

# Benchmarks



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# The Dean's message



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## Our undergraduate engineering options in oil and gas studies are well on track

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In order for the Faculty of Engineering and Applied Science to continue to grow and offer students the highest quality university experience and education, we need to scrutinize our weaknesses and build upon our strengths. To that end, the Faculty participated in an Academic Program Review (APR) in the fall of 2002. Under the coordination of Dr. John Quaioco, associate dean (undergraduate studies), various aspects of the academic program were researched and thoroughly reviewed. All faculty, staff and students had the opportunity to participate in the process through a number of subcommittees dealing with different aspects of the report. The outcome of this process will help the Faculty chart its direction for the next five to seven years as part of an ongoing strategic planning process. We also plan to use this exercise to help the Faculty develop a plan to graduate engineers who are able to meet and

exceed market requirements for the following ten to fifteen years.

Another exciting development is the near completion of the Faculty complement in the oil and gas group. Our undergraduate engineering options in oil and gas studies are well on track, the next step is to develop the respective graduate programs. Our oil and gas group will work closely with Dr. Ray Gosine, associate dean (graduate studies and research) to fully develop these programs. We feel confident that the Faculty can play an integral part in Memorial University's contribution to the local oil and gas industry.

A handwritten signature in black ink that reads "M. R. Haddara". The signature is written in a cursive style and is positioned above a horizontal line.

Dr. Mahmoud Haddara  
interim dean

## News briefs

### CFI New Opportunities Grant awarded

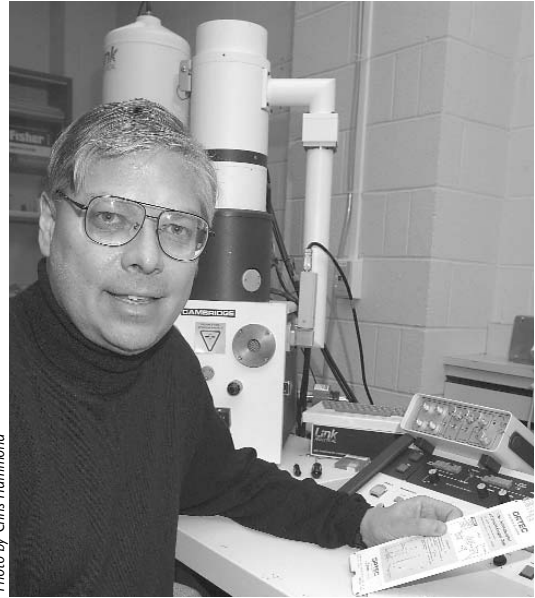
**D**r. John Shirokoff, mechanical engineering, was officially awarded a Canada Foundation for Innovation (CFI) New Opportunities grant in February 2003. This grant is for new faculty members and is to be used towards the purchase of infrastructure and equipment that will enable them to build their research capabilities. Dr. Shirokoff plans to purchase an analytical x-ray diffraction (XRD) system to pursue his research in materials science.

"I plan to use this x-ray system to study new materials and solids (metals, alloys, polymers,

semiconductors), look at their structure, properties, and what controls their behaviour," he says. "As you create materials, the processing often changes the properties and you have to evaluate this to know where the optimum is. You ultimately want to know how much processing will get you into that range of optimum properties."

This instrument will help in analyzing the processing aspect and will also allow users to try new combinations of materials. According to Dr. Shirokoff, there are a lot of

Photo by Chris Hammond



combinations that have never been tried before. Working in this field gives him the chance to try his hand at creating something new.

"A scientist gets the chance to see what kind of results his work produces and if they are good or bad – good being more useful to society and bad meaning that way of doing things does not work. Consequently, you learn not to process in that way. When you are doing research, a negative result is just as significant as a positive result because you have learned something."

The x-ray system enables individuals to identify the latest known compounds using a database of 80,000 compounds. Ten or 15 years ago, the database would have been half that size. The instrument is also very versatile and would be of great benefit to researchers in engineering, chemistry and physics, as well as within the local industry.

"Faculty members at Memorial University should take it upon themselves to do whatever they can to build upon research infrastructure that will in turn create a high level of interaction with the industrial community, and also enable researchers like me to conduct their work using first-class facilities," concludes Dr. Shirokoff.

### Recent Graduates giving back to the Faculty

**A**n advisory board of new and recent graduates of Memorial's engineering program has been created to help improve student life by taking advantage of the knowledge and experience of former students. The board will be appointed by the dean and will include himself plus the associate deans, at least four recent graduates (ideally one from each discipline) and at least one student representative from each society. This advisory board is meant to promote a positive environment and to constitute a means for students to express issues of concern to them. Some of these matters may include: perspective of students regarding academic and co-operative education programs, professional development of students, evaluation of curriculum and current programs, advice on possible changes to programs, development of financial

funding to support student activities, and promotion of the faculty to secondary educational students.

"We want this to be a highly proactive group and a resource for garnering student opinion. As graduates of the faculty's engineering program, we can have a positive affect on the academic and co-operative experiences of both current and future students," adds Adam Stanley (B.Eng. '01).

Dr. Mahmoud Haddara, interim dean, could not agree more. "We want to work with the students to create a better learning environment and a stronger academic program that is responsive to their needs. This board will bring us closer to achieving that goal."

The first meeting of the graduates' advisory board is scheduled for early March 2003.



# Engineering students launch SPE chapter

Started in March of 2002, the student chapter of the Society of Petroleum Engineers (SPE) was created to be a valuable resource for students and the benefits of joining are numerous, according to president, Stephen Thistle.

"We are directly linked with the much larger international organization and as such receive a monthly subscription to the Journal of Petroleum Technology (JPT) which highlights news, upcoming projects and technical issues. We also have access to the SPE online library which includes over 30,000 technical papers to help students with research projects and work-terms. And the potential for scholarships to support students in their studies at Memorial is another big plus."

Of course, one of the most obvious benefits is the opportunity to network with people already working in the industry. For students who are keen to work in this field, this can be a great chance to talk to people about the kinds of positions that are available and perhaps even secure future work-term positions.

Since its inception the student chapter has been active in creating opportunities to network and gain exposure to the industry. Last fall they organized a field trip to the Come-By-Chance refinery and held an Industry Night featuring a lecturer from TransOcean. More events are being planned for the coming months including another industry night and a golf tournament, co-sponsored by the SPE Atlantic Chapter. The student chapter is also planning to attend the SPE Annual Technical Conference and Exhibition in Denver, Colorado in October 2003. Most sponsorship and fundraising initiatives will be geared towards attending this event.

When asked about the newly formed student chapter, SPE Atlantic Chapter president Gunnar Debruijn said, "We are delighted to see the establishment of a strong student SPE chapter at MUN and look forward to participating in high quality events like Industry Night. We are also very optimistic about the talent that this group will bring to our industry."

At present, the student chapter boasts 45 members including Stephen Thistle (president), Curtis Jennings (vice-president), Michael Croft (secretary) and Sherri Butler



Photo by Chris Hammond

Members of the student chapter of the SPE (L-R) Curtis Jennings, Michael Croft and Stephen Thistle.

(treasurer), with Dr. Kelly Hawboldt acting as faculty adviser. "We are actively trying to increase our membership among the junior students so that the chapter can carry on after we graduate. With the growing offshore oil and gas industry, and the recent introduction of oil and gas engineering options for undergraduate students, we are hoping to attract more people into joining and actively taking part in this exciting field," adds Stephen.

The student chapter would like to thank the Faculty of Engineering and Applied Science, SPE Atlantic Chapter, Oilfield Technical Services (OTS), Jeff O'Keefe (former chapter sponsor), engineering students and the university as a whole for their support in getting the chapter off the ground.

For more information on membership or upcoming events please contact: [sspe@enr.mun.ca](mailto:sspe@enr.mun.ca).

## "Workshop for Women Graduate Students in Science & Engineering: Building an Academic Career"

Sponsored by Women in Science and Engineering (WISE) Newfoundland and Labrador

A workshop was held in the Faculty of Engineering and Applied Science on February 15, 2003, to address issues of concern to female graduate students. The workshop, delivered by academic women in various stages of their careers, provided inspiration as well as practical information and opportunities for networking.

## Cathexis Innovations

Since the fall of 2002, many exciting things have been happening for Cathexis Innovations, a new start-up company comprised of four graduates of Memorial's engineering program. They were recently accepted into the INCO Innovation Centre and became a member of the Genesis Centre. They have also been expanding their support staff and are very happy to welcome four new members to their team including a business development specialist, 2 software developers and an implementation engineer. They are currently working with several clients to install pilot facilities that showcase their technology and will allow clients to field-test their system first hand. This is in preparation for full marketing of their flagship product in the upcoming months.



Photo by Chris Hammond

Neil Bose, principal investigator of the NSERC strategic project.

# AUV strategic project update

In January of 2003 there was a meeting of the NSERC Strategic Project participants to discuss the work completed to date. The project titled Offshore Environmental Engineering Using Autonomous Underwater Vehicles (AUV) began in 1999 as an initiative of Memorial's Faculty of Engineering and the Institute for Marine Dynamics (IMD). The objectives of the project are to study monitoring/assessment technologies for the offshore industry; the impacts of discharges of produced water, rock cuttings and drilling muds; and to develop AUV technology for offshore environmental monitoring/assessment.

With one year to go before the project finishes, Dr. Neil Bose, principal investigator, says they have accomplished a lot, but there are still some issues they hope to address in the time remaining.

"In the beginning, the plan was to develop an AUV here at Memorial and use it for ocean environmental monitoring. We have done the work on the ocean environmental monitoring and the ecological risk

assessment, but the data collection using our own AUV is not likely to happen in the time of the project. It's taking longer than we were hoping. We have instead focused on developing equipment for the vehicle, that can be of benefit on an international level," adds Dr. Bose.

At present, the AUV named C-SCOUT is complete and waiting for tank time at the IMD's ocean engineering basin. A Canada Foundation for Innovation (CFI) grant application is being submitted to enable researchers to do further work on AUV studies, which will include offshore missions.

The focus of the project for the time remaining will be on testing C-SCOUT. Propulsion tests with a dummy C-SCOUT (no computer inside, just the propulsion system) have been carried out and are now being analyzed. Further study will also be conducted on the thrusters which will enable the AUV to hover and move sideways. As for data collection and analysis, the ecological risk assessment models have to be validated and a mission simulator has to be developed.

## Making graduate school a WISer place

As a woman pursuing an academic career in science or engineering, have you ever wondered what the journey was like for someone else? Have you ever wished you could sit down and ask your female professor, if you have one, how they managed to do it? Well you might get the opportunity to do just that as part of the Women in Science and Engineering (WISE) Graduate Student Section.

The idea for Memorial to introduce a graduate student section came from a desire to connect with women in similar situations. For Angela Tate, a PhD candidate in the Faculty of Engineering and Applied Science, there was a definite need to address some of the specific concerns which women grad students in the areas of science, technology, engineering and math (STEM) face.

"I think most women grad students are so focused on their research, courses and teaching, they don't have time to network. We want to make it easier for them," says Ms. Tate. "We want to give them a forum where they can express their concerns, ask questions and share experiences."

Out of a total of 155 grad students in engineering, only 21 of them are female, and only 4 of those are enrolled in doctoral studies. In the sciences, especially the life sciences, the numbers are better, however, the fraction of women gets smaller with each higher level of academia and university administration. According to Ms. Tate, the community group WISE tends to focus on professional career development, while the challenges of graduate school and an academic career are very different.

The WISE Graduate Student Section will address issues that are relevant to women grad students. "There will be info sessions on scholarships and student loan programs for women, many of which students know nothing about.

These info sessions will help students and young academics take advantage of programs that are specific to women, like the NSERC University Faculty Awards (UFA) program," points out Ms. Tate. There will also be info sessions on graduate school, including practical things you should know to help you in your program, discussions on balancing family and career demands, and opportunities for sharing cultural perspectives.

Mentoring will also be a focus of the new program. Mentors will be recruited from within the faculty to provide guidance and support to female graduate students. The female graduate students can then in turn mentor the undergraduate students. "I think mentoring works best if you start at the top and work downwards," adds Ms. Tate. "Working with someone who has been there before you makes a huge difference to your outlook and success, and you learn about how to be a mentor by having one."

Over the coming months, Ms. Tate will be working hard to recruit students who want to take part. She will be recruiting people from the faculties of Science, Medicine, Engineering and Applied Science, Education, Nursing, and Pharmacy, as well as the Marine Institute. "I would ultimately like to have representatives from each faculty, department, or school so that we could work together to ensure wide coverage of all the issues that affect women graduate students."

There are only a couple of other universities in Canada that have established a WISE program specifically for graduate students. In February 2003, WISE offered a workshop, Building an Academic Career, for women students interested in pursuing an academic career. For more information about WISE, check out the Web site at [www.stemnet.nf.ca/WISE/](http://www.stemnet.nf.ca/WISE/).

### CEE seminar

The Faculty of Engineering and Applied Science's Continuing Engineering Education (CEE) division, in co-operation with Petro-Canada, will be offering a one week course titled Well Test Interpretation in Practice. The instructor for the course, Dr. Alain Gringarten, is director of the Centre for Petroleum Studies at Imperial College in London. This course is based on industry-standard methodology and will

enable participants to become more skilled and proficient in designing and analyzing well tests. This methodology presents a systematic way of interpreting well tests in homogeneous and heterogeneous reservoirs, including fissured and multilayered systems. Recommendations for designing tests in such formations will be presented, as well as practical problem solving and computer exercises. The course is

designed for engineers with practical testing experience and knowledge of transient well testing nomenclature and conventional interpretation techniques. The course will run April 7-11, 2003 in Rm-4008 of the S.J. Carew (Engineering) Building. For more information please contact Yvonne Raymond at (709) 737-7467, by e-mail at [yvonne@engr.mun.ca](mailto:yvonne@engr.mun.ca) or visit the Web page at [www.engr.mun.ca/CEE](http://www.engr.mun.ca/CEE).

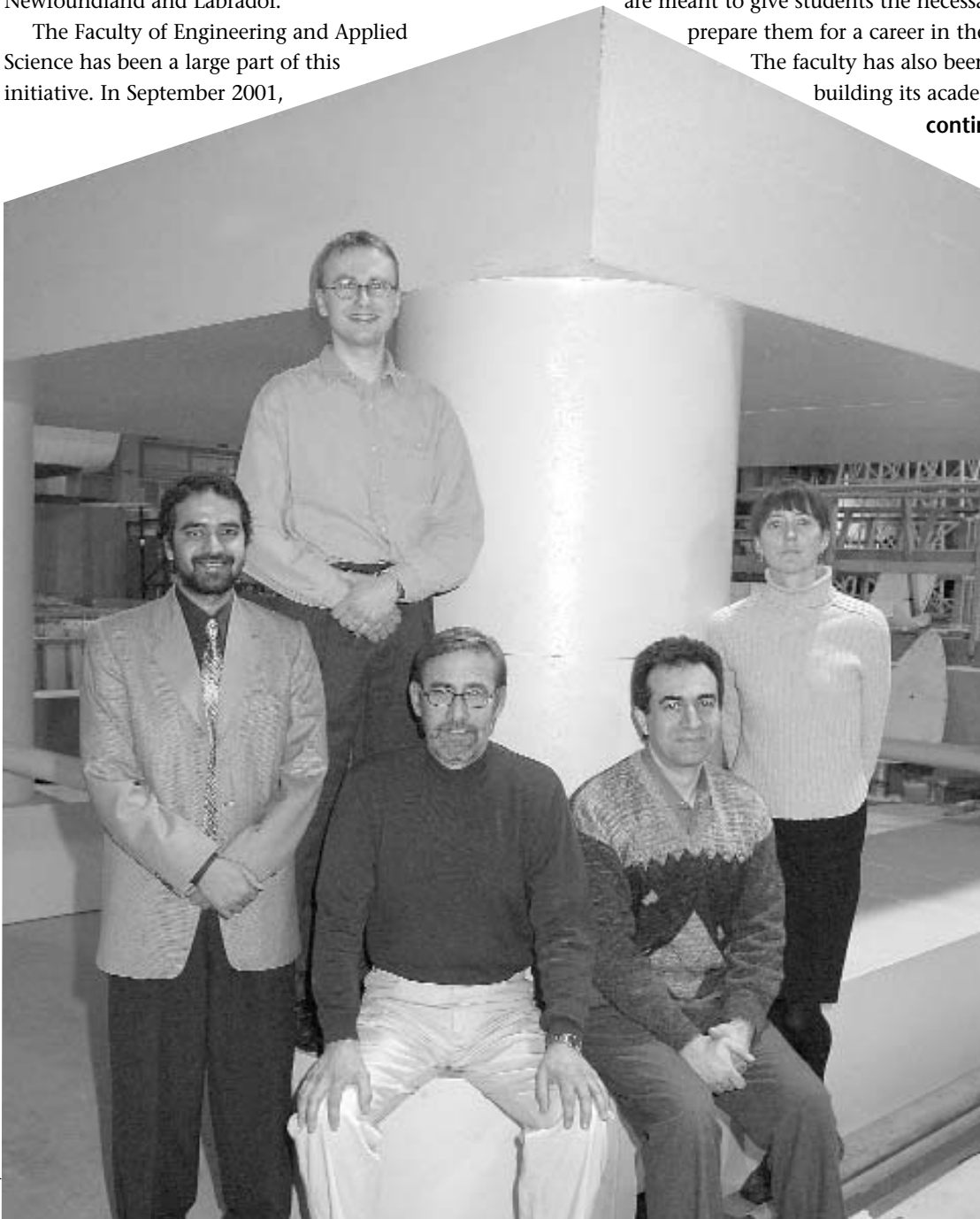
## Faculty of Engineering building oil and gas expertise

Since the inception of the Oil and Gas Development Partnership in September 2000, Memorial University has been actively developing academic courses, training programs and research opportunities to take advantage of the growing offshore oil and gas industry in Newfoundland and Labrador.

The Faculty of Engineering and Applied Science has been a large part of this initiative. In September 2001,

the faculty introduced oil and gas engineering options for undergraduate students in all disciplines, to be taken in the last three terms. These courses, covering subjects such as supervisory control and data acquisition, reliability engineering, and design for ocean and ice environments, are meant to give students the necessary background to prepare them for a career in the oil and gas industry.

The faculty has also been working on building its academic expertise in  
**continued on page 8**



*Building upon Memorial's oil and gas expertise are (L-R): Dr. Faisal Khan, Dr. Vlastimil Masek, Dr. Thormod Johansen, Dr. Majid Abdi and Dr. Kelly Hawboldt.*



## continued from page 7

related courses and research and this has resulted in the formation of the Oil and Gas Group.

Comprised of five core members, all relatively new to the faculty, the Oil and Gas Group has been assembled to take advantage of shared research interests and to collaborate on academic courses. Other possible additions to the team include Drs. Neil Bose and R. Seshadri, both candidates for Canada Research Chairs in offshore and underwater vehicle design and asset integrity management respectively, and Drs. Tahir Husain, Yuri Muzychka and Brian Veitch. The faculty is presently considering the introduction of a new program in process engineering and this group would be a large part of that planning and development.

## Members of the Oil and Gas Group are as follows:

### **DR. THORMOD JOHANSEN (Professor, Ocean and Naval Architectural Engineering and Professor, Department of Earth Sciences)**

Working as a senior research scientist at the Institute for Energy Technology in Kjeller, Norway, Dr. Johansen began working on analytical solutions to flow problems arising in enhanced oil recovery. Recently his research has focused on methods in reservoir and well flow simulation, well performance simulation and reservoir characterization. Earlier this year he was awarded a Canada Research Chair (CRC) in Petroleum Reservoir Engineering and Characterization. Dr. Johansen hopes to use this new designation to build an interdisciplinary network of individuals to contribute to this area of research. Part of his interest in coming to Newfoundland and Memorial University was because he wanted to contribute some of his expertise to the local oil industry. "How to develop these fields is a big challenge, one which I would like to focus my research on in collaboration with the local oil industry." Dr. Johansen is currently working on building an interdisciplinary team in reservoir characterization and engineering (reservoir management) within the Faculty of Engineering and Applied Science and the Faculty of Science.

### **DR. MAJID ABDI (Assistant Professor, Mechanical Engineering)**

Dr. Abdi's research focuses on natural gas processing and conditioning. "Contrary to what some people might think, there are many contaminants in natural gas and it is necessary to treat these contaminants so that the gas can be made suitable for transport in pipelines," says Dr. Abdi. Coming from Iran, home to the second largest natural gas reserves in the world, Dr. Abdi's research has been directed towards the conversion of natural gas to liquid hydrocarbons

(clean fuels) using high performance gas purification solvents and treatment methods. He has considerable experience working on the development of oil and gas processes comprising the design, manufacturing supervision, start-up and troubleshooting of gas processing pilot plants.

### **DR. FAISAL KHAN (Associate Professor, Mechanical Engineering)**

Dr. Khan has long been interested in how a raw material such as oil is turned into a usable end product. During the course of his education, Dr. Khan's area of research shifted from chemical engineering to computer applications that could interface with chemical engineering, and then later on to looking at the environment and the effects of interfering with its natural processes. He first came to Memorial in 2000, as a visiting research professor working with Dr. Tahir Husain in the Faculty of Engineering and Applied Science on a research project developing computer aided risk based corrective actions for contaminated sites in Saudi Arabia. For Dr. Khan, the offshore environment provides a great opportunity to continue his work in risk assessment and reliability studies, while addressing issues specific to working in an offshore, and at times unpredictable, environment.

### **DR. KELLY HAWBOLDT (Assistant Professor, Mechanical Engineering)**

Trained as a chemical engineer, but with a keen interest in the environmental aspects of the industry, Dr. Hawboldt has done considerable research on the best ways of dealing with effluents from production facilities such as produced water and drilling cuttings. Her work has focused on how to treat these by-products and thereby minimize the environmental impact. She is also interested in optimization theories and trying to optimize the process in order to minimize the negative environmental effects. This work would be of great benefit to industry as it would increase energy efficiency and ultimately be more cost-effective.

### **DR. VLASTIMIL MASEK (Assistant Professor, Electrical Engineering)**

Combining his background in mechanical and electro-communications engineering, Dr. Masek is working to focus his research on data logging for more accurate and precise sensing techniques and instrumentation that could bring environmentally-friendly technology to the offshore oil and gas industry. According to him, if you can monitor and sense every aspect in the process, you can better analyze the data and thereby optimize the process. If you have only a few parameters it is very difficult to optimize. Optimization can ultimately lead to cost-effectiveness and more environmentally-friendly processes.



## Feds announce 123 new Canada Research Chairs *Four for Memorial*

The federal government announced an investment of \$130.1 million to support the creation of 123 new Canada Research Chairs during a press conference at Memorial University on Nov. 12, 2002. The announcement was made by Gerry Byrne, minister of State (Atlantic Canada Opportunities Agency), who pointed out that 43 of these new chairs are external recruits of outstanding calibre.

"The brain gain is gaining momentum," said Mr. Byrne. "Researchers from the United States to Japan are attracted by the prestige of the Canada Research Chairs Program and the international reputations of our universities."

Memorial University will be home to four new CRC chairs, including Dr. Thormod Johansen, who is coming to Canada from Norway where he worked as an adviser and senior engineer for a number of petroleum companies, and specialized in developing simulation software. As Canada Research Chair in Petroleum Reservoir Engineering and Characterization at Memorial University, he will work on the development of new simulation methodologies and tools that apply to the entire lifecycle of an oil or gas field, from discovery to abandonment.

The investment announced Nov. 12 includes \$116.4 million from the Canada Research Chairs Program and \$13.7 million from the Canada Foundation for Innovation (CFI) to provide infrastructure support to Canada Research Chairholders.



Photo by Chris Hammond

*Dr. Thormod Johansen, Canada Research Chair in Petroleum Reservoir Engineering and Characterization.*

"An innovative society rests on innovative people," said Dr. David Strangway, president and CEO of the CFI. "We must continue to ensure that top-notch researchers, such as those honoured here today, have the state-of-the-art facilities and equipment they need to carry out world-class research."

Dr. Johansen's long-range goal is to develop new simulation methodologies and tools that are applicable to the entire lifecycle of an oil or gas field, from discovery to abandonment.

For more information on Memorial's new Canada Research Chairs, or on the chairs program, see [www.chairs.gc.ca/](http://www.chairs.gc.ca/).

## Conference on Women in Engineering

This past fall, term 3 electrical engineering students Sarah Houlihan and Zahra Addettia had the opportunity to take part in the annual Conference on Women in Engineering sponsored by the Queen's University Engineering Society. This annual event began in 1991 and has become a national forum to discuss the role of women in the field of engineering.

As first-time participants at the conference, both Sarah and Zahra found the experience to be educational and eye-opening.

"The conference was a great opportunity to network and meet other female engineering students doing the same courses and facing the same challenges," says Sarah.

For Zahra, it was an opportunity to meet new people

and talk to students from other universities across Canada. "It was also a chance to learn something new about the engineering profession while opening your eyes to future opportunities," she adds.

The conference was comprised of four keynote speakers, including Carolyn Emerson from the Faculty of Engineering and Applied Science at Memorial who spoke on *Becoming Leaders: Different People, Different Paths to Career Success*. There were also numerous breakout sessions covering the following topics: obtaining your MBA, the Canadian Space Agency, balancing work and family, engineers without borders, and many more.

# Anchors away for new ocean tech cluster

Oceans Advance is getting ready to take on the international market and put Newfoundland and Labrador on the map as the place to be for ocean technology. Started in 2001, this public-private partnership involving the National Research Council (NRC), provincial government, local businesses, Memorial University, and other stakeholders, has been created to build upon and strengthen links with like-minded ocean technology businesses and community organizations.

Leading the way is development executive, Dennis Hogan. As the founding CEO of the Newfoundland and Labrador Construction Safety Association, Mr. Hogan has considerable experience in building strong partnerships and community links. "Our job is to help weave a network of all the academic, government and industry stakeholders, in whatever aspect of ocean technology they operate – whether from a pure R&D, commercial or regulatory perspective – to create an environment that's conducive to enhancing ocean technology development," says Mr. Hogan.

Newfoundland is home to numerous world-class ocean tech companies such as Rutter Technologies, Lotek Wireless, Guigné International, and Oceanic Consulting, to name just a few. Oceans Advance is looking to create an ocean tech cluster that can build upon this foundation of expertise by expanding upon core R&D programs at the NRC, constructing an incubation facility for start-up companies at the Institute for Marine Dynamics (IMD), and integrating community efforts.

"We want to help create a positive environment for existing ocean tech companies, but also foster an environment that is a catalyst for the creation of new companies. There are so many applications for ocean technology and St. John's is perfectly positioned for exploiting our capabilities and increasing international business opportunities," adds Mr. Hogan.

The ocean technology cluster will play the role of facilitating industry collaboration. Working under the motto that two is better than one, the cluster will advocate combining capabilities to allow companies to create a stronger presence on the international market. Oceans



Photo courtesy of: Institute for Marine Dynamics

Advance will assist with networking, international marketing, identification of business opportunities, and branding of the St. John's ocean technology cluster worldwide.

And what better place to develop an ocean technology cluster than right here in Newfoundland and Labrador. As Mr. Hogan points out, Newfoundland and Labrador's historical and cultural attachment to the sea, strategic geographic location in the North Atlantic, and the fact that over 90 per cent of our population lives near the sea, makes an ocean technology cluster a natural development.

To date, Oceans Advance has been involved in a number of local and international ocean tech initiatives. Meetings have been held with the City of St. John's and the St. John's Board of Trade regarding an ocean technology industrial park for the city. Oceans Advance also participated in a business mission to Ireland this past fall and discussions are currently ongoing for a technology transfer mission to Ireland with 6-10 local companies.

Starting early in 2003, Oceans Advance will be co-hosting a speaker series with the City of St. John's for and about local technologies and businesses working in the ocean tech industry. This will be a great opportunity to showcase research happening locally and demonstrate the importance of this research to the economic development of the province. They also plan to launch their Web site early in the New Year.

"We look forward to working closely with Memorial University on R&D related to the ocean tech industry. Memorial already has a very strong reputation for ocean engineering and aquaculture research," says Mr. Hogan. "Working together we can build upon our core competencies and really push Newfoundland and Labrador into the international market."

## Student profile

# Living life on the edge . . . of the Arctic Circle

Imagine a place where the temperature can drop to  $-70$  with the wind-chill, where food costs three times as much as it does here in Newfoundland and where the sun rises for only a few hours during the day before complete darkness falls. Given a choice most people would prefer to head south, but for Karen Traverse, term 8 electrical engineering, there is no place she would rather be.

Just below the Arctic Circle lies Iqaluit, the capital of the newly formed territory of Nunavut and second home to Karen for the past two years. It is where she hopes to work when she graduates in the spring.

Since her childhood days growing up in Freshwater, Karen has wanted to be an electrical engineer. And she has worked very hard to achieve her goal. When she first arrived at Memorial back in 1994, she knew her grades were not strong enough to gain her admission into the faculty but she did not stop trying. Instead she completed two years of general studies and got in. Electrical engineering has been tough, but her secret for getting through the courses is her genuine interest in the subject.

"People cannot believe that I actually like this kind of thing, working with circuits and all that. But I really enjoy what I do and what I am learning," says Karen with a laugh.

After a number of work terms which saw Karen working with a local alarm company and the Chair of Women in Science and Engineering at Carleton University in Ottawa, Karen got the opportunity to apply for the kind of work she was really keen to try – working with the newly formed Nunavut Power Corporation.

According to Wally Jacobs, co-op co-ordinator, Karen was one of the first students to go to Iqaluit. The experience that she and other students have gained in working there has been invaluable.

"The students who go to Iqaluit gain a great deal of experience working in an area where the traditional methods of engineering do not always work. For example, because of the permafrost, buildings cannot be constructed on concrete foundations and, therefore, must be built on either adfreeze or bedrock piles which are driven into the frozen tundra," he explains. "To save energy, the orientation of the buildings is also important in order to take advantage of the sun and the amount of snow build-up."

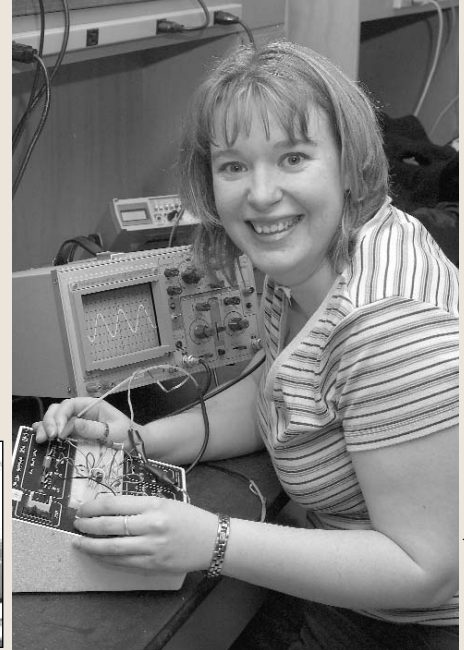


Photo by Chris Hammond

During her first work term in Iqaluit, Karen worked on the power distribution systems doing fuse co-ordination and computer models of their feeder systems. At this time, Nunavut Power was in its infancy and there was a lot of foundational work to be done.

"It is a completely different system in the north. Because communities are so far removed from each other, each community must have its own distribution system and their own generators to supply power," adds Karen.

"Unlike in Newfoundland where there is a main generating station with transmission lines running to a substation, in Nunavut permafrost does not permit transmission lines. So you do what you have to do to ensure all communities have a reliable power supply."

The system, according to Karen, is sufficient and getting better. Years ago it would be common to have a power outage two to three times a week. Now they are working on better fuse co-ordination so that if they have a fault they will not lose the entire system. The work is challenging and there is no shortage of it, especially if you have a strong sense of adventure.

There are a lot of stereotypes about living in the north, but none that could change Karen's mind about going back there to work, if given the opportunity.

"I loved living there! Being from Freshwater, I settled into the small community life rather quickly and felt right at home. And contrary to what a lot of people might think, there was no shortage of activities with access to two arenas, a curling rink, a theatre and swimming pool. And the people were so friendly; they helped me feel like I was a part of the community."

Karen has now returned to the milder winter of Newfoundland to finish off her final academic term. After almost nine years at Memorial, she could not be happier about graduating in the spring. Even though she is unsure what the future holds for her, she is looking forward to getting out and putting what she has learned into practice.

# Alumni profile

## Memorial's Alumni Award for Lifetime Achievement goes to . . . Eric Jerrett (Dip. Eng. '61)

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“Being an engineer is more than just having a degree, a job and a salary. It goes much deeper than that. To be a good engineer, you have to be passionate about it.”

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At the tender age of 15, a young man from Clarke's Beach enrolled in first-year engineering at Memorial. The youngest student at Memorial at that time, Eric Jerrett went on to establish himself as an outstanding engineer, licensed architect, land surveyor and notary public, the only person in Canada licensed to work in all professions. And that is only the beginning of a long list of achievements that have culminated in Eric being awarded Memorial University's 2002 Alumni Award for Lifetime Achievement.

Thinking back to his early years as an engineering student at Memorial, Eric laughs as he recalls the way things were at that time. Back then students had to complete 28 courses in 3 years, far more than they had time for, so one of the labs had to be completed on their own time. Out of 79 students enrolled in the 3-year diploma program, only 10 received their diplomas in the minimum three year period and went on to receive their engineering degree at Nova Scotia Technical College (now Dalhousie University). Not a lot has changed, it was a rigorous program then and it still is today.

But in between studying, the engineering students did find time to put their mark on history and start a mass demonstration. “We marched down to the Colonial Building on Military Road, pulled Joey Smallwood out of

the House of Assembly. After he gave us his speech on Term 29 of the Terms of Confederation, we asked him when he was going to give us a new university. And he said, ‘you will get your new university’,” says Eric with a smile. “So the engineers should take some credit for the new university!”

After completing the requirements for a degree at Nova Scotia Tech, Eric returned to Newfoundland where he worked for the federal Department of Fisheries, Marine Division, taught civil and architectural technology, and worked for a consulting and contracting firm before starting his own business in Bay Roberts. People in the community began asking him to design buildings for them, so he started doing architectural work. He studied, took some courses and eventually was granted a license by the Newfoundland Association of Architects to practice architecture – the only engineer to receive that right.

In 1971, he began E.K. Jerrett and Associates in Bay Roberts and started practicing engineering, architecture and land surveying (a skill he had picked up while studying engineering and later became licensed in). As president of his own company, Eric designed and constructed more churches, schools and swimming pools than any other company in the province. He sold the company 5 years ago to EDM Consultants Ltd. of Deer





Photo by Chris Hammond

Lake and is now involved in some freelance work through E.K.J Consulting Ltd.

His involvement in cultural heritage and preservation began with the purchase of a 35mm camera on graduation day. At that time he was working with the federal Department of Transport, Marine Division, traveling the coastline surveying lighthouse sites. In 1989, he began to notice that a lot of the old buildings in Bay Roberts were being torn down or were falling into a state of disrepair. "A lot of artifacts were being collected and shipped to Quebec and it saddened me to see this happen," he recalls. "So my wife and I and three other people formed the Bay Roberts Heritage Society and started doing something about this."

Since he began, Eric has helped to save many buildings and historical sites from being forgotten. The Western Union Cable Building in Bay Roberts is just one example of a building that Eric has rescued and preserved. The building is now home to a world-class museum and Christopher Pratt Gallery. For what he has given back to his community through his volunteer work and cultural preservation, Eric was appropriately awarded with the Order of Canada in 1998. For Eric, receiving this honour was one of the highlights of his professional career. The other highlight was being given the Award of Merit by the Association of Professional Engineers and Geoscientists of Newfoundland (APEGN) for outstanding contribution to the profession and/or the community.

After a long career working as a professional engineer, Eric credits Memorial University for teaching him the value of community. "There was a great sense of community at Memorial. Students helped each other get through classes and find summer jobs. Dean Carew helped to foster this sense of community for all the engineering students. He knew every student individually. He knew your family and he was genuinely concerned about each student. He made sure that he did what he could to help us get through," says Eric.

"That lesson encouraged me to become involved in the world beyond my personal boundaries and to employ the resources earned through engineering for the betterment of my profession and those around me."

Eric has used his education to give something back to his own community of Bay Roberts. He has given generously of his time and resources for the benefit of education, recreation, health, heritage, culture and youth. And he has taken advantage of every opportunity to use his skills to give something back to his profession. He quotes former U.S. President Roosevelt when he says, "Every person owes a portion of his time to his profession from which he derives his living." His own personal motto is, "What shall it profit a man if he gains the whole world and loses his soul." He has truly taken both to heart throughout his professional career.

# Spotlight

## Teaching machine

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The Teaching Machine tries to give an x-ray view of the computer so you can see what is happening inside

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Professor Michael Bruce-Lockhart has been teaching computer engineering to engineering students for many years. But he was becoming increasingly dissatisfied with the way he saw students programming in the lab and the tools he had available to teach them. So he decided to do something about it. He and colleague, Dr. Theodore Norvell collaborated on the problem and came up with a program called the Teaching Machine that could interactively show students how computers process code step by step.

“When you write computer programs what you are really doing is writing instructions which will tell the computer what to do. I wanted to show students the way we think about computers so when they talk to the machine, when they send an instruction, they can actually see what is happening inside the computer,” says Michael.

Theodore and Michael got together four years ago to undertake this project. The program is used by both in four engineering courses. There is also a Web site with posted tutorials so that students can invoke the Teaching Machine themselves, as an applet, and a video where the instructor walks through the examples in detail using the Teaching Machine.

“The problem with computers is that they are boxes and you cannot see inside them. The Teaching Machine tries to give an x-ray view of the computer so you can see what is happening inside when the data is moving and being manipulated by the program,” says Theodore.

The program is now being brought into the classroom a lot more than before. Michael has rewritten all his class notes in a web format and integrated the Teaching Machine into the notes. It is used to illustrate examples by drawing a picture of what the computer is doing at each step of programming. It also illustrates what happens as the program is executed through time, and allows the program to go back in time if necessary. This is a useful

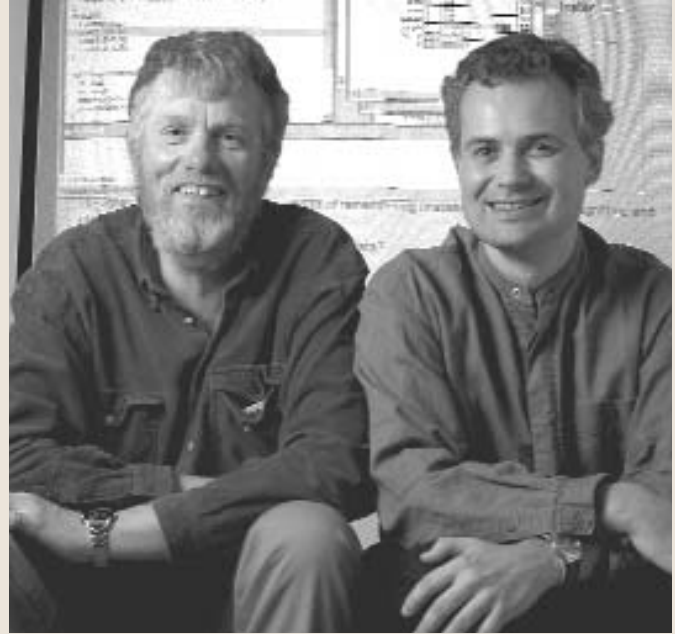


Photo by Chris Hammond

*Creators of the Teaching Machine (L-R): Michael Bruce-Lockhart and Dr. Theodore Norvell.*

feature for classroom use. One of the program’s key features is that it is highly interactive and, as a result, draws students into the example.

“Using the Teaching Machine, we can step into the example and run it on the projector screen. I can concentrate more on showing them what happens, talking about it, and answering questions,” adds Michael.

Students have responded well to the use of the Teaching Machine. It certainly helps make the subject more understandable and easy to follow. The program is also being used at the Graduate Institute of Applied Technology and has received a lot of positive feedback from users. Teachers at the College of the North Atlantic are also interested in the program and steps are being taken to introduce it into some of their programming courses.

Thousands of hours have gone into working on the project. And there is still a lot of work to be done. “We did a major re-write of the program starting a little over a year ago. Much of the code was thrown out and replaced with a design that can support much more of the C++ language and, eventually, Java as well,” says Theodore.

Two engineering work term students, Jonathan Anderson and Michael Burton spent this past summer working on a new program that could support Java. “C began as a simple programming language, but over time it has become complicated. Java, however, was built from scratch and is a much cleaner language and would be more beneficial for higher level courses,” says Jonathan.

Now they’re on the receiving end, as both of them took Michael’s C++ course this past term. “The Teaching Machine is helpful for showing us where everything is stored and thus making the problems more transparent,” adds Michael. “It acts like a virtual computer and it helps a lot with understanding some of the more complicated programming topics.”



Photo by Chris Hammond

*This year's award winner - Mrs. Moya Crocker*

## Faculty of Engineering launches Employee Service Award

**E**arly in the fall of 2002, Dr. Mahmoud Haddara, interim dean of the Faculty of Engineering and Applied Science introduced the Dean's Award for Exemplary Service. This award will be used to send a

message of appreciation to all administrative and technical support staff. "The award will be presented to someone who demonstrates an excellent effort to fulfill his/her job," says Dr. Haddara. "It is a way for us to officially recognize the outstanding contribution of our staff members and promote a positive work environment."

After much review of the nomination forms, this year's winner was announced - Moya Crocker of the Office of the Associate Dean (graduate studies and research). Moya began work at Memorial University in 1980, starting at the Comptroller's Office where she worked until 1984. Since 1984, she has been employed by the Faculty of Engineering and Applied Science working as an intermediate and then senior secretary in the Office of the Associate Dean. Those who know Moya say she makes the faculty a welcoming community for all graduate students. She looks after graduate students' matters effectively and with kindness, and when she is asked for assistance she never fails to provide it in a timely manner. Indeed many would agree that the office of graduate studies would not be the same without her around. Congratulations to Moya on her achievement!

"We hope this small gesture shows our great appreciation to all of our administrative, clerical and technical support staff," adds Dr. Haddara.

## Memorial hosts Canadian Engineering Competition!

**T**he Canadian Engineering Competition (CEC) was held for the first time ever in St. John's from February 27-March 2, 2003. CEC 2003 - Engineering New Horizons carries with it a long line of tradition that began at Waterloo University and has grown exponentially to include engineering students from across Canada, the United States and Europe. For the past 19 years it has brought together the best and brightest engineering students to compete in categories ranging from extemporaneous debate to entrepreneurial design.

"Far more than just an academic competition, the CEC provides a vital link between the national student body and the engineering industrial sector. It is a fantastic opportunity to meet employers and compete against your peers," said CEC 2003 co-chair, Colin Clark

Students who placed at the regional competitions in Western, Ontario, Quebec and Atlantic Canada moved on to compete at the CEC. There are seven categories that students compete in including: corporate design, explanatory communications, extemporaneous debate, entrepreneurial design, editorial communications, junior team design and senior team design.

"The categories cover the full range of skills required of an engineer," added co-chair, Sabrina Mallard. "The atmosphere is competitive and the excitement is contagious as teams work together to accomplish their goal."

Each of the categories challenges students on various aspects of engineering. Last year, representatives from Memorial University received the gold for senior design and the silver for entrepreneurial design at the Atlantic Engineering Competition in Moncton, New Brunswick. This year, the senior design team won silver at the Atlantic Engineering Competition in Halifax, Nova Scotia, and so moved on to compete in their hometown.

The organizing committee would like to thank all the sponsors, participants, students and faculty members who helped make the event a real success. And a special thanks to this year's patron sponsor, the Canadian Forces. Congratulations to all the participants who competed in this year's event! See you next year at the CEC 2004.

For highlights from this year's competition please visit [www.cec2003.cfes.ca](http://www.cec2003.cfes.ca).

# Faculty undergoes academic program review

Early in the fall of 2002, the Faculty of Engineering and Applied Science took part in a university wide initiative and underwent an Academic Program Review (APR). The committee, chaired by Dr. John Quaicoe, associate dean (undergraduate studies), was comprised of nine working sub-committees, which investigated the following issues: strategic objectives, student information and program outcomes, undergraduate teaching activities, graduate teaching activities, co-operative engineering education, research and creative activities, faculty contributions and the role of the faculty in the profession and community, administrative organization including human resources and financial support, and physical resources.

As part of the overall APR process, a faculty retreat was held on November 12, 2002. At the retreat, each committee coordinator presented the highlights of their research, which was followed by discussion from members of the Faculty. The purpose of the retreat was to discuss issues of importance to the Faculty in an open session and to direct the committees towards items in need of further review.

The purpose of the APR as stated in the "Procedures for the Review of Units and Academic Programs" of the University are "to evaluate the quality, success, and role of academic units and programs in the fulfillment of their own and the University's mission and strategic goals; to encourage academic planning, innovation and improvement in the units and programs; to provide an occasion for units and programs to identify opportunities and find ways to pursue them; and to avail of fresh perspectives from colleagues outside Memorial." The process involves a review of the self-study report by a review panel made up of external and internal reviewers. The panel conducts a two-day review of the unit and produces a panel report, which forms the basis of an action plan to address any recommendations that have been made.

Final drafts of each of the working committees' reports have now been submitted to Dr. Quaicoe for inclusion in the self-study report. The report is expected to be submitted to Dr. Michael Collins, dean of record, by the end of February, 2003.

# Search ongoing for new dean of engineering

In the fall of 2002, the Faculty of Engineering and Applied Science began the search for a new dean. A search committee consisting of Drs. Cecilia Moloney, Dennis Peters, Howard Heys and Neil Bose, engineering student Curtis Jennings, external representative Darlene Whalen, and director general of the IMD, Dr. Mary Williams as chair, was established by Dr. Evan Simpson, vice president (academic). The role of this committee is to develop the search criteria, administer the process, and recommend a candidate to Dr. Simpson. Since its inception, the committee has endeavored to ensure the search is an open and consultative process. Numerous meetings have been held with faculty, students and staff to determine the qualities and qualifications that each group feels are important for a new dean.

There are many new challenges facing the Faculty and the new dean will be expected to take leadership of these and many new initiatives. With the growth in the Faculty comes a new opportunity to provide strong undergraduate education, while at the same time expanding research

programs, graduate teaching and outreach to the community and industry. According to committee member Dr. Cecilia Moloney, the Faculty is undergoing a significant change and an individual who can lead with strong, creative insight would be a valuable asset in the years to come.

"There are a number of things happening now and over the next few years that we really need to take notice of. There are challenges in how to pursue student recruitment and outreach to the high-schools. There is also a big demand for strong collaborations with industry and the community, and partnerships with other universities. We need an individual who can build upon the Faculty's commitment to programs and research of the highest quality," says Dr. Moloney.

The search committee has already begun advertising for the position and has given an application deadline of April 4, 2003. They are optimistic that the appointment will take effect in September 2003, or as soon as possible thereafter.



## Building research collaborations

The Faculty of Engineering and Applied Science hosted a research forum with colleagues from the National Research Council's Institute for Marine Dynamics (IMD) and Centre for Cold Ocean Resources Engineering (C-CORE) on February 7, 2003. The purpose of the forum was to discuss possibilities for increased collaborative research with an awareness of each organization's role in the larger technical community. According to Dr. Ray Gosine, associate dean (graduate studies and research) there are obvious connections when it comes to robotics, ice and ocean and

naval architectural engineering, but more could be done on many other levels. "There is an interest amongst the various units to forge a more formal arrangement and to build upon collaborative research opportunities," he added. At present, there is no formal arrangement in place to take advantage of common interests and expertise amongst the three organizations. Representing the IMD and C-CORE at the forum were Dr. Stephen Jones, director of research and Dr. Judith Whittick, president and CEO.

### DEAN OF ENGINEERING AND APPLIED SCIENCE

Memorial University invites applications and nominations for the position of Dean, Faculty of Engineering & Applied Science. The successful applicant will provide strong academic and administrative leadership, fostering excellence in the Faculty's initiatives in teaching, research, and academic and professional service. The Dean will be responsible for the overall management of the Faculty and its growth and will be its foremost ambassador within and beyond the University. The applicant should have a PhD in engineering and be eligible for professional registration with the Association of Professional Engineers and Geoscientists of Newfoundland.

The Faculty of Engineering & Applied Science offers Bachelors, Masters, and PhD degrees in Civil, Computer, Electrical, Mechanical, and Ocean & Naval Architectural Engineering, with optional undergraduate specializations in Offshore Oil and Gas Engineering. The Faculty has approximately 1000 undergraduate students and 150 graduate students. All undergraduate students follow a Co-operative Education program, completing six work terms with local, national and international employers.

Memorial University is Atlantic Canada's premiere comprehensive university and one of the region's most important research facilities. With approximately 15,000 students from 50 countries, it plays an integral role in the educational, economic and cultural life of

Newfoundland and Labrador. The university is located in a community known for its friendliness, historic charm, vibrant cultural life, and easy access to a wide range of outdoor activities. For more information about the position and the University, please see [www.engr.mun.ca/DeanProfile](http://www.engr.mun.ca/DeanProfile) and [www.mun.ca](http://www.mun.ca).

The appointment will take effect in September 2003 or as soon as possible thereafter. The term is five years, renewable. Written nominations or applications, the latter accompanied by a curriculum vitae and the names of five referees, should be addressed to:

Dr. Evan Simpson  
Vice-President (Academic)  
Memorial University of Newfoundland  
St. John's, NL A1C 5S7  
Telephone: (709) 737-8246  
Fax: (709) 737- 2074  
E-mail: [vpacad@mun.ca](mailto:vpacad@mun.ca)

The search committee will start examining files on **April 4** and continue the search until the position is filled. Memorial University is committed to employment equity and encourages applications from qualified women and men, visible minorities, aboriginal people, and persons with disabilities. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

# Faculty news



## New designation approved

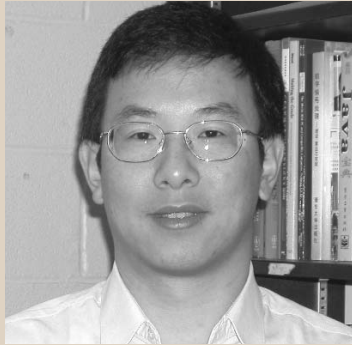
**A**t the October meeting of the Board of Regents a new designation of honorary professor was approved. This new designation is a non-stipendiary appointment category for use in special cases and is to be given to outstanding scholars seeking a significant working relationship with the university. This new designation is not a substitute for professor emeritus or adjunct professor. The appointment will be for an initial period of three years, renewable following a review. Nomination for this may come from an academic unit, a dean or vice-president. The first recipient of this title is Dr. Mary Williams, former professor in the Faculty of Engineering and Applied Science and now director general of the National Research Council's Institute for Marine Dynamics (IMD). Her appointment is effective Jan. 1, 2003.



## New director for CEE

**D**r. Tahir Husain has been appointed the new director for Continuing Engineering Education (CEE), effective Nov. 1, 2002 for a three-year term. Dr. Husain has been a faculty member at Memorial since 1995 in the civil engineering discipline. Since coming to Memorial he has been actively involved in research related to risk-based design and the remediation of contaminated sites. He was also largely responsible for establishing a master of applied science in environmental engineering and graduating over 60 graduate students since its inception. As the new director of CEE, Dr. Husain will be working to increase the profile of the program and to develop diploma and certificate programs that are of benefit to local professional engineers. Some professional development courses currently being reviewed include courses specifically targeted to fulfill the needs of the Association of Professional Engineers and Geophysicists of Newfoundland (APEGN) registration renewal process, and a course on hydromet and processing issues as related to the INCO Innovation Centre. Discussions with Memorial's School of Continuing Education are also ongoing concerning the marketing of the program and collaboration in offering courses.

## New Faculty members



### Dr. Cheng Li

joined the faculty in January 2003. A recent graduate of Memorial's doctorate in electrical and computer engineering program, Dr. Li has been at Memorial since 1999. Prior to starting his graduate studies here

he received a bachelor's degree in communication engineering from the Harbin Institute of Technology (HIT) in China. He then went on to complete a master's degree in telecommunication engineering at the same institution, focusing on trunked mobile communications systems and switching technologies. While studying in China he worked as a research assistant in the Communication Research Centre at HIT. Following graduation he was employed as a communications and electronics engineer with Baosteel in Shanghai, and a network system group manager with Nokia China Investment Co. Since coming to Memorial in 1999, Dr. Li has worked in the Faculty's Centre for Digital Hardware Application Research (CDHAR). Much of his research to date has focused on a multicast packet switching system for broadband communications.



### Dr. Majid Abdi

joined the faculty in January 2003. Born in Tehran, Iran, Dr. Abdi studied at Tehran Polytechnic receiving a bachelor's degree in chemical engineering with petrochemical options, and a master's degree in chemical engineering with a concentration on natural gas processing. Following

his doctorate degree at the University of British Columbia, he received a postdoctoral fellowship from the department of chemical engineering. His industry experience includes working for the National Iranian Oil Company (NIOC) in the Research Institute of Petroleum Industries as a process design/ development engineer. In this position he worked on the development of oil and gas processes comprising the design, manufacturing supervision, start-up and trouble-shooting of gas processing pilot plants. After a short time in Calgary, Alberta, working with Gas Liquids Engineering Ltd., he returned to Iran and accepted a position as senior project manager and director of the gas research division with the NIOC. Dr. Abdi's research has been directed towards the conversion of natural gas to liquid hydrocarbons (clean fuels) using high performance gas purification solvents and treatment methods.

## New Faculty Service Award

The newly created Dean's Faculty Award for Exemplary Service will officially recognize the exceptional contribution of faculty members. All full-time faculty members are eligible to be nominated provided they have served a minimum of one year prior to the nomination. A statement of nomination may come from faculty, students or staff and should describe the nominee's contribution in one or more of the following areas:

- Participation in faculty and university academic committees
- Leadership in faculty initiatives
- Involvement with student-related initiatives and issues
- Representation of the faculty to the community
- Representation of the faculty to the profession

Examples of leadership, initiative, resourcefulness, and/or dedication to high standards should be given as they relate to one or more of the areas above.

Following a routine nomination process, the first recipient of this award is expected to be announced in March 2003.

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