limited Scholarship to Karl Murray. The judges for the competition were Dominik Wechsler from Dupont Kingston Technology Centre and Paul Thornton from GreenCentre Canada.
- The following students win national NSERC awards for 2015-2016: Sarah Piotrkowski (CGSM Crudden group), Amy MacLean (CGSM Loock group), Sean McDonald (PGSD Wang group), Caitlin Miron (PGSD Petitjean group), and Jesse Vanderveen (PGSD Jessop group).
- Ontario Graduate Scholarship recipients for 2015-2016 are: Joshua Clarke(Crudden), Jason Rygus(Crudden), Kyle Bachus(Oleschuk/Liu),Kyle Boniface(Jessop), Michael MacLean(Crudden), Mina Narouz(Crudden) and Christene Smith(Crudden).
- A review article by Matt Kitching a former well-remembered Post Doc in our department with Victor Snieckus is one of 25 most frequently cited papers published in 2012 and 2013, according to the Web of Science. These most highly cited papers contributed the most to the impact factor of the journal Angewandte Chemie for 2014.

MAY 2015

- Science Rendezvous, at the K-Rock Centre on May 9th, featured three magic shows, tables of experiments, and a hands-on laser demonstration, courtesy of many members of the Department of Chemistry.

Eric Keske

Recipient of the NSERC Post-Doctoral Fellowship

When Eric came to the Crudden group in 2009, we had no idea what we were getting. Sure, he held a graduate entrance award, but that would prove to be just the tip of the iceberg for his journey at Queen's.

Coming from the University of Western Ontario, where he obtained a BSc with an honours specialization in chemistry and minor in organic and inorganic chemistry with distinction, he had already gained a good base knowledge from his supervisor, Dr. Elizabeth Gillies. His enthusiasm and natural talent were quickly apparent in the Crudden lab as well.

Within his first year of graduate studies, Eric had won the Christopher Knapper Award for Excellence in Teaching Assistance. He won the Department of Chemistry Tutorial Teaching Assistant Award for Excellence in Teaching in his second year here. From then on, his work and his studies continued to accelerate.

Throughout the remainder of his graduate studies, Eric was funded through an Ontario Graduate Scholarship, an NSERC Postgraduate Scholarship Doctoral Award (PGSD), and even won an Ireland Canada University Federation Dobbin Scholarship, which funded his research trip to Dublin.

Eric's work focused mainly on the synthesis, structure and catalytic activity of N-heterocyclic and mesoionic carbene complexes of palladium, rhodium and iridium. During his six years in grad school, he contributed to ten journal publications and helped to write a book chapter, which has since been published.

Eric did not spend all of his time at Queen's though; he participated in two research exchanges as part of his studies. Firstly, he went to the University of Waterloo to work with Dr. Eric Fillion, and later went to the University College Dublin to work with Dr. Martin Albrecht's group. Both were positive experiences, and helped mature Eric both in his research and personal life.

All work and no play can make anyone something something and Eric is no exception. An avid quoter of The Simpsons, Seinfeld and devout Larry David fan, Eric appreciates a fine drink of… pretty much anything caffeinated or alcoholic. When not wearing a lab coat he can most often be found with a coffee mug in one hand and a glass of bourbon or Guinness in the other. He also enjoys judo, travelling, and loud music, not necessarily in that order.

A couple of months before his PhD defense, Eric learned that he had been selected as a winner of a 2015 NSERC Postdoctoral Fellowship. This is a highly competitive fellowship, with only a handful awarded in a given year. Winners are selected based on their research skill and potential, as well as communication, interpersonal and leadership abilities. Eric will be moving to the University of Edinburgh to work with Dr. Guy Lloyd-Jones.

Recently Eric was one of 45 finalists to be awarded the Reaxys PhD Prize and he will travel to Hong Kong in September to present his work.

If his time at Queen's is any indication of his skill and potential, Edinburgh is in for a treat. Eric has played an integral role in the Crudden group, and developed into a wonderful researcher, lab mate and friend. He'll be missed tremendously here, but I'm sure we haven't seen the end of him yet.

Erwin Buncel Elected to Fellowship

by Ralph Whitney

This past September, Emeritus Professor Erwin Buncel was elected to a Fellowship in the Royal Society of Canada for his contributions to physical organic, bioorganic and bioinorganic chemistry. The department was delighted to see Erwin receive this long-overdue recognition.

Erwin joined the department in 1962 following completion of his PhD degree at University College London and post-doctoral work at the University of North Carolina and McMaster. During his career, through to retirement in 1997, Erwin supervised the research of many undergraduate and graduate students and Post-Doctoral Fellows, resulting in over 250 publications. In 1998 a special issue of the Canadian Journal of Chemistry (volume 76, No. 6, June 1998) was dedicated to Erwin upon his retirement, with a thoughtful tribute written by Peter Kazmaier (PhD 1978).

Interaction with undergraduates was always a pleasure for Erwin. For many years he taught organic chemistry to 2nd and 3rd year students, and physical organic chemistry at the 4th year/graduate level.

Following retirement, Erwin has remained research active in collaborations that have involved colleagues in the department (Jean-Michel Nunzi, Gary van Loon, Philip Jessop, Bob Lemieux), former students (Ik-Hwan Um, Sam-Rok Keum, Julian Dust) and others. He has now authored/co-authored well over 400 publications with a diverse group of students and collaborators. In addition, four monographs have been published, the most recent to appear in 2015.

Erwin was born in Presov, eastern Czechoslovakia, in 1931; he and his family suffered greatly during the atrocities of the Second World War. In 2008, Erwin, his wife Penny and daughters Irene and Jacqui established the Dr. Erwin Buncel Scholarship in memory of his parents, Ignacz and Irena, and sister Marta. This scholarship is given annually to a student entering the 3rd year of a chemistry program.

Coming Full Circle

by Bob Lemieux

Sometimes, circumstances come full circle in one's professional career. I have a vivid memory of moving into my 'new' office on the second floor of Gordon Hall as I started at Queen's as Assistant Professor in the summer of 1992. I was assigned the former office of the late Saul Wolfe, who had moved to Simon Fraser the previous year. Those who knew Saul will recall that he was a heavy pipe/cigar smoker and, although I really liked my office with its expansive wooden bookshelves and air conditioning unit, I had to repaint it (with the help of my wife Laura) to cover the soot ringing the upper walls. On my first official day at the office, I sat at my desk not really sure what to do—I still had to order a computer (there were no personal laptops and/or wireless networks back then…) and a lot of folks were on holidays, so it was pretty quiet. Probably ten minutes had elapsed when a Queen's student named Vance Williams knocked on my door looking for a summer job. I hired him to help me set up the lab that summer, which turned out to be somewhat of an adventure, having to discard some of Saul's old (unlabeled) chemicals, and bring a rather antiquated lab space with teak bench tops (remnants of which can be found covering the floor of Chernoff 202) to acceptable working standards. In the fall, Vance decided to carry out his 4th year research project in my lab, and he stayed on as my first PhD student. He is now a faculty member at Simon Fraser and, for some time, he was a colleague of Saul, thus coming full circle, in a way. Vance was the first of many outstanding students and Post-Doctoral Fellows I have had the privilege of supervising in my 23 years at Queen's. The credit for my scientific achievements goes to them, and I am grateful that they chose to work with me and enrich my life in more ways than one. I am also grateful for my faculty colleagues and the support staff in the chemistry department at

Queen's, past and present, who provided a stimulating and collegial environment that helped me grow as a scientist and an administrator over the past 23 years. I have made lifelong friends here.

I am now moving to the University of Waterloo as Dean of the Faculty of Science. When I was a graduate student at the University of Illinois in the summer of 1985, my PhD supervisor, Peter Beak, brought the entire research group with him to the University of Waterloo to attend the International Congress on Heterocyclic Chemistry, which was organized

by Peter's good friend Victor Snieckus. The Beak group turned out to be the life of the party at the ICHC, and we all became acquainted with the ebullient Prof. Snieckus, who always tends to be where the action is when scientists gather socially (Cardinal Puff et al.). In 1998, Vic moved to Queen's as the inaugural Alfred Bader Chair in Organic Chemistry and he became my colleague. We collaborated on joint projects that leveraged Vic's directed ortho-metalation and directed remote metalation chemistry to develop interesting new core structures for ferroelectric liquid crystal materials, and we co-supervised three graduate students. Now, 30 years later, I return to the University of Waterloo as Dean of Science. Coming full circle, indeed.

Best Wishes Ralph Whitney

by Ken Russell

Dr. Ralph Whitney retired from the department at the end of June. He came to Queen's in 1978 with a PhD under Professor Battersby at the University of Cambridge and post-doctoral research experience at California Institute of Technology. He was doubly welcome because there had been almost no appointments for seven or eight years.

At Queen's, he made significant contributions to teaching, research and administration in the department. His part of the massive load of second-year organic chemistry teaching was to lecture to engineering chemists and chemical engineers in CHEM 288. He also gave a fourth-year course.

His research interests changed from pure organic chemistry to mainly applied polymer chemistry some 20 years ago. He brought his wide background of organic reactions to problems in polymer synthesis, mainly in cooperation with Dr. Scott Parent, chemical engineering. The work culminated in his being a co-inventor of Lanxess Butyl Ionomer patents and a best paper award at the ACS Division of Rubber Chemistry. His enthusiasm for presenting papers at conferences was heightened if they were held near golf courses.

Dr. Whitney took on a share of the administrative work in the department. He was Chair of Undergraduate Studies for many years providing him with additional opportunities to interact with students.

He leaves a lasting mark on Chernoff Hall in the shape of the beautiful banners which greet you as you enter the hall. These banners incorporate a wonderful blend of science and art.

Graduate Student Life in the Department

by Nausheen Sadiq

Another year has come and gone and I am so glad to be sharing some of the adventures the Queen's Graduate Chemistry Society (QGCS). The QGCS strives to hold educational, social and charitable events throughout the year and I had the honour of being Captain of the ship on this journey. I can honestly say that the success we obtained was due to the fantastic quality of council members I had with me and the support of the students, staff and faculty! Today I hope to take you on a journey in the sun highlighting the smooth sailing we have encountered over the past year.

The graduate students in the department pride ourselves on our love for food (especially if it's free) and for this reason I must start with our summer BBQ's. This year the goal was to strive for MORE. More options, more flavour and more food! We introduced corn, chips, both Coke and Pepsi products but also branched out and introduced halal chicken hot dogs to ensure even more members of the department could enjoy our summer BBQ's.

This year we made a splash by introducing a new optional $5 membership fee. This fee would allow any graduate student to opt in and would guarantee members discounts, free stuff and additional options on events throughout the year. This was very successful and allowed the QGCS to have bigger and better events throughout the year.

As there were many major sporting events this past year the QGCS jumped in by airing FIFA World Cup games during lunch hours. The department loved it! We even started a bracket where the winner took home "Dinner for 2" at the Kingston Brewing Company, a prize donated to the QGCS during our sponsorship canvassing which brought many great connections to the department. Gabriel's Pizza became one of our sponsors and provided us with great quality food at discounted prices! We also made good friends with The Grizzly Grill where we hosted our first ever 3-course meal winter formal! The formal was a huge success with great attendance and hundreds of dollars worth of prizes.

The QGCS this year took charge of the Queen's Chemistry Graduate Symposium to ensure its longevity and this highly enhanced attendance and the quality of talks given at the symposium. Due to our fundraising efforts throughout the year we are excited to be leaving $400 to be used for prizes in the following symposium to further the already phenomenal student run symposium on campus. Our yearly Run for the Cure team was so successful that we were able to raise over $2000 for cancer research, which is a departmental record.

Every year the Queen's Chemistry Innovation Council (QCIC) visits the department and allows for students to take part in a career workshop and spend an afternoon picking the brain's of the successful QCIC members who graciously donate their time to us!

The QGCS also introduced swag this year in the form of chemistry T-shirts and beaker mugs making sure the department was left looking sharp!

We went sledding, hiking, bowling (both 5 and 10 pin), on food tours and skating. This year was filled with adventure and excitement and I want to thank everyone for helping us make this year such a success!

There is so much more to share about the incredible year we have had and I can only wait to see the amazing things the following council accomplishes.
The QGCS is a great way to get the department out and about and allows everyone to make lasting memories!

The 2014/2015 elected QGCS executive

were: Nausheen Sadiq, President; Prashant Agrawal, VP Internal; Nakkiran Arulmozhi, VP External; Christene Smith, VP Finance; Lacey Reid, 5th Floor Rep; Caitlin Miron, 4th Floor Rep; Lily Huang, 3rd Floor Rep; Alyssa Brewer, Sports Rep; Alex Cormier, Union Rep and Jacqueline Seguin, Secretary.

Ahoy from the S.S. QGCS 2014-2015,
Nausheen Sadiq
President (Captain)

Undergraduate Life

by Derek Esau

It has been a very successful and busy year for the Chemistry Department Student Council (DSC). The DSC is made up of undergraduate students from all years, with a primary function of forging a sense of community and camaraderie within the chemistry department between undergraduates, graduates, staff and faculty. Every year, the DSC holds events for departmental enjoyment and to help raise funds for an end of the year banquet to celebrate the completion of another year in chemistry. This year the DSC put on social events such as: a welcome back social event for the undergrads, department clothing sales, bake sales and two pub crawls throughout the year. The end of year banquet was held in the Renaissance event venue with an amazing turnout of over 100 guests! Departmental awards were given out for TA, Professor, and Staff Member of the Year to Jason Rygus, Dr. Richard Oleschuk and Meredith Richards, respectively. The DSC also held two information sessions for undergraduate students. The first was an information session providing information to chemistry and biochemistry students about the types of positions available in the chemistry department during the summer and throughout the year. The second information session was targeted at third year students, where fourth year students gave testimony and answered questions about doing thesis projects in the various labs of the department. This year the DSC rose to the challenge of carrying out new faulty of Arts and Science Undergraduate Society (ASUS); initiatives, creating a departmental crest and "Majors Night". To increase a sense of identity between different majors in Arts and Science, ASUS commissioned that each undergraduate department create a crest that will identify them from their peers in other departments. The DSC held a design contest and the winning design was submitted by Timothy Hutama. It is expected that the crests will appear as patches on Arts and Science jackets next year. "Majors Night" was an opportunity for first year students to talk to and ask for advice from upper year students from each department before they select their major. The DSC did an excellent job answering questions and reassuring students about the decision of choosing their major. DSC members also participated in giving campus and Chernoff Hall tours to prospective students. Lastly, the DSC conducted administrative duties such as teaching assessments, meetings with other DSCs and reporting information about the department to ASUS. This was a great year, with many challenges that were overcome by the dedication and hard work of the DSC members, this year would not have been possible without everyone!

Science Rendezvous

by Lily Huang and Gillian Mackey

Thanks to the members from the Department of Chemistry for contributing to the success of Kingston's Fifth Annual Science Rendezvous. The event took place on May 9th in the K-Rock Centre with over 40 participants to showcase the wonders of science to approximately 4000 visitors. The Department of Chemistry had three exhibits. Dr. Philip Jessop presented a chemistry magic show, along with Edward Cieplechowicz, Josh Clarke, Tamara de Winter, David Jessop, Michael Jessop, Michael MacLean, Mina Narouz, and Christene Smith. Dr. Hans-Peter Loock demonstrated the science of lasers with his students, Nicholas Andrews, Sogol Borjian Borojeni, Hao Chen, Annica Freytag, Amy MacLean, Yoany Rodriguez-Garcia, Rachel Ross, John Saunders, and Michaela Thomas. Visitors were also able to try hands-on chemistry with Kyle Bachus, Lucas Choma, Katie Flynn, Sufiat Fusigboye, Lily Huang, Gillian Mackey, Meghan McIlwain, Jason Rygus, Nausheen Sadiq, Jiahui Shen, and Ryan Yuan.

Congratulations

Yingli Rao!

Yingli Rao is the recipient of the Governors Gold Medal Award at convocation. Yingli Rao obtained her BSc degree in materials chemistry from Nankai University in China in 2007. She then went on to Queen's University for graduate studies with Professor Suning Wang. She worked on the luminescent platinum- and boron-containing materials and obtained her master's degree in 2009. After a one-year break back home in China, she resumed her PhD work under Professor Suning Wang in 2010, focusing on the development of smart materials based on photo- and thermal- responsive organoboranes. During her PhD study, she was awarded the prestigious Vanier Canada Graduate Scholarship from the Canadian government and a Marie Mottashed Graduate Scholarship from Queen's University. She has published 18 peer-reviewed papers in high-impact chemistry journals and pioneered in the area of photochemistry of organoboranes. In addition, Yingli further extended the collaboration with researchers internationally. She studied "ferrocene modified boranes" at the University of Tokyo with Prof. Hiroshi Nishihara for three month in 2013, and conducted a collaborative research on "Exploration of the reactivities of B=C double bond" at University of Würzburg, Germany with Professor Holger Braunschweig.

Recent Research in the Mosey Group

Research in the Mosey group involves using and developing chemical simulation methods to address research problems of fundamental and applied interests. Recent efforts in our group have focused on understanding how materials and molecules respond to applied mechanical stresses. To do this, we employ a combination of static electronic structure calculations, e.g. density functional theory calculations, and molecular dynamics simulations to understand how applied stresses affect the atomic-level properties of molecules and materials. The results of the simulations are often used to develop and validate models that connect these atomic-level details to properties that can be controlled in experiments. Such models are useful in the context of understanding and guiding experimental research efforts. In addition to the applied aspects of our research, we develop techniques to overcome limitations of existing simulation methods.

Our research has particular applications to tribology - the study of friction, wear and lubrication. In this context, we are trying to understand the atomic-level origins of friction and develop better means of controlling friction and wear. Recent work in our group has led to the development of a predictive model that relates the friction coefficient, a key quantity used in a wide range of applications, to atomic-level features of the materials forming sliding contacts. This model provides fundamental insights into the atomic-level origins of friction and the ability to rationally design systems with desired levels of friction. Additional work in our group has shed light on ways to use reactions that occur within sliding contacts to fine-tune the properties of lubricants. In particular, we have demonstrated that the extreme pressures encountered during sliding can transform the structures of lubricants in ways that permit detailed control of friction and wear throughout a sliding cycle. Moreover, our calculations show that the pressures at which these transformations occur can be controlled by varying the electronic properties of the lubricant molecules. Finally, we have explored novel forms of lubricants, with key results showing that hydrogen bonded two-dimensional systems may be robust, effective systems for controlling friction and wear.

We have also used simulations to study how applied stresses induce reactions within molecular systems - an emerging area termed mechanochemistry. Our recent work in this area has shown how applied stresses can be used to drive bimolecular reactions, led to strategies for designing molecules in which applied stresses are directed to desired reactive centres, and shed light on how combinations of stresses and torques can be used to control axial chirality. In addition, our group has recently begun to explore the atomic-level processes involved in the mechanochemical synthesis of solid-state systems.

Finally, we are developing new techniques that allow us to perform more realistic simulations. Recent progress in this area has led to the development of strategies that can in principle increase the time scales accessible in molecular dynamics simulations of reactive

processes by several orders of magnitude compared to existing methods, while still accurately describing the dynamics of the system. We have also developed ways to incorporate quantum mechanical exchange interactions into planewave density functional theory calculations of materials at a reasonable level of computational effort. Such abilities may permit the use to hybrid exchange-correlation functionals (like the widely-used B3LYP functional) in electronic structure calculations of condensed-phase systems, which has proven computationally intractable to this point in time.

Kingston Nano-Fabrication Laboratory is Now Open for Business

Back in 2011, Queen's University as host institution was awarded a CFI grant for a project entitled "Embedded Systems Canada" (Dr. Oleschuk Queen's Principal Investigator). For Queen's this meant more than $2 million in new microfabrication equipment and computer assisted design tools. After significant planning, consultation, negotiation and construction the Kingston Nanofabrication Laboratory opened its doors for research and development on April 24th of this year. We were fortunate to have MPP Sophie Kiwala representing Kingston and the Islands, Mr. Pierre Normand representing the Canada Foundation for Innovation, MP Ted Hsu, Kingston Mayor Bryan Paterson and Dr. Steven Liss VP Research for Queen's University on hand for the ribbon cutting ceremony. The new facility expands Canada's network of university-based micro-nano discovery labs and is part of a $50 million, five-year project involving more than 350 university researchers at 37 institutions. The KNFL's highly specialized equipment and advanced expertise provide users with more automated, faster and cost-effective methods and processes for transforming innovative 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. The KNFL will provide advanced training for students, who not only learn to operate highly advanced equipment, but also have the opportunity to explore its limitations and opportunities, enabling them to push the envelope on established manufacturing practices, potentially leading to better products and processes of value to industry. Partnering in the KNFL are Queen's University, the Canada Foundation for Innovation, the Ontario Ministry of Research and Innovation and CMC Microsystems. Earlier this year the lab was further bolstered by an additional $1 million Canadian Foundation for Innovation Grant (Principal Investigator Dr. Jean-Michel Nunzi, Queen's chemistry and physics) for additional fabrication and characterization tools.

The Establishment of the Walter A. Szarek Endowed Lecture Series

by Jason Z. Vlahakis

For nearly 50 years, Professor Walter A. Szarek has been an exceptional member of the Department of Chemistry at Queen's University. This long-standing commitment to the faculty, staff and students of this university is about to be acknowledged by the introduction of the Walter A. Szarek Endowed Lecture Series that will attract esteemed speakers to Queen's University on a regular basis. In much the same fashion as the man himself, the lectureship will continue to cast long shadows on the training of students and the development of chemical research conducted here in the Department of Chemistry.

To acknowledge Walter's many contributions over his career at Queen's, the department is pleased to host a reception during Homecoming (Saturday, 24 October 2015, 10am, Chernoff 117). Light refreshments will be served in the Walter MacFarlane. Smith Family Room at 11am.

We look forward to seeing you on the 24th of October.

To mark this occasion, the department is establishing the Walter A. Szarek Endowed Lecture Series. Fund raising for this initiative will be officially launched at Homecoming, however donations prior to this event may be made at the following link: www.givetoqueens.ca/ProfSzarek

Walter Szarek is known for his multidisciplinary research programs involving the interface of chemistry with medicine, in particular, drug discovery and development. His academic training involved attending McMaster University (BSc and MSc), Queen's University (PhD) and Ohio State University (Postdoctoral Fellow). He was appointed Professor of biochemistry at Rutgers University before his return to Queen's University as a Professor of chemistry in 1967. He has been a member of numerous organizations and advisory boards: ACS, NSERC, PainCeptor Pharma, OSTA Biotechnologies and the Alzheimer's Drug Discovery Foundation/Institute for the Study of Aging. Walter has received some very prestigious awards and honors including the Queen's Undergraduate Teaching Excellence Award, the Queen's Graduating Class Award for Teaching Excellence in Chemistry (three times!), the Claude S. Hudson Award, the Melville L. Wolfrom Award and the Prix d'Excellence – Claude P. Beaubien Award. His stellar research projects continue to attract funding from many sources such as NSERC, CIHR, BioDiscovery Toronto and from industrial partnerships. According to my count, Walter has approximately 286 publications (journal articles, patents and books) as of May 2015, and will no doubt surpass the 300-mark soon. A special issue of the Canadian Journal of Chemistry was dedicated to him in 2006.

Walter's tireless research efforts resulted in the establishment of the company Neurochem, Inc. (now Bellus Health, Inc.). He was a principal investigator/founder of this company – clinical milestones of this

company include the medications KI-ACTA (for the treatment of Amyloid A (AA) Amyloidosis) and ALZHEMED (for the treatment of Alzheimer`s Disease). You may have even bought one of his creations (VIVIMIND) off the shelf at Shopper's Drug Mart for the protection of memory function. If you don't remember buying it, you probably didn't. Although Walter does not like the narrow label of a 'carbohydrate chemist' (and rightly so), he is indeed one of the godfather's in this area and once held the title of Director of the Carbohydrate Research Institute. His publications in Carbohydrate Research alone are staggering reminders of his contributions to sugar chemistry. Although he prefers regular table sugar in coffee, he is no stranger to the synthesis of sweeteners such as sucralose, nor to the use of modified sugars in their relation to antibiotics and enzyme inhibition. In fact, the design of enzyme inhibitors has always been a part of Walter's research; heme oxygenase inhibitors and inhibitors of various glycosyltransferase enzymes are a few of his more-recent interests. His MedChem efforts have also led to the design of well-known anti-cancer agents displaying wide-spectrum anti-tumor activity (with Osta Biotechnologies), drugs for pain management (with PainCeptor Pharma) and anti-malarial/anti-bacterial agents (with the University of Toronto). Numerous collaborations within our own Queen's University community (especially pharmacology, biochemistry and pathology) have led to immense respect for his scientific abilities and immeasurable long-lasting friendships. His numerous collaborators from diverse backgrounds are no doubt secrets to his success and help to illuminate his footprints on this ever-changing environment of a modern medicinal chemist.

Walter has an appreciable sense of humor and always has a comical chemical-related story to tell. Drop by his office to see what I mean. However, be forewarned: his grammar is impeccable and he will correct yours. Particularly at a biochemistry-related thesis defense, he will point out the difference between knowing your chemistry and knowing you're chemistry. Accordingly, he will not likely enjoy the missing oxford commas in this article, nor the missing capitalization in this sentence, but I have included them intentionally for good humor (Or is it humour? Or is it not included?).

The honor of having a named lecture series could not go to a more-deserving individual. As a researcher I have personally been blessed with his guidance for more than a decade, always enjoying the multitude of new scientific vistas we have explored over the course of our travels, and in particular, Walter's mentorship and friendship. I would like to believe that I chose my own way when deciding to enter his famous laboratory (as a postdoctoral researcher), although some believe the middle name I inherited from my grandfather of Zaharias (zahar for sugar) made the connection between us inevitable.

Congratulations Walter, from all of us, for your distinguished teaching and research career, for your continued dedication to science and for the celebratory introduction of this endowed lecture series.

Please join us on

Saturday, October 24th

10am Reception
in Chernoff 117

Honouring Prof. Walter Szarek

11am Light Refreshments
Served in CHE 202

www.givetoqueens.ca/ProfSzarek

TA Teaching Awards

Promoting Excellence in Teaching Assistants in Chemistry

TA award recipients (left to right): Larissa Smith, David Thomas Teaching Assistant Award for Synthetic Laboratory; John Omo Ikpugha, William Patrick Doolan Prize in Chemistry; Stephanie Whyte, Friends of Chemistry TA Award for Excellence in Teaching; Nicholas Andrews, Fisher Scientific Teaching Assistant Award for Chemistry Tutorials

Congratulations to the Class of 2015!

Front Row (from left): Lisa Stephens, Fiona Logue, Nicole Calvert, Elizabeth Ferrell, James Fan
Back Row (from left): Robert Teuma-Castelletti, Spencer Bridgwater, Lucas Choma, Michelle Lemieux, Rosemary Bakhurst, Derek Esau, Sarah James, Gabrielle Klein, Meghan Marchuk, Zachary Mah, Shane Colborne, Timothy Hutama

2015 Departmental Picture

We are pleased to announce that the following speakers have been confirmed for our 2015-2016 Seminar Series. For more information and dates, please visit our website at **http://www.chem.queensu.ca/departmental-seminar-series**

Prof. Bernard Kippelen, Georgia Institute of Technology, U.S.A.

Prof. Federico Rosei, Ėnergie Matériaux Télécommunications Research Centre, INRS

Prof. Samuel Johnson, University of Windsor

Prof. Lisa McElwee-White, University of Florida, U.S.A.

Prof. Scott Gilbertson, University of Houston, U.S.A.

Prof. Matt Sigman, University of Utah, U.S.A.

Prof. Christian Pellerin, Université de Montréal

Prof. David MacMillan, Princeton University, U.S.A.

Prof. Krzysztof Matyjaszewski, Carnegie Mellon University, U.S.A.

Prof. Zhifeng Ding, University of Western Ontario

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