

BENCHMARKS

FACULTY OF ENGINEERING AND APPLIED SCIENCE NEWSLETTER WINTER 2014



ARCTIC RESEARCH PROJECT
to provide unique opportunity
for doctoral students 33

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FROM THE DEAN



Dr. Greg Naterer

WELCOME to the Winter 2014 issue of *Benchmarks*.

It's a great time for students to pursue an engineering education at Memorial University. With thriving industries in the province's offshore oil, oceans, information and communication technologies, energy and mining sectors, among others, the need for engineers is greater than ever before. The faculty is responding to this demand by expanding our programs, enrolments and research capacity. Our goal is to add 40 new faculty positions by 2020, more than 300 graduate students and up to 500 additional undergraduate students. In 2013, we welcomed six new faculty members, increased our graduate student enrolment by about 10 per cent and our first-year undergraduate student enrolment by five per cent.

Two of our exceptional faculty members, Drs. Faisal Khan and Eric Gill, received President's Awards for outstanding research and teaching excellence, respectively. We welcomed two new research chairs. Dr. Brian Veitch was appointed as the Husky Energy Chair in Oil and Gas Research and Dr. Rocky Taylor is the newly appointed CARD Chair in Ice Mechanics. CARD is C-CORE's Centre for Arctic Resource Development. We continue to establish major partnerships with industry, which enabled us to increase our research capacity to over \$15 million in the past year, particularly in the areas of ocean

technology, offshore petroleum and Arctic resources.

In 2013, all of our undergraduate programs received full accreditation to June 2017, including our newly accredited process engineering program. This places our undergraduate co-op programs among the best engineering programs in Canada. Many of our students competed at local, national and international competitions and placed extremely well. For example, Erin Lundrigan and Ricky Bonnell recently won first place at the Atlantic Engineering Competition in the re-engineering category and John Constantine won gold in the engineering communications category. Also, two of our undergraduate students, Mark Elliott and Brandon Fitzpatrick, competed against engineering students from Atlantic Canada and were chosen as the first two recipients of the Peter Kohler Scholarship.

The team-focused approach of our professors, staff and students make our faculty one of the best places in which to work, learn and grow.

As you read the following pages, you will learn more about all of our wonderful accomplishments over the past year. As we gain momentum moving into the third year of our eight-year growth plan, we do so with great enthusiasm and pride.

**Greg F. Naterer, P.Eng., PhD,
FCSME, FASME, FEIC
Dean, Faculty of Engineering
and Applied Science**

BENCHMARKS

EDITOR Jackey Locke **GRAPHIC DESIGN** Helen Houston

CONTRIBUTING WRITERS Kelly Foss, Candace Hall, Kathryn Hong, Jackey Locke, Meaghan Whelan

PHOTOGRAPHY Charles Adler – Kickstarter, Ralf Bachmayer, Aaron Bolt, Brian Claus, Dennis Flynn, Chris Hammond, John Harvey, Kathryn Hong, David Howells, Amanda Knight of Lifetouch Canada, Pu Li, Jackey Locke, Michelle Park, Valeri Pilgrim, Stephanie Robinson, Sara Rostotski

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Please address any comments or suggestions to Jackey Locke, editor, *Benchmarks*, Faculty of Engineering and Applied Science, Memorial University, 240 Prince Phillip Drive, St. John's, NL A1B 3X5, email: jackey.locke@mun.ca or telephone: 709 864 8287.



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**MEMORIAL
UNIVERSITY**

Faculty of Engineering and Applied Science

MEMORIAL HAS one of the premier engineering schools in Canada. Our six accredited, five-year, undergraduate engineering programs, which follow a co-operative education model, provide students with valuable experiential learning opportunities and practical work experience prior to graduation.

Our undergraduate programs include:

- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Mechanical Engineering
- Ocean and Naval Architectural Engineering
- Process Engineering

Offshore oil and gas engineering electives are available in all undergraduate programs.

Graduate programs include research

thesis-based programs at the master's (M.Eng.) and doctoral (PhD) levels in:

- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Mechanical Engineering
- Ocean and Naval Architectural Engineering
- Oil and Gas Engineering

Course-based master's programs in:

- Computer Engineering
- Environmental Systems Engineering and Management
- Oil and Gas Engineering
- Engineering Management

The faculty also offers a graduate diploma in:

- Safety and Risk Engineering

The faculty is home to state-of-the-art laboratories, such as the Autonomous

Ocean Systems Laboratory; Health, Safety and Risk Research Laboratory; Manufacturing Technology Centre; Computer Engineering Research Laboratories; Thermo-Fluids Laboratory; Structures Laboratory; Enhanced Oil Recovery Laboratory; Advanced Drilling Laboratory; Multimedia Communications Lab and Ocean Engineering Research Centre, among numerous others.

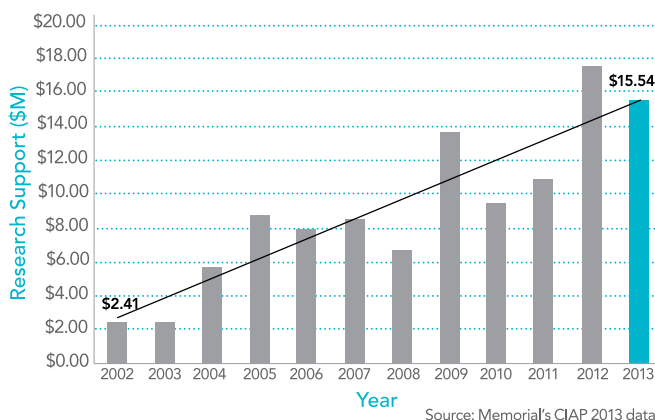
The faculty has significantly increased its research capacity, particularly in our strategic areas of ocean technology, energy, information and communication technology, environment and sustainable infrastructure.

Our faculty members are leading researchers, internationally renowned and award-winners in their respective fields of research. They have secured an increasing amount of financial support from industry, government and other organizations.

A primary purpose and outcome of our research is the education and training of highly qualified personnel. Our research aims to generate knowledge and understanding. The use and application of our engineering research will lead to the creation of new products and techniques, which combines the efforts of researchers, graduate students and entrepreneurs; the same milieu will create the next generation of innovators and leaders in our society.

The faculty's total external research funding has grown from about \$2 million in 1999 to about \$15 million in 2013. ■

Significant growth in research funding over the past 10 years



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Our double vision is 2020.

By 2020, we plan on doubling the Faculty of Engineering and Applied Science.
Our vision is perfect. Join us. »

Memorial's Faculty of Engineering and Applied Science is expanding to meet the needs of the province

WITH A THRIVING ECONOMY, there is a high demand to increase the number of engineering graduates and engineering research capacity in Newfoundland and Labrador. Memorial University's Faculty of Engineering and Applied Science aims to achieve these goals.

The faculty plans to double by 2020, with a significant increase in its student enrolment and research capacity. The \$1.7 million investment in the province's 2012 budget will allow for the development of the expansion plan, as well increasing international recruitment and co-operative education placement services.

The dean of Engineering and Applied Science, Dr. Greg Naterer, aims to focus the growth on strategic areas of importance for the province.

"It's a great time for students to pursue an engineering education," said Dr. Naterer. "Our thriving industries in offshore oil, oceans, information and communication technologies, energy and mining sectors, among others, is creating a high demand for more engineers. Memorial's Faculty of Engineering and Applied Science plans to meet this demand by adding approximately 50 new faculty positions

by 2020, more than 300 graduate students and up to 500 additional undergraduates."

"The faculty also plans to significantly increase its research capacity, particularly in our strategic areas of strength – ocean technology, energy, ICT, environment and sustainable infrastructure," he added.

This increase in enrolment and research capacity will require more physical space. Presently, the Faculty of Engineering and Applied Science is housed in the S.J. Carew Building and the Bruneau Centre for Research and Innovation.

"This new growth will require us to physically expand beyond the walls of the S.J. Carew Building," said Dr. Naterer. "Along with additional students and faculty members, there will also be further administrative support staff, including laboratory and information technologists. There will also be new courses added and potentially new streams, options or programs of study. Right now we are at full-capacity in our current building so this growth will require more space."

Where will engineering acquire all of this additional space for offices, classrooms and teaching/research

laboratories? Part of the answer lies in the province's recent announcement of new core science infrastructure for the St. John's campus. According to Dr. Gary Kachanoski, Memorial's president and vice-chancellor, this will allow for the creation of additional space for engineering and applied science to meet the province's need to expand engineering education and research. And like Dr. Naterer, Dr. Kachanoski is excited about the growth for engineering.

"This is welcome news for Memorial and for the Faculty of Engineering and Applied Science," said Dr. Kachanoski. "Government support for redevelopment of our core science facilities and the doubling of engineering is a game changer for Memorial. Key strategic areas for the university and for the province are ocean technology, offshore petroleum production and arctic resources. This doubling of our engineering academic and research capability will strengthen our capacities in these areas. It's another great reason why we are increasingly being recognized as Canada's oceans university." ■

Synergies among disciplines:

Memorial advances core sciences infrastructure project

MEMORIAL UNIVERSITY has decided on the location of planned core sciences infrastructure on its St. John's campus.

While there was some discussion to situate the new facilities on two different locations, the university will move forward with the single-site option. The new building, which will be located on the north side of campus, on what is now lot 16/16A, will house various units within Memorial's faculties of Science and Engineering and Applied Science.

"The single-site option was chosen primarily because of the cost of construction," said Dean of Science, Mark Abrahams. "Lot 16/16A next to the University Centre was the only green-field we considered that could reasonably accommodate the entire facility.

The single large building will promote consolidation and complementary relationships among the different types of science research as the university moves towards a more interdisciplinary model.

"The Faculty of Engineering and Applied Science plans to double its academic and research capacities by 2020," said Dr. Greg Naterer, dean, Faculty of Engineering and Applied Science. "The new building will allow for additional engineering space to meet the province's need to expand engineering undergraduate, graduate and research activities, particularly in strategic areas of ocean technology,



Kent Decker, vice-president (administration and finance), in front of the location for Memorial's core sciences infrastructure project. Mr. Decker is the chair of the core sciences building steering committee.

offshore petroleum and Arctic resources."

While existing laboratories for the Faculty of Engineering and Applied Science will remain in the S.J. Carew Building and the Bruneau Centre for Research and Innovation, the new core sciences facility will create additional engineering office, design project studio and laboratory space to accommodate a portion of the overall engineering expansion.

"New large full-scale ice mechanics, offshore petroleum and drilling, Arctic ocean, renewable energy and marine testing facilities, among others, are planned for the new building," said Dr. Naterer. "We are now assessing which disciplines will take up space in the new building.

"Our goal is to make the transition as streamlined and cost-effective as

possible and to base our decision on what makes the most sense financially while retaining important synergies among disciplines."

Memorial officials received the final draft of the functional space planning study this past May and it is now being reviewed. One preliminary concept has already been presented to the core sciences building steering committee for discussion.

"The committee has looked at the basic concept for the combination of efficiency of design, both in terms of mechanical systems for the building as well as layout to make the best use of our most valuable resource, the people inside the building," said Dr. Abrahams. ■

Engineering participated in the 22nd Annual National Engineering Month Bridge-Building Competition

RECRUITING EFFORTS were in full force at the 22nd Annual National Engineering Month Bridge-Building Competition. Each year, Memorial's Faculty of Engineering and Applied Science has an information booth at the annual bridge competition to recruit potential students and to raise awareness around the exciting opportunities that Memorial engineering offers.



Nao, our humanoid robot, helped out at the booth by entertaining visitors with his dance moves and talking about the cool world of Memorial engineering. Visitors also received fact sheets on disciplines they were interested in along with admission requirements and guidance on how to prepare in high school.

The annual bridge-building competition for the St. John's area,

which has traditionally been held at the Johnson GEO CENTRE, is an engineering competition for junior high school students from all across the province. Students build popsicle stick bridges, which are tested on the day of the competition. The event is held as part of National Engineering and Geoscience Month. ■

First annual MUN-CSCE Bridge-Building Competition was a huge success

ON MARCH 27, 2013, civil engineering students and faculty came together for the inaugural MUN-CSCE (Canadian Society for Civil Engineering) Bridge-Building Competition.

With five teams comprised of civil engineering students, the event was a huge success. Participants shared their bridge-building stories moments before they held their breaths as their bridges were tested and, ultimately, crushed.

Dr. Helen Zhang introduced the CSCE, CSCE-NL, CSCE-MUN student chapter and their activities. She is extremely pleased with how the first annual bridge-building competition went.

"This is the first bridge-building competition at Memorial, and we promoted the event for many months," said Dr. Zhang. "We had more than 90 participants so it was a huge success and

it was nice to see all of the great efforts of the organizers come together nicely."

The gold medal went to the group "CJR." The silver medal went to the group, "Anything but Civil" and "NRPOP Trident" took away the bronze.

Dr. Greg Naterer, dean, Faculty of Engineering and Applied Science, gave welcoming remarks. Dr. Amgad Hussein, chair, civil engineering, spoke on behalf of the discipline and Dr. Assem Hassan introduced the competition. Drs. Hussein, Hassan, Stephen Bruneau and Mr. Albert Clarke, an executive CSCE-NL committee member, served as judges at the competition.

The annual bridge-building competition was organized by the CSCE-MUN student chapter. For more information, visit: <http://www.engr.mun.ca/~cscemun/home.html> ■



Cleaning up contaminated environments safely

WE ALL KNOW when an oil spill occurs, it's important to clean it up as soon as possible. But, what about the process used to clean it up?

That's where Dr. Helen Zhang, a professor of engineering at Memorial University, and her team, which includes fellow faculty members, Drs. Kelly Hawboldt, Tahir Husain and Bing Chen, come in. They are researching a less toxic and more environmentally friendly process using biosurfactant-based dispersants for cleaning up contaminated environments – a process that has never been done before.

"The management of offshore oil spills in harsh environments are becoming increasingly important as exploration shifts to more remote areas," said Dr. Zhang. "Oil spill management using dispersants has been proven to be effective under challenging environmental conditions; however, chemical dispersant usage may cause some degree of environmental harm due to toxicity and non-biodegradability of some chemical dispersants."

The core of Dr. Zhang's research is to find novel, environmentally friendly and cost-effective dispersants and associated application technologies to adequately address the associated safety and environmental concerns.

"We are working on a process to identify and screen for the superior biosurfactant-producing bacteria from oil-contaminated samples originated in the North Atlantic ocean," explained Dr. Zhang. "We will then grow that bacteria in specific substrate to generate biosurfactants."

Dr. Zhang and her team receive water and oil samples from offshore Newfoundland, and look at all the types



Dr. Zhang aboard the Eastern Canada Response Corporation (ECRC) boat for oil spill response. ECRC provides marine oil spill response services, when requested, to the "responsible party", the Canadian Coast Guard or to any other Government Lead Agency.

of bacteria in the samples to find special bacteria that can be used to make biosurfactants. These special bacteria are isolated and sent for DNA sequencing to get the pure streams, which can then be directly applied for biosurfactant production.

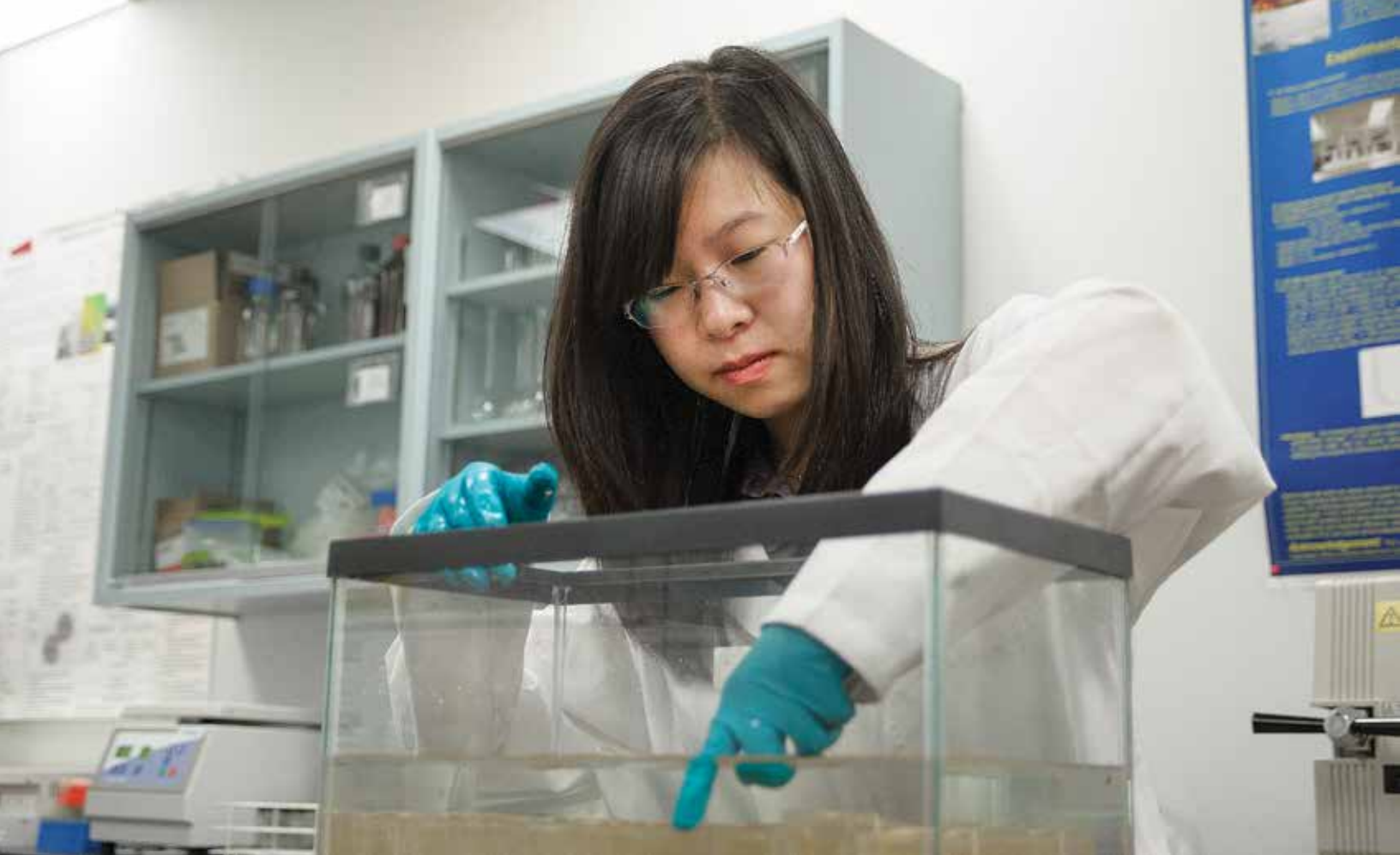
"Compared to their chemical equivalents, biodispersants are less toxic, biodegradable, and can be biologically produced from industrial wastes or by-products," said Dr. Zhang.

"The project objectives are to identify and screen the superior biosurfactant-producing microbes from oil-contaminated samples with marine sources; to use industrial waste streams as the substrate to economically produce biosurfactants; to characterize the newly produced biosurfactants and optimize their combination with solvents to generate advanced biodispersants; and to assess the performance of newly produced biodispersants and associated

technologies for oil spill control in cold and harsh environments.

"The research outputs will provide the Newfoundland offshore petroleum industry with effective biodispersants that have huge potential market values; cost-efficient biosurfactant-/biodispersant-producing technologies that use waste streams as substrates; and oil dispersion technologies that promote the application of biodispersants as an emergency measure for oil spill control in Newfoundland's offshore," said Dr. Zhang. "Additionally, we hope to contribute to the development of biodispersant application guidelines for oil spill control in large-scale applications in harsh environments."

Dr. Zhang's research is supported by Petroleum Research Newfoundland and Labrador (PRNL) and the Research & Development Corporation of Newfoundland and Labrador. ■



Weiyun Lin

Understanding the root of the problem

WITH ANY thriving industry comes environmental concerns and mining is no exception.

Tailings, or wastes from mineral processing operations, are a major focus of environmental engineers, and although many studies have been conducted on the weathering process of tailings, some component transformation reactions within the system remain unclear, according to Memorial graduate student Weiyun Lin.

“Some studies of environmental engineering emphasize the pollutant treatment process and its optimization. I am more interested in exploring the transport and fate of pollutants, to know what is going on in the black box. My research requires knowledge and lab work related to both microbiology and chemistry, and every research

endeavour is challenging, exhilarating and inspiring,” said Ms. Lin.

The disposal of mining and metal-refinery wastes has been a major ongoing and widespread environmental concern. Acid mine drainage (AMD) from tailings and waste rock produced by mining operations tend to contain high metal concentrations with low pH levels due to the various physical, chemical and microbiological weathering processes.

The intermediate sulfur compounds, or thiosalts, are of great importance due to their resistance to conventional treatment processes and their potential to generate acidity and to deteriorate water quality. The stability of the sulfur compound and its treatment and disposal are dependent on the chemical and biological compositions of the residue and the tailings pond.

According to Ms. Lin, to date, the chemical effects on the sulfur transformation have been widely documented, but, unfortunately, in-depth or systematic studies conducted on the microbiological effects on the sulfur transformation in the mine tailings environment are limited.

Ms. Lin works under the supervision of Dr. Helen Zhang, who encouraged her to pursue this topic as part of her PhD.

“Dr. Zhang emphasizes that a PhD study should be of substantial depth and broadness and provide opportunities to involve multiple projects and to build one’s skills,” Ms. Lin said. “She teaches us how to become motivated and that has made my experience at Memorial an enjoyable one.” ■

Wood Group continues investment in Arctic technology development

WOOD GROUP has renewed its sponsorship of the Wood Group Chair in Arctic and Harsh Environment Engineering at Memorial University for a second five-year term, from 2014 to 2019.

The research chair in the Faculty of Engineering and Applied Science will benefit both undergraduate and post-graduate engineering students. With the Arctic and cold regions a strategically important and challenging area of future industry development, Wood Group's objective is to develop enabling technology and environmentally robust solutions for offshore oil and gas developments in these regions. Wood Group is investing \$500,000 CDN to sponsor the chair over the next five-year period. Over the past five years, Wood Group's similar investment has been leveraged by government and other

funding agencies to enable additional research to be performed through the chair program.

"We are very pleased to extend Wood Group's investment in Arctic and harsh environment engineering technology, and to continue to support research delivered from Newfoundland and Labrador," said Mike Straughen, group director of HSSE and executive sponsor of the program. "Several of our business units —Wood Group Kenny, Wood Group Mustang and Wood Group PSN — are firmly committed to extreme environment technology development in key areas such as subsea and pipeline engineering, ice mechanics and Arctic structures. The new chair at Memorial University will continue the excellent work of Dr. Shawn Kenny, the outgoing chair, to support our partnership with the community there."

"I thank the Wood Group for their continued contribution to Memorial's research capacity," said Dr. Gary Kachanoski, president and vice-chancellor of Memorial University. "We are particularly well-positioned to conduct leading-edge research in ocean and harsh environment engineering, and the renewal of this funding is a clear endorsement that the work being done at this institution is world class, particularly in oil and gas exploration and production in Arctic and harsh environments."

The selection process for the chair is underway and the successful candidate will be appointed in 2014. ■

Team Charlie Group wins Term 3 Cube Competition

ON NOV. 25, 2013, term 3 engineering students in the Materials of Construction course participated in a cube competition.

The students work in groups to design different concrete mixtures using a number of variables such as silica fume, fly ash, slag, metakaolin, fibers, etc. The mixtures are tested to determine the strongest mix design – the highest strength of a 50 x 50 x 50 concrete cube. The winning group, Charlie Group, received \$250, donated by Capital Ready Mix. ■



Members of Team Charlie Group receive cheque from Jason Coish, general manager, Capital Ready Mix.



Engineering professor recipient of Hebron Diversity research grant

Drs. Cecilia Moloney and
Francesca Kerton

DR. CECILIA MOLONEY is one of the recipients of the Hebron Diversity Research Grant.

Dr. Moloney received Grant A, which is valued at \$40,000 and is given to a researcher to study the participation of women and/or designated groups in math, science and engineering.

Dr. Moloney and co-investigators, Drs. Cecile Badenhorst, Faculty of Education and Janna Rosales, Faculty of Engineering and Applied Science, are interested in pursuing research on integrative pedagogies to advance the participation of women and other diversities in engineering.

“We found that engineering programs that teach differently are able to attract and retain more women,” said Dr. Moloney. “Oftentimes, these programs introduce new students to engineering by sketching out the ways that engineering helps solve pressing social and environmental problems.

Such changes in engineering education are anticipated to have positive impacts on the participation of women in these professions, and to contribute more generally to the vibrancy of engineering and related professions as we grapple with the challenges of the 21st century.”

Dr. Moloney is interested in developing new methods of teaching engineering courses such as digital signal processing, which require students to integrate abstract mathematical theory with real-world application.

In 2011, the Hebron Project co-venturers announced the establishment of endowments totaling \$1.5 million for women, Aboriginal peoples, persons with disabilities and members of visible

minorities. The funds were to be split between students attending Memorial University and the College of the North Atlantic.

The Hebron Diversity Research Fund Grants were developed through a separate one-time contribution of \$80,000 from the Hebron Project.

The Hebron Project co-venturers are ExxonMobil Canada Properties (operator), Chevron Canada, Suncor Energy Inc., Statoil Canada and Nalcor Energy.

Dr. Francesca Kerton, an associate professor with the Department of Chemistry, is the recipient of Grant B, also valued at \$40,000. ■

“We found that engineering programs that teach differently are able to attract and retain more women.”

– Dr. Cecilia Moloney

Data traffic

THE INTERNET has become the place to watch high-definition television and videos, play games and listen to music. As the reasons to log on become greater every year, so do the number of users and the data traffic.

It is estimated that the increase in global Internet traffic between 2015 and 2016 will be more than 330 exabytes — which is almost equal to the amount of global Internet traffic generated in 2011 — and that one in every five people owns a cell phone, which means that most people are likely accessing the Internet on their mobile devices. As a result, every year Internet service providers are experiencing a greater demand for services, which, in turn, is driving the development and introduction of new technologies.

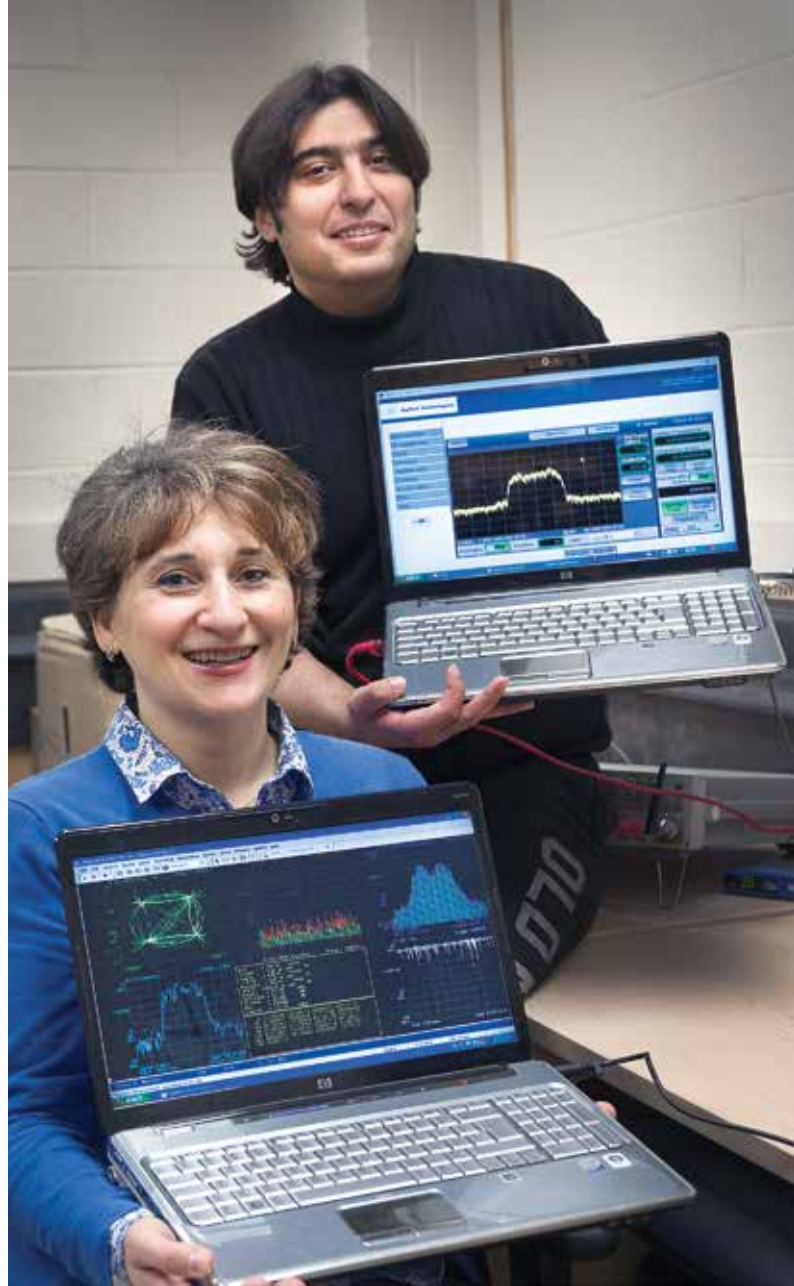
“In wireless communications, 4G networks are being commercially deployed and research has already started to be carried out towards 5G, while in optical communications, 100 gigabit ethernet local area network systems are already here,” said Dr. Octavia Dobre, associate professor, Faculty of Engineering and Applied Science at Memorial.

Dr. Dobre’s research aims to find solutions to diverse problems posed by the next generation communications systems, and involves using cognitive radio (CR) technology as a viable solution to the efficient spectrum utilization in wireless communications.

“Spectrum has been considered to be a scarce resource, while it is actually underutilized,” said Dr. Dobre. “CR technology aims to support dynamic spectrum access, which would allow spectrum utilization by secondary users, when primary/incumbent users do not transmit. However, secondary users should sense the environment and ensure transmission without generating unwanted interference to the primary users. There are several aspects that need to be resolved before the CR technology can be fully implemented in practical systems, such as spectrum awareness, resource allocation and routing.”

Dr. Dobre’s work on CR technology is supported by the Natural Sciences and Engineering Research Council of Canada and the Communications Research Centre in Ottawa, Ont.

In addition to her research on CR technology, Dr. Dobre and fellow faculty member Dr. Ramachandran Venkatesan have started an ambitious Atlantic Innovation Fund (AIF) project aiming to provide a technological



Dr. Dobre and her research student, Walid Jerjawi.

solution to achieve transmission rates higher than 100 gigabytes per second in the optical transport networks.

The goal is to apply orthogonal frequency division multiplexing, a technique used in wireless communications, to transmit at ultra-high speeds on optical transport networks — the backbone for data transmission.

“While several technical challenges lie before us, as well as the challenge of building an optical communications laboratory for experimental verifications, we hope that we will be successful in providing a commercially viable solution,” said Dr. Dobre. ■

A great mind and even greater individual:

Dr. John Walsh leaves a legacy of respect and appreciation

THIS PAST FEBRUARY, Dr. John Walsh, a professor emeritus of Memorial's Faculty of Engineering and Applied Science, passed away. Dr. Walsh taught electrical engineering at Memorial between 1972 and 1996, and those who knew him and worked with him will forever remember him for his tremendous intellect, his teaching excellence and his exceptional contributions to engineering research.

Dr. Eric Gill, an electrical engineering professor in the Faculty of Engineering and Applied Science at Memorial knew Dr. Walsh for approximately 26 years. Dr. Walsh was his supervisor during his master's and PhD programs and during and since that time, he and Dr. Walsh collaborated very closely and wrote many publications together. Dr. Gill is saddened by his passing but grateful to have known and learned from this extraordinary individual.

"He was a researcher, mentor, teacher, colleague and friend. Anyone who had the good fortune of working under his supervision counted it a pleasure and quite an honour. He provided so much on which to build. The ongoing research at Memorial University in the fields of fundamental and applied electromagnetics, in particular the efforts on surface wave radar, is a testament to his desire to see the success of those willing to pursue the work. He will be terribly missed by so many," said Dr. Gill.

Dr. John Walsh's distinguished career as an electromagnetics engineer began on the day he completed his electrical engineering studies in 1966 from Memorial University of Newfoundland. At the time of his graduation, he also



Dr. John Walsh

received the Award of Excellence from the Association of Professional Engineers of Newfoundland.

Dr. Walsh went on to receive B.Eng. (Hons.) and PhD degrees from the Technical University of Nova Scotia and the University of Calgary, respectively. After teaching at Concordia University for two years, Dr. Walsh returned to Newfoundland to assume a faculty position at Memorial, a position he held until his retirement in 1996.

Throughout his career, Dr. Walsh held many titles. In addition to being an engineering professor at Memorial, he was also an adjunct professor in electrical engineering at the University of Victoria; technical director of the Remote Sensing Group at the Centre for Cold Ocean Resources Engineering (C-CORE); founding chairman of Northern Radar Systems Limited (NRSL), now Northern Radar Incorporated (NRI); vice-president, Technical of NRI and honorary research professor, Memorial University. Up until his death, Dr. Walsh held the titles of professor emeritus at Memorial University and vice-president, Technical with NRI.

Dr. Walsh's past accomplishments in association with Memorial University, C-CORE and NRI speak for themselves and his many peer-reviewed publications are indicative of the quality and depth his work continues to command internationally. Those who had the pleasure of knowing and learning from him will miss him, but his legacy will continue to have far-reaching impact. To read more on Dr. Walsh's renowned career, please go to: www.engr.mun.ca/people/jwalsh. ■

"The ongoing research at Memorial University in the fields of fundamental and applied electromagnetics, in particular the efforts on surface wave radar, is a testament to his desire to see the success of those willing to pursue the work. "

– Dr. Eric Gill



Dr. Amy Hsiao

Dr. Amy Hsiao's research on asset integrity issues of large-scale, light-weight aircraft skins and innovative coatings will improve environmental adaptability of Bombardier 415 water bombers, such as pictured above.

'Globally conscious'

Advanced engineering research and training for harsh weather aircraft

HARSH WEATHER environments provide a particular challenge for researchers creating amphibious aircrafts.

Dr. Amy Hsiao is focusing on this challenge. The associate professor in Memorial's Faculty of Engineering and Applied Science is zeroing in on the prevention of corrosion of large-scale aluminum alloys used in the aircraft, the exploration of fatigue and wear mechanisms leading to corrosion, and developing the use of novel coatings to optimize the lifetime of the material.

Dr. John Shirokoff, who is a collaborator on the project, and Dr. Hsiao have begun to explore non-destructive techniques to detect crack growth and propagation in large-scale aircraft structures and coupling these traditional techniques with

novel materials characterization and environmental testing.

Dr. Hsiao's research will include corrosion testing and simulations, mechanical testing, materials characterization, processing and characterization of novel coating and risk, safety and adaptability to Newfoundland and Labrador's climate.

"We will be developing corrosion-testing capabilities to address the materials issues encountered by amphibious aircraft operating in coastal-to-northern harsh environments, such as those experienced in the province," said Dr. Hsiao. "The surfaces and interfaces of large-scale aluminum alloys used in amphibious aircraft applications are subjected to environmental and various service conditions."

With \$600,000 in funding support from Bombardier and the Research & Development Corporation (RDC), Dr. Hsiao hopes to contribute toward best practices in corrosion monitoring, materials testing and structural marine operations.

"I am very excited to be leading this research in collaboration with Bombardier and with the support of the RDC," she said. "RDC's investment supports us in addressing technical concerns shared by multinational companies such as Bombardier. The applied and collaborative nature of the project exemplifies the province's position as a proactive, globally-conscious participant in advanced engineering research and training." ■

Dr. Rocky Taylor is the new CARD Chair in Ice Mechanics

MEMORIAL UNIVERSITY'S Faculty of Engineering and Applied Science has a new research chair. Dr. Rocky Taylor has been appointed the new CARD (Centre for Arctic Resource Development) Chair in Ice Mechanics.

The chair is funded through CARD, a centre of excellence for medium- to long-term Arctic research and development. CARD was founded by C-CORE in 2011 with core funding of \$12.5 million over five years from the Hibernia and Terra Nova projects. The new chair will be funded using \$500,000 over five years from the CARD program.

Building upon one of the three streams in CARD's five-year research and development plan, the chair will work in partnership with CARD and industry to establish, promote maintain and seek additional funding to grow a world-class research program that will strengthen Memorial's research capability involving ice loads on offshore structures and challenges associated with Arctic oil and gas development.

"It's a real privilege to take on a leadership role in this very important and interesting field of work. Ice loads are a dominant consideration for ships and structures designed for operations in ice-prone offshore regions, and our research spans multiple scales of the ice-structure interaction process," said Dr. Taylor.

This work ranges from fundamental investigations of the physical mechanisms that limit ice forces during interactions to the development of robust probabilistic methods that can be employed in design practice. New frontier regions here in Newfoundland and Labrador, as well as throughout the Arctic, hold vast resource potential and

yet they also present engineers with some unique challenges. Working to build the research programs and to help train the personnel that will be needed to overcome these challenges is a very stimulating and rewarding experience."

Dr. Richard Marceau, vice-president (research), Memorial University, said the appointment is the result of academia and industry working together to have huge impact.

"The Arctic is an ecologically important region, yet there is so much to learn, and many unique challenges have yet to be overcome," said Dr. Marceau. "The establishment of the new CARD Chair in Ice Mechanics will allow Memorial University to increase our understanding and research capacity in this critical area while solidifying Memorial's position as a leader in ice and Arctic-related research."

"C-CORE was created 38 years ago to address the technological challenges of oil and gas development offshore Newfoundland and Labrador," said Dr. Charles Randell, C-CORE's president and CEO. "Two years ago, again with the help of industry, we founded CARD to address the challenges of hydrocarbon development in even higher latitudes and to foster the next generation of Arctic experts. We believe creating the CARD Chair in Ice Mechanics will support that effort very effectively."

As the new CARD Chair in Ice Mechanics, Dr. Taylor will lead research programs, building a team of full-time researchers and graduate students and developing collaborative relationships with other academic and industry-based researchers. Dr. Taylor will also contribute to a strong academic program



Dr. Rocky Taylor

in Memorial's Faculty of Engineering and Applied Science by teaching undergraduate and graduate courses, supervising student projects and theses and providing academic and professional service.

Dr. Taylor has been with CARD since its inception in 2011. A graduate of Memorial University, he holds doctoral and master's degrees in ocean and naval architectural engineering, as well as an undergraduate degree in mechanical engineering. Dr. Taylor's research focuses on significant ice-engineering problems, particularly those related to ice load estimation for the design of offshore structures and the mechanics of compressive ice failure. Much of his work is focused on fracture processes in ice and the analysis of associated scale effects. Dr. Taylor recently completed an RDC Ignite-funded program focused on spalling, non-simultaneous ice failure and extension of the probabilistic fracture mechanics model developed during his doctoral studies, which were supported by C-CORE. He is also a co-investigator on a Statoil-RDC-NSERC funded initiative focused on an investigation of dynamic interactions between ice and compliant structures. ■

Future entrepreneurs

WHEN YOU COMBINE an engineering professor who goes above and beyond in her teaching methods, and a group of students interested in learning how to create their own business, the possibilities are endless.

Dr. Amy Hsiao's Business Planning and Strategy in an Entrepreneurial Environment course introduces students to the concepts, issues and themes related to business planning, strategy and entrepreneurship. What is not evident on the surface; however, is how Dr. Hsiao takes the course curriculum to the next level treating her students — or as she refers to them, 'future entrepreneurs' — to high-profile, guest speakers who have been where her students are and have gone on to become successful entrepreneurs.

"Students can learn from lectures, textbooks, case studies, etc. and that's great. The guest speakers share experiences and knowledge that can't always be captured by explicit knowledge, and can only be shared through interaction and engagement, i.e. what is not found in textbooks per se. That is why I bring in guest speakers — I believe that students learn from listening to, and observing, what the

guest speakers — who are successful entrepreneurs in their own right — are saying," explained Dr. Hsiao.

Recently, Dr. Hsiao's 'future entrepreneurs' were brought together via Skype with Charles Adler, co-founder of Kickstarter, a funding platform for creative projects. Since its launch in 2009, the Kickstarter community has funded everything from films, games and music to art, design and technology. But, just how much impact do guest speakers like Charles Adler have on engineering students, who are hoping to start their own companies someday and make a difference in society? Quite a bit, it turns out. Thanks to Dr. Hsiao, Term 8 student Craig Lynch got to meet Mr. Adler.

"The most important thing that I took away from Mr. Adler's talk was to surround yourself with good people who can help you achieve your goals. Your friends tend to be like-minded people, so in order to achieve your goals it's important to surround yourself with people from different backgrounds and different ideas," he said.

"Dr. Hsiao does a great job keeping the material interesting and making the class engaging. She shows videos and Dragon's Den episodes and invites guest



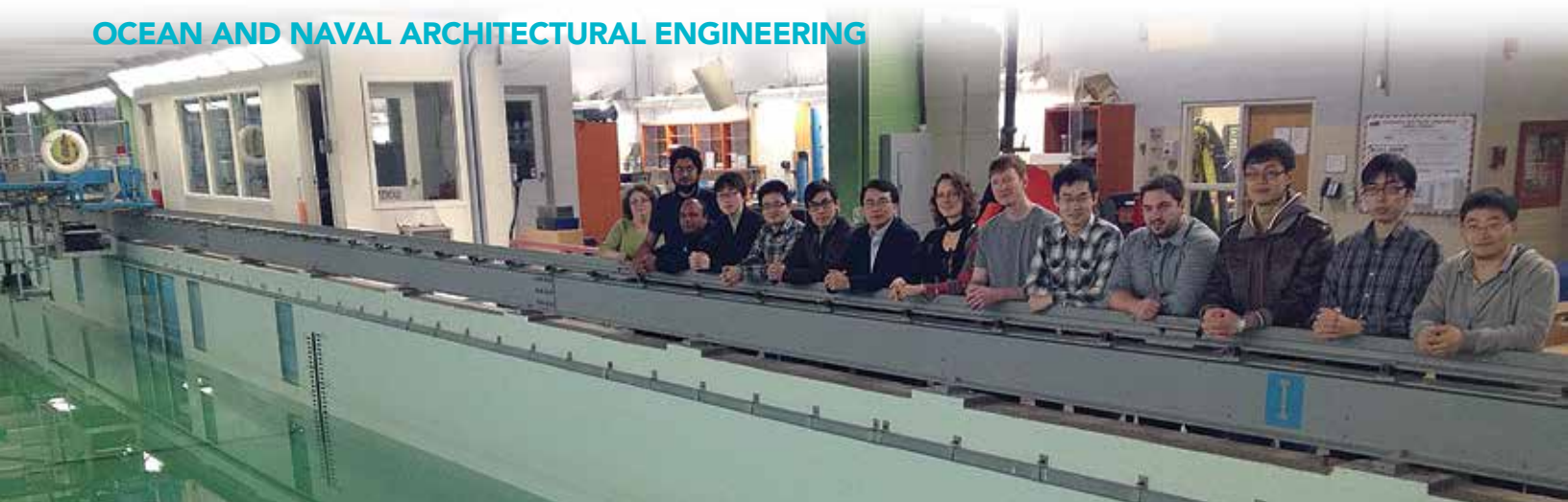
Charles Adler is co-founder and Head of Design at Kickstarter. Prior to Kickstarter, Mr. Adler co-founded the online art publication Subsystem as well as Source-ID, an independent interaction design studio.

speakers, such as Charles Adler, to talk to us. She also encourages the class to ask lots of questions," he added.

Other guest speakers, many of whom were once students in Dr. Hsiao's ENGI 8607 class include Stephen Reddin, who co-founded Cambrai Solutions as part of the Wesley Clover network; Alex Brown, who co-founded Source Studio and became a Genesis Centre client; Dave Rhees, who co-founded Quidi Vidi Brewery; Randy Billard, co-founder of Virtual Marine Technologies; Maurice Tuff, serial entrepreneur and founder of Root Four Imagination Inc; Leonard Lye, serial inventor and entrepreneur of FootWorker; The Genesis Centre and the Research and Development Corporation. ■

"Dr. Hsiao does a great job keeping the material interesting and making the class engaging. She shows videos and Dragon's Den episodes and invites guest speakers, such as Charles Adler, to talk to us. She also encourages the class to ask lots of questions,"

– Craig Lynch



Dr. Wei Qiu and the CREATE team

CREATE Training Program for Offshore Technology Research is providing students with experience on the high seas

AT MEMORIAL UNIVERSITY, the Natural Sciences and Engineering Research Council of Canada (NSERC) CREATE Training Program for Offshore Technology Research is quickly proving to be a valuable part of Canada's strategy for training its labour force to fill well-paying jobs in our economy.

"The idea of providing practical training to support the offshore industry came both from industry and academia," said Dr. Wei Qiu, an associate professor with Memorial University's Faculty of Engineering and Applied Science.

Dr. Qiu leads the team in providing this added training to highly qualified students in the engineering faculty's disciplines of ocean and naval architectural engineering, process engineering, electrical engineering and civil engineering graduate programs and graduate students from the Faculty of Science (chemistry).

"What Memorial is doing is taking students who are already trained in engineering and research for offshore technology such as floating structures, mooring lines and risers, corrosion material engineering and subsea systems, and providing them

with internships. During a four month internship, students work with our industry partners to hone their skills and acquire practical experience," explained Dr. Qiu.

"It's a win-win-win situation, providing benefits to the university, the sponsoring companies and the students," he explained. "Our industry partners, companies such as ConocoPhillips, Husky Energy and American Bureau of Shipping, are experiencing a shortage of qualified employees. Memorial has expertise in offshore research and worldwide partnerships. The CREATE program provides the companies with the skilled people they need. Memorial has a great reputation that is further enhanced by this program expanding our research capability and our ability to attract students. The benefit to students is that it blends practical experience with classroom training and laboratory research. It's a unique program."

Since 2010, graduate students have been participating in internships that cover all aspects of offshore activity. The program aims to build on the region's ocean research strengths and brings together researchers, national

and international industry, classification societies, government agencies and academia to carry out concentrated research and training in offshore technology. An example of this would be students in the program using an icebreaker model such as the one shown in the picture with Dr. Qiu to study ice-ship interactions with collaborative partners. The program also addresses scientific challenges in offshore design and operations. The internship opportunities promote interaction of trainees with academic and non-academic research environments, giving them practical experience in teamwork, critical thinking, problem solving, writing, presentation and networking skills, mentoring and career development. The end result is highly skilled young professionals to help build Atlantic Canada's offshore industry.

The NSERC CREATE Training Program is funded until 2016 by NSERC with support from Petroleum Research Newfoundland and Labrador (PRNL), the Research & Development Corporation of Newfoundland and Labrador (RDC) and Memorial University. ■

Under ice: uncovering the Arctic's secrets

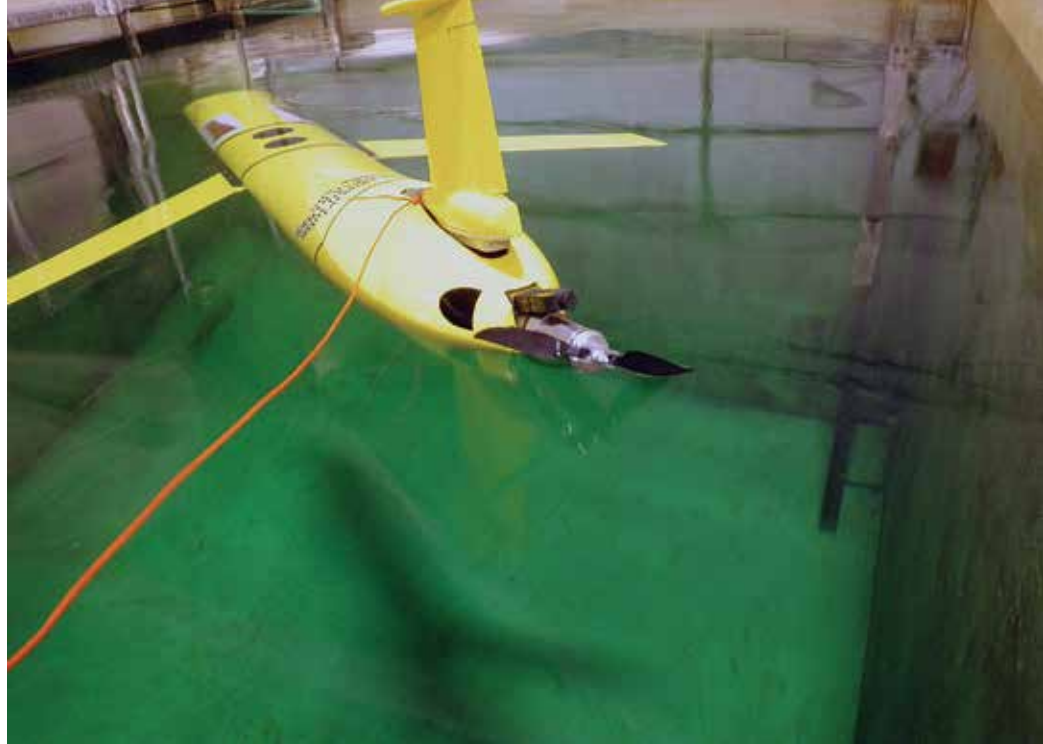
DR. RALF BACHMAYER'S work takes him to many interesting places around the globe, but his focus for the past few years has been developing tools to help scientists to study what lies under Canada's Arctic ice.

"There is a need for more research in order to better understand what's going on in our oceans," said Dr. Bachmayer from his Autonomous Ocean Systems Laboratory in the Faculty of Engineering and Applied Science. "We need more information from the sea, especially from areas we can't access."

Dr. Bachmayer and his team are



working on developing new capabilities for underwater vehicles and equipping them with sensors that can gather data in extreme environments. These autonomous underwater vehicles (AUVs) — will gather information on temperature, salinity distribution, ocean currents and even bio-activity over long periods of time, which will provide invaluable insight to better understand Arctic waters with their economic



potential, relevance to Canada's security and impact on our climate — factors of global significance.

"There are research groups in Canada, but also in other countries such as the UK, the U.S. and Norway, working with larger AUVs in the Arctic and Antarctic regions," explained Dr. Bachmayer. "Our focus on relatively small, but long endurance AUVs will help us find out how water changes and flows and how the ocean moves so we can better navigate it. It will also improve our weather predictions and our understanding of environmental conditions such as global warming, which will enable us to work towards better protecting our oceans."

Research on the Arctic's harsh ocean climate has traditionally been very limited and sporadic. Unmanned underwater vehicles are usually deployed from ships using tethers and collect high-density data in a spatially, and often temporarily limited, fashion. In addition, the missions, and therefore the planned research, is often subject to weather delays and cancellations. The AUVs being developed at Memorial University will be autonomous and capable of

independent navigation and will be able to cover larger distances, gathering research data for weeks and months at a time.

"Our goal is to be able to give these AUVs missions lasting from weeks to months under the ice and they just go off and do it," said Dr. Bachmayer. "The main challenge is to come up with a reliable navigation solution so they can find their way under the ice and back. GPS and standard communication sensors can not easily transmit through the ice and if these AUVs are working under a continuous ice surface, we need them to be able to navigate towards the nearest open water, or to a pre-planned rendezvous site, to transmit data and then continue along their way."

The team has been working for five years on three AUVs, with a fourth on its way. "We've developed a propulsion system that uses very little power and is highly efficient. Our U.S. partner is commercializing it and it will go into production shortly," he states. "We've worked in western Greenland and next year will be travelling out of Halifax towards the Arctic to do some more trials." ■

Dr. Brian Veitch appointed Husky Energy Chair in Oil and Gas Research

MEMORIAL UNIVERSITY'S Faculty of Engineering and Applied Science has a new research chair. Dr. Brian Veitch, a professor of ocean and naval architectural engineering, has been appointed the new Husky Energy Chair in Oil and Gas Research.

Husky Energy initiated the \$2.5-million endowment in 2003. The current focus of the chair is to undertake an innovative research program in offshore oil and gas research, with particular emphasis on offshore engineering for harsh ocean and arctic environments.

"The Husky Chair in Oil and Gas Research will support further understanding of harsh environment operations and underscores Husky's commitment to help develop the province's engineering capability in this very challenging area," said Malcolm Maclean, senior vice-president for Husky Energy's Atlantic Region. "We look forward to working with Dr. Veitch to make the Chair a key part of the local research and education community."

Dr. Brian Veitch grew up in St. John's and graduated from Memorial with a bachelor of engineering degree, followed by a master of engineering degree. He completed further graduate studies at Helsinki University of Technology, where he focused on naval architecture and ocean engineering. Dr. Veitch returned to Canada in 1996 to work with the National Research



Dr. Brian Veitch

Council. In 1998, he was appointed to the Terra Nova Project Junior Research Chair at Memorial University, where he developed an applied research program on ocean environmental risk engineering. In parallel, he initiated an inter-disciplinary research program on offshore and maritime safety with the goal of improving the safety of life at sea. His work has garnered a number of awards, including the President's Award for Outstanding Research at Memorial University and Transport Canada's Marine Safety Award. He also helped launch several technology companies with his graduate students.

In addition to his teaching responsibilities, Dr. Veitch has held several administrative roles in the faculty, and currently serves on the Board of Directors of the Research & Development Corporation of Newfoundland and Labrador.

"I am honoured and delighted to have the opportunity to serve as the Husky Energy Chair. I look forward to working in partnership with Husky Energy to develop an interdisciplinary research, development and innovation

program focused on offshore engineering. Through our work, we aim to create an exciting teaching and learning environment for students and researchers alike, with the ultimate goal of having a positive, practical impact on the industry," said Dr. Veitch.

Dr. Christopher Loomis, past vice-president (research), Memorial University, said the appointment is an excellent example of industry-academic collaboration.

"The Faculty of Engineering has been steadily growing its research capacity and building a reputation for innovative offshore engineering research," said Dr. Loomis. "The success of faculty members like Dr. Veitch is attracting the attention of industry partners like Husky Energy and I have no doubt that this research partnership will lead to further advances that will enhance our knowledge of operating in harsh offshore environments and provide new insight to industry."

Dr. Veitch was selected for this position after a thorough international search. The appointment, effective Jan. 1, 2013, is a five-year renewable term. ■



Students work in the hydrometallurgy laboratory.

Process engineering program is meeting academic and industry needs

IN 2010, Memorial's Faculty of Engineering and Applied Science introduced a new undergraduate program in process engineering. The program is unique in Canada in that it focuses on the processing of natural resources to value-added products. The diverse program encompasses new development, design, optimization, and operation of sustainable processes for societal needs. Graduates of the program use biological, chemical and physical processing of substances to modify their nature, properties and/or composition, to produce useful products such as petrochemicals, gasoline, diesel, metals and alloys.

The program recently became fully accredited and the first group of students graduated in April 2013.

"We are extremely pleased with how successfully the process engineering program has been developing. The accreditation would confirm that this program meets very high standards and graduates of the program will, undoubtedly, meet the growing needs of the process and allied industries," said Dr. Faisal Khan, the founding program chair.

Accreditation is conducted by the Canadian Engineering Accreditation Board (CEAB). It is a process whereby post-secondary undergraduate programs are evaluated according to national standards, such as curriculum requirements, faculty, resources and outcomes of the education.

During Memorial's spring 2013 convocation, 38 process engineering

students received their bachelor of engineering degree in process engineering. Dr. Khan is excited about the opportunities that this program will open up for the graduates.

"Graduates of this program will be safety- and environmentally-conscious engineers, who will be very capable to meet the needs of industry for sustainable engineering development," said Dr. Khan. "They have a thorough knowledge of materials, chemical and physical sciences, and mathematics and an ability to apply this knowledge in an economical and sustainable way to society and industry." ■

Safety and integrity highlighted by Faculty of Engineering and Applied Science

ON MARCH 19-20, 2013, approximately 120 researchers and practitioners came together at the Sheraton Hotel Newfoundland in St. John's for the inaugural Workshop on Safety and Integrity Management of Operations in Harsh Environments.

The workshop had a tall agenda and exceeded expectations, according to Dr. Faisal Khan, who is the Vale Research Chair in Process Safety and Risk Engineering and founding chair of process engineering at Memorial University.

"We are extremely pleased with how everything went. The idea of a workshop on safety and integrity came to me last fall. I wanted to bring together experts from industry and academia to share knowledge and to discuss risk-based solutions to the challenges faced in safety and integrity management in natural resource development in harsh and frontier areas," explained Dr. Khan.

The two-day workshop focused on two important themes related to the management of natural resource development in harsh and frontier areas — namely safety and asset integrity. The main topics of the workshop included safety and integrity challenges in harsh environments and potential solutions; corrosion under insulation; winterization methods; evacuation and

rescue issues and methods to address them; production, processing and transportation challenges and potential solutions and risk assessment and management challenges and potential solutions.

"Harsh environment adds an extra degree of complexity in the assessment and management of risk," said Dr. Khan. "The development of natural resources in the Arctic and sub-Arctic is creating huge challenges. These regions have some of the most severe harsh environment conditions in the world with unique features such as ice and permafrost, complex degradation rates, unpredictable climate changes and high uncertainty due to lack of knowledge in those areas. These important issues require concerted efforts from all entities and this is what this workshop was all about, bringing those key players together to find solutions."

Dean of Engineering and Applied Science at Memorial, Dr. Greg Naterer, chaired the steering committee, which involved representatives from different industries. He was extremely pleased with how everything went and praised Dr. Khan for placing the spotlight on such an important area.

"The workshop was the perfect opportunity for key industry people to come together to talk about issues of safety and integrity in harsh environments and to collaboratively come up with possible solutions for improvement," he said. "It is important to be proactive when dealing with some of the concerns raised during the two days, and Dr. Khan is to be commended for his foresight and for the overall success of this workshop."

The workshop was the result of collaborative efforts from Memorial University, Natural Science and Engineering Research Council (NSERC), RDC Newfoundland and Labrador, American Bureau of Shipping, Vale Newfoundland and Wood Group of Companies. ■

"Harsh environment adds an extra degree of complexity in the assessment and management of risk."

– Dr. Faisal Khan





Protecting our oceans, one polymer at a time

From left to right: Drs. Christina Bottaro, Kelly Hawboldt and Erika Merschrod

WHEN AN OIL SPILL occurs in the marine environment, the impact is huge, not to mention the devastation for marine life. Whether or not a major marine disaster is inevitable with so much activity taking place on our oceans, Memorial University researchers are doing their part to be prepared to protect our oceans.

The chief investigators of the Microfluidic Sensor Technology Project are Drs. Christina Bottaro and Erika Merschrod of the Faculty of Science's Department of Chemistry, and Dr. Kelly Hawboldt of the Faculty of Engineering and Applied Science. This project aims to develop microfluidic sensor technology to measure contaminants in harsh marine environments, especially oil-in-water. The core technology involved is molecularly imprinted polymers (MIPs) and accompanying sensing systems which can be deployed for oil-spill monitoring and fate analysis, or incorporated into the online analysis of produced water and tracking of oil spills in the marine environment.

"Unlike the bulk of online systems

or oil-spill tracking systems, we are targeting components of the oil that are most problematic in the environment due to their toxicity and/or persistence, which means they don't readily biodegrade and [as a result] bioaccumulate in animals and plants," explained Dr. Hawboldt.

The primary advantage of the small MIP-based devices is their sensitivity and selectivity. When deployed into a marine environment, the MIPs will only detect targeted compounds, such as phenols, heavier polycyclic aromatic hydrocarbons and other compounds that are toxic to the marine environment, while avoiding irrelevant compounds, ensuring accuracy.

"That way, produced water-treatment or oil-spill response systems can be tailored to focus on the contaminants of concern. Since the sensors are small and simple, they can be used anywhere samples need to be collected, and they can function in cold temperatures and under ice cover," said Dr. Hawboldt.

The long-term goal is to use the platform technology for the commercialization of new biosensor

applications in medicine, biotechnology and civil defense.

For Dr. Hawboldt, the most exciting part of all of this is being at the front end of disasters and in a position to prevent the negative impacts before they occur.

"This funding will not only lead to innovative sensors, but also delineate the contaminants of concern in produced water and oil spills. We will be better able to treat and respond to these events. This is especially true in harsh environments where compounds may disperse quickly and, are therefore, difficult to measure, but still have an impact on the marine environment. In detecting these compounds, we will be able to better assess the environmental impact and address them through treatment and mitigation," she said.

This project, with a total estimated cost of \$3 million, will receive approximately \$2.1 million from the federal Government's Atlantic Innovation Fund. This funding supports advancements in Newfoundland and Labrador's ocean technology cluster, IT industry and medical research fields. ■



Dr. Lesley James

Investment of more than \$3 million to support facility at Memorial University

TO SUPPORT research and identify new ways to optimize oil recovery, the Research & Development Corporation of Newfoundland and Labrador (RDC) and the Hibernia Management and Development Company Ltd. (HMDC) invested \$1.635- and \$1.7-million respectively last year for the creation of a state-of-the-art enhanced oil recovery research facility at Memorial University.

Research efforts in the new laboratory will focus on enhanced oil recovery (EOR), which is utilized to increase the amount of crude oil extracted from an oil field and extend the field life. Funding from RDC and HMDC will advance research and development (R&D) capacity at Memorial.

"RDC continues to support collaborative R&D between academia

and business by investing in the highly-qualified researchers, innovative research and world-class infrastructure required to advance our development opportunities", said Glenn Janes, CEO, RDC. "Building new research labs and facilities is critical to expanding our R&D capacity, and strengthening our long-term economic performance and global competitiveness. Applied EOR research represents a strategic investment that is critical to sustaining economic prosperity in Newfoundland and Labrador."

Through its CollaborativeR&D program, RDC's funding is designed to foster R&D partnerships between academic researchers and industry.

HMDC's investment is in addition to a 2012 investment of more than \$11 million to fund the

purchase of laboratory equipment and research into EOR.

"The new building, its equipment and staff will support research into enhanced oil recovery, which is critical to the continued success of the province and the industry," said Jamie Long, president HMDC. "Our ultimate goal is to increase oil recovery offshore Newfoundland and Labrador."

The investments will create a world-class research laboratory in Memorial University's Bruneau Centre for Research and Innovation.

"The support from RDC and HMDC will enable Memorial to build on our strengths in enhanced oil recovery," said Dr. Gary Kachanoski, president and vice-chancellor, Memorial University of Newfoundland. "The support we receive from the offshore industry, in partnership with the provincial government, is enabling us to develop expertise and infrastructure that will be unmatched in this country. I am confident that the research completed in the EOR laboratory will have a positive impact on enhanced oil recovery capacity and the province as a whole."

Dr. Lesley James, an assistant professor of process engineering and the Chevron Chair in Petroleum Engineering in the Faculty of Engineering and Applied Science at Memorial, is the principal investigator of the new EOR laboratory. Her research expertise centers on the recovery of oil and gas offshore Newfoundland and Labrador.

"Construction of the Hibernia Enhanced Oil Recovery Laboratory is underway and, once complete, it will house state-of-the-art experimental equipment allowing us to perform enhanced oil recovery experiments at reservoir conditions. The laboratory will enable pore- and core-scale experimental investigations along with the ability to measure fluid, rock and fluid-rock properties," explained Dr. James. ■

Dr. Eric Gill receives President's Award for his teaching

DR. ERIC GILL is the recipient of The President's Award for Distinguished Teaching for 2013, which recognizes continued teaching excellence and outstanding achievement in teaching effectiveness.

A professor of electrical and computer engineering at Memorial since 2000, Dr. Gill has earned the respect of students and colleagues. Dr. Gill teaches challenging core engineering courses; however, Dr. Gill's knowledge of the course material and his unique teaching

approach have been invaluable to his students.

For Dr. Gill, this award acknowledges that he has made a positive impact for his students.

"It gives a sense of satisfaction to know that perhaps I have positively impacted the careers of others and that motivates me to try to continually improve my pedagogical techniques," he said. "I appreciate the recognition from my peers; however, what makes this award even more special, is the positive feedback I receive from

former and current students."

Dr. Gill also won the 2013 Dean's Award for Teaching Excellence, an internal award in the Faculty of Engineering and Applied Science, and in 2012, he was the recipient of the Professional Engineers and Geoscientists Newfoundland and Labrador (PEGNL) Teaching Award given in recognition of exemplary contribution to engineering education. ■



Dr. Eric Gill



Dr. Faisal Khan

Dr. Faisal Khan receives the President's Award for Outstanding Research

DR. FAISAL KHAN is one of the recipients of the 2013 President's Award for Outstanding Research, which recognizes young researchers who have made outstanding contributions to their scholarly disciplines.

Since joining Memorial in 2002 as an associate professor, Dr. Khan, who is chair of process engineering and the Vale Research Chair in Process Risk and Safety Engineering, has continued to work on safety and risk engineering and extended his research scope by applying risk-engineering concepts to safety, asset integrity management, pollution prevention, and renewable energy. He has developed many advanced risk-based safety and integrity management methodologies and models.

His research achievements include the establishment of a unique research health safety and environmental laboratory facility for advanced experiments and model development related to health, safety and risk. The facility is well known by the oil and gas and chemical processing industries and has been instrumental in developing national and international collaborations.

For Dr. Khan, receiving such a prestigious peer-nominated award is about recognition of a continued effort of learning.

"For me, awards aren't milestones or success parameters. It is a motivational recognition that my peers value my efforts. It is extremely satisfying that my peers understand and recognize what I am doing and trying to achieve," said Dr. Khan. ■

Dean of engineering receives prestigious national award

DR. GREG NATERER, dean of engineering and applied science at Memorial, is the recipient of the Canadian Society for Mechanical Engineering's (CSME) 2013 Jules Stachiewicz Medal — the highest award in Canada for contributions to engineering heat transfer.

Dr. Naterer was selected by a national Honours and Awards Committee comprised of his peers for his outstanding contributions to heat transfer and thermodynamics. As a result of Dr. Naterer's research, new understanding and technologies have been developed in a diverse range of thermal engineering areas.

Dr. Naterer is not only thrilled to receive this medal, but also to be recognized by his peers for his research and teaching.

"It is a proud achievement to receive this prestigious award from CSME in an area where I have worked for more than two decades. I am grateful to CSME, colleagues and students who made this success possible and for my contributions to be recognized for having a positive impact on industry and society," said Dr. Naterer.

The Jules Stachiewicz Medal was established in 1983 to honour the late Jules Stachiewicz, who was a long-time professor of mechanical engineering at McGill University. The medal recognizes outstanding contributions in the field of heat transfer, including design, research, manufacturing and teaching. CSME jointly awards the medal with the Canadian Society for Chemical Engineering (CSCE). ■



Dr. Greg Naterer

Dr. Kelly Hawboldt receives Bantrel Award

DR. KELLY HAWBOLDT, a process engineering professor at Memorial, received the 2013 Bantrel Award in Design and Industrial Practice for her contributions to the field of contaminant removal from gas streams, biofuel from processing waste and emissions from offshore oil and gas operations, awarded by the Canadian Society for Chemical Engineering (CSChE). Dr. Hawboldt's career has focused on the sustainable processing of natural resources, and she has made significant contributions in processing natural resources sustainably and utilizing the products in remote and harsh environments where infrastructure and the use of traditional processes are limited.

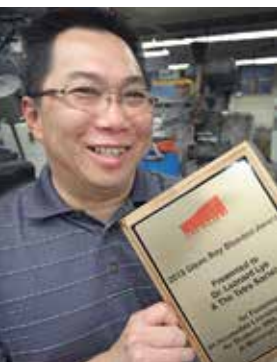
Dr. Hawboldt and her team work in the area of green processing of natural resources, specifically in developing processes and/or products whereby location and/or infrastructure

limit the use of traditional processing and management approaches to maximize products from natural resources.

"It is important to me that the work I do has a tangible outcome, even if it is years away. I want to develop processes and products that are sustainable in nature and have minimal impact on the environment in both the production and use to enhance sustainability of regions," said Dr. Hawboldt. "This award recognizes that I am heading in the right direction and, hopefully, highlights the connection between research and development and industrial application." ■



Dr. Kelly Hawboldt



Dr. Leonard Lye receives Glenn Roy Blundon Award

ABOUT 20 YEARS after he founded and became co-ordinator of the St. John's Chapter of the Tetra Society, Dr. Leonard Lye and the Society received the Glenn Roy Blundon Award for excellence in disability accommodation.

Dr. Leonard Lye "I am extremely grateful for this recognition. Helping people, who may not otherwise have the means to find a solution on their own, is very rewarding," said Dr. Lye. "For me, it's a reason to be an engineer. I am very thankful for all the volunteers and support over the years. This was my initiative and my vision but I couldn't have done this without a lot of help."

In the mid-1990s, Dr. Lye read an article about how Tetra Society founder, Sam Sullivan, contacted the local association of professional engineers in Vancouver, BC for technical help after a skiing accident left him almost completely paralyzed.

"After I read the article, I thought, we are the ideal place to have a society like this," he said. "I talked to several other faculty members who supported the idea. I applied and was approved."

Over the years, Dr. Lye and the Tetra Society have received tremendous support from Dr. Lye's colleagues in the Faculty of Engineering and Applied Science and from employees in Memorial's Technical Services Division.

For more information on Tetra Society and the local chapter and how you can become involved, visit www.tetrasociety.org. ■



Dr. Dennis Peters elected to PEGNL's Board of Directors

DR. DENNIS PETERS was elected Chair-Elect of the 2013-2014 Board of Directors of the Professional Engineers and Geoscientists of Newfoundland and Labrador (PEGNL).

Dr. Dennis Peters

Dr. Peters joined Memorial University in 1998 as an assistant professor of electrical and computer engineering. His teaching is primarily in the area of software, ranging from introductory programming courses to advanced topics such as software engineering and concurrent programming. His research focuses on developing techniques and tools to facilitate the production, analysis and use of documentation for computer system behavioural requirements and design.

"I'm honoured that my professional colleagues have shown their confidence in me by electing me to this position," said Dr. Peters. "This role will give me the opportunity to see another side of how PEGNL works and to work with some truly inspiring colleagues on its board of directors. I'm looking forward to this opportunity and to serving over the next three years as I move through to chair and past chair." ■

Engineering open house is a huge success

ON SATURDAY, March 9, 2013, the Faculty of Engineering and Applied Science hosted an open house as part of the National Engineering and Geoscience month. The open house was an opportunity for the public, potential students and media to learn about engineering and its working laboratories.

Visitors were greeted by information booths represented by various groups and departments associated with Memorial engineering, such as Engineering Undergraduate Student Society B; Memorial Baja Team; the local chapter of Engineers Without Borders; Engineering Co-operative Education; Memorial Student Recruitment; the St. John's Chapter of Tetra Society of North America; the Canadian Society for Civil Engineering and Professional Engineers and Geoscientists of Newfoundland and Labrador.

Visitors could also tour laboratories,

including the wave towing tank; machine shop; autonomous ocean systems laboratory; rescue craft simulator; structures laboratory; and sand bed erosion facility, among others.

Nao, the faculty's humanoid robot, was there to greet people and told visitors about the cool world of engineering and what faculty and students work on as part of the program's curriculum.

The open house drew a good number of visitors and will become an annual event.

The Faculty of Engineering and Applied Science thanks all those who helped make the event a huge success, including the organizers; faculty and staff who volunteered at the information booths and the guided tours of the laboratories; the engineering student volunteers; and of course, to the visitors who came to see what Memorial Engineering has to offer. ■



Summer camps for future engineers

IN 2013, Memorial's Faculty of Engineering and Applied Science held engaging and educational summer camps for youth, ages 9 to 18.

Camp offerings included Robotics, Junior Engineers and Girl Quest and an ArcticENGINEER enrichment program. Co-ordinators worked extremely hard to ensure that participants had a summer to remember.

"We had so much fun teaching kids all about engineering," said co-ordinator Kathryn Hong. "From exploring the world of robotics to the depths of engineering, science, mathematics and technology to the exciting field of Arctic engineering — participants had as much fun as we did as their inner explorer took over."

Engineers are playing valuable

roles in industries in our province and internationally. Nurturing young minds and encouraging them to explore the wide world of engineering is a fantastic way to ensure today's youth have opportunities to tap into these growing fields.

Memorial's Faculty of Engineering and Applied Science proudly offers Robotics and Junior Engineers. Girl Quest is been made possible through generous funding from Hebron and Hibernia Management and Development Company Ltd., ArcticENGINEER is funded by the Research & Development Corporation through its ArcticTECH.

For information on summer camps for 2014, visit: www.engr.mun.ca/community/EngineeringSummerCampProgram.php ■

Fostering curiosity and ambition for engineering in southern Labrador's youth



An aerial view of Black Tickle, one of three communities the Memorial contingent visited in southern Labrador.

THIS PAST SEPTEMBER, after two years of hard work and planning, members of Memorial's Aboriginal Ambassador Program (AAP) Committee, a partnership between Memorial University, the College of the North Atlantic and the NunatuKavut Community Council, travelled to southern Labrador to speak with southern Inuit youth about engineering and engineering technology.

The pilot project is part of Memorial's AAP and was designed to bring educational awareness to southern Inuit students in Grades 5-9. Amy Hudson, with Memorial's Aboriginal Affairs, and

interested schools we met with agreed that an introduction to engineering and engineering technology would be a great topic. The committee worked to ensure that engineering concepts were introduced in a culturally relevant manner, resonating with the students and their communities.

"We also wanted to provide current Aboriginal students from Memorial and/or Aboriginal graduates of Memorial, the Marine Institute and the College of the North Atlantic with a unique opportunity to be ambassadors and talk about their university/college experiences and why they chose engineering as a career."

During the five-day trip, Ms. Hudson and Ms. Pilgrim and two Aboriginal engineering students visited three schools and presented their personal stories as well as a hands-on engineering-related activity with the students.

Ms. Pilgrim, a native of northern Labrador, believes the initiative benefitted everyone involved.

"There is such an appreciation by the people living in remote Aboriginal communities when we actually visit the communities – it builds relationships," she said. "For this particular trip, all four of us are originally from Labrador so that was extra special for us and for the students we met."

Andy Fisher is the associate dean of undergraduate engineering and he was thrilled to be a part of this initiative.

"Any time we have an opportunity to

educate youth about engineering, we are excited. The faculty was very eager to help. After a lot of planning, it was rewarding to see it all come together," said Prof. Fisher.

For the student ambassadors, the trip back home to talk to youth was a unique experience and one they won't forget anytime soon.

"I was both honoured and privileged to have the opportunity to be a role model for the Aboriginal youth of southern Labrador," said Brian Pottle, a fourth-year electrical engineering student. "I hope to continually contribute to the motivation for success among Aboriginal youth."

First-year civil engineering student Sheldon Baikie said he would have appreciated an opportunity like this one when he was growing up.

"The Aboriginal Ambassador Program is very important for young students in remote Labrador communities. I know myself, growing up in Labrador, I didn't know what the field of engineering is all about," he said. "It's very important to go to these communities to educate students."

The hope is that initiatives similar to this one will continue as a way of reaching out to Aboriginal youth in remote areas of Newfoundland and Labrador.

"There is tremendous value in engaging with our youth in a way that fosters ambition and curiosity, and it is our sincerest hope that the ambassador project did just that," Ms. Hudson said. ■



Brian Pottle and Sheldon Baikie do an engineering activity with the students.

Valeri Pilgrim of Memorial's Aboriginal Resource Office, were two of four individuals who travelled to Labrador.

"The project was two-fold," said Ms. Hudson. "We wanted to create an opportunity for educational awareness, and, as part of the planning process,

Faculty of Engineering and Applied Science awarded full accreditation of its undergraduate co-op programs

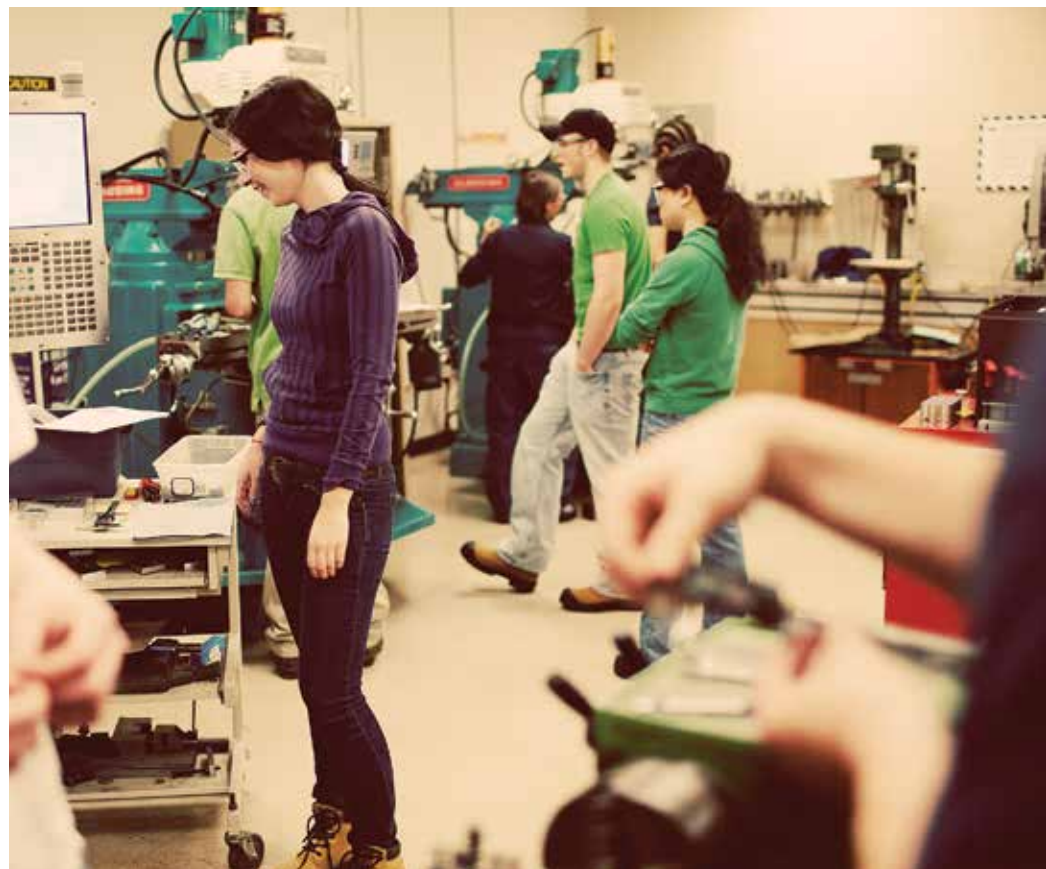
THE FACULTY of Engineering and Applied Science at Memorial University of Newfoundland has been awarded full accreditation status to June 30, 2017 of its undergraduate co-op programs in civil, computer, electrical, mechanical and process engineering by the Canadian Engineering Accreditation Board (CEAB). The faculty's ocean and naval architectural engineering program received a six-year accreditation in 2011, which means that all six undergraduate engineering programs are now aligned to coincide together for the next CEAB accreditation review in 2017.

"Accreditation is an essential requirement of our programs. This is great news for the faculty and for our students, in particular. It is especially good news for our process engineering program which received four years for its first accreditation. New programs normally receive three years for first-time accreditation, so it is an exceptional achievement for our new program to receive four years," said Dr. Greg Naterer, dean, Faculty of Engineering and Applied Science, Memorial University.

CEAB accreditation is recognized worldwide. It involves quantitative and qualitative evaluations of the curriculum, program environment and learning outcomes for undergraduate



UNDERGRADUATE STUDENTS



engineering programs in Canada. The Faculty of Engineering and Applied Science at Memorial has a long, proud history of accredited engineering co-op education. It is dedicated to providing students with the very best quality of undergraduate engineering programs in Canada and around the world.

"This was a great team effort and a major accomplishment for our faculty.

The accreditation process is a vigorous one and involves a lot of hard work and preparation. I want to thank everyone who contributed, especially Andy Fisher, associate dean, undergraduate studies; Faisal Khan, chair, process engineering; as well as Darryl Pike and Nicole Devereaux. We are very proud of our undergraduate programs and students," said Dr. Naterer. ■

Undergraduate female enrolment at Memorial University highest in Canada

AT 29 PER CENT, Memorial University's percentage of female first-year undergraduate engineering students is the highest of any major Canadian engineering school.

Increasing female enrolment has been a long-time priority of the Faculty of Engineering and Applied Science; the most recent data underscores Memorial's leadership in recruiting women to the field.

move forward and expand our faculty. Engineering is an exciting, rewarding and fulfilling career choice."

With a long-standing tradition of graduating exceptional engineers, a co-operative education model, a unique process engineering program, and North America's only undergraduate program in ocean and naval architectural engineering, it's not surprising that Memorial is the top choice of female

scholarships and initiatives at the undergraduate level in support of female students," said Dr. Naterer. "We support Women in Science and Engineering Newfoundland and Labrador (WISE NL) initiatives, and encourage parents who have daughters exploring their options for post-secondary education to consider engineering. We're hoping that engineering can become a more traditional career option for women.

New Brunswick native, Margot Grant, is an Engineering One student, which refers to the common first-year coursework that all engineering students must complete.

"While I am still trying to figure out my education, my decision to enroll in Memorial's engineering program was based on my interest in pursuing a career that encourages women, and because of the faculty's co-operative education engineering program," she explained.

Jessica MacLean, a third-year civil engineering student, is from Halifax and is happy with her choice to move further east to pursue an undergraduate engineering degree at Memorial. "I chose Memorial University to pursue my engineering undergraduate degree because of the 24 months of co-operative education included in the program, as well as the affordable cost of tuition," she said.

For Dr. Naterer, a welcoming and supportive environment for female students like Ms. Grant and Ms. MacLean is important. The faculty will continue building upon its existing initiatives and expanding to others in a multi-year action plan that aims to increase student diversity and, specifically, female representation in engineering. ■



Cheryl Keough, student liaison officer, Faculty of Engineering and Applied Science, speaks with some junior high students.

"One of our important ongoing goals in recruitment and retention is student diversity and women in engineering," said Dr. Greg Naterer, dean, Faculty of Engineering and Applied Science. "We are pleased that our number of and proportion of female undergraduate students has been increasing, and we hope to continue improving as we

students who want to pursue an undergraduate engineering degree.

As part of its "Vision 2020" strategic plan, the faculty aims over the next six years to increase the number of graduates from 155 to 250 by the year 2020, and a significant part of the growth plan is to increase female enrolment.

"We have several engineering

Driven to improve the world

MECHANICAL ENGINEERING graduate Laura Pittman adjusted exceptionally well to university life. The St. John's native, who began a bachelor of engineering degree at Memorial in Sept. 2007, was awarded numerous awards and scholarships during her undergraduate years. She was named to the Dean's List every year, earned national recognition when she won the 2011 Canadian Association for Co-operative Education (CAFCE) Co-op Student of the Year award — a first for a Memorial University student — and was named the Rhodes Scholar from Newfoundland and Labrador for 2013.

"It is an incredible honour to be named a Rhodes Scholar for Newfoundland and Labrador," she said. "For me this scholarship is much more than simply educational funding — it means becoming a part of a group of motivated and passionate people who are driven to improve the world."

With her engineering degree in hand, Ms. Pittman is continuing her studies at the University of Oxford and working towards a Master of Science in Biomedical Engineering followed by a Master of Business Administration. Her current research is based on tissue engineering and focuses on the development of a novel scaffold that will improve the outcomes of spinal fusion surgery, a common procedure for those suffering from degenerative disk disease.

"Things at Oxford are going really well," she said. "The educational system here is quite different from North America; it's much more focused on independent learning with lectures introducing areas in which you can further investigate on your own time."

Dr. Greg Naterer, dean, Faculty of Engineering and Applied Science, was thrilled to learn of Ms. Pittman's latest honour and believes she will do extremely well in the future.

"As a dean it is so wonderful to see our students' succeed. Ms. Pittman has certainly earned this honour and I'm certain she will have many great accomplishments in her life. She is an inspirational role model for young women and for all engineering students. We can not express in words how proud we all feel about her achievements."

Dr. Nick Krouglicof is the head of mechanical engineering at Memorial and was not surprised when he heard that Ms. Pittman had been named a Rhodes Scholar.

"It's hard to imagine a more qualified candidate for what many consider the most prestigious scholarship in the world. Ms. Pittman epitomizes all the virtues by which Rhodes Scholars are



Laura Pittman

judged including making the most of one's talents, achieving academic excellence; and demonstrating leadership and devotion to duty."

Ms. Pittman is adjusting well to life, and her studies, overseas, and realizes the opportunity she has earned will make her much better prepared for her career goals.

"With the world becoming a more interrelated community and the economy depending on global interactions, I think it is imperative to gain a global perspective if I am to achieve my goal of leading a successful international business enterprise in the future," she explained.

Ms. Pittman graduated with a bachelor of engineering in April 2013. During her time as an undergraduate student at Memorial, she was vice-president academic of Memorial Engineering's student society; she was the professional development director for Newfoundland with the Atlantic Council of Engineering Students; competed on the MUN Sea-Hawks Women's Soccer Team; coached junior high and high school volleyball teams and was named to the Jubilee Senior Women's Soccer All-Star Team in 2010 and 2012. ■

Memorial engineering students receive largest ever scholarships from the Kohler Foundation

TWO UNDERGRADUATE engineering students from Memorial received a significant boost recently when they became the first recipients of the Peter Kohler Scholarship.

Third-year ocean and naval architectural engineering student, Mark Elliott, and second-year mechanical engineering student, Brandon Fitzpatrick,

were chosen from more than 40 applicants from Atlantic Canada to receive this substantial award. Mr. Elliott will receive \$15,000 for the 2013/14 academic year and again in the 2014/15 academic year, which will be his final year.

Mr. Fitzpatrick will receive \$5,000 for the 2013/14 academic year and \$15,000 per year for the final two years of his program.

Both students are very thankful to receive the awards. While they say the funding means eating better and increased time for their academics, it's more about working hard every day to be the very best they can be.



Mark Elliott



From left to right: Dr. Nick Krouglicof, Brandon Fitzpatrick and Prof. Andy Fisher

"Being the best one can be is so important, because it will become a habit," said Mr. Elliott. "You will gain more respect. Eventually, you will aim to do better at everything you do and that attitude will lead to success. I am extremely grateful to receive this recognition and very proud to be a recipient of the Peter Kohler Scholarship."

For Mr. Fitzpatrick, his motivation comes from a very important person in his life, his mother.

"My mother has always motivated me to do my best and I strive to be the very best I can be every day because of her," he said. "Winning this scholarship motivates me to work harder to make it to the end of my program. I am very grateful to Mr. Kohler for the opportunities this award has given me."

Andy Fisher, associate dean, undergraduate engineering, believes that scholarships like the Peter Kohler

Scholarship have far greater impact than just a financial one for students like Mr. Elliott and Mr. Fitzpatrick.

"We are very proud of Mark and Brandon," he said. "We encourage all of our students to aim for the top and to never underestimate themselves. Earning financial awards, such as the Peter Kohler Scholarship, helps build confidence in young adults and teaches them that hard work does pay off in the end."

The Peter Kohler Scholarship is administered through the Community Foundation of Nova Scotia. It is a scholarship fund for engineering students in Atlantic Canada. To be eligible, applicants must be enrolled full-time in an engineering program at a university in Atlantic Canada. The scholarship is based upon academic standing and financial need, and may be renewed by the award winner for up to four years, provided that the student maintains a reasonable standing in his/her program. ■



Team Memorial Baja.

Team Memorial does well at international baja competition

FOR THE fourth year in a row, Team Memorial Baja competed at the international Baja SAE Series in Rochester, NY. The team placed 38 out of 88 universities and for the first time, Memorial's baja finished the four-hour endurance race over rough terrain without any technical issues.

"The team put together a really solid effort this year," said Aaron Bolt, team captain. "We learned a lot from last year's competition and because of that we were able to produce a vehicle that was both technologically superior and more capable than ever before. Our car held up great in the endurance race and was able to

compete in all the events," he said.

Baja SAE consists of three regional competitions that simulate real-world engineering design projects and their related challenges. Engineering students are tasked to design and build an off-road vehicle that will survive the severe punishment of rough terrain and sometimes even water. Baja SAE Rochester 2013 took place from June 6-9, and included competitions in acceleration, hill climbing, maneuverability, suspension and traction and endurance.

Mr. Bolt believes that getting involved in events such as the Baja SAE Series enhances the university



PHOTO CREDIT: AARON BOLT

Luke Hancox competes in the endurance race.

experience and encourages students to find creative, fun ways to learn.

"The Memorial Baja team provides a unique experience to engineering students and allows us to get real-world design experience before we graduate," he said. "It is the best way for students in engineering to learn about machining and fabricating and gain hands-on experience with all the tools of the trade, as well as learning to design for manufacturing, assembly and maintenance. It has truly enhanced my academic experience and has been crucial in my development as an engineer. It is awesome!" ■

Engineering students raise money for the Janeway on Pi-Day

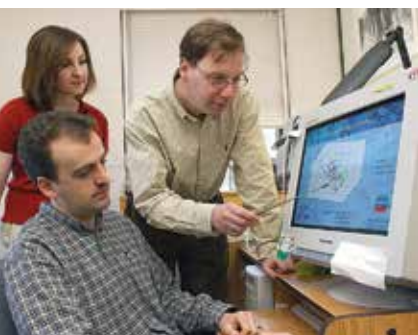
THE ANNUAL "pi-throw" fundraiser takes place on March 14 because the month-day designation corresponds to the number 3.14, which is "pi" – the ratio of a circle's circumference to its diameter. On Pi-Day in 2013, undergraduate engineering students raised more than \$1,000 in support of the Janeway's Children Hospital Foundation.

The fundraiser is organized and executed by student volunteers. Participants pay \$10 to send a whipped pie to a friend or co-worker and the recipient can take the pie in the face for free or re-direct the pie for \$15. Recipients can also choose to purchase the pie for \$20.

This marked the ninth year that undergraduate students from Memorial University's Faculty of Engineering and Applied Science organized the event. ■



Dr. Leonard Lye, associate dean, research, Faculty of Engineering and Applied Science, takes a pie in the face on Pi-Day.



Memorial proud of the success of its course-based graduate programs in engineering

WHEN MEMORIAL University's Faculty of Engineering and Applied Science launched course-based master's degree programs in 2004, the goal was to add diversity to existing graduate offerings and to respond to market needs in specialized program areas. While the master's programs in computer engineering (MASCE), environmental systems engineering and management (MESEM), oil and gas engineering (MOGE) and engineering management (MEM) are challenging, they have been very successful.

"Since the inception of the MASCE program in 2004, more than 80 per cent of students registered have graduated and gone on to successful and exciting engineering careers in Canada and abroad. The other three premium tuition programs have met with equal success," said Dr. Greg Naterer, dean, Engineering and Applied Science, Memorial University.

Liang Zhang graduated from the MASCE program and moved on to a successful career as a validation engineer. "I found that the Memorial engineering instructors and student advisors in this program were friendly and eager to help. They gave me a lot of assistance while I was in the MASCE program," he said.

Marat Gabdeyev is a graduate of the MOGE program and went on to become a field crew manager with one of the world's leading international geophysical companies.

"Being a graduate student at Memorial was a great experience. The quality of students is very impressive. The university has strong links all around Canada. With a mixture of lectures, tutorials and labs, the teaching is excellent. The lecturers are very approachable if you need help with anything and lab helpers are in the labs to help with course work. Overall, I would recommend Memorial's MOGE program as it helped me a lot to achieve my life and career goals," he said.

Once students have completed two semesters in their program with an overall average of 75 per cent, they have the option of completing an internship. These internships can last from four to eight months, and provide students with valuable, practical work experience, especially for international students without prior work experience. While internships are not guaranteed, faculty and staff members make every effort to help qualified students secure internship opportunities.

Dr. Naterer is pleased with the success of these premium tuition graduate programs.

"Our graduates from these programs have gone on to rewarding and successful careers," he said. "Others have successfully pursued PhD studies at Memorial and elsewhere. The programs provide a valuable master's degree education in a specialized field at a tuition level that is among the lowest in Canada for premium tuition programs," he said. ■



Arctic research project to provide unique opportunity for doctoral students

STUDENTS INTERESTED in doing a PhD centered on Arctic shipping and operations have yet another reason to consider Memorial University.

Memorial is one of four partnering universities sponsored to conduct research on safer Arctic shipping methods. As part of the program, students will have an opportunity to conduct some of their research at the partnering universities.

The Joint Center of Excellence for Arctic Shipping and Operations, made up of researchers from Memorial University of Newfoundland, Aalto University in Finland, The Norwegian University of Science and Technology and the University of Helsinki in Finland, recently won an international competition that resulted in C\$3 million in funding from Lloyd's Register Foundation to examine Arctic shipping and operation risks.

Memorial engineering professors Drs. Brian Veitch and Faisal Khan are two of the researchers in the Center of Excellence. They are thrilled with their recent win and take great pride in

the fact that international wins like this validate Memorial's leadership in Arctic and ocean engineering.

"We are so excited to have won," said Dr. Veitch, professor of ocean and naval architectural engineering in the Faculty of Engineering and Applied Science and the Husky Energy Chair in Oil and Gas Research. "Not only does it show Memorial's credibility as being internationally competitive in Arctic and ocean engineering, but it enables us to conduct what we feel is very important research and it also provides our student researchers with the unique opportunity to spend time at the partnering universities which will enable them to establish their professional network."

Dr. Khan believes that providing students with unique opportunities like this one is key to attracting the brightest students.

"The Arctic is a strategic area for Memorial University and as the area is being utilized more, it is also becoming more vulnerable," said Dr. Khan, chair of processing engineering at Memorial and Vale Research Chair in Process Risk and

Safety Engineering. "We are in a position to bring talented PhD students in to conduct leading-edge research to make Arctic shipping safer. This international and competitive win benefits Memorial but, more importantly, its students."

Doug Smith is a PhD student recently hired for this project and he is thrilled to be on the team and is excited about this project for several reasons.

"I was attracted to this project because of its state-of-the-art research goals that were outlined in the project proposal. The four partner universities are highly regarded, especially in the area of Arctic technology. The opportunity to travel to the partnering universities is a great opportunity to meet exceptional research teams and industry professionals internationally. This international networking opportunity is invaluable to my professional development," he said.

Drs. Veitch and Khan will hire at least four PhD students to work on this project. Interested candidates should send their résumé to bveitch@mun.ca or to fikhan@mun.ca. ■

ALUMNI



Engineering alumni put themselves back in the picture

FROM OCT. 17-21, engineering alumni put themselves back in the picture at havin' a time: Reunion 2013.

While there were many activities scheduled over the five days for all Memorial alumni, on Fri., Oct. 18, the Faculty of Engineering and Applied Science hosted engineering alumni from participating classes of 1978, 1983, 1988, 1993 and 2003. The

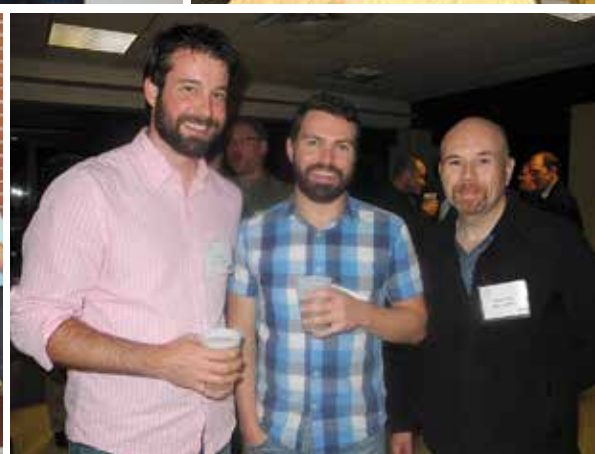
evening began with a wine and cheese event in the foyer of the S.J. Carew (Engineering) Building, followed by a social in the engineering cafeteria. For returning alumni, it was a real treat to come back to the engineering building that they spent so much time in during their undergraduate years.

"I really enjoyed being part of the Reunion Planning Committee, and searching for classmates," said Rosalind Devereaux, class of 1983. "Often when I found someone, we would catch up on the past 30 years or share memories of engineering at Memorial. The reunion weekend was a wonderful experience.

The thrill of walking into the engineering building, reconnecting and reminiscing with old friends, professors and classmates was amazing. We shared many memories and laughs, parting with promises to meet again annually!"

The next afternoon, some alumni returned with their families to tour some of the laboratories, and on Saturday evening, all participating alumni held class-specific events.

To learn about activities planned for Reunion 2014, please go to www.reunion.mun.ca. ■



Engineering lobby modernization

THE FOYER of the S.J. Carew (Engineering) Building has been renovated to prominently display faculty achievements and engineering as a profession.

Visitors to the building are welcomed by a 10-foot-high display case (pictured) featuring a mix of old and new engineering memorabilia, which will be updated on a regular basis. A new seating area creates a comfortable space where students can wait for classes to begin, study or

chat with friends and classmates. A new glass wall separates the seating area from the rest of the foyer. The glass wall features a large replica of the Professional Engineers and Geoscientists Newfoundland and Labrador (PEGNL) seal.

The Faculty of Engineering and Applied Science would like to acknowledge the support of its faculty and staff, Memorial's Department of Facilities Management and PEGNL. ■





Faculty of Engineering and Applied Science
Memorial University of Newfoundland
St. John's, NL
Canada
A1B 3X5

www.engr.mun.ca

007-869-07-13-500