

Spring 2014

The

# EXCHANGER

Department of Chemical and Biological Engineering

FEATURE:  
Coop Offers a Helping Hand and a Leg Up

Thermochemical Catalysis  
Biorefining – Deriving Value from Wood Waste



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA



## Message from the Head

I am pleased to share with you The Exchanger, our Department's newsletter, giving our highlights for 2013. As ever, the most significant event in our Department's year is the graduation of our students. During the May and November graduations we had 76 students receive their BASc degree. In addition, we had 13 MASc, one MSc and 5 MEng degree graduates. Finally, 21 students received their PhD degree. We warmly congratulate these students and hope that we can remain connected and continue to celebrate their future achievements.

We value our continued connections with all our alumni. This year, we hosted two alumni visits to our department. The Chemical Engineering class of 1970, and a unique reunion of all our Bioresource Engineering alumni both took place in May.

The highly successful UBC Engineering Co-op program links our students with employers in Canada and abroad and offers them an opportunity to acquire relevant work experience as well as related skills such as interview and resume preparation. Our Department's Industry Advisory Committee has been instrumental in our efforts to increase the number of our student placements.

This year we also celebrated 25 years of outstanding service to UBC by Ms. Lori Tanaka and Mr. Serge Milliard. Lori has been with the Department since 1988 as Undergraduate Student Support. Faculty and students recognize her dedication and commitment to excellence.

Serge joined the Department in 2008 and serves as an Electronic Technician. All students appreciate his deep knowledge, expertise and friendly nature.

In 2013 we welcomed Dr. Curtis Berlinguette as Assistant Professor in our Department. He is jointly appointed with the Department of Chemistry and is the first such appointment between the two departments.

We also welcomed a CHBE alumna, Ms. Marlene Chow, as Manager of Technical Services. Marlene's knowledge and experience in the chemical process and pulp and paper industries are valuable assets in optimizing our resources and serving our students in ways that are more relevant to industry's needs.

This year we also welcomed Dr. Marc Parlange as our new Dean in the Faculty of Applied Science. Prior to his appointment at UBC, Dr. Parlange served as the Dean of the School of Architecture, Civil and Environmental Engineering at Ecole Polytechnique Fédérale de Lausanne (EPFL). He is an expert on measurement and simulation in hydrology, water resources and the lower atmosphere and received the 2009 Hydrology Award of the American Geophysical Union. Dean Parlange is a Fellow of the American Geophysical Union and is a faculty member in UBC's Department of Civil Engineering.

We hope that you will enjoy reading this issue of The Exchanger. We always look forward to hearing from you and are happy to welcome visits to our Department.

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If you are interested in becoming a mentor, reunion coordinator, volunteer at graduation, or another opportunity to stay connected, please contact the Alumni Relation Office.

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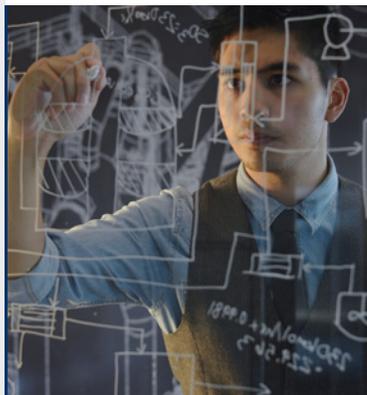
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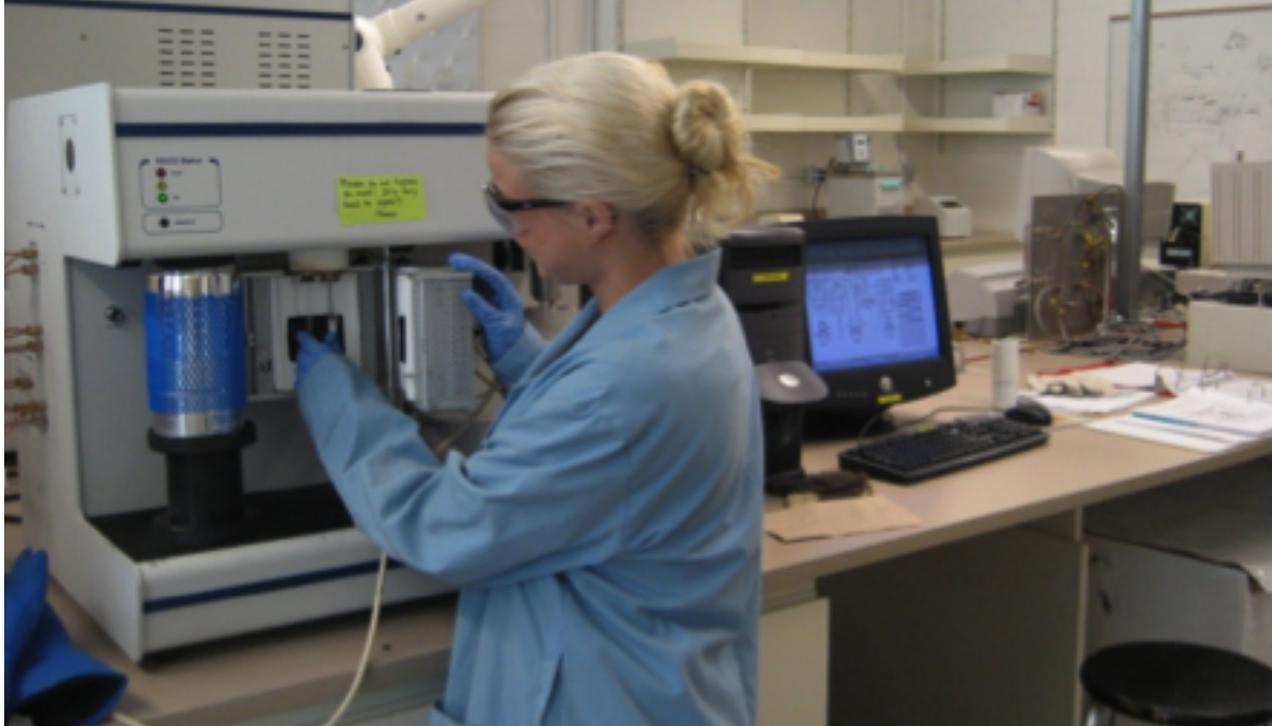
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## On the cover

CHBE student Ben Duenas: 2013 Engineering Coop photo contest of the year winner

Photo by Ben Duenas



## Thermochemical catalysis

### Contributing to clean energy research at UBC

Catalysts are materials that enhance the rate of a chemical reaction without being consumed in the process. They are common in most chemical processing, oil refining and environmental abatement technologies, and are key to many natural and synthetic biochemical processes. Among other benefits, catalysts allow us to produce clean fuels from biomass. They are used to upgrade bitumen from the Canadian oilsands and they ensure that the toxicity of motor vehicle exhaust gases is reduced before release to the atmosphere. Catalysts are a major driver behind many of the new clean energy technologies that are being developed around the world, including here in BC.

Our research here at UBC's Chemical and Biological Engineering Department, over more than two decades, has focused on heterogeneous thermochemi-

cal catalysis, in which solid catalysts combine with heterogeneous reactants and thermal energy to drive various chemical reactions toward desired products, such as biomass to fuels or gas to liquid products. This approach is complementary to the electrocatalysis, photocatalysis and biocatalysis research that is being carried out in the Department, much of which is also focused on clean energy technologies.

The study of catalysis is multi-disciplinary, bringing together fundamentals of materials synthesis and characterization, surface science, reaction kinetics and mechanisms, as well as reactor design. Much of our work is focused on understanding the relationship between catalyst properties and catalyst activity for selected reactions with the aim of improving how these reactions are managed. Our approach uses theoretical and experimental methods to generate the needed data to develop property-performance relations. Typically we control the synthesis of the catalyst material to obtain the desired physical and chemical properties. Most often high surface area nanoparticles of the active catalysts are required.

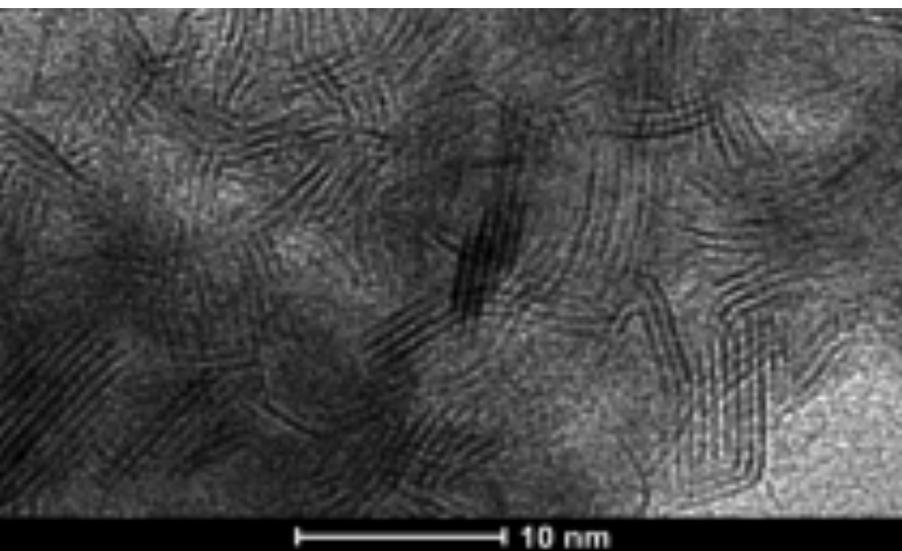
In recent work we have used several techniques to control catalyst structure, including reversed micelles to generate nanoparticles of MoS<sub>2</sub>, citric acid as a chelating agent to control the size and surface area of metal phosphides and ethylene glycol to manipulate the size of Co nanoparticles for Fischer-Tropsch catalysis. The transmission electron micrographs of Figure 1 illustrate the nanostructure of two examples of materials used in recent studies.

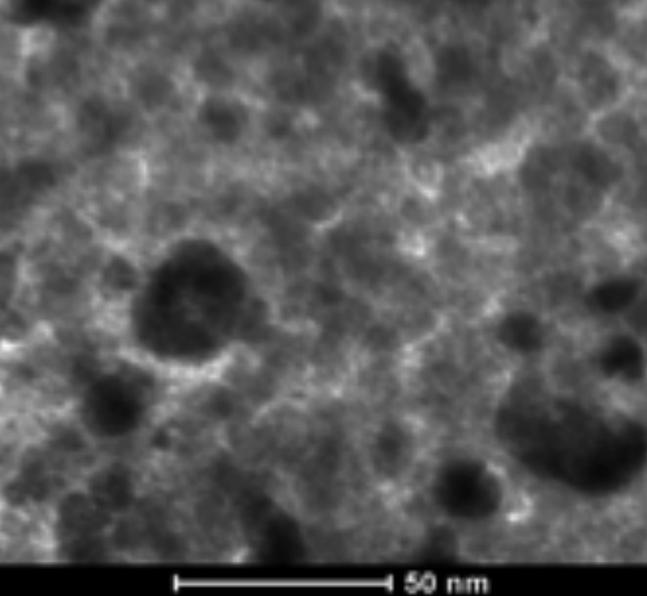
The synthesized materials have then been used to catalyse reactions of interest in various clean energy technologies.

For example, in a project recently completed by Dr. Farnaz Sotoodeh that addressed the issue of hydrogen supply and transport for fuel cell vehicles, the size of Pd nanoparticles used as catalysts to release hydrogen from liquid organic hydrogen carriers (in this case dodecahydro-N-ethylcarbazole) was investigated.

Above: Dr. Victoria Whiffen measuring catalyst properties

Below: Micrograph of a nanostructured heterogeneous catalyst: MoS<sub>2</sub> catalyst showing the layered structure of MoS<sub>2</sub>





Dr. Sotoodeh showed that the Pd size was critical in ensuring that all the available hydrogen stored on the carrier could be recovered during dehydrogenation at low temperature (below 200°C). Pd catalysts with average particle size ~10 nm were shown to have high activity and 100% selectivity for complete hydrogen recovery, whereas larger or smaller Pd particles were much less effective. These types of reactions are known as structure-sensitive and many examples exist in heterogeneous catalysis. In another example, we are examining new catalysts to upgrade crude bio-oils generated by biomass pyrolysis. The bio-oils have high oxygen content that make them unsuitable as vehicle

fuels unless the oxygen is removed. We have examined a new class of metal phosphide catalysts for this reaction, using phenols, the most refractory oxygen-containing compounds present in bio-oils, as model reactants. We have shown that the metal phosphides have unique properties, driving the reaction through two distinct mechanistic pathways for oxygen removal.

A recent Ph.D. graduate, Dr. Vickie Whiffen showed that in this case, the oxygen removal reaction was not structure-sensitive.

Heterogeneous catalysis is very important in the Canadian context because of the critical role they play in processes that utilize Canada's vast natural resources, especially its fossil fuels. Consequently, many of our projects are supported by national and international industrial partners, covering a wide range of topics that include Fischer-Tropsch synthesis, residue oil hydroconversion, hydrotreating, natural gas upgrading and methane combustion. The research is conducted by a group of dedicated graduate students and post-doctoral fellows, many of whom have continued with successful careers in the field of catalysis, both in academia and industry.

*Article submitted by Dr. Kevin Smith*

## Biorefining – deriving value from wood waste

Biorefining, the production of fuels and chemicals from biomass, is an exciting opportunity for British Columbia's forestry industry to diversify their product portfolio and strengthen their economic performance while meeting the demand for sustainability. There is a multitude of products such as fuels, plastics, and pharmaceuticals, that can be produced from the carbohydrates, lignin, and extractives contained in wood and the success of biorefining operations will depend on effectively using every fraction of the wood. Assistant Professor Heather Trajano and her research team are working to develop such processes, and the fundamental transport and kinetic models needed to support reliable scale-up.

Much of the world-wide bio-refining work to date has heavily focused on hardwoods due to their advantages in terms of growth and plantation style. However, almost all of British Columbia's forest is softwood,

which has a distinct lignin structure and a distinct hemicellulose structure relative to hardwoods, and thus Dr. Trajano's focus is on softwood fractionation. In August 2013, Canfor Pulp Limited awarded the 2013 Canfor Pulp University Grants to Dr. Trajano and Dr. Rodger Beatson, a pulp expert from the British Columbia Institute of Technology (BCIT) who has extensive expertise with pulp modification and fibre properties. Dr. Trajano and Dr. Beatson will use the three year \$75,000 grant to study the recovery of hemicellulose monomers and oligomers from pulp mill waste streams for use as strength additives in paper products. Data shows that the addition of hemicellulose sugars back into the pulp improves the tensile strength of the pulp and also helps to reduce and limit the extent of hornification. As a result, more strength can be regained when pulp is rehydrated from the dry state in which it is sold. There are already multiple sources of "waste" solid materials readily available at pulp mills, including for example the bark and the trimmings, and both contain hemicellulose. "Typically they are used as a burner fuel, but there is a possibility that we can derive additional value by doing an extraction first to recover some of the hemicellulose monomers and oligomers from these solid residues" says Trajano. This ensures that more value is derived from waste and forest

Left: Micrograph of a nanostructured heterogeneous catalysts: Pd/Al<sub>2</sub>O<sub>3</sub> catalyst showing Pd particles supported on an Al<sub>2</sub>O<sub>3</sub> substrate.

resources. “Depending on the method of hemicellulose extraction, a wide range of hemicellulose polymers may be obtained, giving ample opportunity to discover those that demonstrate the desired properties,” says Beatson. The solid residue extraction portion of the research will be conducted in Dr. Trajano’s lab at the UBC Pulp and Paper Center (PPC). The pulp modification studies will be conducted at BCIT’s pulping and papermaking facilities and will give BCIT students studying for their diplomas in chemical process technologies a chance to work on the innovative project.

Beta-thujaplicin and plicatic acid, natural anti-fungal and anti-oxidant extractives found in one of BC’s most commercially valuable species, Western red cedar, represent another exciting biorefining opportunity for BC. These extractives are already used as cosmetic, food, and agricultural preservatives. There is recent, exciting research suggesting that beta-thujaplicin has anti-tumor properties as well. Utilizing these extractives as high-value nutraceuticals and pharmaceuticals rests on effective extraction and purification from the wood. Dr. Trajano and her research team are developing an extraction process requiring minimal solvent and heat that can be easily integrated with existing forestry operations. The first step in this work is to establish an accurate extractives quantification process as part of a collaboration with Professor Jack Saddler, in the Faculty of Forestry at UBC. The research is generously supported by the

Peter Wall Institute of Advanced Studies’ Research Mentoring Program and capitalizes on Dr. Trajano’s expertise in mass transfer and Dr. Saddler’s experience with Western red cedar. Once accurate quantification processes are established, Professor Trajano will use a novel reactor system housed at the UBC PPC to explore the impact of solvent, temperature, and flow rate on the yield of beta-thujaplicin and plicatic acid. Ultimately, she hopes that the technologies will be piloted at UBC’s Bioenergy Research and Demonstration Facility on their way to implementation at provincial mills.

The complexity and heterogeneity of forestry biomass creates an enormous range of biorefining opportunities. Dr. Trajano is excited to be building a research program that will create innovative, sustainable technologies to re-energize BC’s forestry sector.

*Article submitted by Dr. Heather Trajano and by Ms. Anna Jamroz*

Below: Dr. Heather Trajano



# Co-op Offers a Helping Hand and a Leg Up

Dr. Peter Englezos, Head of the Department of Chemical and Biological Engineering (CHBE) at the University of British Columbia (UBC) wonders what path he may have pursued if there had been a co-op program at the National Technical University of Athens where he received his Diploma in Chemical Engineering in 1981.

"There was no such a thing as co-op when I was a student, but I wish there had been. The experience could have helped me to develop skills in communication and team work much earlier on in my career, as well as helped me to understand leadership better," he reflects.

Luckily for the engineering students of today, the UBC Engineering Co-op Program is an integral part of CHBE. Students can take advantage of exciting opportunities to alternate course work with practical hands-on experience in the work place. This invaluable addition to their education yields a plethora of positive outcomes, from enabling students to get their first taste of what it's like to apply their skills in the "real world", to giving them the chance to spread their wings and work both nationally and internationally. It also increases their chances of full-time employment when they graduate and, perhaps most importantly, it helps to enrich their university experience by getting them to apply abstract classroom knowledge to solve real-world hands-on problems in the workplace.

## Taming Temperamental Little Beasts

CHBE student Olivia Marais is finishing up the last semester of her degree. Her most recent eight-month co-op work term was at the Michael Smith Laboratories at UBC, and experience that she feels has allowed her to evolve exponentially as a chemical engineer.

"Working in the Piret lab has given me a huge advantage in my fourth-year bioprocess courses. As students we are limited to mostly learning from textbooks; once in a while we do lab work. So, it all feels abstract and removed. Actually working in a lab on my co-op work term allowed me to make connections between textbooks and real life. It's one thing to read about mammalian cell culture - it's another thing entirely to actually work with cells. And it's a lot of fun!"

Olivia knows that the skills that she gained will be useful for obtaining jobs in the future: "I guess the biggest skills I gained are hands-on lab skills, like good pipetting technique, and working in an aseptic environment (which is necessary for cell culture). Time management, which is important in any job, is definitely something you learn when working with cells - they are temperamental little beasts, so you have to time your experiments carefully. Another big one is being able to work in a multi-disciplinary team, and realizing how valuable it can be to work with people who have different skill-sets. Sure, you might have to put in some effort to learn a bit of jargon from their field, but they greatly enrich your project with their own hard-earned knowledge and perspective. Others have skills that you just don't have time to acquire in university, like doing a specific type of microscopic imaging. Their help saves you a lot of time and effort."

Professors at CHBE are encouraged and gratified when students return from their four-, eight- and 12- month work terms with improved engineering and work-place skills.

"We see an improvement in their performance when they come back to academic life," says Dr. Englezos. Even though academic improvement is not one of the

goals of the UBC Engineering Co-op Program, it is becoming more and more apparent that students thrive when they immerse themselves in the opportunities that Co-op has to offer.

## Ready, Aim, Hire!

It is not only Chemical and Biological Engineering students who benefit from the Co-op Program. Jenny Reilly, Director of UBC Engineering Co-op and Professional Development, points out that the Program works two ways.

"It is a human resource portal that not only helps students to formulate connections to industry but provides industry with a pool of highly motivated and employable young minds. Our Co-op Program attracts the best and the brightest students. We have a well-oiled system in place that offers the opportunity for our future engineers to gain paid, relevant and invaluable experience in Co-op work-term opportunities and allows businesses access to intelligent, eager students for short- and long-term employment," she says.

Below: CHBE student  
Olivia Marais  
Photo credit: Martin Dee





Above: CHBE Head Peter Englezos, Coop Director Jenny Reilly and CHBE IAC advisor Tony Hylton (Hatch)  
Photo credit: Martin Dee

## Energy Begets Energy

The Co-op Director's conviction is echoed by leaders in industry who have employed Co-op students in the past and continue to do so. Employers are enthused by the pep of the students who enter their labs, factories and businesses. The students' energy in turn energises these work places.

"Young people are extraordinarily enthusiastic," says Dr. Paul Watson, Director of Canfor Pulp Research and Innovation and board member of CHBE's Industry Advisory Council (IAC). Canfor Pulp and Paper has taken on 34 Co-op students since its first involvement with UBC Engineering Co-op in 2008. The company sees great value in maintaining a strong relationship with the Program.

"Students really extend the lab capacity in our mills," says Dr. Watson. "UBC Engineering Co-op provides us with extra pairs of hands which help us get the job done. The young students have no idea how everything works when they come to us, but they are intrigued," he says. "The co-op process helps us to spot potential employees and helps the students to get a broader experience and, perhaps most importantly, to learn the fundamentals."

## The Whole Kit and Kaboodle

Stephanie Ryan, Director of Talent Acquisition for Suncor is clear in stating what employers want in graduating students.

"We're looking for the whole package," she writes in the Canadian University Report. "You perform well academically, have prior work experience and come to the employer prepared."

Co-op makes it easy for students to apply a bit of spit and polish to their overall presentation. Co-op

coordinators help students with what can be frustrating details, like writing cover letters to employers, compiling resumes, being confident and putting the best foot forward in interview situations, maintaining eye contact and firming up the "limp-fish" handshake. Most importantly, the UBC Engineering Co-op program helps students to get their feet on the most difficult rung of the ladder - the first job.

"That first placement is the hardest to attain and therefore the most valuable," says Floria Lee, employee at TECK and CHBE and UBC Engineering Co-op alumna. Floria was part of the 2004 stream of students that graduated from CHBE; she speaks of her experience with the Co-op program in glowing terms. She had five Co-op work terms during her time at UBC and says that she really benefitted from the transferability of the kinds of skills that evolve and grow with experience, such as soft skills. It is those very skills that Dr. Englezos wishes he had learned much earlier on in his career.

## No Man is an Island

From Dr. Englezos' point of view it is sometimes difficult to be on top of what is needed to ensure that the Department's curriculum is current and appropriate in the ever-changing, ever-progressing world of engineering. Students who venture into the exciting real-life industrial world whilst on Co-op work terms gain an understanding of how to apply classroom knowledge and how to turn intellectual ideas into practical skills. Thus, time spent working in laboratories, factories or out in the field enriches their overall university experience. On their return to academia, students relay what they have picked up "in the field". The university can adjust the curriculum accordingly, thus ensuring a continued confidence in the CHBE program from students and industry alike.



## Calling all CHBE Students!

With such an array of benefits, one might think that every student would be banging on the Co-op Program's door. However, this is not always the case. In the 2013/14 academic year, 77 per cent of CHBE students applied to the UBC Engineering Co-op Program.

"Perhaps home is too comfortable," says Dr. Englezos. "Or perhaps students are not adventurous but they should open their eyes to the promise of working further afield."

This sentiment is echoed by Tony Hylton, Global Managing Director of the Project Delivery Group at Hatch and member of the Department's IAC. CHBE and UBC Engineering Co-op work closely with the IAC to promote the opportunities available to students. They hold information sessions where industry leaders come to speak in order let students know what is ahead of them.

"These experiences change the students' mindset," says Hylton.

"There is a reluctance on behalf of students to move outside of the Lower Mainland for employment but anyone going into the Oil and Gas industry would greatly benefit from a co-op work experience in Alberta," he says. "Alberta is recognised globally as a centre for Oil and Gas industries. All the big companies are there, like Shell and Chevron, as are all the big engineering firms."

In order to stimulate student interest, Hylton recently presented an information session on the Oil and Gas industry. He was encouraged by the number of keen students that showed up to hear what the province of Alberta has to offer in terms of work experience and future employment opportunities and noted a shift in

their attitudes when they were shown developments in the Oil and Gas sector. They seemed more willing to step outside of their comfort zones.

Third-year students were also taken on a field trip, sponsored by Shell Canada, over the course of which they visited industrial plants in British Columbia and Alberta.

"What we notice is that student outlooks change after these field trips. They realise that there is a whole other world out there, full of opportunity. They wake up to things they never knew existed before. They return excited and more open to exploring new possibilities," says Dr. Englezos.

## Try Before You Buy

Andrew D'Souza, chief operating officer of Top Hat, an active learning program that aims to improve student engagement using mobile technology and interactive simulations, extolls the virtues of the co-op approach in an impassioned argument for mandatory co-op programs, in a recent Globe and Mail newspaper article.

"Students enrolled in co-op programs typically work in a range of different co-op jobs throughout their university career, accumulating experience and real-world skills before they officially enter the work force," he writes. "These students graduate with a significant head-start over their peers - an advantage that will remain with them throughout their careers."

Even though, based on the observations of faculty, co-op students noticeably improve when they return to the classroom after their work terms, Dr. Englezos argues that it is not fair to impose co-op as a compulsory educational component. "There are some students who wish to go through university quickly," he says. However, when asked for advice on how to get the most out of their education, the Department Head tells them: "Make sure you check in with the Co-op and consider it before you do anything!"

Left: CHBE student  
Alyssa Brownlee  
Photo credit: Martin Dee

Below: CHBE student  
Colleen Chau  
Photo credit: Martin Dee



## Dr. Curtis P. Burlinguette

Dr. Curtis P. Berlinguette moved his solar energy research program from the University of Calgary to the University of British Columbia this past summer. After graduating with a B.Sc. from the University of Alberta in 2000, Dr. Berlinguette headed to Texas A&M University to pursue a Ph.D. in Inorganic Chemistry before doing postdoctoral studies at Harvard University. He then commenced his independent career at the University of Calgary as a Tier II Canada Research Chair in Energy Conversion before transitioning to the University of British Columbia to serve as Associate Professor of Chemistry and Chemical & Biological Engineering. He has built up an internationally recognized research program in the area of solar energy conversion. His work has included the development of light-harvesting materials for an advanced class of solar cell known as “dye-sensitized solar cells.” The other main component of his research program is aimed at developing economically viable ways of storing solar electricity as high density fuels, such as hydrogen. He has authored over 50 scientific articles, delivered over 100 invited international talks, and has been recognized with a prestigious Alfred P. Sloan Research Fellowship as well as one of Calgary’s Top 40 Under 40 in 2012. He is thrilled to be joining an environment that will enable him to contribute to the mission of sustainability at UBC and in the city of Vancouver.



## Ms. Marlene Chow

After graduating from UBC with a BASc in Chemical Engineering, Marlene joined an Oil & Gas company in Calgary. As Project Engineer, she had the opportunity to design, construct and start up natural gas and heavy oil steam injection projects. She also worked as a Process Engineer, implementing process and system upgrades in a sour gas plant, an opportunity to apply learnings from her undergrad thesis. After ten years, Marlene returned to the Lower Mainland with her family and transitioned to work as Engineering Manager in a petrochemical plant. She was responsible for process optimizations, maintenance and plant expansions for new products. The plant was a chemical engineer’s dream with every unit operation including distillation, batch and continuous reactors, heat exchangers and filters, so Marlene was in her element. Projects included installation of a 33 m diameter storage tank brought in by barge and installation of a 40 m tall distillation tower. Marlene then joined a specialty paper plant as Engineering Manager. She managed all aspects of the business from developing and commercializing products, scheduling machine production, to servicing customers and sustainability while also targeting improved plant financials - a challenging but rewarding mixed bag. This experience provided Marlene with the opportunity to work as a consultant, starting up a specialty paper machine in southeastern Turkey. In 2013, Marlene joined CHBE as Manager for Technical

and Physical Resources; her Technical Department provides services in support of the undergraduates, graduates, faculty and staff.

As a former graduate, Marlene is an enthusiastic supporter of the department and of the benefits of a Chemical Engineering degree. Her own career is a testament to the myriad opportunities that it opens up for graduates. Feel free to drop in to talk to her!



## 25 Year Honorees

### Mr. Serge Milaire

Serge Milaire spent his early years in Vietnam – his father was stationed there with the French military – and then in France before immigrating to Canada in 1960.

On graduating from BCIT as an Electrical technologist, Serge began work at TRIUMF in 1976. He then worked with the departments of Oceanography and Metals & Materials Engineering at UBC, with a stint off campus in the mid 1980s. In 2008 he began work as an Electronic Technician at the Department of Chemical and Biological Engineering. Over the years Serge has developed his expertise in servicing, customising and making specialist electrical and electronic tools specifically for research purposes. Serge enjoys his work, but his favourite part is working in collaboration with keen graduate students, helping them achieve their goals. While there have been many memories over the last 25 years, one that stands out is a 6-week cruise at the equator just south of Hawaii collecting data with a research team from the Oceanography Department.

Away from work Serge enjoys hiking, camping, skiing and travelling with his family. He also plays bass guitar in a band. He lives with his wife, Margaret, son and daughter in Richmond.



### Mrs. Lori Tanaka

Lori Tanaka began her career in the private sector, where for over 12 years she worked in the banking, insurance and accounting sectors. In 1988 she joined UBC's Department of Chemical and Biological Engineering and has been with the same department as Undergraduate Student Support for the last 25 years.

Her role involves her in the progress of each undergraduate from registration, through monitoring of their progress, managing their deliverables such as homework and projects, and advising on their eligibility to apply to different courses. Lori is the resident expert on all things undergraduate with an encyclopaedic knowledge of this area that reaches back in time to inform the advice she gives to young students today.

Lori has celebrated numerous department milestones during these 25 years, including various retirements and anniversaries.

Not the least enjoyable aspect of her work is working with young undergraduate students, helping them to navigate through their academic career. She can count numerous successful professors, engineers, entrepreneurs among the CHBE alumni who she helped successfully through to graduation.

Faculty too have benefited from Lori's professionalism and commitment to excellence – she always goes above and beyond to get the job done. Her advice is "don't sweat the small stuff" and "enjoy each other's company", and this has contributed to the geniality and consideration of the entire office staff. You can see Lori around campus on her daily walks, and, weather-permitting, bicycle rides. Lori lives with her husband, son and daughter in Burnaby.





Above: Student group at Shell dinner

Bottom Left: Safety demo at Agrium

Bottom Right: Student next to large flange during Shell visit

## Third Year CHBE field trip

The third year Chemical and Biological Engineering field trip took place from September 23 to 28, 2013. The trip was successful in showcasing various industries and operations involving process engineering. The student group gained many insights during the week through tours of ALS Metallurgical labs, Kamloops Centre for Water Quality, Agrium, and Shell.

In the first stage of the trip, CHBE students visited Lafarge, a world leader in the production of building materials, to observe the production of cement, aggregate and concrete. The size and magnitude of the production intrigued the students who were also able to see concepts learned in class at work in a real context. Meanwhile, in Langley, students taking the Chemical and Biological Engineering option had the opportunity of attending a tour of the Backyard Vineyards. A presentation on wine-making and the process and sites proved to be highly effective.

The tours hosted by Shell were a highlight and very informative, taking in both the Caroline gas plant and the Shantz sulphur facility. Being able to see heat exchangers, separators, and other process instrumentation at first-hand on such a large scale really stole the show. For many, it was their first

time seeing how all these unit operations connect in such a grand scheme. Having the required protective equipment also allowed the group to get a closer look at the process mechanisms. The passion of the employees there was clear from the way they talked, and from their enthusiasm. In turn, this encouraged students to ask more questions about the company and processes in the plants.

Following the tour, Shell hosted a dinner, giving the visiting students an opportunity to network with Shell staff. There were two Shell staff members at each table and they talked about their experiences, opportunities, and operations in the organization. The keynote speakers told inspirational stories that revealed the depth of their knowledge and their passion for the work. In the question and answer segment of the program, students had the opportunity to ask questions and review their reflections and thoughts with the speakers. Along with the networking opportunities these visits gave the students, it also enabled them to gain greater knowledge of the industries and companies visited and to develop a better understanding of the opportunities available to them after graduation. This trip brought the class closer as a community and definitely ignited a sense of drive and passion in turning towards the workplace.

On behalf of the third year chemical and biological engineering class, we would like to thank all the host companies for this fantastic opportunity.

*Article submitted by Mohammad Zishan Abdullah*

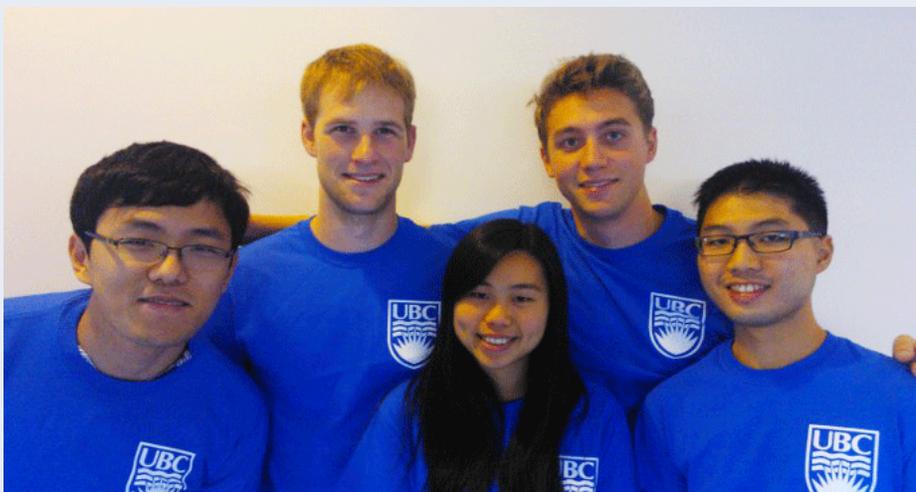


## Chem E-Car

Congratulations to the 2013 UBC Chem E-Car team who placed 2nd at the Pacific Northwest Regional AIChE student conference in Bozeman, Montana in April that year. The UBC team is the only Canadian team that qualified and went forward to compete at the 2013 AIChE National competition in San Francisco, California held in November.

The American Institute of Chemical Engineers (AIChE) Chem E-Car competition takes place between North American universities. Students compete to produce a safe and environmentally friendly fuel to power a student-built, low cost, shoe-boxed sized vehicle. The vehicle must travel a specified distance, anything between 15 to 30 m with a designated load of between 0 - 500 g; the exact distance and load are given to the students one hour before the competition begins. The team coming nearest to the finish line is declared the winner. In addition to building the vehicle and controlling the chemical reactions, the team must also submit a detailed engineering design package. The UBC team produced hydrogen on-board the vehicle by utilizing an acid catalyzed sodium borohydride reaction with water in a safe reaction/pressure vessel.

The team controlled the flow of hydrogen into the fuel cell, which powered a small electric motor. Team members were Colleen Chau, Gary Wang, Norvin Ng, Joel Kumlin and Tyler Pfanner. The team were supported by CHBE faculty Dr. Elod Gyenge and Dr. Fariborz Taghipour and by Andrew Wang (from Dr. Gyenge's group), all of whom provided expertise, advice and contributions.



## Graduation Day

Graduation Day 2013 celebrated the successes of CHBE new graduates and recognized their excellence with the Shell and Hydrates awards. These awards are given in recognition of the student team delivering the best capstone design project.

The two Shell Awards were as follows:

Team: Xinbo Cheng, Kimberly Chin, Qingyuan He, Kyle Lychuk, Yi-Yang Peng, Tabita Verma, Timothy Yip  
Project title: An Innovative Approach of Manufacturing Cream Cheese with Active Probiotic Bacteria *Lactobacillus casei*  
Each student received \$285

Team: Kyle Campbell, Benjamin Chan, Kiki Chan, Matthew Goh, Stephen Lam, Kevin Sipila, Duc Anh Ta, Yiting Tsai  
Project title: Elimination of Lime Softeners in Produced Water Treatment for SAGD Processes  
Each student received \$250

The two Hydrates Awards were as follows:

Team: Joseph Chambers, Sopida Chotwanwirach, Ting Ching Chou, Ming Yi Ma, Sean McBeath, Jim Shen, Zhichao Xia  
Project title: Process and Design of Omega-3 Production from Algal Oil  
Each student received \$100

Team: Caleb Dreisinger, Ki Yeon Koo, Miranda Kostash, Kelvin Lee, Jane Nieuwenburg, Olufunke Olukemi Omole, Ibrahim Salih, Sydney Salters, Sohrab Towfighi  
Project title: Treatment and Recovery of Heavy Metals from Acid Rock Drainage  
Each student received \$100

Teaching Awards

Finally, there was recognition for excellence in teaching. Two Teaching Excellence Awards went to:

- Dr. John Grace
- Dr. Charles Haynes

Bottom: One of the Shell Awards winning teams



# CHBE Graduate Student Club Update

The Graduate Student Club and the Undergraduate Student Club are elected student organisations that act as liaison between students, administration and faculty of the Department of Chemical and Biological Engineering. Over the course of each year, they organise a number of activities and events, both academic and social.

## Christmas Party

As happens every year, the Graduate Club organised a Christmas party in December 2013. Thanks to support from the department, this year's party was held at beautiful Cecil Green Park House, and featured Prof. Epstein's 90th birthday celebration. The party began with welcome speeches from Dr. Englezos, Department Head, and from Hafiz Rahman, Graduate Club President. The speeches were followed by a buffet dinner. After dinner there was a short movie about Prof. Epstein's long career, produced by Ehsan Behzadfar, and more speeches, this time from faculty members, affectionately sharing reminiscences of a life working with Prof. Epstein. The event concluded with a violin performance from graduate student Tony Yang. Feedback from attendees voted this year's Christmas party one of the highlights of the club's activities.

## Grad Reception

In September 2013, the Graduate Club hosted the Grad Reception Party held at the Department of Chemical and Biological Engineering. The party provided an opportunity for new graduate students to get to know other members of the department, including faculty members, staff and graduate students. The program began with welcome speeches from Ehsan Behzadfar, Graduate Club VP and Dr. Englezos, Department Head. After a dinner buffet, Ehsan Mousavi and Melissa Barazandegan gave outstanding musical performances of traditional Iranian music using santoor and tombak. The program also featured a Lucky Draw and a Quiz and Answer session.

Right: Student Leadership Award winners James Butler and Fahimeh Yazdanpanah with Dr. Englezos and Dr. Parlange  
Photo Credit: Ann Lin

Below: Graduate Club Research Day 2013 organisers and volunteers  
Photo Credit: Ann Lin



## Research Day

Research Day 2013, on October 9, was successfully organized by a team of seven graduate students, with support from CHBE Department faculty and staff. The aim was to enhance academia-industry relationships, to showcase research activities conducted across the whole Faculty of Applied Science and to create networking opportunities for the students. The event was attended by graduate students, faculty and representatives from industry, all together more than 130 attendees. Special guests were the Dean, Dr. Marc Parlange, and the Associate Vice President Research of the Faculty of Applied Science. This well-attended event included two keynote speeches, from Dr. Jacob Masliyah and Dr. Darwin Kiel. In addition there were two technical presentation sessions and two professional development workshops. Graduate Student Leadership Awards were presented to James Butler and Fahimeh Yazdanpanah. Networking was facilitated by a poster session and an industry exhibition in the CHBE atrium. All in all, Research Day was a great success and this was reflected in the positive feedback about the event. For more information, please visit [www.researchday2013.com](http://www.researchday2013.com). Research Day 2014 is already being planned.

## BBQ on Kits Beach

The Graduate Club organized a BBQ for the CHBE community on August 4, 2013 at Kitsilano Beach. While some energetically participated in various beach sports such as volleyball, others enjoyed the spectacular scenery from the beach before dinner. It was a fun-filled day out of everyone's busy schedule!

## Coffee Social

With the Department's generous support, Graduate Club arranges a coffee social at the faculty lounge every Friday at 3PM, just after the weekly seminar. This break brings together the faculty, staff, visiting scholars, post-doctoral fellows and graduate students of the department. It offers a weekly opportunity for the CHBE community to interact informally and to unwind together after a busy week. As you might expect, coffee is a big part of the coffee social, but so also are tea, seasonal fruits and, on occasion, delicious homemade food items.



# CHBE Undergraduate Student Club Update

## Welcome Back Barbecue and Imagine Day

On September 3, 2013, UBC welcomed thousands of new and returning students. The various Departments of the Faculty of Applied Science also welcomed their new students, who had already been placed in their specialized field in the summer of 2013. The Chemical and Biological Engineering Undergraduate Club organized a day full of activities and events for students including a Welcome Back Barbecue, a department wide scavenger hunt, as well as a live concert throughout the day to make Imagine Day a memorable day for every student in the department. The events throughout the day encouraged interaction amongst students, faculty and staff members and sparked a sense of community and familiarity for the members of the department. Imagine Day was the start of a strong connection and sense of belonging for the new students and created a smooth transition from their home in their first year of Applied Science into their respective departments.

## Industry Night

On October 15, 2013, the Department of Chemical and Biological Engineering and the CHBE Undergraduate Club hosted the annual Chemical and Biological Engineering Industry Mixer. There were four guest speakers, coming from different fields and with diverse experiences to share: Dr. Eric Jarvis from STEMCELL Technologies, Ms. Jane Nieuwenburg from Lorax Environmental Services Ltd, Mr. Warren Macphail of Devon Energy and Mr. Peter Wynne from Chevron. UBC Alumnus, Mr. Claudio Arato, was the honorary Master of Ceremonies. Department Head, Dr. Peter Englazos, started the night off by welcoming the speakers, students, alumni and other guests to the event. The speakers then shared their stories, gave advice to the students and answered questions. After the speaker sessions, attendees had a chance to mingle and network. Overall, alumni and speakers had a great time mentoring and sharing stories with students while undergrad and graduate students enjoyed the advice and wisdom from industry and academia.

## Sports and Social Events

The Chemical and Biological Engineering Undergraduate Club registered various teams in the UBC Recreational Sport Leagues, including volleyball, ultimate freeze-bee, and basketball. The students

also took part in events throughout Engineering Week including Film FEUStival, Foosball tournament, a four-legged-race and Cooking with Beer. Monthly socials, organized by the Undergraduate Club, brought the students closer together and created bonds between students within and between different study years. The Graduation Boat Cruise was a very successful with a high number of fourth year student attendees. It served not only as a social highspot in the year, but also as a night for students to look back and reflect on their time in the department. The Council is looking forward to another successful Dinner Cruise and Reception following the Design Project Presentations on April 1st, 2014.

## Academic Support

The Chemical and Biological Engineering Undergraduate Club provided academic support to the students by organizing and facilitating academic feedback sessions, tutorial sessions and workshops. The Club also acted as a liaison to the Department and the faculty in discussing accreditation and curriculum issues. With the support and cooperation of the faculty and staff, the Undergraduate Club is looking forwards to catalyzing changes that would assist in improved learning and the successful transfer of knowledge and information within the department.

Below: Imagine Day fun in front of the Department building

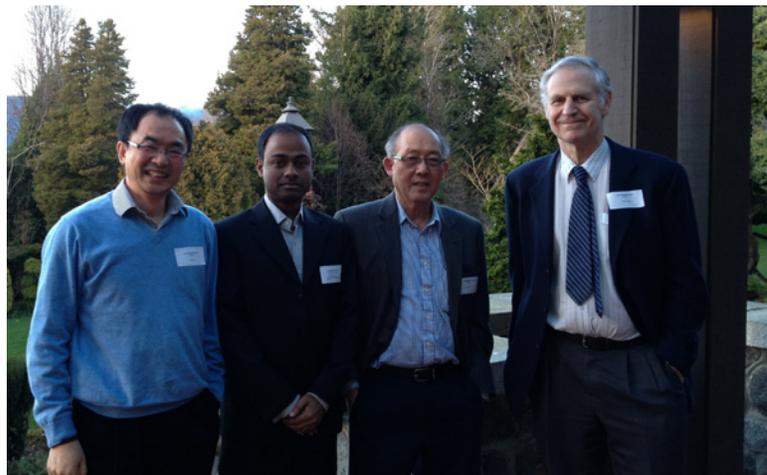




Top Right: Maryam Khoshnoodi award

Top Left: Hafiz Rahman with Drs. Bi, Lim and Grace at the Award ceremony

Bottom Left: Marlene Chow shows a group around the CHBE labs



## Student Achievements

### AMS Just Desserts Award 2013

Congratulations to Hafiz Rahman, PhD student and VP, Academics on the CHBE GSC, for being awarded the AMS Just Desserts Award 2013. The Just Desserts awards are given to individuals that have gone above and beyond to serve the staff and students of their constituency.

### UBC Engineering students win national competition

Congratulations to the whole team, but especially our own CHBE student, Kevin Sipila (CHBE '13) for winning first place at the 28th annual Canadian Engineering Competition (CEC) held in Ottawa, March 7-9, 2013. The team presented the most innovative solution to the challenge, "Rise of the Unmanned Aerial Vehicles (UAV)," developing a method to transmit UAV data effectively within the eight hour time limit.

### CJChE Best Graduate Student Paper

Congratulations to Dr. Mohammed Alaquad, PhD (CHBE '11) for being awarded the CJChE Best Paper Award for the manuscript "The Permeability of Wood-Chip Beds: The Effect of Compressibility, Can J Chem Eng 2012, 90, 1278-1288."

### Best Student Presentation award at 2013 Amherst conference

Congratulations to CHBE Ph.D. candidate Maryam Khoshnoodi on winning Best Student Presentation at the AEHS Foundation's 29th Annual International Conference on Soils, Sediments, Water and Energy. Maryam Khoshnoodi's winning platform presentation was entitled "Environmental Mineralogy Study of Arsenic in a Biological Passive Treatment System".

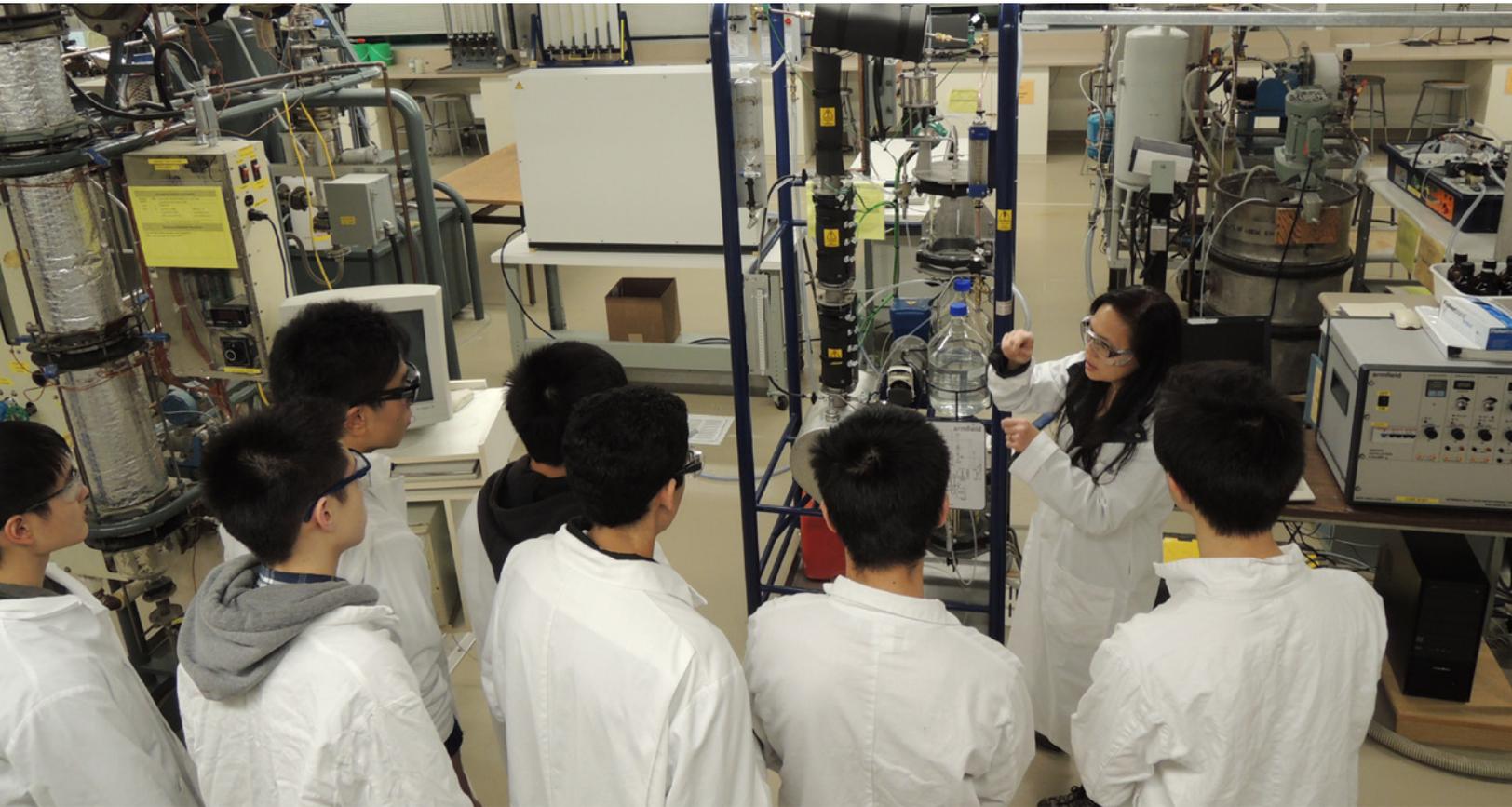
### UBC's inaugural Postdoc Slam

Congratulations to CHBE's Subhashini Vashisth for finishing first place in UBC's inaugural 3 Minute Postdoc Slam. Subhashini Vashisth, PhD in Chemical Engineering from Indian Institute of Technology Delhi, India in 2008, is currently working as a Postdoctoral Fellow in the Department of Chemical and Biological Engineering at UBC.

### Outreach sessions

Congratulations to CHBE graduate student Tony Yang who has pioneered an innovative, creative High School outreach program – the Elite Scientists & Engineers Mentorship Program (ESEMP). Tony planned, set up and ran the programme, which is aimed at high school students from Lower Mainland schools. Tony set out to make applied science real and interesting for young students enabling high school students to find out more about science and engineering. This is particularly important as many high school students know about pure science but not about its applications, particularly in engineering.

The programme has been very successful, growing from 15 applicants in March 2013 to 144 applicants in September 2013, drawn from students in Grades 8 to 12 across all parts of the Lower Mainland.



### Premier Wesbrook Scholarship

Congratulations to Michael Peters, CHBE undergraduate student on being one of the 2013 UBC Premier Wesbrook Scholarship winners. These scholarships are the University's most prestigious designations, conferred to senior students for excellence in leadership, academic achievement and service in student and community activities.

In 2013, twenty outstanding undergraduate students were selected as Wesbrook Scholars; of those, fourteen were chosen as recipients of the prestigious Premier Wesbrook Scholarships.

Also in 2013, this remarkable young man was awarded Stuart D Cavers Memorial Scholarship, presented for academics, character, and promise in the field of chemical engineering; the UBC Trek Excellence Scholarship, awarded to students in the top 5% academically in each undergraduate faculty or school; and the Canadian Chemical Engineering Conference Scholarship, given by recommendation of the Department of Chemical Engineering to an outstanding student.

Michael is currently in the fourth year of his Chemical and Biological Engineering degree at UBC, working on furthering his interest in biomedical engineering. He believes that engineering "affords an unparalleled education in critical thinking that gives you an advantage in any discipline you pursue".





Above: Bennett Award ceremony

## Student Awards

### Chad Bennington Scholarships

The Chad Bennington Scholarship Awards honour Dr. Chad Bennington, Professor in the Department of Chemical and Biological Engineering, who passed away suddenly on February 14, 2010. The scholarships are awarded to undergraduate students at UBC who demonstrate interest, leadership, and academic accomplishment in pulp and paper technology. The 2013 recipients of the Chad Bennington Scholarships were Chenlong Xie and Royce Collin Sy.

### Thomas Bennett Student Enrichment Memorial Awards

On March 6, 2013, a small award ceremony was held in the CHBE building to celebrate the recipients of the Thomas Bennett Student Enrichment Memorial Awards in Chemical and Biological Engineering. Thomas was an accomplished alumnus of the Chemical and Biological

Engineering Department, graduating in 2007. During his time at UBC, he made a positive and lasting impression on students, staff and faculty in the Faculty of Applied Sciences, many of whom were devastated by his untimely death in a tragic mountain climbing accident on April 1, 2010, at the age of 26. The awards support student enrichment activities, specifically students who demonstrate high academic achievement, leadership and social and environmental concern.

The 2013 recipients of the Thomas Bennett Awards were Xinbo Cheng and Gary Lee. Attending the ceremony were Mary Kenny (Tom's mother), the Department's Lori Tanaka, Dr. Naoko Ellis and Dr. Jim Lim, as well as Gladys Conroy, Andrea Walus and Oliver Zihlman from the APSC Development Office.

## CHBE team win at North American iGEM Jamboree

In October 2013, a UBC CHBE undergraduate team attended the North American Regional Genetically Engineered Machine (iGEM) Jamboree in Toronto. The Jamboree serves as a qualifier for the iGEM World Championships which took place at MIT, in Boston, Massachusetts. The CHBE iGEM team received Gold Standing, won the prize for Best Mathematical Model and received an invitation to advance to the World iGEM Championship at MIT in November.

iGEM is the premiere undergraduate Synthetic Biology competition. Student teams are given a kit of biological parts at the beginning of the summer from a Registry of Standard Biological Parts provided by the competition organisers. This is a kit of standardized DNA sequences that can be combined and engineered for specific purposes. Working at their own schools over the summer, they use these parts and new parts of their own design to build biological systems and operate them in living cells. iGEM is an annual competition attracting undergraduate student teams from more than 250 different universities.

At the North American Regional Jamboree, UBC's iGEM team joined 55 other teams from American

and Canadian universities in presenting their work. Twenty-one of these teams advanced to the World iGEM Championship among them UBC, the University of Pennsylvania, MIT, the University of Calgary and the University of Alberta.

UBC's iGEM project builds upon research on the CRISPR system and would grant bacteria immunity against phages – viruses that attack bacteria. Immunization would provide significant economic advantages by cutting the costs borne by any industry that utilizes a microbial bioreactor. For example, 10% of the milk fermentations used in yogurt production have to be discarded due to phage contamination.

The team was composed of Negin Tousi, Michael Peters and Joel Kumlin, students at UBC's Department of Chemical and Biological Engineering (CHBE) and Civil Engineering Graduate Advisor Christopher Lawson (BAsc '10). Additional team members and supervisors of UBC's iGEM team members include Faisal Elstone, Liz Geum, Joe Ho, Dan Korvin, Anna Muller, Frances Russell, Cam Strachan, David VanInsberghe, Grace Yi and Tony Zhao. They were supervised by graduate advisors James Round, Ray Socha and Michael VanInsberghe and faculty advisors Joanne Fox and Steven Hallam.

Sponsorship and funding for the team's trip to Boston for the World Championship were provided by the Department of Chemical and Biological Engineering at UBC, along with other departments and external sponsors.

## Kayaking for Tyler Lewis Foundation

CHBE graduate Sean McBeath spent over 17 hours kayaking to raise money for the Tyler Lewis Clean Energy Research Foundation in July 2013.

Along with competitive kayakers Dion Maxwell and Liam Fisher, McBeath paddled the demanding 135 kilometres from Victoria to Vancouver in under 24 hours – something that has never been done before.

The feat raised over \$17,000 for clean energy research in honour of his long-time friend and mentor Tyler Lewis.

Tyler Lewis was pursuing his PhD at CHBE when he passed away suddenly after a tragic ski accident last December. His parents established the Foundation in honour of their son, to fund alternative energy and applied sustainability research initiatives.

McBeath, who had trained and competed in kayaking all his life, saw the challenging trek as a natural way to honour Lewis's memory and his love of the outdoors.

Below: Sean McBeath and Dion Maxwell race towards the finish line in Vancouver



### CHFCA Lifetime Achievement Award

Dr. David P. Wilkinson, tier I Canada Research Chair and Director of CERC, has been awarded the 2013 Canadian and Hydrogen Fuel Cell Association (CHFCA) Lifetime Achievement Award. This Award from Canada's hydrogen and fuel cell industry recognizes "Dr. Wilkinson's life-long personal involvement in fuel cell technology which includes closing significant technology gaps, providing a basis for future generations of fuel cells, integrating fuel cell technology with clean energy approaches, and simplifying the overall fuel cell system and energy pathways".



### UBC engineers to develop new fuel tank systems

A team of Canadian engineering researchers - led by UBC CHBE Professor Savvas Hatzikiriakos - is partnering with Kautex Corp., McGill University and the National Research Council to optimize a process to manufacture a complete fuel system in a single production step. This Canadian team first is expected to produce a new generation of tanks within five years that meet North America's most stringent emission standards.

The research project was formally announced by the Honourable Gary Goodyear MP as part of the government's investment in innovative research and development projects with the Canadian auto industry. The research project received \$1.5million in NSERC funding over four years with the total cost of the project to exceed \$3million.

### 2013 Standards Developer Award

Congratulations to CHBE Adjunct Professor, Shahab Sokhansanj, one of the recipients of the 2013 Standards Developer Award from the American Society of Agricultural and Biological Engineers (ASABE). Dr. Sokhansanj was recognized at the 2013 ASABE Annual International Meeting for his exemplary leadership and work in the revision of a very important Standard that deals with Densified Products for Bulk Handling.

### Fellowship of the Canadian Academy of Engineering

CHBE professor, Dr. Savvas Hatzikiriakos, was made a Fellow of the prestigious Canadian Academy of Engineering. The induction ceremony took place on June 20, 2013 in Montreal in conjunction with the Academy's 2013 Annual General Meeting and Symposium. Dr. Hatzikiriakos is one of the most accomplished experimental rheologists internationally. He has developed unique world-class expertise in the areas of polymer rheology, processing and surface science. His work has brought new, innovative and challenging ideas to the field and has had both academic and commercial relevance. The Canadian Academy of Engineering is the national institution through which Canada's most distinguished and experienced engineers provide strategic advice on matters of critical importance to Canada.

### Canfor Pulp presents Research Award

Congratulations to CHBE professor Dr. Heather Trajano who, with BCIT's Dr. Rodger Beatson is the recipient of the 2013 award of the Canfor Pulp University Grants Program. Drs. Trajano and Beatson will receive the grant to support their project on recovery of hemicellulose monomers and oligomers from pulp mill waste streams for use as strength additives in paper products. The award provides \$75,000 to support their research over three years.





### Officer of the Order of Canada

UBC Chemical & Biological Engineering professor John Grace is among 34 new Officers of the Order of Canada - one of Canada's highest civilian honours, recognizing a lifetime of outstanding achievement, dedication to community and service to Canada.

Dr. Grace is being recognized for his contributions as a chemical engineer, notably to the development of cleaner technology for industrial processes and energy production. He is a Fellow of the Royal Society of Canada, the Canadian Academy of Engineering, the Engineering Institute of Canada, and the Chemical Institute of Canada. He has also received a host of awards, including the Canadian Society for Chemical Engineering's R.S. Jane Memorial Award, the Career Achievement Award of the Science Council of British Columbia, the American Institute of Chemical Engineers' Thomas Baron Award and its Dupont Particle Technology Forum Award and the Meritorious Achievement Award of the Association of Professional Engineers & Geoscientist of BC.

"John is an outstanding Canadian figure in chemical engineering and a world-renowned leader in the field of fluidization, chemical reaction engineering and clean energy," says department head Peter Englezos.

### Top cited Biotechnology & Bioengineering journal paper

Congratulations to Dr. Jamie Piret, whose article on "Inhibition of glutamine-dependent autophagy increases t-PA production in CHO cell fed-batch processes", published in the journal *Biotechnology & Bioengineering* (Vol. 109, May 2012, pages 1228-1238) has been recognized as Top Cited Research by the journal. The article presents the results of a multi-disciplinary study led by Dr. Piret's group in collaboration with the groups of Dr. Michael Butler (Microbiology, University of Manitoba), Dr. Hélène Côté (Pathology, University of British Columbia) and Dr. Sharon Gorski (Genome Sciences Centre, BC Cancer Agency, and Molecular Biology & Biochemistry, Simon Fraser University).



### Engineers Canada Fellowships

Two CHBE faculty members were honoured with Engineers Canada Fellowships during 2013.

- Dr. Kevin J. Smith was honoured for his work on understanding the relationships between heterogeneous catalyst properties, reaction kinetics and reaction mechanisms.

- Dr. Shahab Sokhansanj was recognized for his research in feedstock engineering, focusing on harvesting, drying, fractionating, and densification of cellulosic biomass.

On behalf of the department and University, we congratulate both on this great honor and accomplishment.

### American Physical Society Fellow

Congratulations to Professor James Feng who was elected a Fellow of the American Physical Society. This Fellowship is a recognition by his peers for his outstanding contributions for pioneering studies of solid-liquid two-phase flows, interfacial dynamics of complex fluids, and phase-field modelling of the moving contact line. Earlier in 2013, Dr. Feng was honoured by being appointed Distinguished Scholar in Residence by the UBC Peter Wall Institute for Advanced Studies for 2014-15.

Dr. Feng holds a Canada Research Chair in Complex Fluids and Interfaces and a joint appointment with UBC's Department of Mathematics. His interdisciplinary work seeks to exploit mixtures of complex fluids for novel engineering and biomedical applications, such as improved processes for controlled drug release and investigations into the dynamics of pathological cells—damaged red blood cells found in malaria and cancer.



## APSC Community Service award

CHBE alumnus Claudio Arato received both his B.Sc. in Chemistry (1989) and B.A.Sc. in Chemical Engineering (1991) from UBC. Following graduation, he developed a successful and highly regarded career both as a professional engineer and as an inventor, with numerous technical papers, patents and patents pending, providing his services on projects throughout N.America, E.Europe & Mexico. His innovations and creativity have not stopped at the drawing board, and Claudio has led the start up of "skunkworks" technology development programs and companies in industries as diverse as low carbon cement, heavy oil upgrading, agriculture, GMO-free biofuels & chemicals, nanotechnology, pulp & paper and water treatment.



He currently serves as both Principal for Bacchus Consulting and Director of Engineering for Sonoro Energy.

Beyond his impressive career, Claudio's contributions to causes within his community are extraordinary. He has been actively involved with the Association of Professional Engineers and Geoscientists of BC (APEGBC) since his membership first began in 1994, dedicating over 10,000 volunteer hours towards the betterment of his profession. He is a three-term Elected Board Councillor and has served on multiple task forces and committees, including both the Professional Practice and Registration Committees, mentoring new graduates and recent arrivals and as a speaker on sustainability and ethics on the mandatory APEGBC Law and Ethics course. Claudio's commitment to his professional community was recognized in 2010 when he was awarded the APEGBC DC Lambert Professional Service Award, in 2011 when he was recognized nationally as a Fellow of Engineers Canada and in 2013 when APSC recognized him with its Meritorious Community Service award for professional service. In May 2014, Claudio will be receiving the Engineers Canada Meritorious Service Award for Professional Service in Saint-John, NB. Claudio's engagement with his community extends beyond his professional contacts - he was Co-founder and Director of the Cascadia Prosperity Forum in Vancouver. He has been called an "outstanding volunteer and ambassador" for the Make-A-Wish Foundation, acting as a Wish Grantor from 2000 to the present and received the BC/Yukon Volunteer of the Year award in 2010. Claudio has also volunteered a significant amount of time to several major Vancouver sporting events, including the 2010 Olympic Bid and Games' Committees, the 2006 World Junior Hockey Championships, the 2007 Memorial Cup.

Over the past ten years, Claudio has been a staunch supporter of and contributor to the UBC Faculty of Applied Science through his membership of the Chemical and Biological Engineering Industry Advisory Committee, as well as his more recent participation as an invited lecturer on Faculty of Applied Science course 450 - Engineering and Ethics, and as an advisor for Faculty of Applied Science course 263 - Technology and Development: The Global Engineer.

Claudio has literally dedicated tens of thousands of hours, both personally and professionally, to the support and betterment of the community in which he lives.



## Bio Resource Engineering Alumni Reunion

May 25, 2013

The Department of Chemical and Biological Engineering (CHBE) and the Applied Science Alumni Relations office hosted a reunion of all Bio Resource alumni over UBC Alumni Weekend in May 2013. Bio Resource

Engineering, now a part of CHBE, was once a separate department. Alumni from the BIOE programme were invited to campus to introduce them to what has been since the '90s the amalgamated Department of Chemical and Biological Engineering.

Classes from BIOE were small and although some of the alumni have kept in touch with each other, it was a great experience for them to come back to campus to mix with and mingle with classmates from different years. Fifteen alumni from the programme returned to campus and were treated to a tour of the CHBE building and department by the Head, Dr. Peter Englezos. The visit was followed by a dinner at Mahoney's Pub on campus. Highlights from the reunion included a quick stop into the Cheeze and photos by the Cairn. The reunion organiser, Barbara Peat (BASc '80 BIOE), who was unable to be there in person, was able to join the group over the internet by Skyping into the reunion mixer.

*Article submitted by Courtney Smith*

## CHML '70 Alumni Reunion

The reunion of the UBC Chem Eng class of 1970 (the first in 43 years) was a great success according to all who attended. Former classmates travelled to the reunion from as far afield as Israel, California, Quebec, Ontario, Alberta as well as from other locations in BC outside of the Lower Mainland.

The main event on the evening of May 23 was held at the Seasons in the Park Restaurant atop Queen Elisabeth Park in Vancouver.

The evening began with drinks and canapés, then moved on to a four-course dinner and story time, with many of the former classmates recounting their adventures and experiences over the past 43 years of being in the workplace. Our classmates have worked in a number of industries all over the world, including the chemical processing, pulp and paper, petroleum and environmental industries. Although most of us are now retired, some continue to be active in the workforce. The next morning, we had a tour of the Chem Eng building. Many of our classmates had not been back to Chem Eng since graduation, so seeing the new building and especially the new labs was an interesting and enjoyable experience.

Dr. Peter Englezos, Head of the Department of Chemical and Biological Engineering, presented the new and

improved Department to us and recounted its evolution from our day to now. The most striking differences were the addition of the biological engineering component to the Department and the number of female undergrad and grad students. Dr. Englezos gave us a tour of the building and labs. In the course of the tour we met Dr. Norman Epstein, which was a great treat for us. Dr. Epstein had been one of our professors while we attended UBC Chem Eng, and it was good to see that he has lost none of his sharp wit and ability to make a quick comeback, over the past 43 years.

We ended our reunion with a farewell lunch at Mahoney's pub on campus, where we all agreed to get together before the next 43 years have passed.

*Submitted by Anthony Galloway (BASc '70 CHML)*



## Graduate Club Seminar Series

The Graduate Student Club Professional Development Seminar Series was launched in fall 2011. The objective was to create an opportunity for graduate students to hear more about the professional lives and careers of individuals in the chemical and biological engineering community, both within industry and academia. Initial seminars focused on CHBE faculty members. The students really enjoyed the opportunity to ask the professors questions about their career choices and to gain insights into their experiences and motivations. Over time, the seminars have widened in scope to include industry leaders – many of them the key individuals who oversee hiring processes within their companies. This has given the students a rare opportunity to ask questions such as what do companies really look for in a resume. The most valuable thing students get from these seminars is to: (a) accept that challenges are part of life, and (b) that by facing these challenges it is possible to become as successful as the speakers in this seminar series.

The 2013 Professional Seminar Series speakers were:

- Dr. Clive Brereton, Vice President Technology, NORAM Engineering and Constructors Limited and Adjunct Professor, UBC CHBE: Corporate & Experience Overview
- Dr. Shahram Tafazoli, President and CEO of Motion Metrics International Corporation: Starting and Running an Innovative Company – A Case Study
- Dr. Xiaotao Tony Bi, Professor, UBC CHBE: Particle Technology, Clean Energy and Green Engineering - A personal journey and perspectives
- Dr. Madjid Mohseni, Professor, UBC CHBE: Pursuit of a professional career: some experiences and perspectives
- Dr. Shahab Sokhansanj, Adjunct Professor, UBC CHBE: My Journey

## Distinguished Speaker Series

January 21, 2013

DR. AMY SHEN

Associate Professor, Mechanical and Chemical engineering, University of Washington  
Droplet microfluidics for applications in cell encapsulation, biosensing, and diagnostic imaging

March 4, 2013

DR. SUZANNE M. KRESTA

Chemical and Materials Engineering Professor, University of Alberta  
Research seminar: Is that Stirred Tank Really Perfectly Mixed?  
Adventures In Shifting Paradigms

March 25, 2013

DR. ERIC SHAQFEH

Lester Levi Carter Professor, Department Chair of Chemical Engineering, Stanford University  
“Sedimenting Particulate Suspensions in Viscoelastic Fluids Under Orthogonal Shear”

May 13, 2013

DR. GANAPATI YADAV

R.T. Mody Professor, Institute of Chemical Technology, Mumbai  
“Science and engineering of pores, particles and interfaces: forays into development of clean and green processes”

February 15, 2013

DR. JOSEPHINE M. HILL

Professor and Canada Research Chair in Hydrogen and Catalysis, University of Calgary  
“101 Uses for Petroleum Coke”

March 5, 2013

DR. SUZANNE M. KRESTA

Chemical and Materials Engineering Professor, University of Alberta  
Teaching seminar: The Power of a Great Example

March 27, 2013

LANE DESBOROUGH

Product Strategist for the Diabetes division Medtronic, Inc. “Technology and Innovation: Reducing the Burden of Diabetes”

June 30, 2013

DR. YA-HUEI CHIN

Assistant Professor, Department of Chemical Engineering, University of Toronto  
“Manipulating the fate of aldehydes during their catalytic deoxygenation on solid acid catalysts”