2012 DISTILLATIONS

University of Toronto

CHEMISTRY ALUMNI MAGAZINE

Voices from our Past: Profiling the diverse and rewarding careers of our alumni

INNOVATION • EDUCATION • EXCELLENCE

Message from the Chair

Our Department of Chemistry has one of the finest collection of people you could meet who work together to educate scientists and make discoveries that will lead to a better, more sustainable future. This issue of Distillations highlights the accomplishments last year of our students, faculty, staff and alumni. They may wear IUPAC-MAN tee-shirts but they are changing how we think about world.

Take the example of the Green Chemistry Initiative that you will read about in this issue. This is a grassroots movement of graduate students to promote less wasteful, more efficient ways of doing chemistry. This effort is linked to the research of our world-leading catalysis groups because the discovery of catalysts can lead directly to "greener" chemical processes. Read in this issue about the catalysis work of Associate Chair Mark Lautens and Canada Research Chair Doug Stephan, the research of Vanier scholarship holders Si Yue Guo and Melanie Mastronardi and of the Chair's Doctoral medal holder Charles Yeung.

Also featured in this issue are highlights of our research leadership in many other areas. Environmental Chemistry is highlighted by the work of Jon Abbatt and Jennifer Murphy, medicinal chemistry by Aaron Wheeler and Andrei Yudin, solar energy materials by Dwight Seferos, and entrepreneurship by Cynthia Goh. Dwight Seferos and Mark Taylor were made Canada Research Chairs last year, making a total of eight for our Department. Congratulations!

As the Department strives to be greener, so does the University, led by Scott Mabury, past Chair of Chemistry and now Vice President, University Operations. He leading the effort to make the university more cost and energy efficient. Fifty years ago the Lash Miller Chemistry Labs were designed to carry out chemistry safely but energy efficiency was not considered a priority. We are taking the first small steps in reducing the energy consumption of the building by safely decreasing the flow of conditioned air through the undergraduate labs when they are not in use. Even this was a complicated process that required the talent and good will of many people. A future, larger project priced at $30M will be to added badly needed expansion space to Lash Miller and provide more research space and "swing space" while the air handling is modernized.

We had a surprise visit by the Premier of Ontario and four cabinet ministers in April 2013 to tour our very impressive analytical facilities and hold a press conference. The NMR staff showed off their new, extremely sensitive 500, 600 and 700 MHz spectrometers and two with cryoprobes in our large, new NMR facility. The NMR, X-RAY and AIMS (mass spectroscopy) labs have grown over the past five years into world class facilities thanks to grants from CFI/ORF to Mark Lautens, and NSERC to myself, and resourceful management by Tim Burrow, Alan Lough and Matt Forbes. Now it is ANALEST's turn. Thanks to Andrei Yudin's success last year in obtaining CFI/ORF funding, ANALEST, managed by Dan Mathers, will be the next to expand with new equipment for the Centre for Chemical Analysis.

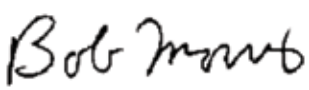
We owe a debt of gratitude to many individuals who have selflessly supported our academic and research mission. Jamie Donaldson served as a wonderful Associate Chair, Graduate Studies over the past five years; guiding students and ensuring that they found supervisors; running workshops and recruiting weekends; developing funding plans; performing scholarship ranking; and sometimes serving in my place. The number of graduate students expanded considerably over his term to the present number of about 280. During this time an impressive fraction of the total number of prestigious NSERC Hamer and Vanier scholars in Canada were in our Department. Jamie will tell you that he devoted 106 h to the job but he still manages to take out his sailboat! At the end of 2012, he turned over the reins to Gilbert Walker, who has ably taken the challenge of recruiting the students we need for research. Of course, the tremendous effort of Penny Ashcroft Moore, Anna Liza Villavelez and the rest of the Chair's office staff should not be overlooked in the successful administration of our large graduate program. The University recognized this when Penny was awarded the Dean's Distinguished Long Service Award. Finally, we are very thankful to the alumni who endowed four graduate scholarships last year;

Message from the West

two were obtained with the help of a match from the Provost's PhD Enhancement Fund. This will help us recruit the best and brightest students to our Department.

Rob Batey has distinguished himself as a Faculty of Arts and Science Teaching Award Winner and exceptional leader of our undergraduate program as Associate Chair since 2009. He spearheaded the creation of the popular Synthetic and Catalytic Chemistry Specialist program and created and taught the popular course for non-scientists: The Chemistry and Biology of Organic Molecules: Sex, Drugs and Rock and Roll! The enrollment in the latter has doubled over the past two years. Congratulations to Rob with great admiration and thanks. Again the Chair's office staff has worked tirelessly with Rob and the Undergrad Studies Committee to provide our chemistry students with a first rate learning environment. No wonder that Undergraduate Counsellor Armando Marquez won the Outstanding Chemistry Staff Award. Our undergrads welcomed two new enthusiastic Lecturers to the Department last year, Jessica D'eon and Barbora Morra who write about themselves in this issue. They join a distinguished group of Senior Lecturers including Andy Dicks, who won the 2012 Ontario Confederation of University Faculty Associations (OCUFA) Provincial Teaching Award, the highest honour bestowed to a higher education faculty member teaching at an Ontario college or university. Andy writes about mentoring Canada's very successful Chemistry Olympiad team. The consistent support of donors for our teaching mission is gratefully acknowledged.

It has been an honour and pleasure for me to Chair this amazing Chemistry Department. It was made possible thanks to all of the people here that have put their heart and soul into our great and worthy mission of education and research.



Robert H. Morris, FCIC FRSC
Professor and Chair
Department of Chemistry

Honours and Distinctions

Professor Voula Kanelis is the recipient of a prestigious Canadian Institutes of Health Research (CIHR) New Investigator Award, valued at $300,000 over 5 years, to pursue her structural biology studies of membrane transporter protein regulation and the role of mutations in these proteins in causing diseases such as cystic fibrosis, dilated cardiomyopathy, atrial fibrillation and increased risk of myocardial infarction. This award is in addition to the NSERC Discovery and CIHR Operating grants held simultaneously by Professor Kanelis and will provide a measure of teaching relief to permit her to pursue her research even more vigorously.

Professor Ulli Krull, Vice-Principal, Special Initiatives and Vice-Principal, Research, at UTM, received a Community Services Award from Life Sciences Ontario at their gala on Wednesday, Feb. 27, 2013. The award recognizes "an individual who has helped build the life sciences community and strengthen its local and global reputation, where he or she has gone above and beyond the call of duty." Life Sciences Ontario (LSO) is an organization that represents and promotes the province's life sciences sector, collaborating with governments, academia, industry and other provincial and national groups to promote and encourage commercial success. LSO has established relationships with nearly 30 partner organizations and currently represents over 150 individual and corporate members. Professor Krull is a professor of analytical chemistry and holder of the AstraZeneca Chair in Biotechnology. He is recognized as one of the leading analytical chemists in Canada. He has also been a very active member of the community, playing various leadership roles, including his current appointments as chair of the Healthy City Stewardship Centre and vice-chair of Advantage Mississauga. Past awards/honours have included the Faculty Teaching Excellence Award at UTM; the University of Toronto Faculty Award, which recognized Krull's excellence in research, teaching, and service, and the inaugural Outstanding Contributor Award from the School of Continuing Studies.

For the third year in a row, the Erindale Chemical and Physical Sciences Society won first place in the Chemical Society of Canada National Student Chapter Competition. ECPS is ably advised and mentored by Judith Poë, Senior Chemistry Lecturer in the UTM Department of Chemical and Physical Sciences.

On a related note, Judith Poë has been reappointed as the Chair of the Board of Trustees of the Canadian Chemical Education Trust. In addition, she will co-chair with Andy Dicks, the IUPAC 23rd International Conference on Chemistry Education, ICCE2014, to be held at the University of Toronto in 2014.

Undergraduate Chemistry Laboratory Renovations to be Completed

In Fall 2011, the first major stage of a complete renovation of UTM undergraduate chemistry laboratories was finished, on-time and on-budget, at a cost of roughly $6 million. The final stage of the renovation, started on April 1, 2013, has a budget of $3.2 million target completion dateof Sept 1, 2013 just in time for the start of the undergraduate term. While the first stage of these renovations focused on facilities for large 1st and 2nd year undergraduate chemistry courses, this last stage will provide the infrastructure necessary for conducting advanced upper-year chemistry courses including chemical synthesis laboratory courses, biological chemistry techniques courses, and analytical instrumentation courses. As in the earlier stage of renovation, the design of these new laboratories was a collaborative process involving chemistry faculty, technical staff, UofT facilities engineers and external architects, working to achieve results that will provide for excellence in undergraduate chemistry education well into the 21st century.

- Peter Macdonald, Professor and Chair
Department of Chemical and Physical Sciences
University of Toronto Mississauga

Message from the East

This year, the Chemistry Group at the Department of Physical and Environmental Sciences (UTSC) welcomed Artur Izmaylov, a new faculty member at the assistant professor level. Artur brings to the Department expertise in developing electronic structure and quantum dynamics methods. In particular, his research focuses on the development of computational methods to obtain a detailed understanding of processes involving simultaneous dynamics of electrons and nuclei. Such processes find application in many areas of fundamental and technological importance, including: solar energy conversion, UV-light DNA damage and repair, magnetic field sensitivity in living species, catalysis at surfaces, and general surface chemistry.

The chemistry faculty at UTSC continue to expand on collaborative opportunities for graduate students. Vinci Hung, a PhD candidate in Kagan Kerman's group, collaborated with the Joseph Wang research group at the University of California San Diego on the development of a medical sensor that attaches to the skin in the form of a temporary tattoo. The sensor comes in several designs, including a smiley face, and monitors epidermal pH. The Izmaylov and Zhang groups have also joined forces in order to find safer and better Mn-porphyrine contrast agents.

2012 saw the opening of a clean laboratory, a major piece of new infrastructure at UTSC. ALFONSE (Advanced Laboratory for Fluorinated and Other New Substances in the Environment) is a dedicated facility for processing environmental samples for organic contaminant trace analysis. The lab is the only one of its kind in the country, featuring a series of filters which block out possible trace gases and particles. Such extreme filtering ensures quality results by removing even the smallest contamination that might taint specimens found inside the lab. UTSC's analytical facility, the TRACES lab, is now fully functional and serves as an infrastructure hub for structural analysis to our undergraduate and graduate researchers. A recent addition to our facility is an X-ray fluorescent instrument, which has proven critical for providing insights into the chemical composition of complex geological samples.


ALFONSE lab

There are exciting times ahead and we are looking forward to future expansion at UTSC. Planning is now underway for a new science building to be located on the north end of the UTSC campus. This building will house new research and teaching space for chemistry and will enable strong interactions between researchers and students at all levels that are representative of the University of Toronto's strong research culture.

- Bernie Kraatz, Professor and Chair
Department of Physical and Environmental Sciences
University of Toronto Scarborough

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Questions? Ideas?
Contact Chemistry at
416-978-3564 or
chair@chem.utoronto.ca

In this Issue

Alumni Profiles

Chemistry alumni pursue diverse and rewarding careers

Michael Corbett

Graduated with a BSc in 1981, an MSc in 1986 and a PhD in 1989 with supervisor Michael Menzinger. Michael is a Forensic Toxicologist at CRS Inc.

After graduating from Chemistry, I completed additional courses in pharmacology and physiology at UofT. I began working as a Research Scientist (later a court-going Forensic Toxicologist) in the Toxicology section at the Centre of Forensic Sciences for the Province of Ontario in 1988. In 2011, I received a Master of Laws degree (LL.M.) specializing in Criminal Law and Procedure from Osgoode Hall Law School at York University. I am now self-employed and engaged by legal counsel to write forensic toxicology reports and attend court to provide expert evidence in both criminal and civil trials. I am also an adjunct Associate Professor and lecturer in Forensic Sciences at UOIT, a Community Instructor for UofT's School of Continuing Studies and a Consultant Inspector/Auditor for the National Laboratory Certification program. During my career, I have conducted original research on the pharmacokinetics of ethanol in over 800 forensic human subject using breath testing.

My experience in Chemistry provided me with a solid theoretical and practical foundation of the science and technology of the detection of chemical substances in different physical states, and encouraged a spirit of creativity.

Do you have any advice for recent and soon-to-be graduates?

Recognize the range and respect the limitations in publications. Strive to create and be intellectually curious, responsible, flexible, appreciative and accepting of arduous tasks. In seeking gainful employment, consider an analogy of the remark made by President Kennedy at Rice University, "Ask not what your country can do for you, ask what you can do for your country."

What are some of your favourite memories from your time at Chemistry?

Receiving encouragement from Professor Polanyi during my oral thesis defense.

Do you have anything else you'd like to share with other Chemistry alumni?

I've been happily married to my wife, Eileen for 17 years, and am the proud father of daughter Julianna (11 years old).

Interested to learn more about what Michael is doing? You can reach him at michael.corbett@utoronto.ca.

Karolina Fritz

Graduated with a PhD in 2007 with supervisor Gregory Scholes. Karolina is currently an Instructor at the Institute of Holistic Nutrition and Institute of Traditional Medicine.

I have always been passionate about teaching. I taught my first lesson during high school as part of the Peers as Teacher's Helpers program. Since then, I have taught, tutored, and otherwise educated adults and children alike in an array of science and technology topics. A big part of teaching is being able to present in front of an audience. During my studies at Chemistry UofT, I was able to hone my presentation skills. Professor Scholes always insisted that we prepare for conferences. He used to tell me, "if you can get past the first three slides, then the rest of the presentation will go seamlessly". I still remember constantly practicing the first three slides of my talk before delivering each presentation.

After completing a one-year certificate program in Holistic Nutrition and a certificate in Energy Medicine at the Institute of Holistic Nutrition, I began teaching holistic and scientific theories at various advanced adult learning institutions. At the Institute of Holistic Nutrition, I designed and taught the Chemistry of Essential Oils course as well as designed and updated the Advanced Nutrition Research course and its course notes, which focuses on Statistics and Research Methodology. I currently teach Principles of Biomedical Sciences for the Institute of Traditional Medicine. One of my biggest professional successes has been starting my own business, Medium2 with Danielle Hurst, where we help people connect with their loved ones who have passed on.

Do you have any advice for recent and soon-to-be graduates?

Follow your passion and have the integrity to stand-up for it. Know who you are and live who you are.

(Cont. on pg. 8)

Christoph Hebeisen

Graduated with a PhD in 2009 with supervisor R. J. Dwayne Miller. Christoph is currently Manager – Vulnerability Research at the TELUS Security Labs.

After finishing my PhD, I worked as a Post Doc in Professor Paul Corkum's group at the NRC/University of Ottawa. I took a graduate certificate program at the University of Washington in Critical Infrastructure Protection through distance education. I had been interested in IT security for a long time, but this program really drove home the importance of the field and awoke my passion for it. Afterwards, I began working at the TELUS Security Labs as a Security Researcher with the Vulnerability Research team. We reverse engineer software, file formats and network protocols to determine how vulnerabilities in software could be used to break into computer systems. We use our findings to develop detection methods, which are then used to detect intruders in computer networks and to stop attacks as they are happening. Protecting computer networks against intruders struck me as a fascinating challenge when I first heard about this line of work. It presented the opportunity to use my passion for IT, my research skills and my love for solving puzzles – and to get paid for it. I became the manager of the Vulnerability Research team last August. While moving into management has reduced the technology component of my job, it has brought with it a new set of exciting opportunities and challenges in shaping the workflow, the team, our products and our interactions with customers.

While I always had an interest in programming, my research with the Miller group offered me an opportunity (or maybe an excuse) to hone my skills in a number of programming languages and learn about different programming paradigms. I still use this knowledge every time I reverse engineer software. The persistence required to drive a research project forward and persistently searching for creative ways to attack difficult problems are some of the skills I learned as a grad student. They translate well to many jobs and are a great asset outside of academia. They certainly helped me immensely in moving my career forward.

Do you have any advice for recent and soon-to-be graduates?

There is more than one way to build a career with your graduate degree. Be open to the possibility that professional fulfillment is not limited to the plan you had when you entered grad school. Think about how the skills developed in grad school (i.e: research, writing, critical thinking, public speaking, teamwork, leadership) are applicable to the career fields you are interested in pursuing. Don't expect employers to understand how your experience is applicable – tell them how your skills and experiences will benefit them.

What are some of your favourite memories from your time at Chemistry?

My favourite memory of all time occurred in Chemistry: I met my wife, Sadia. Another would have to be the moment I realized that I had indeed observed and characterized a truly femtosecond electron pulse. Ralph Ernstorfer, a postdoc who worked on this project with me, and I had literally been working around the clock in alternating 12 hour shifts at the Advanced Laser Light Source (ALLS) trying to make this experiment work. The memory of seeing the results of the preliminary analysis of the data in the wee hours still gives me goose bumps.

Interested to learn more about what Christoph is doing? You can reach him at heby@castanea.ca.

Huda Henry-Riyad

Graduated with a BSc in 1999, an MSc in 2002 and a PhD in 2004 with supervisor Thomas Tidwell. Huda is currently the CEO of The Key Publishing House.

After graduation I worked for a year as a Post Doc at Texas A&M University with Professor Daniel Romo. Afterwards, my partner and I founded The Key Publishing House Inc., in order to support our research center (The Key Research Center) where we could combine collaborative social and physical sciences research without relying on external funding. During the last few years, our business has witnessed extraordinary development and expansion. As a result, we've been able to move into other opportunities such as consulting and private equity investments. We currently have joint venture partnerships with different firms around the world.

As the CEO of a growing company, I am responsible for overall company strategy. I oversee eight different departments that deal with the whole process of publishing and marketing of books in both print and electronic mediums. I am responsible for planning, directing and coordinating operation activities at the highest level of management.

I learned a lot from Professor Tidwell,. He was a great teacher and has had a positive impact on my life. He could present any complex idea in a clear, concise, eloquent manner in a style that was very accessible to his students. His supervision, advice, and support expanded my academic and non-academic horizons and helped me in all different aspects of my life. The Chemistry grad program has also made a significant contribution to my career achievements. The focus, dedication and hard academic work strengthened my critical thinking skills and and enhanced my overall intellectual abilities. Furthermore, it helped build my confidence and enabled me to judge difficult situations with a scientific approach to find the optimum solutions. Learning is still an integral part of my life, and I strongly believe that education is a never ending endeavor.

Do you have any advice for recent and soon-to-be graduates?

Set your own vision, be persistent, work hard and continue learning. It doesn't matter which academic field you specialize in University, what matters most, is how you transfer your academic skills of critical and analytical thinking to achieve your goals.

What are some of your favourite memories from your time at Chemistry?

All of my memories at Chemistry are favourite ones. I had a very pleasant experience with everyone in the Department. I feel privileged to have worked with great colleagues in research and teaching and have built life-long friendships.

Interested to learn more about what Huda is doing? You can reach her by visiting: www.thekeypublish.com

Baagi Mmereki

Graduated with a PhD in 2005 with supervisor Jamie Donaldson. Baagi is currently the Director of the University of Botswana Foundation.

When I came to UofT to study, I was already employed as a Chemistry Professor at the University of Botswana. Upon completion of my PhD, I returned to my job. In fact my PhD was sponsored by the University of Botswana. All of my schooling, from primary school, undergraduate to graduate studies were achieved through scholarships. I always intended to give back to the community in the same manner. While I was working, first as a Sr. Lecturer, then later as the Chair of the Department, I started doing voluntary work with the Foundation, and I found it very satisfying. When I had the opportunity to become the Director in 2010, I jumped at the chance. As the Director of the University Foundation, my main mission is to oversee the University's advancement initiatives and funding drives. I coordinate fundraising efforts to achieve the University's vision of being a centre of academic in Africa and beyond. My job entails interacting with people from all walks of life who are working towards an educated nation. Chemistry at UofT gave me a great start to my career by giving me the requisite proposal writing, research and presentation skills that I now use in order to match our vision with the social investment aspirations of individuals and corporations.

Do you have any advice for recent and soon-to-be graduates?

Perseverance and focus are key. But most importantly, don't mask your weaknesses, but rather work on them. UofT has plenty of activities to enhance one's skills.

What are some of your favourite memories from your time at Chemistry?

There are plenty. I always enjoyed the annual Environmental Chemistry Colloquium. Another was when I learned that I had received an award for good results from the previous semester. The activities by the student run Chem Club were memorable as were socials with our Profs. The soccer discussions and arguments with the guys at ANALEST kept me sane.

Do you have anything else you'd like to share with other Chemistry alumni?

I'm now the proud father of two daughters. I already had one child when I was at UofT. I added a second to my clan just five years ago.

Interested to learn more about what Baagi is doing? You can reach him at MMEREKI@mopipi.ub.bw

Karolina Fritz (cont. from pg. 6)

And never compromise who you are!

What are some of your favourite memories from your time at Chemistry?

There are too many to choose from: the infamous Scholes' pub crawls, Peggy's Halloween parties, sleepless nights at the lab running experiments.

Interested to learn more about what Karolina is doing? You can reach her at lina.fritz@utoronto.ca.

Rui Resendes

Graduated with a BSc in 1996 and a PhD in 2000 with supervisor Ian Manners. Rui is currently the Executive Director at GreenCentre Canada.

Chemistry is everything. Chemistry can change the world. One of the things I have learned as my career has evolved is that there is a tremendous wealth of technology that resides both within the academic and the entrepreneurial communities. All of these technologies have tremendous potential. However, academic research is intended to advance the science and not necessarily to build product prototypes. GreenCentre Canada was developed to take a "hands on" approach to commercializing emerging Green Chemistry innovations originating from academia and industry. Our job is to transform these breakthroughs into green products, services, and industries to enhance our quality of life and preserve our environment for existing and future generations. After assuming the role of Director of Commercial Development, Chemistry and Materials, at Queen's University's PARTEQ Innovations, I led the creation of GreenCentre Canada. Growing GreenCentre Canada into an internationally recognized organization is one of my greatest professional successes. As the Executive Director, my role is primarily to oversee strategic expansion, with plans to expand into US and European markets.

When I look back at my education with Professor Ian Manners, in one of the largest research groups in Toronto, I was surrounded by top-notch scientists. Working in a group like that forced us to excel and instilled in us a sense of healthy competition.

Ian encouraged us to always push the edges of the envelope. Since leaving UofT, Ian's approach has continued to serve me well throughout my career.

Do you have any advice for recent and soon-to-be graduates?

I invite young chemists to read an article in the March/April 2013 issue of ACCN ("Mass Appeal", Vol 65, issue 2), in which I highlight the importance of effective communication. As scientists, our job is ultimately to advance the human condition. We sometimes fall into the trap of focusing on our research and have trouble articulating why our work matters, but it's important to be able to explain to non-chemists why they should care about chemistry.

What are some of your favourite memories from your time at Chemistry?

I have some fantastic memories from my time at Chemistry, most of them started with the Chem Club or the GSU.

Do you have anything else you'd like to share with other Chemistry alumni?

I believe that it's important to always maintain a second passion. If you're one-dimensional, you'll be incremental.

Interested to learn more about what Rui is doing? You can reach him at rui.resendes@greencentrecanada.com

Design Your Own Reunion

Do you want to get in touch with your friends from Chemistry at UofT? You're not restricted to attending the Spring Reunion. We can help you plan your own reunion! We have a BBQ and a gorgeous patio that can be used in spring, summer or fall, and our fabulous Davenport Atrium can be used in inclement weather.

Department of Chemistry Christmas Party, December 1953, Undergraduate Inorganic Laboratory, Wallburg Building. Photo credit: W. A. E. McBryde

Please contact Penny Ashcroft Moore at 416-978-3566 or send an email to chair@chem.utoronto.ca for more details.

Do you have news to share?

Have you published an article or been featured in the media recently?

Perhaps you have celebrated a promotion, wedding or birth recently that you would like to share with your fellow alumni.

Contact us at chair@chem.utoronto.ca so that we can work with you to share the details of your success!

Alumni News

Professor Jason Dwyer (PhD 2005 with R.J.D. Miller) of the University of Rhode Island and co-founder of Insight Nanofluidics, was recently awarded a five-year $400,000 CAREER award for research from the National Science Foundation (NSF). The award was granted through the NSF's Faculty Early Career Development Program. Jason plans to use the award to combine elements of chemistry and engineering in order to develop new methods for diagnosing medical conditions using hand-held technology.

Professor Mark MacLachlan (PhD 1999 with G. Ozin and I. Manners) of UBC was awarded an NSERC E.W.R. Steacie Memorial Fellowship in recognition of his contributions to supramolecular and materials chemistry. Mark's research involves several areas of supramolecular chemistry, including conjugated metallomacrocycles, inorganic molecular capsules and porous materials. Recently, he developed a new family of chiral nematic mesoporous materials that are iridescent and mimic the structures of beetle shells (Nature, 2010, 468, 422), and have potential applications for photonic materials and window coatings.

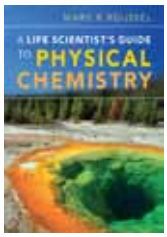
Dr. John Pezacki (BSc 1994, Postdoctoral Fellow with R. Kluger) is a recipient of a 2012 Royal Society of Canada Rutherford Memorial Medal in Chemistry. The Rutherford Medals are awarded for outstanding research in any branch of physics and chemistry. John is currently working in the Biomolecular Sensing and Imaging group at the NRC. His research program works at the interface between chemistry and biology and has led to the creation of new biomolecular sensing and imaging tools and ground-breaking applications of these tools, yielding new insights into the molecular basis of complex biological processes.

Dr. Michael Powell (BSc 1977, PhD 1981 with A.J. Kresge) has been a Managing General Partner at Sofinnova Ventures since 1997. Sofinnova is one of the larger life science venture capital firms in California, and today is primarily focused on funding biotech companies. This past year Dr. Powell and his team raised their eighth fund, a successful and oversubscribed $440M, earmarked for mostly clinical-stage therapeutics companies. Thus far Dr. Powell has been involved in raising five of Sofinnova's eight funds, with a cumulative $1.4B under management.

In January this year, Dr. Powell completed his tenure on the Board of Directors at Intellikine, a start-up, San Diego-based cancer company that is developing innovative, small molecule drugs targeting the PI3K/mTOR pathway. Dr. Powell was one of the initial and largest investors, exiting when they were successfully acquired by Takeda Millennium for $190M, with additional milestone payments expected to follow.

Mike is currently Board President of AVAC (AIDS Vaccine Advocacy Coalition) in NYC, a past Advisor to the Bill and Melinda Gates Foundation, a past Strategic Advisor to One World Health, and a Founding Venture Advisory Board member of the IAVI (International AIDS Vaccine Initiative) Innovation Fund. He also serves on the University of Kansas board of IAMI (Institute for the Advancement of Medical Innovation), and the University of Minnesota's CPD (Committee for Pharmaceutical Development). He flies too much, but as the guy piloting in the front left seat, he seems to love it.

Professor Marc Roussel (MSc 1990, PhD 1994 with S.J. Fraser) of the University of Lethbridge, Alberta has recently published a book, A Life Scientist's Guide to Physical Chemistry through Cambridge University Press. The book is based on his experience teaching physical chemistry to a mixed audience of chemists and biochemists at the University of Lethbridge over the last decade and a half. There are a lot of examples, many of which are of direct biological relevance. Roussel has included a few surprising applications for the life science students, such as the physical chemistry behind the wood frog's overwintering in the frozen state, and the physico-chemical evidence for the remarkable longevity of the bowhead whale. The book also contains large number of exercises (350+) and end of term problems, many based on biological applications. For more information and online resources, visit, www.cambridge.org/roussel.



In Memoriam

Marie Aprile
BA 1952
Marie Aprile passed away on December 19, 2009 in her 81st year. She received her BA in Chemistry 1952. Marie will be fondly remembered by her many nieces, nephews and their families.

(Cont. on pg. 38)

Chemistry Olympiads

2012 National Finals University of Toronto

The annual International Chemistry Olympiad (IChO) has grown steadily since its inception in 1967, when only three nations from Eastern Europe participated. The IChO is now hosted in a different country each July and attracts close to 80 countries from all continents. The goal of the competition has always been to encourage excellence in science education throughout the world - the IChO is the most prestigious event of its kind for chemistry students at the Canadian high school or CÉGEP level.

Canadian Chemistry Olympiad National Camp Laboratory

All participating countries, Canada included, devote an enormous amount of time, energy, and money encouraging and preparing their most talented students so that they will do well at the IChO. The caliber of the competition is exceptionally high and encompasses both theoretical knowledge and laboratory expertise.

Canadian students and mentors first attended the International Chemistry Olympiad in 1986. Since that year, our students have won 8 Gold, 25 Silver, and 46 Bronze Medals, along with 3 Honourable Mentions.

After a week of intensive workshops, tests and laboratory examinations, four Ontario students were selected to represent Canada at the 2012 IChO in Washington, D.C.: Run Ze Cao; David Pechersky; Isabelle Yang and Leslie Ying. The team members were further trained at the University of Toronto under the guidance of Dr. Stanislaw Skonieczny, based on preparatory problems published by the United States organizers. Dr. Skonieczny and Patrick Kim acted as mentors for the team, while Dr. Tihana Mirkovic and Dr. Russell Boyd (Chair of the Chemical Institute of Canada, Dalhousie University) attended as scientific observers.

Based on the results of Canada-wide examinations in chemistry and other local competitions, 10 high school students attended the 2012 National Olympiad Finals at the U. of Toronto, held from June 1-7:

Deborah Baremberg, Colonel By S.S. (ON)
Run Ze Cao, Martingrove C. I. (ON)
Tony Han, Semiahmoo S.S. (BC)
Ji Sup Kim, Yale S.S. (BC)
Justin Lim, U. of Toronto S.(ON)
Sydney MacDonald, U. of Toronto S. (ON)
David Pechersky, Vaughan S.S. (ON)
Isabelle Yang, Don Mills C. I. (ON)
Scott Yargeau, Yale S.S. (BC)
Leslie Ying, U. of Toronto S. (ON)

The following individuals voluntarily acted as 2012 Olympiad National Camp Mentors:

Naila Assem, U. Toronto
Dr. Andy Dicks, U. Toronto (Nat. Coord)
John Janetzko, Harvard U., USA
Patrick Kim, U. of Toronto
Jin Lee, U. of Toronto
Dr. Tihana Mirkovic, U. of Toronto
Miguel Neves, U. of Toronto
Dr. Kristine Quinlan, U. of Toronto
Dr. Stan Skonieczny, U. of Toronto

44th International Chemistry Olympiads Finals in Washington, D.C. July 21-30, 2012

This year, the 2012 IChO practical examination was composed of two tasks over the course of five hours. One of them required students to measure reaction rates and to determine the order of a reaction and associated kinetic constant. The experiment was repeated with a deuterated reagent to deduce the operative rate-determining step. The second experiment concerned synthesis of a manganese complex, and determination of its formula by titrimetric analysis. Overall, the Canadian team performed at a high level in both tasks, which was a testament to their solid background in fundamental laboratory techniques.

In the realm of physical chemistry, students derived a general formula for the quantized energies of linear polycyclic aromatic hydrocarbons (PAHs), and completed energy level diagrams for anthracene and benzene with π electrons. Calculation of the energy gap for three PAHs enabled students to comment on the relative reactivity of these conjugated molecules, and to identify their corresponding absorption spectra. Students also analyzed the unit cell of the superconductor YBCO via element assignment and application of Bragg's law. They then formulated equations illustrating the dissolution of YBCO in HCl, and subsequent treatment of

that solution with KI and sodium thiosulfate.

Square-planar platinum complexes were used to illustrate stereoisomerism and the trans effect in inorganic chemistry. Students determined rate constants for substitution reactions of square planar complexes. Another inorganic question focused on determining the concentration of thiomolybdate ionic species in a mixture. Here, students manipulated data obtained by absorption spectroscopy and implemented the systematic treatment of equilibrium. Fundamental knowledge of boron chemistry was assessed through structure determination and thermochemistry, which led to an estimation of the dissociation enthalpy of the B-B single bond.

One organic chemistry question related to the total synthesis of Varenicline, an established treatment for smoking addiction. Students were required to draw eight intermediate compounds along a synthetic pathway, with proton NMR data included to aid identification. Secondly, an example of a Diels-Alder reaction was provided to students. An artificial enzyme was designed to bind a diene to a dienophile and to catalyze a reaction between them. The task was to draw potential regioisomers and stereoisomers which could potentially be formed in the uncatalyzed reaction. For the conclusion, the active site of the enzyme was shown and students drew the structure of the enzyme-catalyzed reaction product.

Out & About In Washington, D.C.

As is the case every year, the 2012 IChO kept students busy outside of the examinations with a varied and lively social program. Students visited several world-class museums and other places of note, including the NASA Goddard Space Flight Center, the Library of Congress, and the Albert Einstein Memorial. Students also attended a Baltimore Orioles Major League Baseball game at Camden Yards and the Kings Dominion amusement park. These activities afforded the Canadian students an opportunity to make new chemistry friends from across the globe, whilst allowing them to relax during a very stressful week. The friendships they formed were quite evident at the closing ceremonies and will continue for many years to come. The Canadian medals were awarded as follows: Run Ze Cao: silver medal (placed 60th in the world); Leslie Ying: bronze medal (95th); Isabelle Yang: bronze medal (124th) and David Pechersky: bronze medal (177th). Medals are awarded annually to the top 60% of participants. The 2013 IChO will be held in Moscow, Russia (the site of the 2007 event).

Canadian National Team (from left to right): Dr. Stanislaw Skonieczny (mentor), David Pechersky (bronze), Patrick Kim (head mentor), Isabelle Yang (bronze), Leslie Ying (bronze), Run Ze Cao (silver)

Acknowledging Olympiad Supporters

The organization of the Canadian Chemistry Olympiad is heavily based on volunteer work. Organization of the academic program with related provincial and national selection processes, team training and escorting of students to international competition venues are all done by volunteers. This tireless commitment is why we are very grateful to dozens of individuals across the country for their involvement and expertise.

Administrative and fundraising support for the Olympiad program has been provided by the **Chemical Institute of Canada (CIC)** since 2010. The CIC raised money from various industrial sources, including **Dow**, **Recochem** and **Nova Chemicals**. In addition, the **Ontario Ministry of Education** supported the program, along with several universities and high schools. These included **Dalhousie University**, **University of Toronto Schools**, **Don Mills Collegiate**, **Semiahmoo Secondary School**, **Vaughan Secondary School** and **Yale Secondary School**.

The University of Toronto was the site of the Chemistry Olympiad Ontario final, the National Finals and national team training in 2012. The **Faculty of Arts and Science** at the **University of Toronto** remains a major source of volunteers, who work at different levels of the selection process and final training of the national team. We are very grateful to **Professor Robert Morris**, Chair of the Department of Chemistry, University of Toronto, for his unwavering support of our program. We also greatly appreciate the secretarial, technical, and financial advice from the best personnel in the **Department of Chemistry**.

We are very thankful for the strong and continued support provided by **Professor Gordon Bates** from the Chemistry Department, University of British Columbia. Professor Bates coordinated the IChO program for many years and in 2012 he obtained significant funding from his Department to sponsor the program.

Finally, we would also like to acknowledge donations of textbooks by the **Nelson** publishing company, due to the ongoing efforts of Barbara March.

- Andy Dicks and Stan Skonieczny
This article is condensed from one originally written for Chem13 News October 2012 edition, #393.

Green Chemistry Initiative

In October 2012, twelve members of the Department across disciplinary backgrounds teamed up and launched the Green Chemistry Initiative at U of T. The field of green chemistry has been growing steadily, both in academia and in industry. Within our own Department, several research faculty members are engaging in greener research and teaching faculty are incorporating green concepts in both lectures and laboratory experiments. Additionally, in recent years there has been an increase in the commercial applications of green chemistry with many technologies enjoying the journey from lab to market, demonstrating the 'real-world' applications of green chemistry.

Even with these positive developments within the field, we felt that there was still some work to do in terms of awareness. Many graduate students are interested in green chemistry but are not entirely sure how to apply the concepts to their own research. In addition, we need to learn how to tell whether something is really "green" or not. In response, GCI was formed with the goal of raising awareness and increasing knowledge about the field of green chemistry. We intend to establish a network in which students, faculty, and members of industry can exchange knowledge about the field, thus generating new opportunities for education and collaboration.

What have we done so far?

Our initial efforts have resulted in:

- The creation of a new Green Chemistry Lecture Series, with generous funding support from the Department. Each month, a speaker from either academia or industry delivers a lecture. Our first lecture took place on November 2nd, 2012 and our speaker was Dr. Andy Dicks who provided valuable insight and helped answer the question: What does it mean to be chemically green?

- The launching of the first awareness initiative through a Green Chemistry Trivia Challenge. Our trivia events occur weekly on Fridays during ChemClub sponsored donuts/brunch, where we ask a question related to some aspect of green chemistry. Respondents answer on a ballot, and each correct answer serves as an entry for great prizes!

What to expect?

Heading into 2013, we are planning several exciting events and activities! Our weekly trivia challenge will continue and the lecture series will bring in diverse and high-profile speakers. Green chemistry workshops will be held in order to help increase the overall knowledge about the field. This knowledge should come in handy as we are planning a waste reduction challenge where the research groups of Lash Miller will be competing with each other in order to reduce their output of chemical waste. We are also pleased to mention that we are planning additional energy reduction initiatives that will be implemented within the Department. With these events, we are striving to be a green and sustainability leader on campus.

If you have any suggestions or comments for us, you can access and interact with us via email (green@chem.utoronto.ca) or online as we are active on social media outlets. We can be found on Facebook (www.facebook.com/GCIatUofT), and at www.chem.utoronto.ca/green. We have also created a group on LinkedIn (Green Chemistry Initiative at U of T) and a handle on Twitter (@GreenChemUofT) in order to facilitate networking and delivering more content. The response from the chemistry community has been very positive so far, and we are looking forward to the exciting events we have in store for 2013. Keep it green!

- Dr. Raj S. Dhiman,
Publicity Manager – Green Chemistry Initiative

Running for Hope

Members of the Mabury group (L to R: Derek Jackson, Amy Rand, Lisa D'Agostino and Anne Myers) participated in the Toronto Pearson Runway Run on June 23, 2012 as a fundraiser for Hope Air. Hope Air is a national charity that provides free flights to people who cannot afford the cost of an airline ticket to get to medical expertise or specialized medical technologies that usually exist only in larger urban centres. The 5km run took place on runway "24L", thankfully closed to departing and arriving aircraft for the duration of the event!
- Derek Jackson

Pueblo Science

Promoting Science Literacy



From right to left: The Pueblo Science team demonstrates static charges, liquid nitrogen display, phosphorenscence display at Varsity Stadium

Pueblo Science is a non-profit organization promoting science literacy in under-serviced communities both in Canada and overseas. Initially conceived by Chemistry Professor Cynthia Goh, and later founded by Dr. Mayrose Salvador, the organization has recently increased its activities in Toronto.

Pueblo Science's events include a year-long after-school program for young students, workshops and science camps (the Department of Chemistry generously provided the space for the summer and March editions). Last month, Pueblo Science was invited by the Varsity Blues to provide a science education component at a hockey game attended by Toronto District School Board (TDSB) students. Before the UofT-Ryerson face-off, Pueblo Science showcased several science phenomena, explaining phosphorescence, diffraction, static charges, and friction. Pueblo Science members also performed the first intermission show: exploding liquid nitrogen into the air to create a huge cloud of water vapor which rolled on the ice and covered the entire arena, inspiring joyful cheers of the 3000 attending children and teachers.

- Alon Eisenstein

The core Pueblo Science team:

President: Mayrose Salvador (PhD 2007 with G. Scholes)
VP: Calvin Cheng (Currently PhD student with M. C. Goh)
Camp Director: Neta Raz (PhD 2010 with E. Kumacheva)
Science Instructor: Andrea Nagy (BSc 1999, MSc 2002, PhD 2008 with R. J. D. Miller and currently a Postdoctoral Fellow with R. Jockusch)
Science Instructor: Yvette Liu (BSc 2008)
Finance Officer: Emina Veletanlic (PhD 2008 with M.C. Goh)
Program Coordinator: Alon Eisenstein (Currently PhD student with M. C. Goh)
Advisor: Professor Cynthia Goh

Ask a Laureate Lectures and Essay Competition

The third annual Ask a Laureate event was a resounding success. We filled the Earth Sciences Auditorium with more than 400 keen young science students and their teachers from across the GTA. Our engaging speakers, whether they provided youthful exuberance, polished wit and wisdom, or sharply honed business acumen, gave the audience a mesmerizing glimpse of what it is to do chemistry. By recounting anecdotes from their personal journey, speakers made the science accessible to students, and helped them visualize themselves as scientists someday.

Dwight Seferos talked about conductive and semiconductive polymers, the potential for plastic solar cells, and polymer nanomaterials for energy storage. Myrna Simpson told us about developing NMR-based metabolomics for identifying earthworm responses to environmental pollutants using 1H NMR. Cynthia Goh tied basic science to technical innovations

Top: Robert Morris, Chair and Corneliu Chisu, M.P. for Pickering Scarborough East congratulate essay contest winner.
Bottom: Essay contest winners and teachers enjoy lunch with Laureates and special guests. Photo credit: C. Kutas

responsible for everyday conveniences, and Peter Pekos explained the entrepreneurial process in the business of chemistry, and how to market an invention.

We developed a brand new script for 'magic moments', using chemically based magical tests to detect aptitudes for science, and the potential for luminous ideas.

Department Chair Bob Morris was a tremendous support in making the 2012 event possible, footing the bill for the out of pocket expenses, and having his office staff organize the Luncheon for essay contest winners. We had 49 entries this year, with the first prize going to an essay on soil contaminants, and several runners up writing about Canadian Scientists as well as the science behind everyday household items.

Corneliu Chisu, P.Eng., M.P. for Pickering Scarborough East was on hand to congratulate students and teachers for engaging with chemistry in such a meaningful way, and helped present certificates to essay contest winners and their teachers. He also presented a Certificate of Appreciation to Bob Morris and the Department of Chemistry, in recognition of his ongoing support for the Laureate initiative.

My sincere thanks also goes out to the Laureate Events Committee (Kris Quinlan, Patricia Meindl, Al-Amin Dhirani, Penny Ashcroft Moore, Melvin DeSouza) and the countless volunteers, both graduate and undergraduate students, who helped the event run smoothly.

- Cecilia Kutas, Laureate Events Chair
For more information about future Ask a Laureate events and to view the video recordings of the lectures, visit www.chem.utoronto.ca/chemistry/askalaureate.php

Graduate Award Recipients

Our graduate students are among the most distinguished in the country. Every year, we acknowledge their success and distribute more than 20 awards and innumerable scholarships to our students. 2012 was no exception. A complete list of awards and their recipients is available from www.chem.utoronto.ca/grad/award_recipients.php. We are proud to announce and acknowledge the following awards received in 2012:

Boehringer Ingelheim Award of Excellence in Organic or Bio-Organic Chemistry
Gavin Chit Tsui

Chair's Doctoral Medal (see story on page 18)
Charles Yeung

Michael J. Dignam Graduate Travel Award
Christina MacLaughlin

Roberts Fellowship
Laura Hoch and Eugenia Duodu

NSERC Vanier Scholarship (see story page 17)
Si Yue Guo and Melanie Mastronardi

Principal's Graduate Student Research Award
Johnny Westgate

Beverley Wedemire Memorial Scholarship
Ramsay Beveridge

3M Canada Incorporated Scholarship
Leayen Lam

Lorne F. Lambler, Q.C. Scholarship
Miriam Avadisian

Norman Stuart Robertson Fellowship
Tayseer Mahdi

FAS Alumni & Friends Graduate Scholarship
Brian Lam

Gilles Brassard Doctoral Prize for Interdisciplinary Research
Melanie Mastronardi

Awards Reception

On May 10, 2012, students, staff, faculty and guests gathered to celebrate the many accomplishments and honours received by our Department throughout 2011 and part of 2012. Chair Robert Morris hosted the event which recognized faculty for their many accolades, staff for their dedication and students for their accomplishments. Professor Robert Batey, Associate Chair, Undergraduate Studies, presented awards and scholarships to the undergraduate students, and the Croft TA awards to four graduate students. Professor Morris and our honoured guests presented graduate students with more than 22 awards. Faculty were honoured for their excellence in research and teaching, and spoke briefly thanking their research groups. Chair's Office Manager, Penny Ashcroft Moore was recognized for receiving a Dean's Distinguished Long Service Award (see story on page 22), and the Outstanding Chemistry Staff Award was presented to Undergraduate Counselor Armando Marquez (see story on page 22). The numerous awards celebrated during the event demonstrate the tremendous strength and effort of our entire community.

We were pleased to welcome our special donors and friends to help celebrate our many accomplishments with the Chemistry family. The donors and the student award recipients had an opportunity to discuss the recipients' research during a luncheon held in the Davenport Atrium. Following the luncheon, our donors and friends presented their named awards to the graduate and undergraduate student recipients. The event was a wonderful opportunity to reflect on the many accomplishments of the Chemistry family, and look forward to another stellar year in 2013. We thank our donors for helping us celebrate our success and congratulate all awards recipients.

- Nina Lee

Chemical Society of Canada CCUCC Chemistry Doctoral Award
Charles Yeung

General Motors Women in Science and Mathematics Awards
Taunia Closson and Dziyana Kraskouskaya

Harry Jerome Award for Academics
Eugenia Duodu

NSERC Environment Canada Atmospheric and Meteorological Graduate Supplements
Dana Aljawhary

ONTARIO STUDENT OPPORTUNITIES TRUST FUND

John Bunting Graduate Prize in Chemistry
Anna Cumaraswamy

BASF Canada Graduate Student Award
Tyler Schon

Dalton Chemical Laboratories Organic Chemistry Scholarship in Memory of Peter Yates
Rebecca Courtemanche

Dalton Pharma Services Advanced Inorganic & Materials Laboratory Fellowship
Fatme Dahcheh

Leslie Gladstone Cook Memorial Fellowship
Genevieve Canzonieri

Robert & Jean Hadgraft Graduate Fellowship in Chemistry
Yin Song and Adelle Vandersteen

Merck Frosst Canada Inc. Chemistry Conference Award
Jeffrey St. Denis

Merck Frosst Canada Inc. Graduate Award in Chemistry
Rebecca Courtemanche

Dr. L. Bradley Pett Graduate Award in Biological Chemistry
Eugenia Duodu and Katarina Vulic

Relocation Assistance Award
Tara (Sooa) Cho

Edwin Walter Warren Graduate Student Award
Ramsay Beveridge and Colin Bridges

Xerox Research Centre of Canada Graduate Award
Colin Zamecnik

GRADUATE STUDENT ENDOWMENT FUND

David H. Farrar Graduate Scholarship in Chemistry
Dziyana Kraskouskaya

Jim Guillet Chemistry Graduate Scholarship
Martin Czar and Gregory Gibson

Alex Harrison Award in Analytical Mass Spectrometry
Dana Aljawhary

Ministry of the Environment Graduate Scholarship
Perry Mitchell

ChemClub Graduate Scholarship
Lisa Kozycz and Tayseer Mahdi

QUEEN ELIZABETH II GRADUATE SCHOLARSHIP IN SCIENCE AND TECHNOLOGY

F.E. Beamish Graduate Scholarship in Science and Technology
Paraskevi Lagaditis and Gabriel Menard

Digital Specialty Chemicals Graduate Scholarship in Science and Technology
Michael Sgro and Tayseer Mahdi

Dina Gordon Malkin Graduate Scholarship in Science and Technology
Christopher White

Martin Moskovits Graduate Scholarship in Science and Technology
Paul DiCarmine and Yelena Simine

Edwin Walter and Margery Warren Graduate Scholarship in Science and Technology
Brent Pautler and Sarah Styler

Croft TA Awardees
Each year, the Undergraduate Office recognizes excellence in teaching by our graduate students with the Croft TA Awards. The awards are given to lab demonstrators and tutors for both the Fall and Winter session.

Fall 2011
Tutor - Landon Edgar
Lab Demonstrator - Scott McClure
Lab Demonstrator - Calvin Cheng

Winter 2012
Tutor - Corey McClary
Lab Demonstrator - Sean Liew
Lab Demonstrator - Jack Sheng

Vanier Scholarship Recipients

Si Yue Guo and Melanie Mastronardi

Top: Si Yue Guo
Bottom: Melanie Mastronardi
Photos provided by Si Yue Guo and Melanie Mastronardi

Si Yue Guo and Melanie Mastronardi are two of 22 U of T doctoral students to be awarded 2012 NSERC Vanier Scholarships. The Vanier Canada Graduate Scholarships (Vanier CGS) program was launched by the Government of Canada in 2009 to strengthen Canada's ability to attract and retain the world's top-tier doctoral students. Each scholar receives up to $50,000 annually for up to three years, and each is selected based on their demonstrated leadership skills and a high standard of scholarly achievement in graduate studies in the social sciences and humanities, natural sciences and engineering, and health.

Si Yue Guo (Polanyi group):
Si Yue's research involves the study of the molecular motions underlying simple chemical reaction at surfaces, studied experimentally a molecule at a time by Scanning Tunnelling Microscopy and then modelled theoretically from first principles by quantum mechanics. The work will provide basic insights into the nature of surface-catalysed chemical reaction.

Melanie Mastronardi (Ozin group):
Melanie's research focuses on the preparation, isolation, and characterization of monodisperse silicon nanocrystals (ncSi), which is a crucial step towards developing silicon nanomaterials for use as a "green" alternative in optoelectronic and biomedical applications. Using size-selection methods including density gradient ultracentrifugation and size-selective precipitation, she has prepared monodisperse fractions of ncSi from as-synthesized ensembles that have high polydispersity. With the ability to prepare monodisperse fractions, she is able to study the size-dependent properties of ncSi such as photoluminescence, absolute quantum yield, and lifetime, which will be vital for tailoring and improving the performance of ncSi applications.

2012 Chair's Doctoral Medal

Dr. Charles Yeung

Over the last five years, Charles Yeung has set the bar very high in terms of passion, creativity, and hard work. An alumnus of the Dong group, Charles received the 2012 Chair's Doctoral Medal for distinction in research by a PhD candidate who recently defended their thesis. Professor Dong nominated Charles for this prestigious award, citing his remarkable publication record, his ability to deliver excellent presentations, and his prolific research. Charles is passionate about the education and personal growth of his fellow lab mates.

Charles has won praise for his thesis, "Transition Metal Catalysis: Activation of CO2, C-H, and C-O Bonds En Route to Carboxylic Acids, Biaryls, and N-Containing Heterocycles." He described in his thesis four distinct and powerful catalytic transformations that he discovered and developed for use in organic synthesis: 1) activation of CO2 for a mild and functional group tolerant synthesis of carboxylic acids; 2) oxidative two-fold C–H bond activations as a strategy toward biaryl compounds; 3) migratory O- to N-rearrangements in pyridines for the preparation of N-alkylated heterocycles; and 4) asymmetric hydrogenations of cyclic imines and enamines en route to chiral 1,2- and 1,3-diamines and macrocyclic peptides. In each case he found suitable metal complexes to catalyze the formation of a multitude of new organic compounds and did a great job shedding light on how they function.

He is a prolific researcher, publishing over 8 manuscripts during his student career. On the basis of his doctoral work, Charles was also awarded the doctoral award from the Canadian Council of University Chemistry Chairs (CCUCC), and has presented his thesis work at both the Canadian Chemistry Conference in Calgary (2012) and the Organic Reactions & Processes Gordon Conference (2011). As a result of Charles' exemplary efforts, he has received a number of awards, including the Boehringer Ingelheim Prize in Organic or Bio-Organic Chemistry (2011), the NSERC André Hamer Postgraduate Prize (2007), the Lefevre Medal and Prize (2006), and a Canadian Society for Chemistry Silver Medal (2005). Charles speaks highly of his time at the University of Toronto: "It is a privilege and honour for me to receive this recognition from the Chair. I am grateful for the remarkable experience I had during my PhD."

Since graduating from Chemistry in 2011, Charles has been working as a Postdoctoral Fellow with Professor Eric Jacobsen at Harvard University, a prominent scientist in the field of asymmetric catalysis. He is studying how urea and thiourea catalysts can promote chemical reactions by hydrogen bonding. In particular, he is pursuing the synthesis of chiral amines by iodocyclization. Charles plans to return to Canada to pursue an academic career in the future.

- Nina Lee with information provided by Charles Yeung, Vy Dong and Robert Morris

Undergraduate Award Recipients

We were pleased to honour 37 undergraduate students with scholarships and prizes in 2011 and 2012. These deserving students received these awards for their academic accomplishments and contributions to University life. Of note, the following awards were acknowledged during our Awards Reception:

David H. Farrar Scholarship in Chemistry
Erika Siren (2011), Perry Menzies (2012)

Robert and Jean Hadgraft Scholarship in Chemistry
Michael Bielecki (2011), Aizhou Wang (2012)

Faculty Award Recipients

Our faculty received more than 30 prestigious awards and honours in 2012. Please visit our website regularly to read more about these, and additional honours that our faculty have received at www.chem.utoronto.ca/chemistry/news.php

We are proud to announce and acknowledge the following awards received in 2012:

Jon Abbatt
Fellow, American Geophysical Union
CIC Environment Division Research and Development Award

Timothy Bender (cross appointed with Chemical Engineering)
Connaught Innovation Award

Andy Dicks
OCUFA Teaching Award

Patrick Gunning
CSC Ichikizaki Fund for Young Chemists
Royal Society of Chemistry MedChemComm Emerging Investigator Lectureship Award

Lewis Kay (cross appointed with Biochemistry)
Royal Society of Chemistry Khorana Prize
University Professor

Kagan Kerman
Ontario Early Researcher Award

Eugenia Kumacheva
Connaught Innovation Award
Humboldt Research Award
U of T Inventors of the Year Award

Mark Lautens
University Professor

John Polanyi
Berlin-Brandenburg Academy of Sciences and Humanities Helmholtz Medal

Greg Scholes
Royal Society of Chemistry Bourke Award

Dwight Seferos
Connaught Innovation Award

Molly Shoichet (cross appointed with Chemical Engineering and the Institute of Biomaterials & Biomedical Engineering)
Clemson Award for Contributions to the Literature on the Science or Technology of Biomaterials
Connaught Innovation Award
Canadian Academy of Health Sciences

Stan Skonieczny
CIC Award for Chemical Education

Doug Stephan
Royal Society of Chemistry Ludwig Mond Award

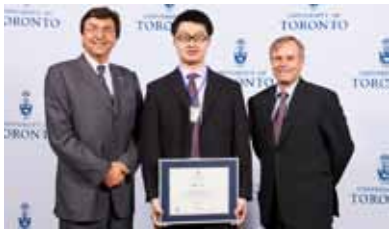
Mark Taylor
Alfred Sloan Fellowship
IUPAC Travel Award

Aaron Wheeler
Faculty of Arts and Science Outstanding Teaching Awards
ACS Division of Analytical Chemistry Arthur F. Findeis Award
Royal Society of Chemistry Joseph Black Award
U of T Inventors of the Year Award
Heinrich Emanuel Merck Award for Analytical Science

Mitch Winnik
ACS Award in Polymer Science

Andrei Yudin
Fellow, Royal Society of Chemistry (UK)

Deborah Zamble
Queen Elizabeth II Diamond Jubilee Medal for contributions to the Royal Canadian Institute for the Advancement of Science



From left: President David Naylor, Simon Chen, and Gordon Cressy. Photo courtesy of the UofT.

University of Toronto Alumni Association Gordon Cressy Student Leadership Award
Simon Chen (2012)

Promotion and Tenure

The following professors were promoted to Full Professor or received Tenure in 2012.

Full Professor: Jeremy Schofield & Deborah Zamble
Tenure: Jennifer Murphy, Dvira Segal & Mark Taylor

Canada Research Chairs

The following professors were awarded first-time or renewed Canada Research Chair positions in 2012.

Canada Research Chair, Tier 1: Eugenia Kumacheva
Canada Research Chair, Tier II: Dwight Seferos & Mark Taylor

Provost's PhD Enhancement Fund Program

U of T's Department of Chemistry has earned an international reputation as a graduate education and research powerhouse. Graduate students, and the original research they undertake, are essential to Canada's competitiveness in the knowledge economy. Moreover, the ability to work with the world's best graduate students is a key factor in the successful recruitment and retention of leading faculty.

Global competition for this talent is fierce. To enhance our efforts to attract top graduate students, we are inviting investments in the form of endowed scholarships from alumni and friends. To encourage donations, the University of Toronto has established the Provost's PhD Enhancement Fund (PPEF) Program. The PPEF Program provides a remarkable leveraging opportunity that doubles the impact of gifts in support of PhD students.

The PPEF Program works as follows:

A donation of $50,000 per award will be matched 1:1 through the PPEF. (Note: $50,000 is the minimum amount necessary to establish a named endowed graduate scholarship at the University of Toronto.)

The annual payout on the resultant $100,000 endowment will create a named scholarship of approximately $4,000 per annum to benefit graduate students, in perpetuity.

This is a time-limited program: to be eligible, pledges must be made by December 31, 2014 and paid in full by December 31, 2016.

At the Faculty of Arts and Science—where a pressing need for financial assistance for international students has been identified—preference for the match eligibility will be given to gifts which support international students enrolled in a PhD program.

If you would like more information on this program, please contact Leslie McCarley, Director of Development, Faculty of Arts and Science at 416-946-5192 or leslie.mccarley@utoronto.ca

UNIVERSITY OF TORONTO
FACULTY OF ARTS & SCIENCE

Yes, I would like to make a donation to the Department of Chemistry!

1.) YOUR INFORMATION:

Name: _____ Email: _____

Address: _____ Phone: _____

May we recognize you in published donor listings ?

☐ Yes, please recognize me as _____ ☐ No

The Provost's PhD Enhancement Fund (PPEF) is a new program announced by the Provost at the University of Toronto, will provide 1:1 matching support if we raise $50,000 (pledges must be received by December 31, 2014 and paid in full by December 31, 2016). The new fund will help the Department of Chemistry enrol the best and brightest graduate students from around the globe. Please check here if you would like to support this fund.

☐ **PPEF** ☐ **DEPARTMENTAL TRUST**

2.) YOUR GIFT: (Please select one option)

a.) Here is my single donation of $_____

☐ Visa ☐ Mastercard ☐ Amex

Card Number: _____ Exp: _____ /_____

Name on card: _____ Signature: _____

☐ Cheque, which is enclosed (payable to the University of Toronto)

b.) Here is my monthly donation of ☐ $_____

Please charge my credit card on the 1st day of each month: ☐ Visa ☐ Mastercard ☐ Amex

Card Number: _____ Exp: _____ /_____

Name on card: _____ Signature: _____

☐ Blank cheque marked VOID, which is enclosed. I authorize the University of Toronto to deduct the amount I have specified from the account number on the cheque, on the 1st day of each month.

Signature: _____ Date: _____

3.) HOW TO DONATE: (Please select one option)

a.) Return this completed form to:
University of Toronto, Donations Management
21 King's College Circle
Toronto, ON M5S 3J3

b.) Donate online: Visit https://donate.utoronto.ca/chemistry to make a secure online gift.

Your Privacy: The information on this form is collected and used solely for the administration of the University's advancement activities, undertaken pursuant to the University of Toronto Act, 1971. If you have any questions, please refer to www.utoronto.ca/privacy or contact the University's Freedom of Information and Protection of Privacy Coordinator at 416.946.7303, McMurrich Building, Room 201, 12 Queen's Park Crescent West, Toronto, ON M5S 1A8.

Monthly Donation: You have certain recourse rights if any debit does not comply with this agreement. For example, you have the right to receive reimbursement for any debit that is not authorized or is not consistent with this PAD Agreement. To obtain more information on your recourse rights, contact your financial institution or visit www.cdnpay.ca.

Charitable Registration #: BN 1081 62330-RR0001 **Solicitation Code: 0570047805** **Project ID: 0560001540**

Thank you for your generous support!

Chemistry Outstanding Staff Award

Armando Marquez

Armando Marquez (Undergraduate Counselor, Chair's Office), is the recipient of the 2012 Chemistry Outstanding Staff Award

Armando Marquez holds more than just a key administrative position within Chemistry, he is a pillar within our Department. As the Undergraduate Counselor, Armando is an ambassador for Chemistry and the first point of contact for our undergraduate students. However, he is much more than an administrator. Armando is always available to provide advice and a sympathetic ear to a troubled student or lend a hand to a colleague.

As the recipient of the 2012 Outstanding Staff Award, Armando joins an elite group of Chemistry staff who have demonstrated ongoing distinguished service to the Department, or who have contributed exceptional performance in a project or service effort. The Chemistry faculty supported his nomination, citing his unparalleled influence, dedication and impact on the Department. Applauded as the consummate professional, Armando proactively deals with undergraduate related matters, and always works to complete projects in a timely fashion. His work as the Undergraduate Counselor has gained him the respect of faculty, students and colleagues alike. Despite having no chemistry training, he is undoubtedly the most knowledgeable member of our Department with respect to our undergraduate program. Chair Robert Morris presented Armando with the Chemistry Outstanding Staff Award during the Awards Reception held May 10, 2012.

- Nina Lee

Dean's Distinguished Long Service Award

Penny Ashcroft Moore

Dear Meric Gertler congratulates Penny Ashcroft Moore. Photo provided by Faculty of Arts and Science

Penny Ashcroft Moore (Manager, Chair's Office), is the recipient of a 2012 Dean's Distinguished Long Service Award

It was an unseasonably warm and sunny day in February. The Chair's Office was humming with activity; students dropping in with questions and the clickity-clack of fingers flying across keyboards when a representative from the Faculty of Arts and Science Dean's Office walked through the front door and headed straight to Penny's office. She knocked on Penny's door, stepped inside and shut the door, "I have some news for you," she said with a smile, "You're a recipient of a Dean's Distinguished Long Service Award. Congratulations! You deserve it, you really, really do." With a hug, she handed Penny a letter and proceeded to share how impressed the Dean was with Penny's contributions and the positive impact she has made to the Faculty over the years, and that the Chemistry Department had enthusiastically nominated her for this honour.

Penny is a partner in carrying out the job of Chair of the Department. She has a wealth of knowledge and experience in academic policies and procedures, and manages the Chair's Office proactively to ensure her staff are able to positively and efficiently enhance the student experience as well as provide support for the faculty. She was a key player in organizing the events for the International Year of Chemistry celebrations in 2011, including the incredibly successful Ask a Laureate Lectures and gala dinner. She has prepared more than 500 award nomination packages for faculty and as a result, the Department has had an incredible success rate of 45%. She is responsible for advancement for the Department, maintaining relationships with our alumni, donors and friends. Under her direction, the Chair's Office runs like a well-oiled machine, and she has contributed to the smooth and seamless transition for the last five Chairs. Penny has been recognized for her contributions with a Chemistry Department Outstanding Staff Award in 2007 and a Chancellor's Award nomination in 2010. This tip of the hat from the Faculty of Arts and Science recognizes a dedicated, hard-working and creative professional who has helped shape the Department and assisted in making ours one of the top 20 chemistry departments in the world.

Shortly after 4pm on April 17th, Dean Meric Gertler welcomed a standing room only crowd in the Hart House's elegant Debates Room to honour the Outstanding Staff and Teaching Award Recipients. One by one, he called up the recipients of the Teaching and Staff Awards. When Dean Gertler welcomed Penny Ashcroft Moore to the stage, the crowd erupted with cheers. She spoke, thanking the Dean for the honour, then the Department for nominating and appreciating her efforts. Wiping away tears, Penny described how moved she was by the recognition. Afterwards, as she shook the Dean's hand, Penny looked out over the crowd and saw the familiar faces of her Chemistry family, beaming with pride. Congratulations, Penny!

- Nina Lee

Conference Awards

Presented to Chemistry's Undergraduate and Graduate Students

American Geophysical Union Fall Meeting, December 2012

Outstanding Student Paper Awards
Jeff Geddes (Murphy group), Biogeosciences section
Sarah Styler (Donaldson group), Atmospheric section
Greg Wentworth (Murphy group), Atmospheric section
Sumi Wren (Donaldson group), Atmospheric section

CSC Conference, May 26-30, 2012 Oral Presentation Awards:

Third place - Organic Division
Matthew Bancerz (Georges group)

Reg Friesen Award in the Chemical Education Division & XRCC Award in the Materials Chemistry Division
Jennifer Lofgreen (Ozin group)

First place - Advances in Synthetic Methods Symposium
Serge Zaretsky (Yudin group)

Poster Presentation Awards:

Honourable mention - Analytical Division
Alyson Baergen (Donaldson group)

First place, Undergraduate poster competition - Biological / Medicinal Chemistry Division
Bill Kim (Woolley group)

Honourable mention - Inorganic Division
Paraskevi Lagaditis (Morris group)

Honourable mention - Organic Division
Sean Liew (Yudin group)

Second place - Organic Division
Chris White (Yudin group)

Inorganic Discussion Weekend, November 2-4, 2012

Poster Prize
Elisa Carrera (Seferos group)

Society for Environmental Toxicology and Chemistry (SETAC) North American Meeting, November 11-15, 2012

Best Student Poster Presentation Award (PhD level)
Derek Jackson (Mabury group)

Undergraduate Student Profile

Simon Chen

Graduated with a BSc in 2012. Simon is currently a PhD student at the Washington University School of Medicine.

I spent my grade school years in beautiful British Columbia, but by the end of high school I was determined to get out for a bit, and Toronto seemed the proper destination. I entered U of T initially wanting to do physics, but through taking CHM151 I found that I really enjoyed chemistry and wet labs the most. Thus I enrolled in the Specialist program in Biological Chemistry, through which I was able to survey various fields of chemistry – synthetic, physical and analytical – in depth and under the guidance of incredible teachers.

Most importantly, I was able to explore various aspects of chemical research, first working in Professor Andrew Woolley's lab on azobenzene crosslinking-mediated photocontrol of protein folding. Afterwards I moved to Professor Greg Scholes' group to work on cryptophyte algae, then Professor Mark Taylor's lab to synthesize novel benzimidazole-based halogen receptors for anion sensing, and finally back to Professor Scholes to investigate the fluorescence of cryogenic paraffinic matrices of polycyclic aromatic hydrocarbons. Outside the monastic confines of the Lash Miller labs and lecture halls, I was involved in the Chemistry Students' Union, helping to organize various social events and guest lectures for fellow undergrad chemistry students.

After receiving my BSc from U of T in 2012, I made a slight career switch and am now enrolled in the research-oriented Washington University School of Medicine in St. Louis, Missouri, with aspirations of entering academic medicine in oncology or neurology. In talking with my new classmates and comparing my undergrad chemistry background with theirs at other prominent schools such as Harvard and UC Berkeley, I am constantly struck by the rigour, depth and diversity of Toronto's undergrad chemistry program. My experience as an undergraduate in the Department was incredibly intellectually stimulating and fostered within me a deep but healthy scientific skepticism as well as the skill to effectively use and rely upon the primary scientific literature, both of which have been serving me extremely well in my current education. I will always look back at my four years at the Department fondly – it is where I truly became educated and learned from incredible mentors and teachers to think as a scientist.

- Simon Chen

Chemistry Students' Union

The Chemistry Students' Union had a busy year in 2012. The CSU is a student organization that represents any student taking a class run by the University of Toronto Chemistry Department. Over the year the CSU sponsored talks by Professors Jik Chin, Vy Dong, and PhD Candidate Ramsey Beveridge to speak with students about the exciting research they do in our Department. Additionally the CSU sponsored panel sessions to inform undergraduates about what it's like to do graduate level research in chemistry. The turn-out for the events have been great and students get really excited about their opportunities in chemistry. But equally important, the CSU sponsored two social events at local bars so that chemistry students would have an opportunity ot enjoy fun nights out together. The CSU likes to remind chemistry students that while chemists may work hard, they love to play hard too. Coming up soon is the annual CSU elections for next year's executive team. Here's to another great year with CSU events!

- Bruce Gregoire, 2012-2013 President

Graduate Student Profiles

Miriam Avadisian

Graduated with a BSc in 2009. Miriam is currently a PhD student in the Gunning group.

I was born and raised in the beautiful city of Toronto with the dream of one day attending the University of Toronto. This dream became my reality when I was accepted into UTM. After my second year of undergraduate studies, I discovered my love for chemistry and in 2009 graduated with a double major in chemistry and bio-logy. Engaging in my passion for chemistry, I joined Patrick Gunning's medicinal chemistry laboratory at UTM in 2009 to pursue a PhD degree. My research involves designing and synthesizing anti-cancer drugs that are composed of two binding partners: a 'key' to bind a specific cancer protein, and an 'anchor' to sequester the protein to the cell membrane to inhibit its motility. By suppressing the movement of several proteins, these drugs inhibit their cancer-promoting activity. My project seeks to develop and use these novel molecular glues to block the function of proteins involved in the growth of cancer cells.

Outside of lab, I am the founder and President of an organization called Venture (www.venture-connections.ca). Venture was developed for graduate students who are proactive in career development; to give them an opportunity to connect with successful professionals in key industrial sectors through our Graduate Mentorship Program, Networking Nights and Professional Development Workshops. In addition, I am the founder of a federal non-profit organization called Education. Discover Your Potential (EDYP) (www.edyp.ca). The mission of EDYP is to provide free tutoring, mentorship, scholarships and academic support services to high school students from low-income families who wish to pursue post-secondary education.

Upon completion of my doctorate degree, I am hoping to pursue an MBA degree to bridge my science background with business knowledge. My friends and family always ask when I will be finished with my studies and my answer is always "soon".

- Miriam Avadisian

Alon Eisenstein

Alon is currently a PhD student in the Goh group.

I can still remember the day I decided to study Chemistry: I was sitting in a small coffee shop, going through the list of study fields. Remembering my deep admiration towards my chemistry teacher, and the joy inspired by the subject, I made an easy decision. After completing my BSc in Chemistry at the Ben-Gurion University in Israel, I took some time working as an analytical R&D researcher for a local Pharmaceutical company, a most rewarding experience. Returning to Ben-Gurion University, I decided to specialize in nanotechnology, and ended up designing and building a new type of scanning tunneling microscope. Upon completing my studies, I came to UofT, together with my partner and daughter, to start my PhD studies with Professor John Polanyi, studying reaction dynamics using scanning tunneling microscopy. After two years with the Polanyi group, with the realization that my interest lies in application based research, I transferred to the Goh group. Since then I have been studying several aspects of nanomaterials, from nanoparticles to nanofilms. In the past few years I have developed my passion for science education and outreach. As a member of the Pueblo Science team (see article page 14), I've had a chance to work with children and parents and share my love of science with them. As I near the end of my studies, I am exploring opportunities to follow my passion by engaging people with science.

- Alon Eisenstein

Sumi Wren

Sumi is currently a PhD student in the Donaldson group.

I spent my childhood living in a small town in Manitoba and my adolescence in the Ottawa Valley. The daughter of two chemists, the apple didn't fall far from the tree. In 2006 I obtained my BSc in Chemistry from Queen's University. It was there that I first developed an interest in physical chemistry, particularly spectroscopy. Since I wasn't ready to jump back into the lab, and because I've always loved teaching others and sharing science, I went on to obtain a BEd in Math and Chemistry from OISE & U of T. After a year teaching math at a private school in England (a challenging, rewarding and certainly educational experience!), I decided to return to studies in chemistry. I was particularly drawn to Jamie Donaldson's research as it applies methods in physical chemistry to problems in atmospheric chemistry.

My research in the Donaldson group has focused on gaining a better physical and chemical understanding of ice surfaces – which are important interfaces, both in the lower (snow and sea ice in the polar and mid-latitude regions) and upper (cirrus clouds and stratospheric ice particles) atmosphere. This work has connected me with a very rich air-ice chemical interactions community and has provided me with exciting travel and collaborative opportunities. During my time at U of T, I have remained actively involved in teaching, outreach and community building activities, such as Girls Rock Science. Upon completion of my PhD this summer, I will commence post-doctoral research in Professor Geraldine Richmond's group at the University of Oregon. My long-term goal is to obtain a position at a smaller academic institution where I can combine my interests in teaching and chemistry.

- Sumi Wren

Chem Club

2012 was an unquestionably eventful year for chemists at UofT! During Chem Club parties, we ate scrumptious international foods, drank delicious beers and wine, and busted unique moves on the dance floor. On our many excursions, we skied Quebec powder snow, showed off chemistry to the general public at Science Rendezvous, cheered on the Jays, camped on Lake Huron with the racoons, and only the bravest among us rode the Leviathan at Canada's Wonderland. Along with the relentless new thrilling activities, Chem Club awarded two graduate scholarships, donated to the local community, and improved its customer service at the Chem Club store.

Many of you know Chem Club for its Friday treats, but how does Chem Club get its funds you might wonder? In fact, Chem Club is a small business within the Department, run by an executive team of nine elected graduate students and assisted by a large group of graduate student and post-doc volunteers. The Chem Club store is Chem Club's main source of revenue; selling lab manuals and supplies to undergraduate students taking chemistry courses. The profit made from these sales goes directly to fund all of Chem Club's activities, from social events to scholarships and donations, and much more! Thank you to all the executives and graduate students who volunteer their time at the Chem Club store, we couldn't offer all those Tim's donuts, COBS breads, and Greg's ice cream without you!

The Chem Club team understands that graduate life involves more than just research and academics, and we try our best to create a multifaceted experience. With our funds secured through Chem Club store sales, in January we held a Japanese and Korean-themed cultural night where we dressed up kimonos and indulged in sushi and kimchi. At the end of the month, over one hundred of us trekked to the majestic Mont Tremblant in Quebec for a three day ski trip in powder snow. At the bowling event a month later, some of us threw strikes, but we mostly gullied our bowling balls. In March, we welcomed potential new graduate students during the Graduate Student Weekend with another cultural night where we ate enchiladas and tacos and drank margaritas to the sounds of live Mexican music and cracking piñatas. In May, the Depart-

ment played a central role at Science Rendezvous, a public science awareness event now held nationwide, where over eighty of us showed off how cool chemistry is. Then, it was time to host our biggest event of the year, the Las Vegas Formal at The Berkeley. The event was a smashing success and the entertainment was breathtaking! Two performers wowed us with their circus skills on the trapeze and the aerial silks. Before we danced the night away to a live band, we gambled away all our (thankfully fake) chips. The food was delicious, the drinks were plentiful, but the company was the best part of the evening.

May also marked the turnover of seven Chem Club executives and Chanelle Jumper (Treasurer), Trevor Janes (Stores Manager), Christine Le (Internal Events Coordinator), Jenny Wong (External Events Coordinator), Phillip Gregoire (GSU Representative), Si Yue Guo (Secretary), and Nadine Borduas (President) were elected to join Ben Chung and Melanie Mastronardi (replaced by Laura Reyes in October) as executives-at-large. We focused on governing effectively and responsibly, and on improving relations between the undergraduate and graduate communities in the Department, especially in terms of providing better customer service at the Chem Club store. Chem Club therefore slashed the price of gloves, labcoats, goggles, and exam solution packages as well as extending its business hours, all without sacrificing its budget for events!

1. Prospective graduate students visit the Hockey Hall of Fame. 2. Celebrating in style at the Las Vegas Formal. 3. Pub crawl along College Street

Indeed, the fun continued throughout the summer. In June, we tried to cheer on the Jays, but we must not have been loud enough… We then packed our rented SUVs and drove out to Lake Huron, where we camped at MacGregor Point Provincial Park for a weekend. The great weather allowed us to swim off the beaches and sit around the campfire. The only incident during this perfect outdoor weekend was the theft of some hotdogs by the local racoon population. Finally, to celebrate the end of the summer, we all went on a pub crawl along College Street wearing our cool "IUPAC-MAN" T-shirts!

With the start of the semester came all the new graduate students. Chem Club worked hard to welcome them and hosted a German Cultural Night with savoury schnitzels and an inflatable bouncy Neuschwanstein Castle. That same weekend, we took two buses to Canada's Wonderland, where some ate funnel cakes and quickly regretted it after a ride on the intimidating Leviathan. In October, Chem Club hosted a party at Sin and Redemption to welcome the new graduate students and to thank all of the volunteers who so generously helped out at the Chem Club store during the September rush. After this, Halloween was already around the corner, and Chem Club threw a scary costume party where a pumpkin burger won the pumpkin carving contest. To end 2012 in style, Chem Club organized the annual Holiday Party at the BierMarkt for a couple hundred revelers. The event was a blast and guests were treated to delectable foods and an impressive assortment of German beers, all to the sounds of a live band. It was an awesome start to the holiday season!

While it might appear that Chem Club only provides bread and games, the executive team is also determined to give back to the Chemistry Department and the larger community. Throughout the year Chem Club funded Chemistry sports teams, undergraduate events, science awareness programs, and colloquia, symposia, and seminars. To strengthen our community leadership, we also raised money for UNICEF and the Daily Bread Food Bank. Chem Club continues to support the Department with the Chem Club Graduate Scholarships – we take this opportunity to congratulate this year's recipients Gregory Gibson (Seferos group) and Jieshu Qian (Winnik group), and the university with another $10,000 contribution to the Faculty of Arts and Science Endowment Fund. Many other great causes that we have funded can be found on our website www.chem.utoronto.ca/chemclub/, where you can also find information on how to get your cause funded. You can now also like us on Facebook! (www.facebook.com/UTChemistryClub)

What's great about being part of Chem Club is knowing that you're helping to build a fun and collaborative atmosphere where everyone can find common ground. We thank all of the people who have contributed to this community, especially our volunteers. Cheers to all the Chem Club execs of 2012! 2013 promises to be just as exciting!

- Chem Club 2012-2013 (Chem Club article written by Nadine Borduas and edited by Laura Reyes and Si Yue Guo)

Welcome New Faculty

Chemistry Welcomes Jessica D'eon and Barbora Morra

Dr. Jessica D'eon

Jessica joined Chemistry as a Lecturer on July 1, 2012.

My serious interest in chemistry began at an orientation session in the Department of Chemistry at Dalhousie University where I completed my undergraduate degree. At this orientation faculty members described the benefits of pursuing a degree in chemistry, which included: understanding the world at a fundamental level, developing problem-solving, reasoning, and technical writing skills, as well as learning to give scientific presentations. When I decided to pursue a degree in chemistry, I was excited to get a great education and move on to other things. What I didn't expect was how engaging I would find the topic of chemistry itself.

A large part of my love for chemistry grew out of the enthusiasm I observed in my professors. Whether in the day-to-day explanations of the thermodynamics of phase transitions where Professor Jan Kwok pretended to be a water molecule and exclaimed to his neighbours "hey boys, now we can all evaporate!", or in a special demonstration of the thermite reaction in the inorganic laboratory with Professor Stan Cameron. My love of chemistry in the classroom was extended to chemical research with my fourth year thesis project in theoretical chemistry with Professor Russell Boyd.

After a sabbatical from higher learning to do some travelling, I decided to pursue a PhD at the University of Toronto in Environmental Chemistry under the supervision of Professor Scott Mabury. I felt instantly at home in Environmental Chemistry as I love looking at the natural world from a molecular perspective. My PhD research involved determining sources of human exposure to fluorinated chemicals, with a focus on the use of commercial fluorinated surfactants in food packaging. This research took me in many interesting directions, including a foray into the popular media with appearances on CTV News Network and Global News to discuss the role of fast food wrappers in human chemical exposure.

I am very excited to start the next chapter of my chemistry career as a Lecturer in Environmental Chemistry here at the University of Toronto. I hope to impart the same love of chemistry to my students that was demonstrated to me. When I began graduate school my advisor Scott Mabury told me there were only two facets to my job description; everyday I had to either "learn something or discover something". In my new job I add a third facet, "teach something".

- Jessica D'eon

Dr. Barbora Morra

Barb joined Chemistry as a Lecturer on July 1, 2012.

As a child, my fascination with chemistry began when my school teachers used science to explain the world around me. As I grew older, chemistry became a captivating subject filled with puzzles that I needed to solve. My interest led me to the University of Western Ontario where I completed a BSc with an Honors Specialization in Chemistry. During that time, I became engrossed in synthetic organic chemistry. The concept of engineering molecules on an atomic level and troubleshooting their synthesis persuaded me to begin working in synthetic chemistry labs. During my summers while still an undergraduate student, Dr. Mark Workentin and Dr. Brian Pagenkopf welcomed me into their research groups and the wonderfully challenging world of building molecules. From the moment I was handed a lab coat and goggles, I was hooked on organic chemistry.

During my undergraduate research with Dr. Pagenkopf, I completed a project involving the annulation and alkylation of indoles with 2-alkoxycyclopropanoate esters. My passion for heterocyclic chemistry quickly grew and made my decision to pursue graduate school one of the easiest of my life. Continuing to explore methodology development with the pursuit of natural product synthesis for the next five years would prove to be a very rewarding experience.

As a new graduate student discussing potential research projects, Dr. Pagenkopf suggested that I consider a small total synthesis. My enthusiasm led to remarkable success early and before the end of my first year, I had achieved my first total synthesis. By applying a [3+2] cycloaddition reaction developed in our research group, I completed the synthesis of (±)-que-

brachamine in 13 steps and 17.8% overall yield. That project taught me that to synthesize even a small and seemingly uncomplicated molecule was a surprisingly difficult task, and the lessons learned through the process were invaluable. Looking back on my graduate years, the synthesis of (±)-quebrachamine still stands out as one of the highlights of my chemistry career, and it was at that moment that I truly felt that I could call myself a synthetic chemist. Shortly thereafter, I was honored to become one of the first recipients of an NSERC Vanier Scholarship, which allowed me to focus more of my time on my research and teaching. My exploration of heterocyclic chemistry continued when I completed a new methodology involving the synthesis of tetrahydroisoquinocarbazoles by way of indole alkylation. I also assisted in the development of a new oxidative formation of trans-THF rings, which was the inspiration of my final project towards the total synthesis of biselide A and E.

In the early years of my graduate career, I aspired to join the pharmaceutical industry and continue the pursuit of synthesizing new and interesting molecules. However, near the end of my PhD I quickly realized that some of my most fulfilling graduate school experiences involved teaching and mentoring roles. In particular, I found great pleasure in helping people reach their full potential both in the lab and in the classroom by encouraging them to understand chemistry, as opposed to relying on memorization. It became clear to me that inspiring students to share my passion for chemistry was the career path I wanted to pursue. During my final year of graduate school, I was thrilled to accept a teaching faculty position in the Chemistry Department at the University of Toronto. It's been a long journey, but I am so thrilled to be a part of such an incredible Department that is committed to providing a superior educational experience for all of its students.

- Barb Morra

Spotlight On:
Lautens Research Group

Mark Lautens (centre) and group. Photo courtesy of Mark Lautens

The evolution of organic synthesis has led chemists to seek increasingly efficient and environmentally benign ways to make molecules of interest for evaluation as potential medicinal agents, and ultimately to prepare them on scale for production purposes. Chemical efficiency can be improved by devising shorter sequences of chemical reactions to produce the desired product, as well as developing milder conditions, using less harmful solvents and reagents, as well as more robust catalysts that can accomplish more in one step, than previous multi-step methods.

Our group is known for a family of Rh and Pd catalyzed asymmetric ring opening reactions that meet a high standard of efficiency. Both reacting partners are incorporated into the final product with little or no "waste" molecules produced and only trace amounts of catalyst required. These reactions were used to provide access to bio-active substances such as anti-depressants, anti-cancer and cholesterol lowering agents as well as structurally complex natural products. Recent contributions are focused on a new direction for improving efficiency, namely the use of multiple metals (and their accompanying ligands) in a single flask so as to achieve a sequence of reactions without the need for any work-up between the individual steps. Multimetal catalysis saves time and eliminates the waste associated with solvent changes and intermediate purification.

In the past 18 months, our group has been recognized in several important ways. Recent PhD's from the group took prestigious Postdoc Fellow positions at MIT and leading institutions in Germany including the Max Planck Institute für Kohlenforshung. Others took academic jobs in the US and Canada and industrial jobs at Pfizer, Boehringer Ingelheim and Bayer. The group prides itself on its international flavour.

- Mark Lautens

Spotlight On:
Murphy Research Group

Jennifer Murphy (centre) and group. Photo courtesy of Jennifer Murphy

Nitrogen is key to life on Earth, but despite being the most abundant element in the atmosphere, the strength of the N2 triple bond renders those atoms inaccessible under most natural conditions. In the modern industrial period, humans have devised technologies that break this triple bond (or 'fix' the nitrogen) intentionally (e.g. for fertilizer production) and unintentionally (e.g. as a byproduct of high temperature combustion). Industrial rates of fixation are now much faster than natural processes, which include lightning and symbiotic microbes, that once limited the availability of nitrogen to ecosystems. Once released into the environment, fixed nitrogen can cycle through a range of chemical forms, influencing air quality, climate, acid deposition, and ecosystem health. The Murphy group employs a range of analytical techniques to measure nitrogen-containing compounds in different environments, to better understand their sources, sinks, and chemical transformations.

City

In the Greater Toronto Area, each summer brings a new wave of smog alerts, highlighting our concern over poor air quality. Ozone, one of the dominant components of smog, is a secondary pollutant formed in the atmosphere through light-catalyzed reactions of nitrogen oxides and volatile organic compounds. Because this chemistry is non-linear, determining the efficacy of air quality management strategies is challenging. We have combined measurements from ground-based monitors and satellite-borne sensors to confirm that the Drive Clean program has effectively reduced ozone precursors by almost 50% in the last decade. While the change in ozone was initially quite small, our chemical analysis suggests that further improvements can be expected. In the spring of 2013, we plan to install a greenhouse gas monitor at the Toronto Islands to help understand the interplay between greenhouse gases and air quality pollutants. Future work in collaboration with Jamie Donaldson will include an investigation of how nitrogen oxides interact with urban snowpacks, with their unique combination of salts and organic constituents.

Forest

Two hundred kilometers north of Toronto, the Murphy group studies biosphere-atmosphere exchange of nitrogen- and carbon-containing compounds from a 30m research platform towering above the canopy at the Haliburton Forest Wildlife Reserve. There is potential in the future, that forested areas in Canada could be managed to sequester carbon, however, first the biogeochemical links between carbon and nitrogen in forest ecosystems need to be better understood. Intensive measurements conducted thus far include direct measurements of nitrogen deposition in rain and from gas and particle phase species. Long-term measurements of carbon, water, and energy exchange are ongoing, allowing us to contextualize the dramatic impact of an early spring heatwave in 2010, which damaged emerging leaves and led to the forest being a large carbon source over the remainder of the year.

Farm

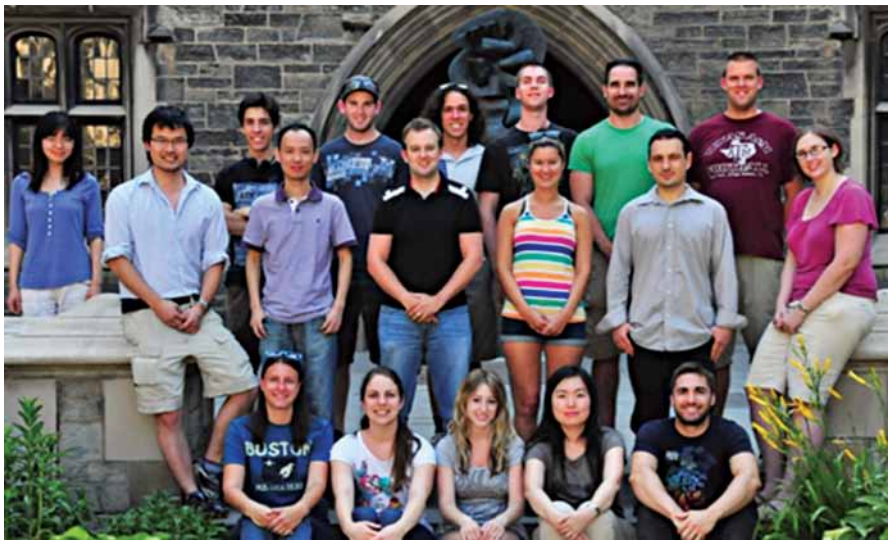
Ammonia is the dominant base in the atmosphere and contributes to the formation of particulate matter, which has human health and climate change impacts. While the application of synthetic fertilizer allows the planet to sustain a much larger population, the emission of excess nitrogen from agriculture can lead to serious environmental problems. The Murphy group has measured ammonia in a variety of urban and rural environments in Europe, California, and Ontario - next stop northern Alberta! These measurements are helping us to address the significant uncertainties that exist with respect to the biosphere-atmosphere exchange of ammonia. For example, we found evidence that the presence of acidic particles in the atmosphere can enhance the loss of ammonia from natural ecosystems downwind of farms. This shows that pollution from power plants and vehicles can couple with pollution from farms and affect how far downwind nitrogen will deposit to ecosystems. Our long-term goal is to develop a robust technique to directly measure the biosphere-atmosphere flux of ammonia.

Industry

An emerging class of nitrogen-containing pollutants are amines, which are proposed for large-scale use in carbon capture and sequestration (CCS) installations. The intention is to use the amines in a reversible cycle to strip carbon dioxide from large fossil fuel combustion sources and store the concentrated CO2 underground. While the amines are theoretically recycled in this application, it is possible that leaks will occur and that the amines and their oxidation products will be released to the environment. In collaboration with Jon Abbatt, we are studying the kinetics and mechanisms of the oxidation of amines in an environmental chamber, while simultaneously developing techniques to detect these compounds in the ambient atmosphere. By obtaining baseline measurements in Alberta and Saskatchewan now, we will have a point of comparison once the major CCS facilities are operational.

- Jennifer Murphy

Spotlight On:
Seferos Research Group



Dwight Seferos (centre) and group. Photo courtesy of Dwight Seferos

I knew that I wanted to work in an area that constantly excited me and also addresses an important goal.

Electronics and computing are very interesting, very advanced and the technology grows exponentially. Yet all of our devices run on electricity that is mainly produced by the same methods that have existed for over a century. The transistors' cousin, the p-n junction photovoltaic (solar cell), is not cost competitive with generators. Much of our research focuses on developing low-cost solar alternatives based on polymers that have a delocalized electronic structure. There are many examples of carbon-based semiconductors (carbon nanotubes, graphene), yet none possesses all the desired properties (light absorption, charge generation, charge transport) that are required for solar cells.

We have a million and one ideas, the trick is to focus on the promising strategies. Nanostructure is king in polymer solar cells and late in 2010 we learned that we could control nanostructure by preparing polymers that consisted of blocks of distinct heterocycles (selenophene and thiophene). This led us to discover that when incorporated into a device, these polymers retain their structure at high temperatures and devices function with long lifetimes. This is significant because lifetime is a critical issue for solar cells.

Because the processes that govern photo-conversion are complex, and it is not often clear how molecular forms translate into function, we often rely on computational modeling to hone in on desired targets. This has led us to focus on polyhetercycles that contain heavy group 16 elements. Recently, we have published a series of papers on polytellurophenes, which are the heaviest known group 16 heterocycles. These materials absorb strongly in the solar spectrum and their larger, more polarizable atoms facilitate charge generation and transport, yet they are still 95% carbon.

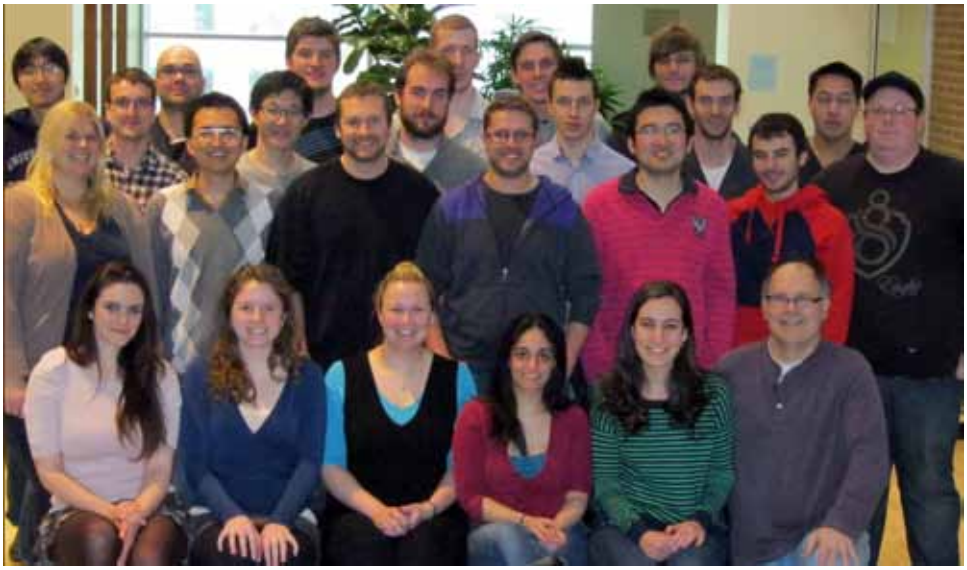
Conservation through more efficient energy transport and storage is another issue that our research addresses. Battery technology is an area in need of a disruptive breakthrough. Our polymer materials not only convert light into electrons, but also store electrons within their delocalized electronic structure. Here our research efforts focus on new polymers and materials that store a significant amount of charge very rapidly. Nano is again important and we have developed patented polymer nanotubes with high porosity and charge storage ability. Ultimately, we'd like to replace batteries with materials that can be charged in a few seconds.

Climate change and global warming will continue to create significant debate. For me, there is far too much empirical evidence supporting climate change and this is the time to work on the problem.

- Dwight Seferos

Spotlight On:

Stephan Research Group



Doug Stephan (front row, far right) and group. Photo courtesy of Doug Stephan

Our research program is focused on catalysis and materials. To this end, we explore the reaction chemistry of both transition metal and main group compounds alike in an effort to uncover unique reactivity, develop such findings for useful stoichiometric reactions and then extend the chemistry to catalytic protocols allowing the facile production of highly desirable materials and products.

Much of our work in the area of transition metal catalysis is prompted by collaboration with industry. For example, we are working with the Saudi Basic Industries Corporation (SABIC) to develop a new class of olefin polymerization catalysts which provide a range of polyethylene grades. We are also working with LANXESS to uncover proprietary catalysts for hydrogenation and olefin metathesis to be used for the production of synthetic rubber products.

Main group catalysis is an area that has received lesser attention in the literature. However six years ago, we uncovered the unique ability of "frustrated Lewis pairs" (FLP), combinations of B and P compounds, that can effect the hydrogenation of a variety of organic substrates. While the early examples were polar substrates such as imines or enamines, we have more recently extended this reactivity to the reduction of olefins, polyaromatics and N-based heterocycles. The potential for both synthetic and commercial applications have spawned much interest as such catalysts avoid the use of expensive and toxic precious metal catalysts.

We have also expanded FLP chemistry to capture, effect stoichiometric and catalytic reductions of CO2 to methanol or CO. While this chemistry is still in its early stages, the potential of new strategies to reduce CO2 is clearly of much interest, given both the known impact of CO2 as a greenhouse gas and the need for alternative sources of C-based fuels. Detailed mechanistic aspects of this work are also being studied in collaboration with Professor Eugenia Kumacheva.

In a new collaboration with Digital Specialty Chemicals we are working with Professors Datong Song and Harry Ruda to uncover new main group and transition metal precursors for applications in the electronic industry. The strategy targets molecular synthons that thermally degrade under relatively mild conditions to deposit controlled layers of unique binary, tertiary and quaternary materials.

Our group is a team of undergraduates, graduate students and postdoctoral fellows that work in parallel, often collaborating to develop specific new applications of our chemical technologies. The borders between inorganic, organic, main group and transition metal chemistries is viewed as artificial and students are strongly encouraged to ignore them as this often leads to exciting new findings. The group gains much experience in manipulation of air sensitive compounds employing our 17 dry-boxes stations and Schlenk lines. In addition, our group NMR spectrometer and X-ray diffractometer allow us to move quickly to characterize our chemistry. Perhaps most importantly, the collegial, supportive and cooperative environment in our Department, together with the outstanding departmental facilities, places us in the enviable position of being able to pursue many new ideas to exciting new chemistry.

- Doug Stephan

Spotlight On:
Wheeler Research Group

Aaron Wheeler (centre) and group. Photo courtesy of Aaron Wheeler.

Professor Aaron Wheeler is a member of the international community of scientists, engineers, and clinicians working to develop integrated, hand-held "lab on a chip" methods for chemical analysis. Wheeler and his research group at the U of Tare known in particular to be innovators in "digital microfluidics," a fluid-handling technique in which electrostatic forces are applied to manipulate discrete liquid droplets on an array of electrodes coated with a hydrophobic insulator. Since 2005, Wheeler and his group have worked to develop lab-on-a-chip solutions to problems in chemistry, biology, and medicine.

Chemistry

Chemists have long been interested in miniaturizing organic synthesis to take advantage of favorable scaling of diffusion and heat exchange over small distances. Unfortunately, the dominant technology used to date (relying on enclosed microchannels) is not an ideal match for all synthetic applications because of clogging of solid reagents and precipitates, complex plumbing issues, and material incompatibilities. Wheeler's group recently demonstrated an alternative to microchannels for miniaturized organic synthesis the first method of its kind. The device was designed to handle solid and liquid reagents with diverse properties for up to thirty reaction steps in parallel. Working with Professor Andrei Yudin, the new devices and methods were applied to synchronized and combinatorial synthesis of peptidomimetic products. The Wheeler and Yudin teams are currently developing the next-generation of this tool to allow for the automated synthesis of libraries of compounds for applications in drug discovery and high-throughput screening.

Biology

In vitro mammalian cell culture and analysis is omnipresent in modern biology, but it comes at a cost, with world-wide activities requiring an annual expenditure of billions of dollars and hundreds of thousands of laboratory hours. Wheeler's research group was the first to explore the compatibility of digital microfluidics with cell culture, with the goal of developing systems capable of automating the process, reducing costs, and reducing human error and exposure to pathogens. Among many innovations in this area, the Wheeler group recently developed a device format allowing for adherent cells to be grown in multiple generations (over multiple weeks) without operator intervention. The Wheeler group has applied this technique to the culture and analysis of cell lines, primary cells, stem cells, and non-mammalian microorganisms. The group recently joined forces with the U of T Innovations and Partnerships Office and MaRS Innovations to spin-out a startup company to translate these techniques to market for researchers in basic sciences and in the pharmaceutical industry.

Medicine

Dried blood spot (DBS) samples stored on filter paper are becoming popular for clinical testing because of the small volume required (pin-prick in place of venous blood draw), easy storage and handling (no requirement of phlebotomist, centrifuge, etc.), and straightforward waste disposal (incineration rather than decontamination of sharps, etc.). Despite these advantages, the technique is currently used only in niche markets because standard laboratory tools are not designed for handling and analyzing tiny scraps of paper. The Wheeler group recently developed the first microfluidic techniques capable of extracting and quantifying analytes from DBS samples. Working with collaborators at the Newborn Screening Ontario (NSO) program at the Children's Hospital of Eastern Ontario, the new methods were used to quantify phenylalanine, cysteine, tyrosine, and succinyl acetone (biomarkers for phenylketonuria, homocystinuria, and tyrosinemia in neonates) in DBS samples. Future instruments relying on these methods will make it possible to analyze more samples more efficiently than is the case today.

- Aaron Wheeler

Faculty Appointments

Rebecca Jockusch Elected to the ASMS Board

Rebecca Jockusch has been elected to the position of Secretary of the American Society for Mass Spectrometry (ASMS) for a two year term from July 1, 2013 to June 30, 2015. ASMS was formed in 1969 to promote and disseminate knowledge of mass spectrometry and allied topics, and currently has a membership of over 8,500 scientists.

Scott Mabury Appointed Vice-President, University Operations

Scott Mabury was appointed Vice-President, University Operations for a five-year term effective January 1, 2012. The position provides oversight of university-wide budget, space, and information technology matters. The Vice-President is supported by the Executive Director, Planning & Budget, the Assistant Vice-President, Campus and Facilities Planning and the Chief Information Officer in providing high-level strategy and policy direction in these three areas, with a tri-campus perspective.

Environmental Chemistry Colloquium

The ECC XII group in front of the living watershed installation at the Evergreen Brickworks.

The Environmental Chemistry Colloquium (a.k.a ECC) is an annual gathering during which students enrolled in Environmental Chemistry share their research with peers and committee members. ECC XII was held June 11-13, 2012, and marked the largest meeting yet, with 36 student presentations! In keeping with tradition, the first day of the colloquium was held at an off-campus location: this year, the Evergreen Brickworks. Once one of Canada's preeminent brickyards, the site now hosts a community environmental centre that showcases green design and urban sustainability. Following a full day of exciting presentations, students (and even some professors!) participated in a trivia hunt which served the purpose of allowing attendees to learn about the rich heritage of the site while team-building among peers. Coming down to a (sweaty!) photo-finish, the winning team walked away with coffee gift cards after learning about 'brownfields', listing the five watersheds in the region, and snapping a photo of a frog.

The second day of presentations was held at UTSC in the Science Wing. After a catered lunch in the student lounge, a few students headed off to committee meetings while others headed outside for some soccer and frisbee in the sun. The final day of presentations was held at the Multifaith Centre on the St. George Campus. The annual faculty barbeque, during which the faculty treat the students to a decadent assortment of grilled goodies, is always one of the highlights of ECC. It was no exception for ECC XII. The barbeque, which was held in the Davenport Courtyard at the Lash Miller Building, capped off the meeting with great success. While flipping veggie burgers, the faculty deliberated on the many outstanding presentations of the colloquium, and eventually announced Hussain Masoom of Andre Simpson's group as the clear winner for the ANALEST-sponsored best presentation award. Congratulations!

Finally, Hussain was also named as the new student organizer for the next meeting. He will join senior organizer Sumi Wren and faculty liaison Jon Abbatt to host ECC-XIII.

The ECC XII committee would like to thank the Department of Chemistry and Chem Club. With their generous financial support we were able to host another successful ECC!

- Sumi Wren (Jr. organizer), Anne Myers (Sr. organizer), Myrna Simpson (faculty liaison)

2011-2012 A. R. Gordon Distinguished Lecture Series

Daniel G. Nocera, Massachusetts Institute of Technology

We were pleased to welcome Professor Daniel G. Nocera as our 2011-2012 Gordon Lecturer. In a series of three inspirational lectures he described research targeted to find a practical way of using sunlight to split water into hydrogen and oxygen and thus provide a renewable source of clean energy for the world.

Nocera gave his inaugural public lecture, "The Global Energy Challenge and a Solution" in the Macleod Auditorium on October 18 to a full audience. He demonstrated how the global energy appetite, greater than 16 terrawatts, will at least double by midcentury, driven by a population likely to reach over nine billion. He also explained, should everyone were to live like Canadians, worldwide consumption would be more than 130 TW in 2050. His argument is that solar energy storage is the sustainable solution and that the technology must have a manufacturing cost of $10 per pound, like automobiles and "Big Macs." As he described to the UofT News, his goal is to provide cheap, efficient energy to developing countries[1]. With that in mind he illustrated the discoveries in his lab that lead to the design of an "artificial leaf", that when placed into water in sunlight, stores photons as hydrogen and oxygen gas. Graduate student Demyan Prokopchuk commented about the lectures, "It is rewarding to know that Professor Nocera's fundamental academic interests in proton coupled electron transfer (PCET) over the past 20 years have become invaluable tools in understanding the mechanism of water splitting and developing the artificial leaf." A demonstration of the "artificial leaf" is viewable on-line at, www.youtube.com/watch?v=LEEhxk-CiOQ&feature=plcp. Over the next two days, Nocera gave several technical lectures which expanded on the research in physical and inorganic chemistry that makes this "artificial leaf" technology possible. His second lecture, "The Chemistry of Solar Fuels" addressed the fundamental process of creation, and emphasized the synthetic inorganic chemistry, photochemistry, electrochemistry, time-resolved spectroscopy and biochemical processes involved. His final lecture, "The Artificial Leaf", explained the preparation and mechanism of the cobalt-phosphate electrocatalyst for water splitting and the development of a usable and scalable device from the discovery.

In addition to his lectures, Nocera met with faculty and students during his very busy visit. They were struck by his broad knowledge of science, his humorous observations, his enthusiasm and his dedication to finding a practical solution to the Global Energy Crisis for the benefit of all. We were fortunate to host such a memorable, gracious and engaging guest. After celebrating 2011 as the International Year of Chemistry, Nocera's research was a perfect illustration of the positive impact that chemistry can have on our world.

- Robert Morris

[1]www.news.utoronto.ca/mit-professor-touts-artificial-leaf-potential-clean-energy-solution

Departmental Named Special Lectures

Adrian Brook Lecture
Mark Taylor, U of T
Noncovalent and Reversible Covalent Interactions: Fundamental Studies and Applications in Catalysis

Alex Harrison Lecture
Jennifer Murphy, U of T
Sources, sinks, and chemical transformations of reactive nitrogen in the atmosphere

Alphora Lecture
Tobias Ritter, Harvard University
Late-Stage Fluorination for PET Imaging

Ates Tanin Lecture
Scott Browning, U of T
An Elephant in the First-Year Chemistry Classroom: Are Ontario High Schools Equally and Adequately Preparing Their Students for University Science?

Bryan Jones Lecture
Voula Kanelis, UTM
Biochemical and biophysical studies of the first nucleotide binding domain from SUR2A

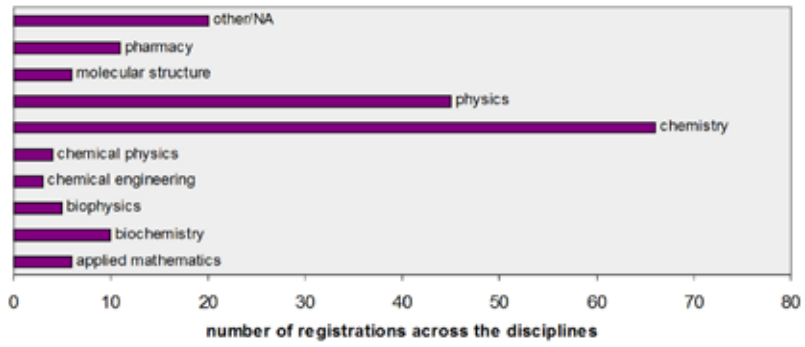
Eli Lilly Lecture
Ben Cravatt, Scripps Research Institute
Activity-based proteomics - applications for enzyme and inhibitor discovery

Chemical BioPhysics Symposium

University of Toronto April 13-15, 2012

Continuing a legacy of ten years, the Chemical BioPhysics Symposium (CBP) was held again in Toronto in 2012. Since its early days the conference has been organized and run by students from different departments: biology, chemistry, pharmacy and physics. With participants across those fields, covering both experimental and theoretical aspects, the main goal of the CBP is to create communication between different scientific disciplines.

This year's conference was a great success. Compared to previous years, we had a 20% increase in participants, who mostly originated from outside the University of Toronto. With almost 180 registered graduate and undergraduate students, postdoctoral fellows and faculty members, we experienced three days of great science and networking hosted in the Leslie L. Dan Pharmacy building.



Top: Number of registrants across the various disciplines.
Bottom left: Keynote address. Bottom right: Annual banquet dinner

We welcomed eight keynote speakers from all over North America: Andrew Miranker (Yale), Claudiu Gradinaru (UofT), Jim Collins (Boston), Richard Epand (McMaster), Zahra Fakhraai (U Penn), Klaus Gawrisch (NIH) and Klaus Schulten (UIUC). We were excited to welcome back Suckjoon Jun (Harvard) who returned to CBP ten years after participating in the poster presentation as a graduate student during CBP 2002. The keynote speakers were complemented by 19 oral presenters chosen from the submitted abstracts and almost 100 poster presentations. Continuing the success of the workshop series introduced during CBP 2011, we held three workshops, all of which were well received amongst our participants.

Our annual panel discussion dealt with the "State of Funding today", discussing the opportunities for funding for scientific efforts. This year the panel was chaired by Professor Cynthia Goh who was amongst the group of visionaries that created CBP 11 years ago. Following the panel discussion we invited the speakers and participants to mingle around the poster boards over chocolate fondue and other tasty desserts.

The annual banquet dinner, our main social event, was held on Saturday evening. The highlight of the night was a jeopardy game, during which we tested our participants on their history, culture, math and science knowledge, and their verbal skills. The informal atmosphere during the multi-course dinner provoked fruitful discussions and networking opportunities that were appreciated by participants as well as the organizational committee.

CBP 2012 was a terrific success! Not only did we experience the highest number of participants in our history - we also welcomed new participants from the engineering sciences and have received great feedback from our event. Moreover, students from other universities outside Toronto were so enthusiastic about CBP that they have already signed up to be a part of the organizational committee for CBP 2013. The organizational committee is proud of our success and are looking forward to next year!

- Christina Müller, Co-Chair CBP 2012

Report on ISACS8

July 19-22, 2012

Challenges in Inorganic and Materials Chemistry (ISACS8)
19 - 22 July 2012 • Toronto, Canada

From July 19-22, 2012, the Department of Chemistry was host to ISACS 8; the eighth International Symposium for the Advancement of Chemical Science, sponsored by the Royal Society of Chemistry of the UK. The theme of the conference was "Challenges in Inorganic Chemistry and Materials Chemistry". The conference aimed to bring together exceptional researchers - all leading names in their field - for an outstanding plenary programme, complemented by contributed talks, together with extensive poster sessions that provided many networking opportunities. The invited speakers, a variety of chemists from around the world included: Simon Aldridge (Oxford), Tom Baker (Ottawa), Viola Birss (Calgary), Paul Chirik (Princeton), George Christou (Florida), William Dichtel (Cornell), François Gabbaï (Texas A&M), Clare Grey (Cambridge), Sossina Haile (CalTech), Joe Hupp (Northwestern), Noritaka Mizuno (Tokyo), Russell Morris (St. Andrews), Kyoko Nozaki (Tokyo), Warren Piers (Calgary), Annie Powell (Karlsruhe), Roberta Sessoli (Florence) and Joan Valentine (UCLA). In addition, contributed talks were given by Merle Arrowsmith (Bath), Rahul Bannerjee (NCL-India), John Errington (Newcastle), Josh Figueroa (UCSD), Tomislav Friscic (McGill), Stephen Liddle (Nottingham), Steve Loeb (Windsor), Paul Ragogna (Western), Gill Reid (Southampton) and Adam Viege (Florida). More than 225 chemists were in attendance, including colleagues from Canada, the USA, and around the world.

Challenges in Inorganic and Materials Chemistry was the second event in the ISACS series in 2012 and the first of the series to take place in Canada. ISACS 8 built upon the success of ISACS 3 which took place in 2010 on the same topic. Both inorganic and materials chemistry are key areas of research that will play a significant role in meeting some of the biggest issues facing mankind in the future. ISACS 8 focused in on a number of these areas, outlining some of the most recent successes as well as some of the major challenges that lay ahead.

The Chair of the scientific committee for this meeting was Professor Doug Stephan, while other members included Kit Cummins (MIT), Phil Dyer (Durham), John Errington (Newcastle), Jeff Long (Berkeley), and Stephen Skinner (Imperial College).

- Doug Stephan

Report on NMR Bootcamp

June 4-9, 2012

The NMR Facility and Tim Bender, NMR Facility Manager hosted the National High Field NMR Centre (NANUC) BootCamp from June 4 – 9, 2012. We welcomed seven presenters who spoke about the most popular and powerful software suites in order to demonstrate the latest developments in the field of NMR. This was the first year the NMR BootCamp was held in Toronto, and we were pleased to welcome more than 25 participants during five days of programming. During the six-day camp, participants had a chance to explore adding bio-solids to our traditional strength of liquids biomolecular spectroscopy. Participants attended lectures, participated in hands-on sessions, and networked with industry leaders during several sponsored dinners.

- Tim Burrow

Births and Weddings

Jack (Machine Shop), Suzan and big sister Mhari O'Donnell, welcomed Gracie on Jan 30, 2011. Photo provided by John Ford.

Trevor Vandenboer (PhD 2012 with J. Murphy) and Cora Young (PhD 2010 with S. Mabury) were married July 7, 2012. Photo provided by Trevor Vandenboer.

Jeff St. Denis (Yudin group) and Megan (nee Baumler) celebrated wedded bliss on March 24th 2012. Photo provided by Jeff St. Denis.

Anthony Tavares (Krull group) married his sweetheart, Raquel on August 25, 2012. Photo credit: Memory Video & Photography/C . Gennaro.

Brent Pautler (M. Simpson group) and Christine Plateo celebrated their nuptials on August 25, 2012. Photo provided by Brent Pautler.

Stefanie Steele (Receptionist, Chair's Office, BSc 2009) and Mark Morreale (BASc 2009) were married on September 8, 2012. Photo credit: John Lee.

Demyan Prokopchuk (Morris group) and Natalia Mnich exchanged wedding vows on November 10, 2012. Photo provided by Demyan Prokopchuk.

Mark and Julie Nitz welcomed their son, Miles on Thursday November 22, 2012. Photo provided by Mark Nitz.

In Memoriam (cont. from pg. 10)

Jessie Selina Roberts Current

BA 1925

Jessie Selina Roberts Current passed away February 11, 2011 in her 109th year. She received her BA in 1925. Beloved wife of Warren James Current and sister of the late Dr. James Roberts and the late Ina Louise Roberts. Jessie is survived by dozens of cousins who will miss her dearly.

Alice Fredericka Sophia Fischel

BA 1952 MA 1953

Alice Fischel passed away on Friday November 2, 2012 at the age of 84. One of only four women in her graduating class, she received her MA from Chemistry in 1953. She is survived by her 3 nephews: Richard, Gordon and John.

Lloyd Alfred Hassell

BA 1941

Lloyd Hassell passed away in Mississauga on November 27, 2011 at the age of 92. He received his BA in Chemistry in 1941. Lloyd was predeceased by his loving wife, Jessie and brother, Jack. He is remembered by his sister, June (Douglas), his cherished friend, Grace, and his many nieces and nephews.

Solomon Kaiman

BSc 1942, MSc 1946

Solomon Kaiman passed away in Ottawa on February 11, 2011 after 90 years. He received his BSc in 1942, and his MSc in 1946. Solomon was predeceased by his first wife, Esther. He is survived by his beloved wife, Sylvia and his many children and grandchildren.

Elvins Yuill Spencer

PhD 1941

Elvins Spencer passed away on March 3, 2012 at the age of 98. He received his PhD in organic chemistry in 1941 with Professor George F Wright. Elvins will be fondly remembered by his wife Hanna, children Erica (Patric) and Marty (Kathryn), and many grandchildren and great grandchildren.

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