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WINTER 2011

Engineering

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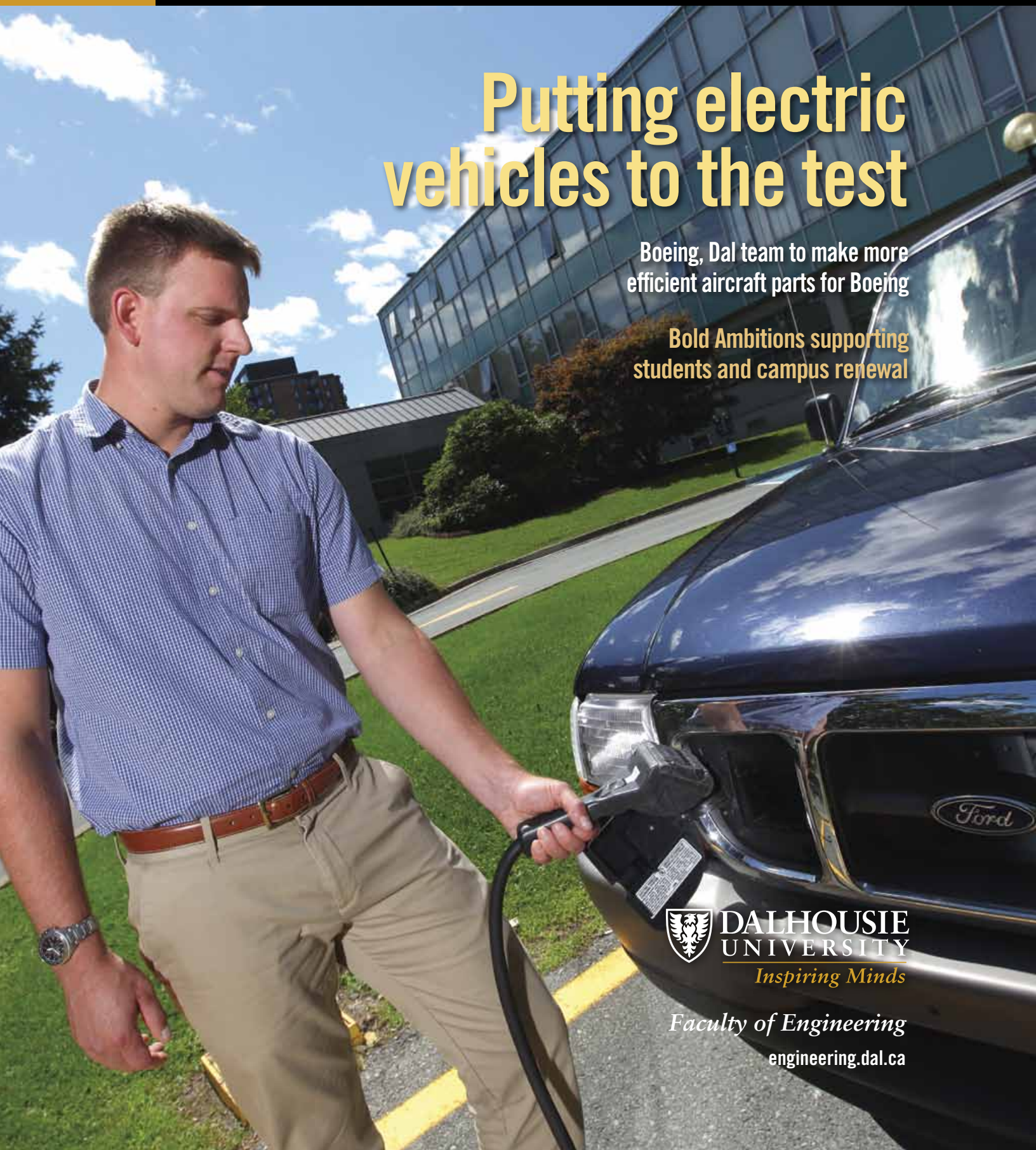

Putting electric vehicles to the test

Boeing, Dal team to make more efficient aircraft parts for Boeing

Bold Ambitions supporting students and campus renewal

DALHOUSIE UNIVERSITY
Inspiring Minds

Faculty of Engineering

engineering.dal.ca

Building on the success of recent years, 2011 was another outstanding period for the Faculty of Engineering.

Buoyed by increased enrolment, our faculty continues to solve complex societal issues, aide communities in need of innovative solutions and help industry cut inefficiency. Students work hand-in-hand with professors and on their own, putting their mark on the profession and jump-starting their careers.

As you are aware, Dalhousie's Bold Ambitions campaign is well underway and as you'll read, the Faculty of Engineering continues to be a recipient of the great generosity of those who wish to see its continued growth and student success. I'd like to thank everyone for their support of the faculty and in helping make Dalhousie engineering graduates the best in Canada.

Please keep us up-to-date with your news, stories and successes and help us spread the message of what this faculty and its alumni are capable of accomplishing.

Have a wonderful holiday season and a happy New Year and we'll see you in 2012.

Dr. Joshua Leon, P.Eng.
Dean of Engineering

Contributors

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For more news and events, visit the engineering alumni website at: *alumni.engineering.dal.ca/*

Contact: Jenn Moore, *Alumni & Donor Relations Officer*; jennifer.moore@dal.ca 902.494.3158

Electric Vehicles

Getting a real charge

Electric vehicles. Are they for real or just a fad? Can they satisfy the needs of the daily commuter? Can they match the performance we've come to expect from their fossil fuel driven counterparts?

With the arrival of the Nissan Leaf and the much-hyped Chevrolet Volt, electric vehicles are back on centre stage after a decade of being relatively silenced. The idea of owning an electric vehicle may seem novel to some, while others may wonder if such a machine could actually meet their day-to-day needs. So, now that they're arriving in North America, can they?

"Absolutely," says Mechanical Engineering professor Lukas Swan. "Electric vehicles are smooth, silent, produce no smell or emissions, and are safer."

In gas vehicles we're constantly shifting and that's complicated. But with electric, the moment you push the pedal you're already at high efficiency.

Dr. Swan is no stranger to electric vehicles. In addition to focusing on renewable energy in his studies, and now as a professor, he and his father, David Swan, a graduate from TECH, own DHS Engineering which provides consulting services to the electric vehicle and renewable energy sectors.

Dr. Swan and his father have three electric vehicles – two 2000 Ford Ranger EV trucks and a 2002 Toyota Rav4 EV. All three run on nickel-metal hydride batteries, which was the leading technology a decade ago. Despite being 10 years old, he says they outperform their gas counterparts in nearly every way.

"They have electric motors coupled to single-speed transmissions with high torque at low speed and very good power at high speed, which matches well with vehicle requirements," explains Dr. Swan. "In gas vehicles we're constantly shifting and that's complicated. But with electric, the moment you push the pedal you're already at high efficiency. They accelerate and travel at highway speeds the same as any gas vehicle."

While their only limitation is range – the Rangers go about 100 kms on charge and the Rav4 goes 170 kms – Dr. Swan

says he has no "range anxiety" as he rarely uses a full charge in a day.

He uses a Ranger to get to work and hauls any cargo or trailers he needs to – in fact, the truck pulled the Dalhousie Architecture and Engineering float in the Parade of Lights, winning awards in 2009 and 2010. For longer trips he plans to stop and recharge, which can be done with most 220-volt appliance outlets in a house. "If you need to get to Montreal over night, you may have to rent a car, but the electric vehicle performs superbly for the majority of your trips," he says.

But isn't electricity generated from fossil fuels? Do these vehicles really have a smaller footprint than conventional ones?

"Because electric vehicles are so efficient, they are responsible for less greenhouse gas emissions than gas vehicles, even though N.S. electricity is predominantly produced from coal. Furthermore, every day that goes by the electricity in N.S. is less carbon intensive because we're installing more wind turbines that feed into the grid. So the car's footprint gets cleaner," explains Dr. Swan. "In contrast, every day that goes by, extracting oil becomes harder and consequently has more emissions. So if we project in the future, electric vehicles are getting cleaner, while the gas cars are getting dirtier."

Depending on your province, the footprint may be dramatically smaller says Dr. Swan. "Worldwide, gasoline is the dominant fuel for vehicles so emissions from the cars are similar everywhere. However, as you move to different jurisdictions, electricity is generated by different means. In N.S., we use coal, natural gas, hydro and increasingly wind. But in Quebec, most of their energy is hydro. So when you drive electric there you are driving completely emission free. In Ontario, their electricity is primarily nuclear, so again limited emissions."

Also a professional wind developer in Nova Scotia, Dr. Swan knows the benefits that come with renewable energy and its role in our life.

"It was renewable energy that created fossil fuels, but it took millions of years and we happily extract them over a few centuries – there's something wrong with that. We need to go back to the renewable energy that created fossil fuels in the first place. We need to reduce energy use and transition it to renewable energy, and electric vehicles and wind turbines can help us do that."

Dr. Swan acknowledges that electric vehicles cost more than gas cars to purchase but says, like everything, economies of scale mean the price will drop with increasing sales. He cites hybrid cars that were much more expensive when they first arrived than today. "The Toyota Prius is on its fourth generation with increasing efficiency and amenities while the price continues to drop."

"There's a pride that comes with driving an electric vehicle as well," he explains. "It makes you feel good about your transportation. It's like buying a nice home appliance that is quiet and uses less resources, you quickly forget about the cost and focus on enjoying the product."

For two car families, Dr. Swan suggests a fully electric model like the Nissan Leaf for commuting and general purposes, stating "you will be surprised how much you use it and how little you use your gas vehicle." However, if you are a one-car home and do long-distance traveling, a Chevrolet Volt may be more appealing at this time.

"The transition to electric vehicles is occurring simultaneously with the installation of renewable energy," says Dr. Swan. "The Nova Scotia Government's renewable electricity plan has legislated 25 per cent renewable electricity by 2015 and has proposed 40 per cent by 2020. It's a tremendous opportunity for the province to get these efficient electric vehicles and to clean up our electricity grid, a win-win situation."

Capping off in Texas

The Dalhousie Remote Operated Vehicle Team (ROV) has good reason to be proud. They participated in the Marine Advanced Technology Education Centre (MATE) competition held in June 2011 at the NASA Neutral Buoyancy Lab in Houston, Texas where they won first place for their engineering evaluation, and seventh overall in the competition.

The competition is open to universities and high schools worldwide. This year marked the 10th anniversary of the MATE ROV competition with 29 universities and 30 high schools participating.

This year's mission was to cap an oil well – modeled after the Deepwater Horizon explosion in the Gulf of Mexico that killed 11, injured 17 and sent oil spilling and venting from the wellhead into the ocean. The disaster is the largest accidental marine oil spill in the history of the petroleum industry and caused extensive damage to marine and wildlife habitats and tourism industries. Reports indicate the spill was the result of both technological and human failures.

The MATE ROV competition requires students to think of themselves as entrepreneurs and to treat MATE like a client. The team was instructed to create a company that specializes in solutions to real-world marine technology problems. The Dalhousie ROV team named their project for the cap the oil well mission, "The Betta Project."

"The team is very resourceful and creative, and those are the skills needed to take on these missions," says Steve Doll, administration lead and fifth-year engineering student. "Our main focus is on good design principles."

The BP Oil Spill was simulated in NASA's Neutral Buoyancy Lab and the team was required to demonstrate how quickly their tool could react to an oil spill response training mission. Each team was given five minutes to set up the system, 15 minutes to complete the mission task, which was to get the well head cap put on and sealed in one motion, and five minutes to demobilize and exit the control shack.

Judges of the competition were people from industry and representatives from NASA Buoyancy Team, Shell, and Video Ray. Engineering professors Reg Peters and George Jarjoura accompanied the 14 students that made the trip to Houston for the competition. The ROV team sponsors are Shell, Dalhousie and Ultra Electronics (the team is always actively pursuing support from sponsors to assist in achieving successful missions).

The Dalhousie ROV team begins working on their project one year before the actual competition. Each year the team builds a new robot and motor entirely from scratch. Some of the components they made this year include: the propulsion system, propellers, and cowlings; and they also machined the hyper drive. First and second-year students are also encouraged to participate. The team trains the new recruits and helps them become shop certified and familiar with the tools.

Six team members drove from Halifax to Houston with the robot, which was loaded into a truck proudly displaying decals of the team's logo. Although the team has faculty support, the project is completely student run.

"We create our own tools and are very good at doing things ourselves," says Mr. Doll. "We want the students to feel like they really helped with the project, designed and contributed to it entirely. This is something we take pride in and it is something that our sponsors are really proud of as well," he says.

The 2012 MATE competition is set to take place in Orlando, Florida. The team expects to receive their next mission anytime now, and "that is when, says Mr. Doll, the real fun begins!"

You can visit the Dalhousie ROV Team's website at **dalrov.ca**

New lab from old space

Innovative space redesign creates a better lab for hands-on learning in measurements, systems, vibrations, and mechatronics

Like in seemingly every other building at Dalhousie, the department of mechanical engineering needed a new lab and new space, with only one problem – there wasn't any available. That, of course, was not enough to stop the department from coming up with a unique solution to get the most out of limited resources.

"As a fixed downtown campus, we are physically constrained by space," says mechanical engineering professor Lukas Swan. "So, we took old spaces and created new space and new opportunity to enhance education by more effective use of facilities."

The renovation increased the size of the space and added lots of new equipment. "The previous room had only eight stations and the space was underutilized due to old-concept layout which had adjoining offices" says department engineer Peter Jones.

Renovated last summer the lab is now 40 per cent larger than before and the number of work stations increased to 20. The new facility features custom-designed L-benches which permit only two students per station while accommodating long track and shaft experiments. Limiting each station to two students creates a more engaging laboratory environment where everyone is involved. Furthermore, the lab is enhanced by new data acquisition systems that employ the latest technology.

"This renovation has a silver lining which enabled us to address other space issues as well," explains Dr. Swan. "The increased stations allow us to host multiple courses simultaneously, freeing up another space for a different use."

The new lab, with its modern equipment, ensures students head into the field with the experience of having handled and operated new technology. Not only does it create more capacity for people and equipment, but more capacity for learning.

"It's great to work with newer technologies and working in groups of two is more efficient," says fifth-year mechanical engineering student Amanda Wiseman.

"The lab also allows us to go from mechanical engineering to electrical engineering and that broadens our skill set," adds fellow fifth-year student James Mills.

The labs include hands-on learning in measurements (strain, temperature, motion),systems (feedback, loop control, HVAC, robot controls), vibrations (rotating shafts), and mechatronics (combination of mechanical and electrical engineering).

This new lab space, along with its unique L-style stations, is an example of an innovative solution to a common problem. At the end of the day, its greatest strength is accessibility to the student. "As humans we principally learn by doing, it's very natural," says Dr. Swan, who recently met with each of his 64 students and received overwhelmingly positive response on the new lab.

‘Made in Nunavut’

an approach to dealing with wastewater

When it comes to safe water, not all things are made equal. In fact, the differences in water and wastewater management among Canadian territories and provinces are staggeringly different. In Northern regions in particular, the provision of clean drinking water, and reliable wastewater collection and treatment services, is extremely difficult.

Rob Jamieson, associate professor in Dalhousie’s Faculty of Engineering, is hoping to change that. Nestled in the heart of northern Canada, Dr. Jamieson’s team of researchers and graduate students have set up shop in the territory of Nunavut where they’re studying wastewater management systems in four remote communities and assessing the potential environmental risks.

With new federal regulations being proposed for all municipal wastewater treatment facilities across Canada, the Government of Nunavut granted $3 million over the next four years to Dal’s Faculty of Engineering for this leading-edge wastewater research project. With extensive knowledge in the field and host to the newly-upgraded Centre for Water Resource Studies (CWRS) Water Analysis Lab, Dalhousie secured the contract in July 2010.

Complex issues in wastewater exist in a variety of locations across Canada. But when it comes to implementing treatment systems, one size does not fit all.

“Climate, permafrost, and remoteness of communities are only some of the obstacles we face in the North that are not an issue here in the Maritimes,” Dr. Jamieson says. “Small communities in Nunavut that are only accessible by air or sea have limited capacity to operate complicated wastewater treatment systems.”

“As opposed to trying to implement mechanical wastewater treatment systems, like what’s typically used here, we’re evaluating the use of passive wastewater treatment systems,” explains Dr. Jamieson. “This includes

Opposite page: Jenny Hayward dries a wetland soil sample to determine the particle size distribution. As it's often too expensive and impractical to ship samples back to Halifax to be analyzed, this demonstrates an example of improvisation in the field.

waste stabilization ponds and wetland systems which are relatively easy to maintain and ideal for remote communities like those in Nunavut."

Jenny Hayward, one of Dr. Jamieson's graduate students, made her first trip to Nunavut in June 2011. Equipped with bear bangers and knee-high rubber boots, most of her days were spent on site at a lagoon and wetland system located in Coral Harbour. She examined the wetland hydrology, assessed wastewater treatment performance and monitored basic water quality parameters.

"We spent a lot of time characterizing the current systems to determine how well they are working and identify any associated risks," she says. "Since there haven't been many peer-reviewed wastewater research studies done up north, there's a lot of grey literature. We're trying to set up a more feasible, long-term plan for these communities that are founded on data collected in the North."

And like most fresh, innovative science experiments, obstacles are inevitable and timing is everything.

"Bacteria, for example, is very time sensitive," she says. "You have 24 hours to collect the sample, get on a plane, get to the lab, and test the sample. Logistically, this can be very difficult. Your plane could be delayed for hours depending on the weather. A lot of planning has to be done to ensure that everything you need or might need is available on site."

Rob Jamieson and his co-investigator Graham Gagnon lead an interdisciplinary group of academics and graduate students on the project including Heather Castleden and Peter Duinker, assistant professor and professor in the School of Resource and Environmental Studies, respectively, and Craig Lake, associate professor in Dalhousie's Department of Civil and Resource Engineering.

"This project is not only assessing the environmental impacts of wastewater treatment but also the social aspects, since there are a lot of health-related issues that can arise from inadequate wastewater management systems," says Dr. Jamieson. "We are learning a lot about past and present water and wastewater management issues by talking to people in the communities."

Going forward, Dr. Jamieson and his team will make recommendations to policy makers based on how well the existing systems are performing, in turn coming up with cost effective solutions for the Government of Nunavut in order to meet whatever the new wastewater regulations will be.

Although the contract is only set for five years, Dr. Jamieson says the benefit to grad students who are working on this project are transformative, long after the contract has expired.

"At this point, we're only conducting performance assessments, but we plan to experiment with, and assess, system improvements later in the project. This provides for a great graduate training environment," concludes Dr. Jamieson. "Working in this type of environment and under these types of circumstances – it offers students a truly unique and meaningful experience."

Professor Rob Jamieson, lead on the Nunavut Wastewater Research Project and Wendy Krkosek, a PhD student and research engineer with the Centre for Water Resources Studies, who project manages the program.

Improving the life of aircraft –

Lighter aircraft. Reduced maintenance. Less wear and tear. Such improvements would drastically reduce costs to the aerospace industry and for manufacturers of aircraft.

That's why Boeing has entered into a partnership with the Faculty of Engineering at Dalhousie to establish research links in Atlantic Canada and in the field of materials engineering, at which Dalhousie excels. Paul Bishop, professor of materials engineering, is leading the project, titled Advanced Materials Development.

"The research fundamentally centers around the development of new materials for aerospace applications. It means stronger lightweight aluminum alloys, an accelerated development time for new materials through computational modeling and improved coating practices for existing metallic components," says Dr. Bishop. Dalhouie's facilities, researchers, staff and track record made it an appealing partner to the Chicago, Illinois based Boeing.

"In the long-term it would mean lighter weight aircraft, improved aircraft materials and components with reduced maintenance time and enhanced durability," he explains. "The overall goal is improved process economics, improving the aircraft over its useful life."

The breadth of research will be in the area of materials engineering and manipulating powdered materials such as aluminum into bulk materials and engineered shapes. Also of importance to Boeing was Dalhousie's very deep scope of research and experience in particulate materials research – the development of technology that converts powdered materials (metals, alloys, ceramics) into a useful engineered product. In fact, Dalhousie is home to the largest group of researchers in the area of particulate materials research in Canada.

Longevity is pivotal

The project length of five years is a tremendous advantage as it enables the faculty to hire a considerable number of researchers for an extended period of time.

"The longevity is pivotal for us," explains Dr. Bishop. "It brings a major international company into the faculty that wasn't here before. Since engineering is inevitably about the use of the finished product, this is an excellent example of us looking to develop finished products and technologies that are industrially viable in the near term. This is truly research with applied industrial outcomes."

The project will also engage students from the undergraduate to the post-doctoral level. Dr. Bishop says a major benefit to students is working on a real-world problem that has the potential to create real world solutions for a company like Boeing.

In keeping with the faculty's shift to more design-focused education, that aspect of the project is engrained from the start. "It could be the design of an alloy so that it meets the performance

Advanced materials expertise brings Boeing to Atlantic Canada

requirements, that it's cost effective, and also safe for industrial handling," says Dr. Bishop. "These elements of design are in the mindsets of the students from the beginning."

Diverse team of experts

Joining Dr. Bishop as co-principal investigators on the project are Stephen Corbin and Kevin Plucknett, Process Engineering and Applied Sciences; Darrel Doman, Mechanical Engineering and Josef Zwanziger, of Chemistry.

Dr. Bishop believes having different sets of eyes and viewpoints focused on the same problem is an advantage. "We have very different backgrounds," he explains. "Bringing that expertise to the same project and adding the multidisciplinary collaboration will be a great strength of the work."

Boeing, also funding research projects in the Faculty of Computer Science, sees an opportunity to collaborate and strengthen their research capacity, both in Canada and internationally.

"We have a strong history of partnership. We're privileged and honoured to include Dalhousie on the list," said Susan Colegrove, regional director of International Strategic Partnerships for Boeing Defense, Space & Security, who spoke of the value of the research at an event at Dalhousie in September.

"We're proud to have Atlantic Canada's leading research university on these projects," added Diane Axness, director of platform systems/subsystems technology with Boeing.

Dr Paul Bishop

"In the long term it would mean lighter weight aircraft, improved aircraft materials and components with reduced maintenance time and enhanced durability," Dr. Bishop explains. "The overall goal is improved process economics, improving the aircraft over its useful life."

BOLD AMBITIONS THE CAMPAIGN FOR DALHOUSIE

Know how to build bridges.

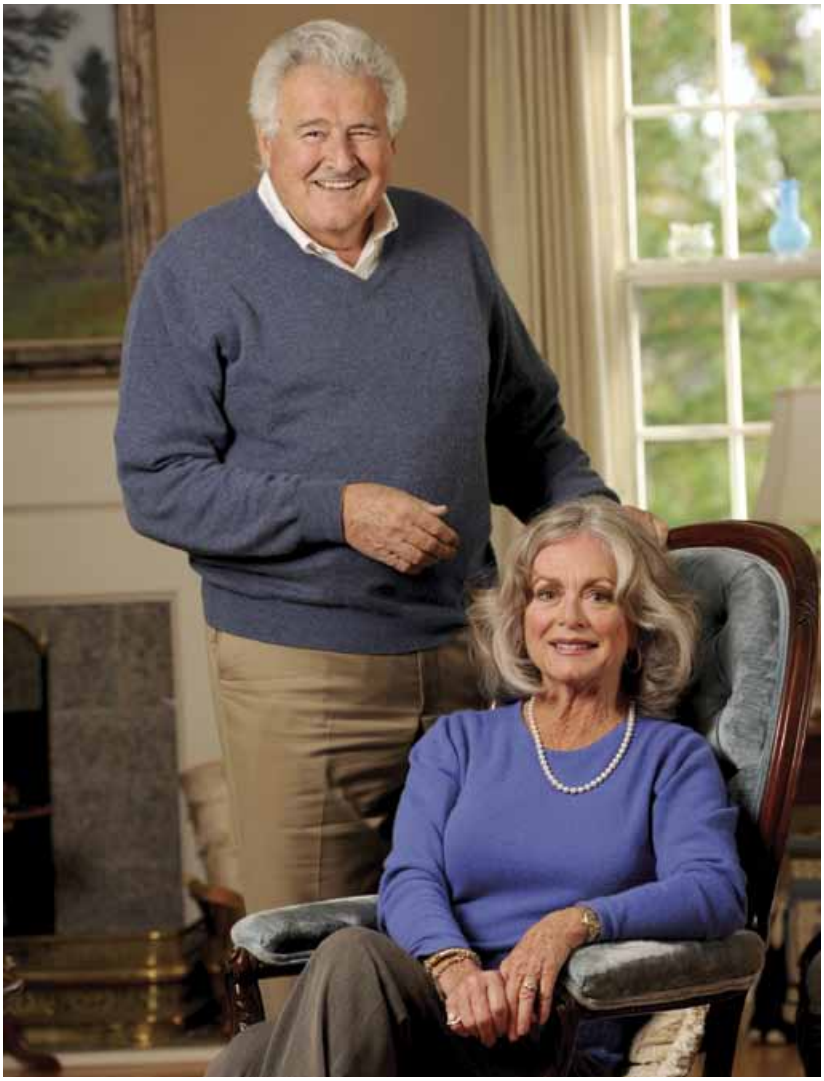
Richard Murray (BEng '66 (NSTC))

"One of the most important parts of bridge-building is people," says Richard Murray. "Whether you're building a physical bridge or just trying to bridge a gap between people, it's always the people that make it successful."

Mr. Murray and his wife Melda are paving the way for student success through an endowed scholarship fund they have established at Dalhousie. Richard & Melda Murray Scholarships will be awarded to two students from Jamaica who are planning to pursue a career in civil engineering. The renewable scholarships, which will be awarded in perpetuity, are each valued at up to $22,000 per year.

The Murrays' links with Jamaica span more than 40 years, including the decade they lived there. It all began in the late 1960s when Mr. Murray, a civil engineer, accepted a one-year contract with Alcan. When the contract ended, he had offers to stay in Jamaica. He worked with local companies and managed a ready-mix concrete company before starting a general contracting business with three partners. In addition to professional connections with the country, the Murrays have an important personal one – their son, Cameron, was born there.

Today, as president of the Halifax firm R. A. Murray International Limited, Mr. Murray and his team provide engineering, general contracting, material procurement and logistical services to countries throughout the world. They recently completed the project of building 17 bridges plus connector roads across Jamaica. They begin work on a new installment of bridge-building in April 2012.



Richard and Melda Murray at their home.

The infrastructure is essential to the Jamaican economy. "People can't get their goods and services to market without the proper road system and highway bridges," Mr. Murray says. He explains that bridge-building is a team effort. "Our program has been successful because of the high involvement of Jamaicans giving us great input, and our mentoring and training."

The firm has also made a difference through corporate citizenship. "We really wanted to be part of the community

that we were building a bridge in. So we helped reconstruct schools that were in a bad state of repair from the hurricanes, we equipped several schools and we assisted a couple of police stations by putting all new windows in them," Mr. Murray says.

And now the Murrays are providing a bridge to university education through their scholarship fund at Dalhousie. "Jamaica gave us a wonderful experience in many ways," Mrs. Murray says. "We feel that we owe that country something… We always said that if there was any way in which we could help we would do it. We both feel that now is the time to pay back."

Their hope is that scholarship recipients will return to Jamaica and contribute to the country's progress. "It was really emphasized to me how important it is to do this, because when we formed our management team for our last bridge program, the average age of the team members was about 68-77. I was one of the youngest guys," says Mr. Murray. "So I'm hoping that these graduates will go back. As long as I have work in Jamaica I will hire them."

While the Murrays continue their international work and travels, they are proud of their long-standing ties with Halifax and Dalhousie. Mrs. Murray says she earned her PhT (Putting Hubby Through) working full time at the Sir James Dunn Law Library, while her husband was studying at Nova Scotia Technical College and holding down a part-time job.

When asked what Dalhousie means to him, Mr. Murray replies: "Dalhousie was my introduction to higher education. I admit I was never a great student, but I was inspired by Dalhousie to get on and succeed and become an engineer."

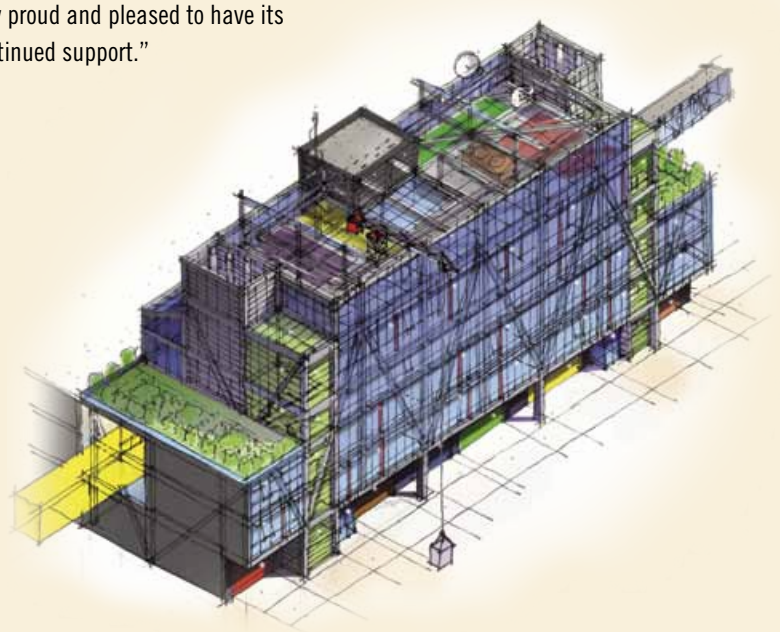
CBCL Limited signals support of **IDEA Building** with $100,000 gift

With *Bold Ambitions: The Campaign for Dalhousie* well underway, fund raising for the new engineering facility, known as the Innovation and Design in Engineering and Architecture (IDEA) building, is gaining momentum, most recently with a $100,000 gift from CBCL Limited.

"Given its longstanding relationship with Dalhousie Engineering, starting with NSTC, then TUNS and now Engineering, CBCL is an excellent fit for this new initiative," said Josh Leon, Dalhousie Dean of Engineering. "The company has been an outstanding supporter of engineering education in the past, and we are very proud and pleased to have its continued support."

The donation will be targeted to the innovation and design theme of *Bold Ambitions*, an area which focuses on collaborative learning facilities for engineering and architecture students.

"CBCL prides itself on providing exemplary engineering services to our clients and we very much rely on educational institutions like Dalhousie University to provide our future professional engineers," said CBCL President and CEO Michael R. MacDonald. "Therefore, I am very pleased that CBCL has this opportunity to support the Faculty of Engineering through the *Bold Ambitions* campaign."



May Best Sexton Memorial Scholarship

Celebrating women in engineering

Dalhousie University is pleased to announce the creation of a new scholarship. The **May Best Sexton Memorial Scholarship for Women in Engineering** will be awarded to deserving students entering their third year of engineering studies at Dalhousie. The scholarship recipient will demonstrate high academic achievement and community involvement, the same values May Best demonstrated in her own life.

May Best Sexton, the first wife of Frederick H. Sexton, graduated from M.I.T. in 1902 (chemistry) and was a researcher for General Electric Co. In 1908 she lobbied to establish a Technical Institute for Women, reflecting her commitment to industrial training and gender equality. May was an officer in the I.O.D.E., the Red Cross and the Local Council of Women in Halifax. She died in 1923 at the age of 43.

This renewable scholarship is open to all women students accepted into third year engineering at Dalhousie. Scholarship donations, payable to Dalhousie University and indicating the scholarship name in the memo section, are welcome by mail, telephone or through online giving.

Mail to:
Office of External Relations,
Dalhousie University
PO Box 15000 Halifax NS B3H 4R2
Tel: 1.800.565.9969 or 494.8801
Give online:
giving.dal.ca/maybestsextonscholarship

For more information:
Chris Locke, Development Officer,
Faculty of Engineering
Tel: 902.494.2861
E-mail: Chris.Locke@dal.ca

The 2011 3rd Annual Dalhousie Faculty of Engineering

Golf Tournament

Held on September 12th at the beautiful Glen Arbour Golf Course, the tournament was a great success! Plans are already underway for next year's event with the goal of making it even more enjoyable.

We hope you plan to participate in the 4th Annual Dalhousie Engineering Golf Tournament planned for September 2012. And we hope you will consider bringing along a friend or two!

Thank you to Mr. Hartlen

The Faculty of Engineering would like to sincerely thank Chuck Hartlen, P.Eng (Electrical, 1983) for hosting the 3rd Annual Dalhousie Engineering Golf Tournament. We truly appreciate the enthusiasm and support that the Bell Aliant team contributes to the overall success of the tournament.

40th and 50th Anniversary Reunions

Over 50 alumni from Nova Scotia Technical College attended their class reunion on October 20 – 22 to celebrate their 40th and 50th anniversaries. The alumni in attendance were from Civil Engineering class of 1961 and all disciplines from the class of 1971.

They came back to campus for a few days packed with activities including a welcome back reception, a tour of Sexton Campus, a barbeque in Alumni Lounge, and a farewell brunch held in the Design Commons.

We had plenty of positive feedback on the event and hope that everyone enjoyed themselves. Do not hesitate to contact jennifer.moore@dal.ca with further feedback or any questions.

If you are interested in planning a reunion for 2012, please get in touch!

Class of 1961

Class of 1971

Class Notes

Denise Trim, BEng '87 (TUNS Civil)
Denise is the Atlantic regional manager for project management at Public Works and Government Services Canada. Following two busy years managing projects in the federal government's Economic Action Plan, Denise is entering French language training to meet the bilingual requirement of her position. She lives in Dartmouth with her family.

Daniel Phillips, BEng '99 (Mechanical)
Daniel Phillips wishes to say 'hello' to the alumni of the mechanical engineering classes of 1998 and 1999. Dan now lives in Toronto, working for Sony as the Marketing Director for television. Any former classmates looking to reconnect please look for him on Linked-In.

Peter Young, BEng '94 (TUNS)
In 2010 Peter completed his MES degree at Dal, and is currently living in Kyiv, Ukraine volunteering with the English department of a Christian organization called CCX.

John Toomey, BEng '84 (TUNS)
John has returned to Canada after 12 years in the U.S. where he managed information technology at investment banks based in New York. He, Rebecca and their son Nolan have settled back in Toronto where John is VP of IT Operations for Shoppers Drug Mart.

Heather MacLean BEng '88 (TUNS Civil)
Heather has been promoted to full professor in the Department of Civil Engineering at the University of Toronto where she researches and teaches in the areas of environment and energy systems. Her contact is Heatherl.maclean@utoronto.ca

Alain LeBlanc, Valedictorian, BEng '85 (TUNS Electrical)
Now working in sports medicine, Alain worked as an engineer for eight years. He graduated from Dalhousie Medicine in 1991. At the 1985 TUNS graduation, his APENS Award stated "most likely to serve society in an ethical manner." He believes he is still doing that. Alain lives in Victoria, B.C., is remarried and has five children.

Paul Marriner BEng '66 (NSTC)
Paul owns and operates Gale's End Press (www.galesendpress.com), is a member of three writers associations, and a contributing writer and editor to several outdoor and fly fishing publications. His articles have appeared worldwide. Paul's book, *Atlantic Salmon: A Fly Fishing Reference*, was released in June of 2009 and was an Outdoor Writers of Canada book award winner in 2011. Paul has three children with his wife of 46 years with whom he lives with in Mahone bay, N.S. pmarr@tallships.ca

Rameshwar D. Srivastava, MEng'64, PhD'67 (NSTC)
Rameshwar is currently the principal engineer with the KeyLogic Systems located at the U.S. Department of Energy's National Energy Technology Laboratory (NETL), Pittsburgh, Pennsylvania. He has been at NETL for the past two decades. He was a professor and chairman of chemical engineering at the Indian Institute of Technology, Kanpur and was also a consultant for Space Sciences, Inc., Monrovia, California. He has authored/co-authored five books, including Perry's Chemical Engineers' Handbook.

Grenville Phillips BSc, BEng'91, MASc'98, MURP'98
Grenville recently returned from his fifth deployment to Haiti following the 2010 earthquake, where he, inter alia, trained Haitian engineers to assess the safety of buildings and to supervise effective repair and strengthening measures. He is a fellow of both the Institution of Structural Engineers, and the Chartered Institution of Highways and Transportation. He has practiced civil, structural, environmental, and transportation engineering in the Caribbean for the past two decades, and is the author of two books, *Brothers Kept Apart*, and *Solving the Arab-Israeli Conflict*.

Sarah L. F. Devereaux BEng'93, MEng'99
Sarah has been named the first woman president of the Consulting Engineers of Nova Scotia. She is senior environmental engineer at the Halifax office of Dillon Consulting.

Michael Mahoney, BEng'95, MASc'97 (TUNS Civil)
Micahel was recently promoted to director of admixture and fiber marketing for Euclid Chemical (Cleveland, Ohio) and was recently elected as president of the Fiber Reinforced Concrete Association. He and his wife Cynthia have been living in Ohio for the last eight years since relocating from Halifax where he was a researcher at Dal.

Please send **Engineering Magazine** Class Notes and In Memoriam notices to jennifer.moore@dal.ca.

Photograph by Katherine Wooler

Engineering and architecture students teamed up this year for the annual Parade of Lights. Their cooperative effort won them first place for the float's creativity, use of lights and overall effect.

Upcoming Events

Please visit www.alumni.engineering.dal.ca/Events for a complete and up-to-date list of events.

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