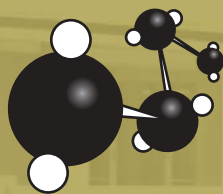


# NEWSLETTER

## Faculty of Applied Science

# CHEMICAL ENGINEERING



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James McLellan,  
*Professor and Head*

## MESSAGE FROM THE HEAD

On an advancement trip to Calgary in March, I reflected on the remarkable temperature shifts that can take place in that city, from a -30 C windchill at the beginning of the week to a forecasted high of 15 C by the end of the week. And so it is in the world right now, as we all reflect on the dramatic drop in the economy and chart our best course through what promise to be very challenging times, hoping for an early recovery, but mindful that recovery could be a long and drawn out process. There are some mildly encouraging signs on the horizon, but a number of sectors are facing massive restructuring.

Many of you will have read the budget reports from Principal Tom Williams, which can be found at [www.queensu.ca/principal/financialupdate.html](http://www.queensu.ca/principal/financialupdate.html). Queen's, like every university in North America and beyond, is faced with uncertain funding from provincial or state governments coupled with sharply reduced investment revenues from endowment funds, and a student body faced with uncertain summer and full-time employment prospects. The province is likely to provide some protection from a free-fall in revenue, in contrast to the sharp declines in revenue faced by many companies. But the forecasts are still grim, and the ability of the Faculty of Applied Science to shield the Department from budget cuts has come and gone.

The Chemical Engineering Department comes into this storm as a very efficient, low-cost "producer" - educator - of high-quality students. This does not mean poor quality; we have strong programs in Chemical Engineering and Engineering Chemistry, with very strong enrolments in Chem Eng, and healthy, steady enrolments in Eng Chem. We have a talented and dedicated faculty and staff, who have been recognized for their contributions in teaching and research and support both within Queen's, and externally, and who have worked hard to ensure the quality of our programs as enrolments in our programs have increased dramatically. We have creative and talented students, always eager to help the department and Faculty and who go on to successful careers. We have strong industrial and organization interactions both in our academic programs, and in our programs of research and discovery. And we have a strong group of dedicated alumni, who are interested in the department and provide continuing support. We have big ideas about what we want to accomplish in our academic programs and research. We are fortunate to have a strong endowment that means the difference between making do with old equipment in the labs, and bringing in new experiments, and enhancing the student experience through international exchanges and field trips. But we will face challenges. Given our cost structure, the most likely and immediate place that we will feel the cuts will be in our teaching assistant budget transfer from the university, so we will have to re-evaluate our spending in all areas, and review how we deliver our courses.

In the midst of doom and gloom, this newsletter offers some bright lights – the recent generous donation from Shell Canada to continue support to the TEAM program, recent successes on the research front including the renewal of the Tier II Canada Research Chair for Aris Docoslis and the successes in the Canada Foundation

Continued on page 2.



# MESSAGE FROM THE HEAD

for Innovation (CFI) for a number of our researchers, to our re-designed web page for the department for getting our message out, new recruiting strategies for graduate students, a new strategic plan completed and being implemented, and stories of successful TEAM group projects. This edition could be the TEAM edition, as there is much good news to share.

Our strategy to weather the storm? Continue to innovate, pay close attention to the quality of our programs of study and research, keep enrolments strong, keep close watch on our costs to ensure that resources are spent to the greatest impact, consolidate where possible and appropriate, anticipate changes in funding support and adjust our operating strategies to absorb the changes, work with alumni and companies to find much needed financial support, and keep focused as a department. My advice to our students – keep your costs down, find opportunity wherever you can and take advantage, be flexible, keep learning. In our recent Oil and Gas Speakers Series, a quick glance at the speakers showed many who were veterans of the 80s downturn, and this was their common experience – mine included.

If your company is looking for engineers, please don't hesitate to give me a call, or email me. I would be delighted to serve as "match maker", to introduce you to many fine students that we have at Queen's.

In the past two years, I have visited Calgary and Halifax a number of times to meet with alumni, and on the horizon will be visits to the Toronto area and southwestern Ontario, Vancouver, and the New York City area. I hope to see many alumni at receptions, as well as in small group get-togethers. If a group of you would like to get together, please drop me a note, and I will see how we can work a visit to your neighbourhood in our travel plans. And as always, the door to the Queen's Chemical Engineering department is open for you and your families should you be in our area.

## BARRIE JACKSON

After working for 35 years worldwide in design, research and development for Shell, pursuing a second "post-retirement" career innovating in the teaching of design at Queen's culminating in the TEAM program (and recognized by the Canadian Council of Professional Engineers Gold Medal for his efforts), Barrie Jackson savoured what must be a most special of moments when he hooded his granddaughter, Rowan Jackson, at the Spring 2008 convocation. Rowan is a graduate of the Chemical Engineering '08 class. Barrie is one of the best examples I know of an engineer who made a mark in industry, and came back and made his mark in engineering education, much to the benefit of students over the years and the department. A "CIR" (Certified Industrial Relic – his term, offered tongue in cheek), Barrie will continue to have a part-time involvement mentoring students in the TEAM program, having handed over the coordination of the program to David Mody.

Thank you Barrie. And we look forward to your third career!

## SHELL SUPPORTS TEAM FOR ANOTHER 3 YEARS

Shell Canada is supporting the Technology Engineering and Management (TEAM) program for another 3 years, and is also providing 3 years of support for the Oil and Gas Speakers Series. The total donation to the department is \$425K, and follows the \$400K donation that Shell generously provided in 2005. TEAM will receive \$400K, and \$25K will support the Oil and Gas Speaker's Series, helping the series to continue beyond its very successful inaugural run (please see later in the newsletter). The \$425K donation to Chemical Engineering is the major part of an overall \$470K donation to Queen's as part of Shell's Campus Ambassadors Program. The remaining monies are going to Geology/ Geological Engineering, Mechanical Engineering and Mining Engineering. TEAM itself is a strongly interdisciplinary program, and this year we have students taking TEAM from Mechanical Engineering, Environmental Studies, Biology, Commerce, and Law. The Campus Ambassador program within Shell has contact groups of employee alumni - ambassadors - from each university. The Queen's team within Shell included Rob Seeley (Chem Eng '81), who was the lead for the team, and Mirko Zatka (Eng Chem '82, MSc '84). Thank you!

## COLLABORATION IS THE MOTHER OF INVENTION AT LANXESS INC.

In 2008, two Queen's professors celebrated 10 years of collaboration with LANXESS Global Butyl Rubber R & D. One of those professors was our very own Dr. Scott Parent and the other was Dr. Ralph Whitney, cross-appointed from the Chemistry Department.

Collaboration spawns new ideas and for the past decade, this group has produced significant pieces of intellectual property and numerous refereed journal articles of highly relevant butyl rubber research. As a special bonus, this collaboration has generated highly trained individuals with specific skill sets tailored to the elastomer industry.

To mark this milestone, Drs. Parent and Whitney visited LANXESS Inc. headquarters in Sarnia to present an overview of the research projects from the past decade and to outline their focus towards future projects.

*From Left: Dr. Ralph Whitney, Dr. Ralf-Ingo Schenkel (Head of Global Butyl R&D), Dr. Lisa Knight, Lorenzo Ferrari (Manager of Product Research Group), and Dr. Scott Parent*



# RESEARCH & GRADUATE STUDIES NEWS

## DESTRUCTION OF TOXIC VOCs IN A NOVEL TWO-PHASE BIOTREATMENT SYSTEM

Benzene, toluene, ethylbenzene and o-xylene (BTEX) are volatile, toxic compounds found in off-gases of a variety of industrial processes. Although their removal/destruction by physical or chemical means (e.g. carbon adsorption, flaring) can be effective, alternative low-cost, "green" solutions are being sought for the treatment of such Volatile Organic Compounds (VOCs). Biological treatment via the use of a bioscrubber (essentially passing the VOC-laden air stream through an aqueous contactor containing BTEX-degrading microorganisms) is such an option.

As might be expected, however, BTEX compounds are not only toxic to humans, but also to the degrading organisms that are used for their destruction. The challenge therefore, in designing/operating biotreatment systems for BTEX compounds is to maintain aqueous BTEX concentrations to below cytotoxic levels during high feeding rates and transient VOC loadings. The Research Group of Andrew Daugulis has shown that selected polymer beads, when added to the bioscrubber, can act as sequestering/delivery agents of BTEX compounds to cells within the biotreatment system. That is, the high affinity for BTEX by certain polymers results in high removal efficiencies from the gas phase, while sequestering the toxic BTEX compounds, until needed, by the microbes residing in the aqueous phase of the bioscrubber. In this fashion aggressive and/or fluctuating BTEX loadings can be applied to such a two-phase bioscrubber with high treatment efficiency and minimal concerns about toxicity to the microbes. In fact, it has been shown that the polymer beads can sequester more than 90% of the BTEX within the bioscrubber at any time, releasing it to the microbes for degradation "on demand".

This research is being undertaken by Jennifer Littlejohns, a PhD student in the Daugulis Lab, and has included an examination of the mass transfer of BTEX compounds and oxygen between the phases (gas, liquid, solid), microbial kinetics, hydrodynamics within the bioscrubber, and mathematical modeling of this multiphase treatment system. The work has resulted in a number of publications in international peer-reviewed journals, and conference presentations around the world.



## CHEE FACULTY SUCCESS IN CFI

The Canada Foundation for Innovation (CFI) Leaders Opportunities Fund has given more than \$2 million to support Queen's research projects. Two of these award winners are from Chemical Engineering.

Lauren Flynn has been granted \$100,000 for research on tissue engineering with adipose-derived stem cells. "Tissue engineering holds great promise for the treatment of numerous diseases, disorders, and traumas," says Dr. Flynn. "The long-term objective in this field is to create tissue substitutes that will fully integrate into the body, promoting regeneration and restoring lost functionality." Her research focuses on the investigation of stem cells isolated from human fat. The CFI funds will be integral to establishing Dr. Flynn's research program involving novel bioreactor strategies, differentiation, and the fabrication of 3-D constructs for soft tissue reconstruction.

Kimberly Woodhouse, Dean and researcher received \$125,000 for her work in elastomeric polymers for tissue engineering; building biomimetic scaffolds.

Brian Amsden, Stephen Waldman (Mechanical & Materials Engineering; cross-appointed to Chemical Engineering) and Stephen Pang (Anatomy & Cell Biology) received \$389,849 to develop biomimetic materials to be used in the regeneration of tissues from CFI in 2007. They applied for and received matching funds of \$389,849 from the Ministry of Research & Innovation after receiving their CFI grant.

As our population ages, we're seeing more cardiovascular disease, osteoarthritis and chronic lower back pain. The cost of treating these conditions is escalating. Tissue engineering, where cells are combined with biomaterials to form new tissue, has the potential to solve these problems. Using advanced equipment, Drs. Amsden, Waldman and Pang will employ tissue engineering techniques to regenerate arteries, articular cartilage, ligaments and the shock-absorbing portion of the spine.

## STUDENT LIFE

The undergraduate Chemical Engineering and Engineering Chemistry clubs had another successful year, providing students with an opportunity to build program spirit and have an outlet from the daily grind. The clubs organized the annual Welcome Back BBQ in September, with an emergency trip to Loblaw's to pick up more food because of our large numbers! A good time was had by all. Other social events such as the BNO/GNO (boys night out/girls night out) was a huge success, with the some of the highest turnouts in recent years. The Science Formal Wine and Cheese went very smoothly, and the Christmas Potluck saw a range of interesting gifts for the professors. The clubs looked after athletics including teams in water polo, soccer, hockey, and volleyball. The BEWIC sports day was again a huge success with a large turnout. The yearend Banquet saw 230 participants - students, grad students, faculty, staff - the largest ever, and was held at the Olympic Harbour restaurant. The clubs also organized the Chem-Pals Speakers Series, which saw a range of interesting speakers come and speak to undergraduates about interesting career opportunities and fields. The undergraduate clubs continue to play an important role in maintaining the closeness and spirit of our programs, in spite of our large numbers (~400 undergrads in years 2-4 in Chem Eng and Eng Chem).

And announcing... the Chemical Engineering Graduate Students Association (CEGSA). The Grad Students Association was recently formed, and they just held their kick-off BBQ event, in spite of rain, with a strong turnout. Next up - a soccer tournament, squash ladder and tennis ladder. CEGSA will organize social and sporting events, and will help identify speakers for the Department Seminar Series.

## ENG CHEM REVIEW UNDERWAY

The Eng Chem program continues to thrive in a strong partnership between the Departments of Chemical Engineering and Chemistry. Ten years after the administrative home of the program moved to the Department of Chemical Engineering, it's time to review the focus and emphasis of the program to ensure that it is an exciting, high quality program for students, and that it draws on the established strengths at Queen's. Scott Parent, Chair of the Eng Chem Curriculum Committee, is leading this review, which will see a renewed emphasis on products and properties, and the incorporation of a new course in electrochemical engineering and a revised course in colloids and surface phenomena. Both of these courses will draw from established strengths in the department – Brant Peppley is Tier I Canada Research Chair (CRC) in Fuel Cells, and will teach the first course, while Aris Docoslis, Tier II CRC in Colloids and Nanoscale Engineering, will teach the second course. Look for more information about changes in coming newsletters.

## CHEE470 TRIP TO SHELL AND COVIDIEN

*By Jason Munn (4th Year Chemical Engineering student)*

The CHEE 470 (Design of a Manufacturing Process) class of 2008 was fortunate enough to visit Montreal, Canada this past fall to partake in guided tours. One group of students visited the Shell Canada petrochemical refinery in Montreal East, while another group visited Covidien—a leader in the healthcare products manufacturing industry. Approximately 130 students, along with teaching assistants and the course coordinator Dave Mody, departed on a Thursday evening for Montreal. Starting at 7am on Friday morning tour groups arrived at the Shell site to begin guided tours of the facilities. Equipped with proper safety equipment including fire retardant Nomex®, P&ID's, and a knowledge base stemming from three years in the chemical engineering department students observed one of the many aspects of chemical engineering. Retired plant operators as well as engineering staff from Shell graciously donated their time to explain various safety, operational, and business aspects of an operating petrochemical processing facility. Saturday saw a smaller group of students visit the Covidien site to see a slightly different perspective of a manufacturing process.



*Above: One of three CHEE470 tour groups at the Shell refinery in Montreal east.*

For those that went to the Shell site, Saturday was a mock PHA (process hazard analysis) based on the section of the Shell plant that was toured. For those students new to the industrial setting the scale, size, sound, and smell of a running plant was foreign and unexpected. From a student perspective many were amazed at the scale of the operation. The amount of machinery, unit operations, people, and controls was something that had never scale such as this before. The field trip provided a tangible insight into much of the material discussed in CHEE 470. The actual mechanism and scale of a control valve was discussed. Running pumps and compressors were observed to be not only blocks on a flow diagram, but fully operational (not to mention loud) pieces of equipment. The intricacies of piping and the realization of proper design in terms of unit locations was understood much better after seeing pipe racks and trying to follow a single process line from a P&ID.

A few hours in a refinery seemed like too brief a time to take it all in, but it did provide insight into one of the many facets that chemical engineering or engineering chemistry have to offer. In terms of providing a background into the scope of the course material for CHEE 470 it is undisputable that the trip did an excellent job.

The secondary outcome of the trip was an uncanny bonding experience between such a large group of people. While the tour was one aspect of the trip the socializing, nightlife, and close hotel quarters were a great way for the graduating class to come together as in a setting outside of a lecture hall. All of this of course would not have been possible without the tireless effort of Dave Mody, Maureen Plunkett, the teaching assistants, and all those involved in the trip. The CHEE 470 class would like to extend its thanks to all those involved for making a useful and memorable trip. Montreal will forget that the chemical engineering class of 2009 stayed downtown for two nights. Shell and Covidian may forget that they had a large tour group of Queen's students in 2008 pass through their gates, but for the many in the chemical engineering class of 2009—the trip to Montreal for CHEE 470 will never be forgotten.

### *Special Thanks to:*

*Queen's—James McLellan, Dave Mody, Maureen Plunkett, CHEE 470 TA's, Office Staff*

*Shell—Deborah Baluch, Marc Legault, Joelle Jureidini, and guides*

*Covidien—Katherine Crewe, Laurie Belange, Norm Lanthier*



Michael Hrynyk,  
M.Sc. (Eng) student

## SCIENCE ACE TINKERS WITH URINE RECYCLING

Wade Hemsworth, *The Hamilton Spectator*, Dec 16, 2008  
(reprinted with permission)

The idea is a little hard to swallow but he's working on it. Ancaster science ace Michael Hrynyk is trying to find a safe new way for astronauts to turn their urine into drinking water. The 23-year-old aspiring astropharmacologist graduated from McMaster in the spring and spent 10 weeks as a NASA intern at the Ames Research Center in California last summer. Now he is doing graduate studies at Queen's University in Kingston, where he is overseeing two undergrads on a novel project to filter urine using biotechnology. The team is preparing to head to Utah to work at the Mars Desert Research Station, this planet's closest approximation of the Martian terrain. The station is operated by the Mars Society which facilitates projects for university and NASA researchers. Hrynyk and his team will spend nine days there starting Jan. 2 testing a new technique to recycling waste water as part of a broader group of 74 researchers testing prototypes for tools and techniques.

Hrynyk's team has developed small beads derived from beans and algae. Under simulated space conditions, they will measure how well a protein in the beads filters out urea, the organic compound in urine. Recycling human waste into potable water in space is difficult. Distillation techniques don't work well without gravity, and other processes require huge amounts of energy. Biotechnology could offer a new solution, Hrynyk explained. "We're still a long ways away from drinking our own pee, but it's a first step," he said, acknowledging he gets a lot of ribbing about the project. Reducing the amount of water required in space would allow for longer missions and larger crews. On Earth, waste recycling could help in areas lacking safe water.

Michael is pursuing his Master's in the department under the supervision of Ron Neufeld.

## UG LAB UPDATE

The purchase of a new temperature control system experiment, made possible by the Rapson Family Fund, is a significant addition to the Second Year Lab Projects. This system will provide students with a practical introduction to many concepts that are discussed in subsequent process control courses and lab projects.

The apparatus includes a PC-based control system capable of operating in several different modes, a Peltier element serving as both a heating and cooling source, an insulated metal rod and temperature sensors. The heating/cooling element is located at one end of the rod, while the temperature sensors are located along the axis of the rod.

Lab teams can investigate the effects of control sensor location and control tuning parameter changes on temperature control performance when a disturbance occurs, or when a change in setpoint is made.

We are grateful to the Bryan Rapson for his continuing generosity for making this lab possible.

Steve Hodgson operating the new temperature control system, 2008



## A NEW FACULTY MIX IN THE DEPARTMENT – PROFESSIONAL PRACTITIONERS

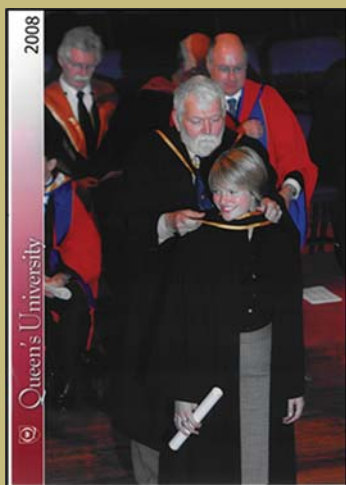
One of the changes that have happened in the department is the move to an effective mix of regular tenure-stream professors and professional practitioners – faculty who have extensive design and research experience who complement the regular faculty. This approach has been strongly embraced by faculty in the department, and we are fortunate to have David Mody (responsible for design in the curriculum and the Technology Engineering and Management (TEAM) program), and David Poirier (Laboratory and Projects Coordinator). David Mody brings 17 years of industrial design experience with Fluor-Daniel to his position, while David Poirier brings 10+ years of research experience, particularly in combustion and transport phenomena, to his position. The two Davids (sequel to the three tenors) bring a strong commitment to their responsibilities, and have taken the lead in their respective portfolios. What does this mean? The laboratory courses get the full-time attention of someone who can take an idea from discussions, design and develop the laboratory project and develop a teaching model around it. Students in 4th year can work on an interesting and challenging array of industrial projects, with industrial clients, on projects that span a broad range of fields, and are situated around the world. The traditional “publish or perish” doesn’t enter the picture. Rather, the goal is to ensure that our design and laboratory courses are innovative and continue to grow and prosper.

## LET’S COMMUNICATE !

The technical communications component of the curriculum has undergone major changes over the past two years. Formerly delivered as a traditional one semester course in the 3rd year, the workload is now distributed across both semesters of 2nd and 3rd year, and includes structured writing, presentation, and editing activities through a series of workshops. The two Academic Assistants who lead the workshops, act as mentors and facilitate workshops; Sal Thomas (EngChem 2000) brings her industrial product development experience to the students, while Karen George (ChemEng 2003) has experience in project management and report writing.

Dr. Doug Babington, Director of the Queen’s Writing Centre, teaches the fundamentals of technical communication in CHEE260. Second year students also participate in a series of assignments including an individual research report, an oral presentation, briefing notes, and a formal letter as well as a discipline-specific assignment.

CHEE 360 (Technical Communications II) was designed and taught by Robin Hutchinson who, with nine years of industrial experience behind him, has a strong appreciation of the importance of communication skills in the workplace. Dr Hutchinson has front-loaded these courses so that most of the work is done early in the term, leaving the students free to work on final assignments in other courses toward the end of the term. All indications are that the students appreciate this new approach to delivering technical communications content.



## A SPECIAL MOMENT FOR BARRIE JACKSON

The convocation of a child is a very proud moment for parents and grandparents alike but if you are Barrie Jackson, the moment he hooded his granddaughter, Rowan, was the high point. Following in her grandfather’s footsteps, Rowan completed a B.Sc. in Chemical Engineering and while her grandfather semi retires, it is fitting that the next generation of chemical engineers is ready to continue the work.

In Barrie’s own words: “It gave me great pleasure to have the opportunity to hood my granddaughter Rowan at the spring convocation. The family mythology tells us that when some years ago Rowan and a cousin came to Queen’s with me one summer, with the help of Steve Hodgson we made “dynamite” actually some black powder. Much to the horror of their parents they had a wonderful time “blowing up” small rocks in the field behind our house in Perth. It has been suggested that that was when Rowan decided that she wanted to be a Chemical Engineer. Although I tried to stay out of Rowan’s life for her four years at Queen’s, it was rewarding to see the purple person at the greased pole mature into the fine young woman she is today.”

# PROGRAM NEWS



## OIL & GAS SPEAKERS SERIES

The 1st inaugural Oil and Gas Speakers Series took place on January 23rd, 24th and 25th and gave attendees a greater understanding of the oil and gas industry. Queen's Alumni travelled from across Canada to share their experiences and knowledge of the vast opportunities and challenges that exist in the oil and gas industry. Students making deciding about whether a career in this industry is right for them, benefited from attending this conference.

The speaker series was designed to provide students with an opportunity to network with Queen's alumni working in the oil and gas industries. We gratefully acknowledge the financial sponsorship of **Shell** (Gold sponsor), **Paramount Energy Trust** (Silver Sponsor), **Suncor Energy Inc.** (Silver Sponsor), **EnCana Corporation** (Silver Sponsor), **O'Connor Associates** (Silver Sponsor) and **Esso Canada / Imperial Oil** (Silver Sponsor).

This event was a resounding success due to the outstanding efforts of the speakers and the Organizing Committee.

David Mody, Maureen Plunkett

Website: <http://oilandgas.chemeng.queensu.ca>



## TEAM

TEAM is considered by many to be a fantastic industry outreach program. Many of our projects are featured in internal company newsletters and we love hearing when this occurs because it means our students have helped a company towards greater success.

A recent example of this is from Ontario Power Generation's Newsletter "Power News." Their newsletter showcased the "Hydroelectric Business TEAMS UP with Queen's University" article. In it, OPG mentioned this was the third year they had participated, and for OPG they "gain valuable business insights for a modest investment." Projects that OPG have supported include an energy storage plan for the Pickering Wind Turbine and a sustainable powerhouse design for the Ranney Falls generating station. This year OPG are supporting two projects combining students from engineering, law, commerce and biology. The two projects involve making recommendations to the fish friendliness of hydroelectric dams.

Murray Paterson (OPG Project Manager) said in the OPG newsletter "Our experience with the TEAM program has been extremely positive. TEAM members bring an energetic, focused and multidisciplinary perspective to problem solving. TEAM projects develop solutions that are practical and readily applicable to real world problems. The TEAM approach has provided excellent value for the time and money invested by OPG."

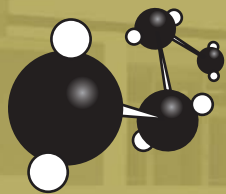


The Shell Albion Oil Sands Newsletter entitled "Connections" showcases the students of the 2008 Shell TEAM project. The newsletter describes the project as a technical, economic, and environmental feasibility study of the cooling processes at the Scotford Upgrader Expansion site. Oil Sands Vice-President, Operations Thomas Zengerly was quoted as saying "These projects are quite challenging. It is clear these students worked very hard on this study, and their presentation offered some perspective we had not considered," The students of that particular project were equally glowing. Anna Petreshyn (Mech 08) said in the newsletter, "The opportunity to work in a real-world scenario has helped us build our confidence in communicating with clients, field experts and supplier companies. This course was unlike any I've taken, and has been a great experience for all of us as we prepare for our careers." This year Shell is also sponsoring two fascinating feasibility projects that involved the gasification of biomass to provide diesel fuel and methane gas.

## ABOUT TEAM

TEAM is supported by Shell and by the Ontario Centres of Excellence. It is a multidisciplinary course involving students from Engineering, Commerce, Law and Science (i.e. Biology, Environmental Science, etc.). TEAM does real projects for real clients around the world. We're always on the lookout for clients, if you would like to contact us to sponsor a project please visit our website or contact Dave Mody.

Website: <http://team.appsci.queensu.ca>



# NEWSLETTER

## Faculty of Applied Science

# CHEMICAL ENGINEERING



## NEWSLETTER FEEDBACK

The Chemical Engineering Newsletter is a publication of the Department of Chemical Engineering, Queen's University, Kingston, ON K7L 3N6. Its purpose is to provide news concerning faculty, staff and students in the department.

News, comments and suggestions can be sent to [newsletter@chee.queensu.ca](mailto:newsletter@chee.queensu.ca) or 613.533.2765. Update your contact information at <http://alumni.queensu.ca/> and click on "Update My Profile".



## Faculty of Applied Science

# CHEMICAL ENGINEERING

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## SPRING REUNION WEEKEND MAY 22 - 24, 2009

Alumni are invited to participate in the "Spring Reunion Weekend" - Friday, May 22nd to Sunday, May 24th. There will be a barbecue on the Saturday from 12:00 to 1:30 p.m., at the Agnes Benedickson Field followed by individual open houses. Chemical Engineering's Open House will be from 1:30 to 3:00 p.m. in Dupuis Hall.

For a full listing of Spring Reunion events, please visit: <http://www.queensu.ca/alumni/programs/events/springreunions/Schedule.html>

