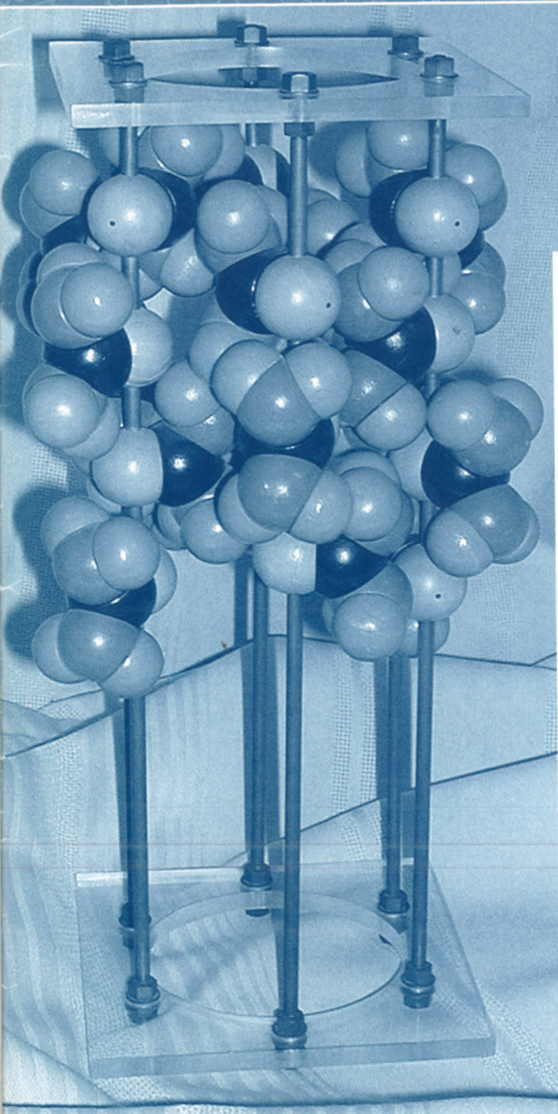
Q-CHeM CHRONICLES

Queen's UNIVERSITY

AUGUST 2005



First Queen's Ph.D. in Chemistry

Henry G. McAdie, Ph.D. 1956

Supervisor: Prof. G.B. Frost

Mechanism of the Formation and Decomposition of the Molecular Inclusion Compound of Urea and n-Octane. Model shows the hexagonal arrangement of the molecules of urea (NH2)2CO in the crystalline compound. The molecules of n-octane C8H18 are not shown, but in the crystal are contained within the cylindrical cavity at the centre.

Colour code: light blue: O, black: C, dark blue: N, orange: H

Construction: Frame by R.D. Bradfield, instrument maker in the Physics Department, 1953. Fisher-Hirschfelder molecular models by H.G. McAdie.

Please join us as we celebrate the 50th anniversary of the first Queen's Ph.D in Chemistry. The celebration will take place on Friday May 5th, 2006 at Chernoff Hall, Queen's University.

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Queen's UNIVERSITY

AUGUST 2005

A Summer at Alphora Research

BY SARAH WOOD

Hardly six weeks into the summer and I feel like I have already gained more than a summers worth of knowledge and lab experience.

This summer I am working at Alphora Research Inc., a small but growing pharmaceutical research company in Mississauga, Ontario. It has been a great opportunity to further my career development and made me eager to pursue a future in the chemical industry.

I work as a part of a research and development team under the guidance of a senior research scientist. Alphora focuses on the field of custom synthesis of complex organic molecules for pharmaceutical and biotechnological applications. My current project involves the development and optimization of synthetic routes for an active pharmaceutical ingredient.

Through this summer employment I have had many opportunities to apply my knowledge gained from the classroom environment. I am continuing to learn new laboratory techniques and am reinforcing the theory I have learned at university.

This position has allowed me to work alongside many distinguished chemists who have provided great insight into the real world applications of the pharmaceutical industry.

TA Awards

In order to promote and recognize excellence in teaching by Teaching Assistants (TAs) in Chemistry, the Department has added six (6) new TA awards. Previously there was only one award honoring Paddy Doolan, a chemical technologist and lecture demonstration assistant extraordinaire in this department from the 1920's to the 1950's. The set of seven awards covers both tutorial style and laboratory teaching in 1st, 2nd, and 3rd years. Each TA award is $500. Awards for the 2003-04 academic year were presented at the TA training day in early September:

Merck Frosst Canada TA Award
Stephanie Smith

Merck Frosst Canada TA Award
Stephen Lee

DSC 2004 TA Award
Eric Anctil

Varian Canada TA Award
Laurie Brown

William Patrick Doolan Prize
Simona Mitu

Fisher Scientific TA Award
Kevin McEleney

Din Lal TA Award
Sergei Manzhos

Christopher Knapper Award Winners

Congratulations to Ian Wyman and Eagranie Yuh who received the *Christopher Knapper award*. This university-wide award is presented to TAs exhibiting the qualities of dedication to students and a passion for education.

Killam Award

Congratulations to Dr. Axel Becke. He has been awarded a prestigious Killam Research Fellow for 2005-2006 and 2006-2007. Killam Research Fellowships enable Canada's scientists and scholars to devote two years to full-time research and writing. Only seven new awards and seven renewals are made each year. Dr. Becke is internationally renowned for his research in the field of computational chemistry: the simulation of molecular structures, energies, and chemical reactions by computer calculations. Dr. Becke is a leader in the development of a relatively new approach to computational chemistry known as density-functional theory. The theory allows scientists to perform computer simulations on much larger problems than are possible with other approaches, opening the way to exciting new applications in chemistry, physics, materials science, and biology.

Please Welcome Our Newest Professors

Dr. Anne Petitjean was born and raised in France. After her undergraduate studies in Lyon working on mimics for natural enzymes (cyt P450) and virus self-assembly as well as luminescent materials, she joined the group of Professor Jean-Marie Lehn in Strasbourg (France) for her PhD. There she developed mimics for peptide secondary structures (helices, strands and turns) with applications in nanotechnology (e.g. wires, multi-state switches). Part of her graduate work also has incidences in anti-cancer therapy. In order to gain further experience in the latter field, Dr. Petitjean joined the group of Professor Jacqueline K. Barton at the California Institute of Technology (United States) and developed mismatch selective cis-platin derivatives with potential applications against certain colon cancers. She has recently joined the Department of Chemistry at Queen's University, as a Queen's National Scholar, where she develops supramolecular systems as new materials and bioactive species.

Anne Petitjean

Message from the Head

BY DAVID WARDLAW

Last year was another superb year, one in which we continued to build strength in all areas. We are steadily progressing towards our goal of becoming one of a small number of top-level, full-service chemistry departments in Canada, carrying out internationally recognized research and providing leadership in chemical education.

Two new faculty were hired in 2004-05. Both arrive in July 2005, one is a Tier II Canada Research Chair (Derek Pratt) and the other is a Queen's National Scholar (Anne Petitjean). They join David Zechel as assistant professors specializing in biological chemistry; each is the subject of an article inside this issue. The Department is in the middle of recruiting two Tier I Canada Research Chairs, one in Computational Chemistry and a joint Chemistry-Physics chair in Chiral Photonics. A nominee for each CRC position has been submitted to the University's CRC Executive Committee who make the final decision on the suitability of nominees. Once approved by the University, nominees then apply for final approval at the federal government level.

The 2004-05 undergraduate enrolment in Arts & Science degree programs with an identifiable chemistry component (minor, medial, major, subject of specialization) is up ~45% from the 2002-03 enrolment level and up ~ 25% from the 2003-04 level. The 2004-05 Engineering Chemistry enrolment is up ~ 10% compared to the previous year. The Department received $75,000 from the Faculty of Arts & Science to expand and improve the laboratory facilities for its highly successful 3rd year integrated lab course introduced last fall (see article in this issue). With the arrival of two new faculty in 2004-05 and two in 2004-05, we are poised to begin the expansion of our graduate enrolment en route to our target of 115-120, in step with the provincial government's recently announced initiative of increased funding to support growth in graduate program enrolment in Ontario. More important than the size of the graduate cohort is its quality. To this end we have systematically been raising our graduate admissions standards by instituting more rigorous admissions procedures and attempting to recruit more students holding major external scholarships.

Corporate support for specific departmental activities continues to increase steadily (see article on new TA awards) and enhances generous ongoing support from Chemistry alumni. The Queen's Chemistry Innovation Council, our external advisory body, has matured in its first five years into a effective organization for the promotion of the Department and enhancement of its activities (see article by the new council chair, Jan Oudenes)

Workshop on Design of Experiment

The inaugural workshop on design of experiment was held in the Department on May 4. This one-day workshop was open to all research personnel in Chemistry, in cognate departments at Queen's and RMC, and local industry. The session was organized by Jan Oudenes, Chair of the Queen's Chemistry Innovation Council and President of Alphora Research. Speakers were from Alphora Research in Mississauga and the DuPont Canada R&D facility in Kingston.

December 2004

Annette Keyes, Graduate Secretary, receives the Department of Chemistry Staff Recognition Award as staff person of the year. This is the first time this award has been given.

Message from the Manager

BY RICK BOSWELL

Once again, the past year saw many changes in chemistry. With enrollment numbers increasing and the struggles created with timetables, it was necessary to offer several evening lab sections for the first time in over 20 years. My thanks to our lab techs who volunteered to put in the overtime to make this happen - Len Rose, Ted Ison, Tom Hunter and Lyndsay Hull. Their dedication to the undergraduate lab program is truly appreciated.

In light of the scheduling difficulties, we are renovating our undergraduate lab space this summer to better accommodate the recent changes in our undergraduate program and the increasing undergraduate enrolment. Physical and Analytical 2nd year Chemistry labs are being combined into the same space, the existing analytical space will be converted for the third year integrated lab program. The renovation is financed by a $75,000 allocation from the Dean's Equipment fund.

We are also busy renovating and moving labs in the research area to accommodate our two new faculty members. This is essentially re-locating benches and fumehoods from one area to another and the work is proceeding nicely. The design of the building and the built in adaptability of the facility have made this an easy task to accomplish.

Chernoff Hall continues to set the standard for academic science buildings in Canada. I presented a talk in Ottawa in May at the first Canadian Science Buildings Conference on how the flexibility and adaptability for Chernoff Hall have assisted us through a phenomenal and unexpected growth spurt. This presentation has spawned an article in a major facilities maintenance publication. I will also be speaking in Portland, Oregon this fall at the Labs21 conference on the efficiency of our fume hoods and overall mechanical design. Three years later and we're still making news!

I am looking forward to the next year as we adapt yet again to the changes that are now almost constant. The building is a victim of its unprecedented success and I hope that we can continue to enjoy the growth that we have seen since its completion in 2002.

DID YOU KNOW...

Chemistry meets Art Conservation:
The secret world of conservation science at Queen's

Few people know about the conservation science Master's, offered through the Art Conservation program at Queen's and its interdisciplinary projects. Over the past few years there has been a growing collaboration between chemistry and art conservation; chemistry students, both undergraduate and graduate, and chemistry faculty are working with Dr. Alison Murray of Art Conservation on a major international project investigating the conservation and cleaning of acrylic works of art. It is an interesting and colourful study of polymer chemistry that is advancing the knowledge of acrylics within the conservation science field. Students have the opportunity to collaborate with institutions in North America and throughout the world, such as the Smithsonian Institution in Washington DC, the Tate Gallery in London, England and the University of Turin in Turin, Italy. Students have presented their wok at a host of international conferences, notably within the past year at the Infrared and Raman Users Group conference in Florence, Italy, the International Institute for Conservation conference in Bilbao, Spain and the Materials Research Society conference in Boston, USA.

Please Welcome Our Newest Professors

Dr. Derek Pratt was born April 10, 1976 and raised in Ottawa, where he attended Colonel By Secondary School before receiving his B.Sc. (Hons.) in Chemistry in 1999 from Carleton University. During his undergraduate studies Derek worked as a research assistant in the laboratories of Professor Jim Wright (1997-98) at Carleton and Dr. Keith Ingold at the National Research Council of Canada (1998-99). In 1999, Derek moved to Nashville, Tennessee to pursue a Ph.D. at Vanderbilt University under the supervision of Professor Ned Porter supported by NSERC PGS-A and PGS-B (Julie Payette) post-graduate scholarships in chemistry. In the fall of 2003, Derek joined Professor Wilfred van der Donk's research group at the University of Illinois at Urbana-Champaign, where he held a Jane Coffin Childs Fund for Medical Research Post-Doctoral Fellowship. In November 2004, Derek accepted a position in the Department of Chemistry at Queen's University and will begin his independent career as Assistant Professor (and Canada Research Chair (Tier II) in Bioorganic and Physical Organic Chemistry) in July 2005. His interests are mainly in mechanistic organic chemistry relevant in biology.

Derek Pratt

2004 – 2005 DEPARTMENTAL HIGHLIGHTS

July 2004

Guojun Liu and David Zechel take up their new faculty positions at Queen's.

Suning Wang is awarded a Queen's Research Chair (check the month and title of award)

September 2004

Launch of new 3rd year, "integrated" laboratory course

Hugh Horton is awarded a Gordon & Jean Southam Association Fellowship from the Association of Commonwealth Universities.

Continuation of Dow Weekly Seminar Series sponsored by Dow Chemical @ $15,000 per year for three years (year 3 of 3).

Continuation of Bayer Distinguished Lecture Series sponsored by Bayer Rubber Division @ $20,000 per year for three years (year 3 of 3).

Annual meeting of Queen's Chemistry Innovation Council

1st Careers Luncheon for undergraduate and graduate students

October 2004

Roxanne Lewis and Mark Mohamed each win a prize for best poster at the National Undergraduate Chemistry Conference in Ottawa.

Departments of Chemistry and Physics awarded permission to recruit a Tier I Canada Research Chair in Chiral Photonics (a joint appointment in the two departments).

March 2005

Peter Loock granted tenure and promoted to rank of Associate Professor, effective July 1, 2005.

Gregory Jerkiewicz promoted to rank of Professor, effective July 1, 2005.

Richard Oleschuk receives the Chemistry Departmental Student Committee (DSC) Teaching Award for 2004-05 at the annual Chemistry Banquet.

Graduate students Owen Clarkin and Guru Saravanabhavan receive DSC Teaching Assistant Awards at the annual Chemistry Banquet.

Graduate students Alison Holliday, Daryl Allen, and Alan Wong awarded Natural Sciences & Engineering Research Council Postdoctoral Fellowships.

Keijan Bian receives national Macromolecular Science & Engineering Division Graduate Student Award from the Chemical Institute of Canada.

April 2005

Bob Lemieux receives the W.J. Barnes Award for 2004-2005. This award is presented annually by the Arts and Sciences Undergraduate Society to deserving members of the Faculty of Arts and Science who have made a significant contribution to teaching.

Patrick Hecht is awarded a 2005 Pfizer Summer Undergraduate Research Fellowship in Synthetic Organic Chemistry. The fellowship permits the awarded to devote full-time effort to a summer research project in the Department under the supervision of a Chemistry faculty member

May 2005

Richard Oleschuk receives the Fred Beamish Award from the Canadian Society for Chemistry.

Vic Snieckus receives the Bernard Belleau Award from the Canadian Society for Chemistry.

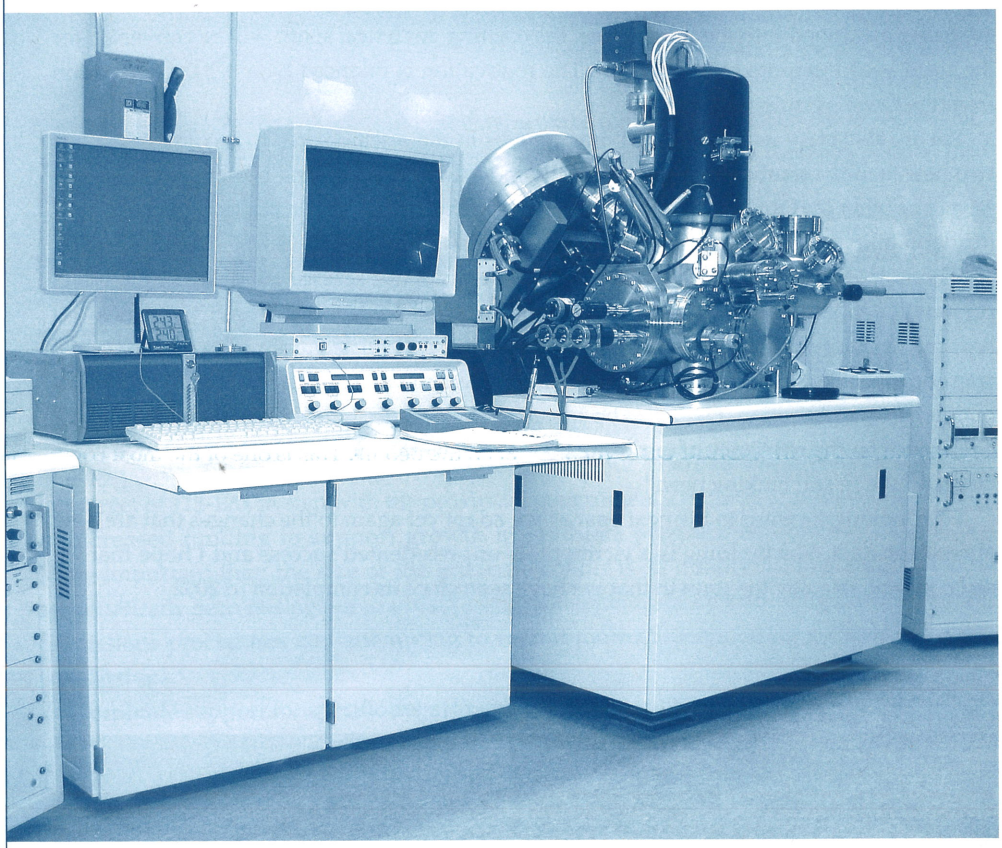
Alison Holliday receives 2005 Analytical Chemistry Division Graduate Student Award in honour of Walter E. Harris at the Canadian Society for Chemistry conference.

Undergraduate summer research: 18 students holding NSERC Undergraduate Summer Research Awards and 8 other students begin four months of research work in various research laboratories in the Department.

Microlab 310-F Surface Analysis System

In fall 2004, the Department of Chemistry initiated an effort to acquire a high-resolution surface analysis system manufactured by Thermo Electron Corporation (formerly known as VG Scientific) that will serve chemists, physicists and materials scientists who require surface-chemical and surface-electronic characterization.

micron- and nanometer-sized materials and architectures. This surface analysis system complements other surface analysis tools such as optical microscopes, surface profiler, scanning tunneling microscope, and atomic force microscope present in the Department and acquired with the support from NSERC and CFI.



This is a high-resolution Auger-electron system, also referred to as a scanning Auger microscope (SAM), with multi-technique capabilities that include an X-ray photoelectron spectrometer (XPS), a detector of backscattered electrons (BSE), and an Ar-gun for depth-profile analysis. The system allows one to obtain high-resolution images of conducting, semi-conducting and insulating solids, and to prepare a map of elements detected at the sample's surface.

The high spatial resolution (~10 nm to ~15 nm) and chemical mapping capabilities make it a suitable instrument for research in the emerging science and technology of

The areas of physical and engineering sciences that will profit from the existence of this new facility include catalysis, electrochemistry, corrosion science, micro-fluidics, lab-on-a-chip, fuel cells, polymer science, ultra-thin films, quantum dots, magnetic thin layers, nano-wires, semiconductors, micron- and nanometer-sized structures, bio-compatible materials, porous materials, laser machining, sensors and actuators, fiber composites, environmental materials, energy conversion, photo-voltaics, and tribology.

One Year Old at Queen's

Guojun Liu

Dr. Guojun Liu has spent most of his first year on re-building his research group and raising funds. By July his group will consist of four post-doctoral fellows, three graduate students, two undergraduate students, and one technologist. His research is presently funded by the NSERC Discovery, Special Research Opportunity, and Collaborative Research and Development Grants and contract money from Afton Chemical Corporation, Xerox Corporation, and L'Oriel. After an initial slow start with instrument setup, his group is now gathering steam. Among the success stories at Queen's has been a facile new one-pot method for the preparation of nanometer-sized spheres with patterned surfaces and interiors. These spheres bear structural resemblance to animal cells and may find applications ranging from controlled drug delivery to nanoelectronics.

The Lui Group

David Zechel

One year has passed since my arrival in Chernoff Hall and what an excellent adventure this has been so far! I followed the sage advice of my colleagues and spent money early, quickly and thoroughly and much to my satisfaction the expected result was achieved: equipment and reagents filled the empty benches, talented undergraduates and an excellent postdoc took up the call to arms, and now results are trickling from the reaction flasks.

What has truly impressed me about Chernoff Hall, and other faculties at Queen's, particularly Biochemistry, has been the people. This is one of the most collegial and supportive environments I have ever had the pleasure to work in. Folks are driven here, but they want to work with you, not against you. I've been warmly welcomed into every office and lab, given lucrative advice in grant writing, offered the use of any piece of equipment that caught my fancy and encouraged to join research collaborations. I owe a great debt to Queen's Biochemistry who without hesitation gave me the opportunity to supervise a pair of 4th year students; these students, along with my postdoc Dr. Yan Luo, assembled a functioning chemistry and molecular biology lab within a remarkably short period of time and kick-started a challenging research program along the way. This work continues with two NSERC undergraduate summer research students. My primary challenge now is to convince ambitious graduate students to sign on to this odd hybrid of chemistry and biochemistry that is flourishing here in Chernoff!

Taila Hartley, Dianna Wang, Dr. David Zechel and Dr. Yan Luo

Honours Degrees

Below is a list of all those who graduated with an honors degree: Catherine Elizabeth Ross, Naamah Laila Abudulai, Bill Aida, Caroline Barnes, Louise de la Durantaye, Christa Margaret Huntley, Heather Husch, Deborah Lynn Kelley, Kevin Koo, Crystal Leigh Maitland, Adam James Munnings, Zaara Sarwar, Rachel Lenore Tripp, Lisa Wong, Victoria Irene Cooper, Michelle Douma, Megan Lord-Hoyle, Justin Patrick Rothwell and Cheryl Saunders.

DID YOU KNOW...

You may designate your bequest to the Department of Chemistry?

Your bequest regardless of its size is welcome and appreciated. Your gift will help the Department of Chemistry meet the challenges and opportunities ahead. To learn more about how your bequest, charitable annuity, or gift of life insurance can help educate the next generation of chemistry professionals, please contact: **Doug Puffer, Office of Planned Giving, Queen's University, Kingston, ON, K7L 3N6. *Tel* 1.800.267.7837, *Fax* 613.533.6762 *Email* pufferd@post.queensu.ca**

Queen's Chemistry Innovation Council: A Message from Jan Oudenes, Council Chair

The QCIC is an advisory council to the Chemistry Department, and has membership from industry, government and society at large. Primary objectives of the Council are to enhance the reputation of the Chemistry Department and to promote the interaction of academia and our society at large, including industry and government.

This year the council has focused on advancing a human resources agenda, on identifying and strengthening important skill sets which will provide Queen's undergraduate and graduate students, and, postdoctoral fellows and research associates with a competitive edge in an ever increasing global environment. Such new skill sets should lead to better and more efficient research, and to superior funding of innovative research.

In 2005, the Council organized a workshop in "Design of Experiment", also referred to as DOE, a pilot project to show the increasing importance of this discipline in science and engineering. Novel, more complex materials with stringent performance qualifications, coupled with a revolution of analytical sciences over the last few decades will continue to challenge a new generation of scientists and engineers to develop superior (manufacturing) technology. More recently this concept has also been recognized by regulatory authorities like the US Food and Drug Agency. Hence, I believe that the Council can fulfill its mandate by being a champion for developing new competencies.

The Council is also involved this year in a pilot project for summer employment of undergraduate chemistry and engineering students. From my experience, Queen's students compete effectively at this level with students from other universities. In addition, it is an attractive means to connect academia and industry in such an effective manner.

In closing, I would like to express our excitement to assist David and the staff of the Department of Chemistry in building a school with a wonderful reputation.

Words from a member of the Council

I can truly say without reservation that my years at Queen's were among the best years of my life. The Queen's experience, the rich lifelong relationships among my peers, and an academic education that prepared me well for my professional life are a few things that I took away from the University and they all continue to enrich my life to this day. When I was asked to join the QCIC, it was an easy decision to accept. My participation on the Council gives me a way to reconnect with the University and the Chemistry Department. And it also provides me with a way to give something back that hopefully will benefit future students and the University. I believe that the Council, through the diverse backgrounds and experience of its members, can provide important perspective from outside the University; useful input to the on-going evolution of the Department; and continuity of the past, present and future so as to help the Department succeed in its pursuit of excellence. **Dave Thomas**

Advancement News

BY ARIG GIRGRAH AND PATTY MCHENRY

The Chemistry Department is one academic unit that has embraced the goals of Queen's new plan for alumni relations and has already done a fantastic job of engaging its students, alumni, faculty, and staff. For instance, the Chemistry Innovation Council, comprised of 20 alumni and friends from the government sector and industry, give their "time, treasure, and talent" to advance the goals of the chemistry department and build mutually beneficial relationships between academe, government, industry, and society.

A broad cross section of chemistry alumni and friends demonstrate their commitment to Queen's by participating in volunteer or philanthropic activities. Whether sharing expertise with faculty, speaking on student career panels, guest lecturing, securing student placement/intern positions, providing gifts of equipment in kind, submitting articles for *QChem Chronicles*, giving to the Annual Fund, contributing to the Chemistry Equipment Challenge, or donating leadership gifts for Chemistry funding priorities, this participation is of utmost importance to the success of students while at Queen's and later in life.

On behalf of the Chemistry Department, the Faculty of Arts & Science, and the University as a whole, we would like to thank you for all you have done this past year!!

Patty McHenry, *Senior Development Officer*
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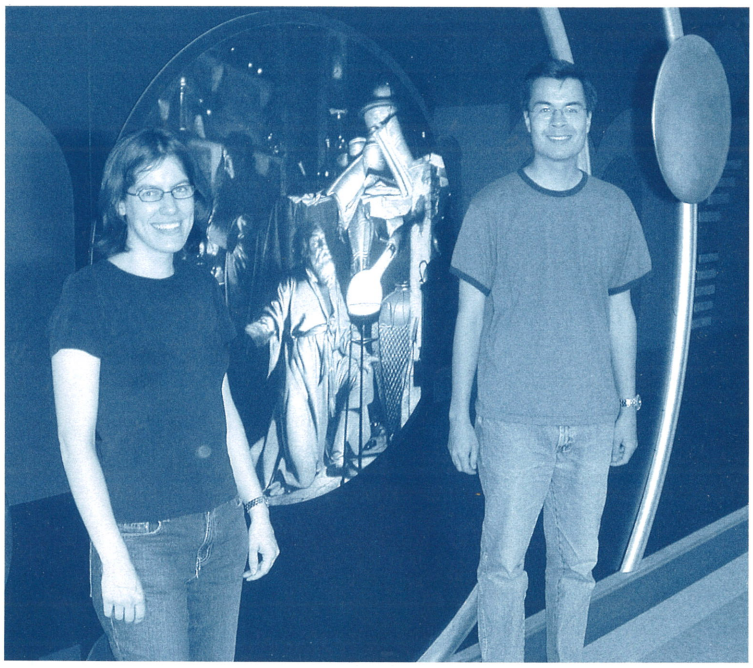
On their way… life after graduate studies



Alison is headed to University of British Columbia and Scott to the University of Illinois at Urbana-Champaign

Alison Holiday

It's hard to believe that eight years have passed since I first stepped into the chemistry department at Queen's. Then, it was labs and odd smells in Gordon and Frost and confusion about how to find classrooms in the Annex. Now, in Chernoff Hall, a social fabric is spun over lunch or coffee in sunny lounges and rooms are easy to find.

The people around me have also changed during my time at Queen's, as new faculty have arrived, and the cycle of welcoming and goodbyes for undergrads and grad students continues. It's a strange and wonderful thing to meet former TAs or compatriots at conferences or to have their exploits filter back to the department.

Despite the changing faces, however, what has stayed constant is the friendliness and the openness of the community. When research is not going quite as well as one might hope or when writing seems to be a never-ending task, there is always someone there with a word of encouragement or even just a wave and a smile when passing in the hall. I'll miss the chemistry department at Queen's, where my knowledge of chemistry has expanded so much, so many friendships have been built, and where I have learned to hit a softball on average at least one out of every four tries.

Scott Hartley

I recently looked at the departmental website and realized that roughly half the faculty have spent less time in this department than myself (I began as an undergraduate in 1996). This could be taken as an unfortunate perspective on how long I've been in Kingston, but I prefer to think that it highlights the revitalization that has been taking place here over the last few years. Over the course of my education here, there has also been a huge advance in the quality of our departmental facilities. The most significant, of course, is our migration to Chernoff Hall, but there has also been a large investment in communal facilities like the NMR lab. It's been a pretty exciting time to work in the Queen's Department of Chemistry.

Of course, I didn't know that any of that was going to happen when I originally decided to stay in Kingston for graduate school. At the time, I think what I most liked about the department was the quality of the graduate students and post-docs. In some ways these people are the most important to a positive experience but the least heralded. Almost all of the people I have met here have been knowledgeable, helpful, and fun to work with, and have made this a pretty good few years.

Homecoming Weekend 2004

will take place on October 22, 23 & 24.

Call us or visit
http://homecoming.queensu.ca/
for updates on the celebrations!

Alumni Contact Information

Do we have your current, correct mailing and contact information? Do you have a new email address? Let us know. We would really like to locate and/or hear from all of our "extended family" of alumni. Please feel free to write/email/call and give us details of where life has taken you since your days in the Department!

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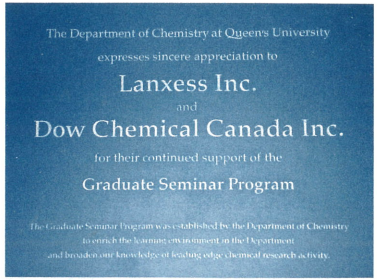
A very special thank you goes out to Fisher Scientific and Kim McFarlane, who sponsored our 2nd annual Departmental BBQ on July 15th, 2005. Our 1st annual BBQ was held in August 2004.

Chemistry Department Seminar Program

Our Seminar Program continues to be a great success. Thanks again to Dow Chemicals and Lanxess for their generous and continued support.

See the 2005-2006 seminar schedule at www.qchem.queensu.ca.



David Wardlaw presents acknowledgement plaques to our Seminar sponsors.

Andrew Carr and Ron Huizingh from Lanxess

Darwin Wilson from Dow Chemical

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