

U of A • Engineer

Keeping in Touch with
Alumni

Return on Investment

Anne Marie Toutant (Mining '87) knows that any worthwhile effort demands hard work and attention to detail—even if the results are temporary

The Rest of the Story
Fantastic Four
Mr. Clean
Rising Stars

The energy is building

It's the beginning of a new academic year, and I'm sure you recall the energy of arriving on campus to begin your first year of studies in the Faculty of Engineering or returning in subsequent years as you progressed through your engineering program. That atmosphere of excitement, of striking up friendships and getting involved in your studies and projects, is a constant here every September.

And it doesn't just appear to be growing in intensity—it is. The Faculty of Engineering's largest-ever graduating class—805 students—convocated in June and joined our family of alumni; this September we welcomed our largest first-year engineering class ever, with over 930 students. Our faculty continues to grow, with more than 200 professors providing our students with an outstanding educational experience.

Our graduates, in turn, meet the growing demand for high-quality engineering professionals. To help serve our students and the needs of our economy, the faculty is again undergoing a physical change. Some of you will have heard me speak at alumni events about the Innovation Centre for Engineering (ICE) that started construction this summer.

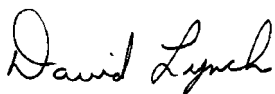
Located between the Chemical and Materials Engineering Building and the Windsor Car Park, ICE will provide approximately 26,000 square metres (gross) of exceptional space to support expanded educational and research activities in the Faculty of Engineering. Housing faculty members, staff and students from every engineering discipline, ICE will be a hub of activity providing greater opportunities for interdisciplinary collaboration among professors and students.

Construction of the “core and shell” of ICE is scheduled for completion early in 2013. While funding is not yet available to construct the interior finishes of the ICE, this final phase of the project will likely occur during 2013 and 2014, subject to the availability of funding at that time. I would like to thank our many alumni and corporate supporters who have helped so significantly in reaching this advanced stage in the ICE project.

You can see architectural drawings and get more information about ICE on Page 17 of this edition of U of A Engineer and you can follow its progress on our website: www.engineering.ualberta.ca/ICE.

ICE has been designed to achieve, at a minimum, the Canada Green Building Council (CaGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System silver certification. The current design and construction status indicates that the higher-level LEED gold-level certification is within reach.

This is an exciting and transformative initiative for the Faculty of Engineering and we will keep you apprised of our progress each step of the way. In the meantime, I invite you to take a few moments this fall to remember and recapture that feeling of energy, optimism and endless possibility that each new term brings.



David T. Lynch, PhD, P.Eng.
Dean of Engineering



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Dean of Engineering
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VISION To be one of the largest and most accomplished engineering teaching and research centres, a leader in North America.

MISSION To prepare top-quality engineering professionals, to conduct world-leading research and to celebrate the first-class reputation and outstanding accomplishments of alumni.

VALUES Dedication, integrity, professionalism and excellence in teaching, research and service to the global economy and community.

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Dean of Engineering David Lynch is featured in a commercial produced by the Canadian Association of Petroleum Producers to get the facts about oilsands development out to Canadians. Lynch highlights a fact lost in the emotional debate over oilsands development: U of A researchers are solving problems.

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Tina Naqvi-Rota (Civil '90), executive vice-president of Cameron Development Corporation, talks about the family business's success and how her engineering education helps her lead the development firm behind South Edmonton Common and other new enterprises.

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Anne Marie Toutant (Mining '87) knows that any worthwhile effort demands hard work and attention to detail—even if the results are temporary. The Suncor Energy VP compares mining to ballet: both require creativity, dedication and talent, and both are ephemeral.



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Four Faculty of Engineering professors have been presented with prestigious awards for excellence in teaching, research, leadership and early achievement from the Association of Professional Engineers, Geologists and Geophysicists of Alberta.

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Work has begun on the Innovation Centre for Engineering (ICE), a project that Dean of Engineering David Lynch describes as “transformative” for the Faculty of Engineering.

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Our annual feature catches up with members of the Class of 2010 to learn what their first year in the profession was like and spotlights new graduates who have incredible experiences and deep reserves of enthusiasm.

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Gary Michalchuk (Civil '84) followed in his father's footsteps in environmental engineering and added his entrepreneurial flair into the mix, winning an Ernst & Young Entrepreneur of the Year Award for growing his own recycling company, E.I.L. Environmental Services.

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We take a retrospective look at Survey School. One of the first courses offered at the U of A, Survey School has been a part of an engineering education at the university for generations. Mining professor Tim Joseph says the course imparts fundamental knowledge even in a high-tech era.



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Message from the Editor

What's your story?

A friend of mine was recently reviewing an article in this fall's edition of *U of A Engineer*—the Rising Stars feature. She felt that the profiles of our newest alumni were impressive, that the young men and women featured in the article speak well of the quality of education they receive at the Faculty of Engineering. But one thing piqued her curiosity.



How do we decide who to profile? It's the same question one of the students being

profiled in this edition once asked me.

Bobby Williamson (Petroleum '10) showed up at the Dean's Office in January or February of 2010 wanting to know how he could be profiled in the Rising Stars feature. You've got to admire that kind of initiative. Williamson was proud but not boastful of his achievements. He had been humbled during his second year of engineering studies when he

flunked out. After taking a year off to consider his options, he returned to the engineering program and flourished. During his second-last semester, Williamson earned a perfect 4.0 grade point average. He also had a social life, as a member of the U of A Dance Club and as a cartoonist with *The Gateway*.

So, to answer the question of criteria for Rising Stars profiles, we want to be sure that every engineering department is represented, and beyond that, it boils down to an individual's story—has this person overcome some major obstacle, or earned perfect grades, or had an exceptional experience, or landed a dream job?

The truth is, the first couple of editions of Rising Stars were more difficult to pull together than this year's has been. I can't claim to have my finger on the pulse of the student body—but I work with the people who do. Our professors and student advisors and co-op advisors know our students well, as do our Engineering Employment Centre staff. Experience plays a part, too. Over the past three years, I've met the students profiled this year, through their academic and extracurricular activities. I've interviewed them in the past, in fact.

This year's group just seemed to present itself, organically. They're a great group of bright, personable young people who have worked hard and wrung more out of their university experience than a textbook education: as undergraduate students, they have been involved in student groups, international exchanges and research projects. They have been active members of the university community.

"When you volunteer at university, you aren't just going to school," says Rising Star Elaine Rippon, who has been a role model for girls and young women. "You get a sense of community; you see how the university is impacting young women. It's more than book learning—you see the bigger picture."

With young alumni like this to choose from, the challenge in writing about Rising Stars isn't so much deciding who to profile, it's trying to limit yourself to four.

Richard Cairney

Richard Cairney
Editor

facebook

Staying in touch just got easier

Want to be informed about what's going on in the Faculty of Engineering? Want to hear about other alumni, students and professors?

Become a fan of the U of A's Facebook page—you'll get news, photos and videos about the Faculty, students and alumni sent directly to your own Facebook account.

Join us online at: www.facebook.com/UofAEngineering.



The rest of the story

Dean of Engineering David Lynch reminds us of an important fact often overlooked in the emotional debate over oilsands development: U of A researchers are finding ways to protect the environment and helping to change technology the industry is using. By Richard Cairney

Dean of Engineering David Lynch is appearing in television, print and Internet ads produced by the Canadian Association of Petroleum Producers (CAPP) to get the facts about oilsands development out to Canadians. Filmed in May, the 30-second commercial shines a light on oilsands research being carried out by hundreds of professors and graduate students across campus.

CAPP began its public awareness campaign last year in response to emotionally charged criticisms of oilsands development. In the commercial, Lynch addresses a common misconception. “There can be a prevailing thought that nobody is working on oilsands development challenges,” he says. “And my response is that nothing could be further from the truth.”

The commercial shows Lynch in a lab with Vanier Scholarship recipient Lisa Brown, a PhD candidate in geoenvironmental engineering. Under the supervision of geoenvironmental engineering professor Ania Ulrich, Brown is investigating the role microbes play—or can play—in removing contaminants

from groundwater. Brown and Ulrich are part of a very select group of researchers internationally who are examining this field. The research could have impacts far beyond the oilsands industry.

Lynch says this kind of leading-edge research is an untold story that is overlooked in the debate over oilsands development. U of A research into the oilsands predates their development. In 1925, engineering professor Karl Clark developed the hot-water separation process that led to today’s technology. Research into the oilsands—from improving existing extraction and development practices and finding ways to mitigate environmental impacts, to ongoing efforts to develop new approaches that would change the industry—continues at a vigorous pace.

“People are quite energized when I describe what’s happening at the University of Alberta,” Lynch says in the commercial. “Over 1,000 researchers collaborate here on this one major topic: the responsible development of our oilsands.

A film crew focuses in on Dean of Engineering David Lynch who, in turn, focuses on oilsands-related research being conducted by hundreds of professors and graduate students across the U of A campus. Lynch appears in a commercial produced by CAPP. Visit www.engineering.ualberta.ca to view the commercial.

Richard Cairney




“We do two types of research. One would be improving existing processes. The other type would be looking for breakthroughs. How do we make it better? Less impact on the air. Less impact on the water. Less impact on the land.”

CAPP President and CEO Dave Collyer (Mineral Process ’77) says the association asked Lynch to participate in the campaign because Canadians want to hear informed, objective opinions about the oilsands. The association’s research into public perceptions about the oilsands showed that Canadians were unaware of technology advances and other industry initiatives, Collyer says.

“We learned that Canadians were interested in hearing about the industry from credible third parties and that’s where Dr. Lynch comes in,” he says. “Dr. Lynch is able to credibly deliver a message about current university-level research to improve oilsands performance which will responsibly advance oilsands development.”

To view the CAPP commercial, visit <http://www.youtube.com/DOengineer>.

A portrait of Tina Naqvi-Rota, a woman with long dark hair, wearing a black cardigan over a leopard-print top. She is sitting at a desk with her arms crossed, looking directly at the camera. In the background, there is a large map or architectural plan on the wall.

Tina Naqvi-Rota
(Civil '90) taps into
her engineering
background
as executive
vice-president
of Cameron
Development
Corporation—the
family business.

By Mifi Purvis

Uncommon Developments

The development project was audacious in its sheer scope and scale—it's the kind of undertaking that doesn't just change shopping patterns, it changes traffic patterns, infrastructure and even settlement. Anyone who knows Edmonton has already figured out that the project is South Edmonton Common. Tina Naqvi-Rota (Civil '90), executive vice-president of Cameron Development Corporation, has been involved since the first shovel broke ground in 1996.

Naqvi-Rota joined Cameron in 1991 after earning her degree. But really, she'd

been there all along. Cameron is a family-based commercial real estate development company started in 1979 by Naqvi-Rota's father, Jerry, and mother, Henrietta. The commercial properties that Cameron has developed include grocery-anchored sites as well as power-centre sites, housing retailers such as Wal-Mart, Sobeys, London Drugs, banks, fast food and a variety of other retail tenants.

From Cameron's boardroom in its downtown Edmonton office, Naqvi-Rota describes the acquisition as "fortunate." She is slightly reserved, speaking in

Tina Naqvi-Rota (Civil '90) in Cameron Development's boardroom. South Edmonton Common has altered shopping patterns and municipal infrastructure.

measured tones, but her ready laugh puts you at ease. She recounts her parents' start in the late 1970s and reminds us that in the early 1980s, the real estate

market crashed. "Everything went to heck in a hand basket," she says. "It really didn't recover until '92, '93."

"We were fortunate in the 1990s to come across the land now known as South Edmonton Common," says Naqvi-Rota. "It was owned by CP Rail and they were looking to develop it, but they needed a development partner." CP brought Cameron in, but subsequently decided not to participate in the development. Cameron later purchased the lands outright from CP.

The fact that Cameron had the land at the southern outskirts of the city (South Edmonton Common is bounded by 23 Avenue on the north, the Anthony Henday in the south, Gateway Boulevard on the west and Parsons Road/99 Street on the east) perfectly positioned the developer for the new style of box-store shopping that was becoming ubiquitous in North American cities. American retail heavy hitters such as Home Depot and Wal-Mart were coming to Canada with plans, looking for locations. Cameron Development was ready to lead the charge.

Before South Edmonton Common was a glimmer, and before Naqvi-Rota was a real estate developer, she considered pursuing architecture. Instead, when she finished her degree and earned her PEng, she joined the family outfit. Once there, she found that she had an affinity for the business side of things. "My engineering degree gave me the ability to know how to get things done," she says, "and the practicality to plan for the future."

Cameron builds box stores with the ability to divide and change interiors. "The reality is, 20 years from now, it might be used for something else. So when I arrange for the engineering servicing for the site," she says, "I build in that flexibility." Her education gave her a deep understanding of what's possible in a commercial real estate development, what obstacles to expect and how to speak the same language as the

engineers on her projects. An MBA ('95) was icing on the cake, but anyone who has come up in a family business can tell you the real education started years before.

Naqvi-Rota spent weekends as a kid driving around with her parents looking at real estate. Maybe that's where she learned patience. Cameron Developments has seen its way through two recessions. "Be conservative; don't take on too much risk," Naqvi-Rota says, explaining the company's staying power. The industry is relatively small and she comes across the same people as they move to different posts and responsibilities. "Relationships are very important."

Ken Shillington (Civil '85), Stantec's VP for the Edmonton region, can vouch for the care Naqvi-Rota devotes to business relationships. He met her 16 years ago, in the planning stages of South Edmonton Common. Stantec has grown alongside Cameron, largely thanks to those great relationships. "They were a small family business," Shillington says of Cameron. "And we weren't that big either."

He describes Cameron as a great business and Naqvi-Rota as a leader with a personal touch. The two companies challenged each other on the mega-project, learned new skills and helped build the community. "I have a huge amount of respect for Tina," he says, adding that it's important that business leaders give back to the community—and that Naqvi-Rota doesn't hesitate to do just that. "She's been heavily involved in Compassion House Foundation and other charities."

As Naqvi-Rota's business and community presence have grown, she has honed her leadership skills. She grew up watching her parents and says one of the best things a leader can do, especially in the context of a flourishing family business, is to invest time wisely at the outset when dealing with people. "I have to pull in my own reins sometimes," she says. "Sometimes it could take me five minutes to do something myself, but instead I sit and talk it through with a staff member. It might take 20 minutes." The goal, she says, is that next time, the solution will come easier to staff.

By the NUMBERS

2.4 million: area of South Edmonton Common in square feet

First: rank, in size, of the retail project among open-air retail projects in Canada

320: area, in acres, of South Edmonton Common

214,000: area of the South Edmonton Common Wal-Mart, in square feet

150: number of stores in the Common

16: number of screens in Cineplex Odeon

7: number of family members involved in the business. No word yet on whether Tina's children will join.

2009: the year that Naqvi-Rota calls "a blip—a breather." The temporary slowdown allowed Cameron Development to recharge.

"My engineering degree gave me the ability to know how to get things done and the practicality to plan for the future."

— Tina Naqvi-Rota

Naqvi-Rota makes leadership, in the context of an entrepreneurial family business, look easy. But it's not. "Leadership is not black and white," she says. "As engineers, we are trained that there's a way to calculate and get the right answer. It doesn't work that way with people."

Current challenges she's facing include other large new retail developments on the horizon and the company's eventual transition. Her father still comes to work every day but eventually he and Henrietta will want to retire, and Naqvi-Rota and her siblings will take on larger roles. When the time comes, they'll be prepared.

Return on Inv

Anne Marie Toutant
(Mining '87) knows that any
worthwhile effort demands
hard work and attention
to detail—even if the
results are temporary

By Mifi Purvis



estment

Anne Marie Toutant (Min E '87) is dedicated to leading teams that are capable, flexible and prepared to take on any task they're assigned.

The work of a dancer is temporary. Once the music dies, audiences are left with a memory, an idea of what used to be there. And for all its fluid grace, dance is both a lot of fun and damn hard work, as Anne Marie Toutant (Mining '87) can attest. A classical ballerina until young adulthood, the mining executive returned to the studio a few years ago, in her 40s, to take dance classes at Keyano College in Fort McMurray.

She knows that other worthwhile things are also temporary. In her capacity as VP of Mining Operations at Suncor Energy, she's also responsible for reclamation and aims to make sure that mining is about the temporary use of land.

Toutant, in Edmonton for a Mining Association of Canada board meeting, is sipping coffee in the lobby café at the Westin. She sits with the straight spine of a dancer and reflects on her 25 years in mining. Somehow, the two things don't seem at odds.

In 2004, Toutant was a general manager with 18 years' experience. She held an

enviable position with Luscar's Boundary and Bienfait Mines in Saskatchewan. (Sherritt and the Ontario Teachers' Pension Plan purchased Luscar Ltd. in 2001.) Mining coal in the province meant moving earth; Toutant spent three-and-a-half years managing dragline operations, uncovering the coal that enabled Luscar to supply fuel to SaskPower. Toutant was overseeing three divisions and had wide responsibilities, notably for operating costs and implementing business plans.

"Someone asked me, 'How come your site is always ready for what's coming?' People are only resistant to change if they are inadequately prepared for it."

— Anne Marie Toutant

"I'd done a lot of leadership development work in collaboration with (Luscar's) HR manager in Saskatchewan, Loretta Miiller," Toutant says. Leadership development, hers and others', is a recurring theme. Remote from corporate offices in Edmonton, Toutant and Miiller wanted to invest site staff with "the capabilities, experiences and foundational pieces that they needed to cope with and initiate change," Toutant says. To that end, and with the services of the Canadian Management Centre, she and Miiller devised custom-built workshops for the staff. The plan helped create an adaptive workforce. "Someone asked me, 'How come your site is always ready for what's coming?' People are only resistant to change if they are inadequately prepared for it."

Maybe it was that ability to foster corporate change that caught the eye of Suncor Energy.

Suncor Oil Sands EVP at the time, Steve Williams, now COO, told Toutant that the company was looking to enrich its management team as it prepared to ramp up growth. He described a Canadian energy company maturing to become an organization with strong emphasis on safety, innovation and operational excellence.

Today, Toutant aims to capitalize on the strength of Suncor's pedigree as an entrepreneur on the frontlines of the oilsands, to bring the company into its own as a leader in the field. Over the past seven years, the company's maturation has evolved, with work such as the Journey to Zero safety initiative, an SAP business enterprise system, innovation in tailings technology, adoption of lean manufacturing principles and the merger with Petro-Canada.

It wasn't just the company that was changing and growing. Toutant worked on her own management style. "I've worked at becoming more open and transparent," she says. And she has sunk significant time and effort into developing the scope and readiness of the individuals and teams that work with her, which she calls "foundational."

For all her experience, Toutant didn't start with a drive to become an engineer. She graduated from St. Albert Composite High School with the kind of marks that opened doors. "I can't stand blood, so I didn't want to be a doctor," she says. "One of my really good friends at the time was applying for engineering. I thought I would, too." Toutant, then Anne Marie Willott, started the common first year of



engineering at the U of A “not having a clue what an engineer did.”

“The mineral team had the most fun and threw the best parties.” Toutant stops and lets out a delighted laugh. “So I decided to go into mineral. That’s how I started my career.”

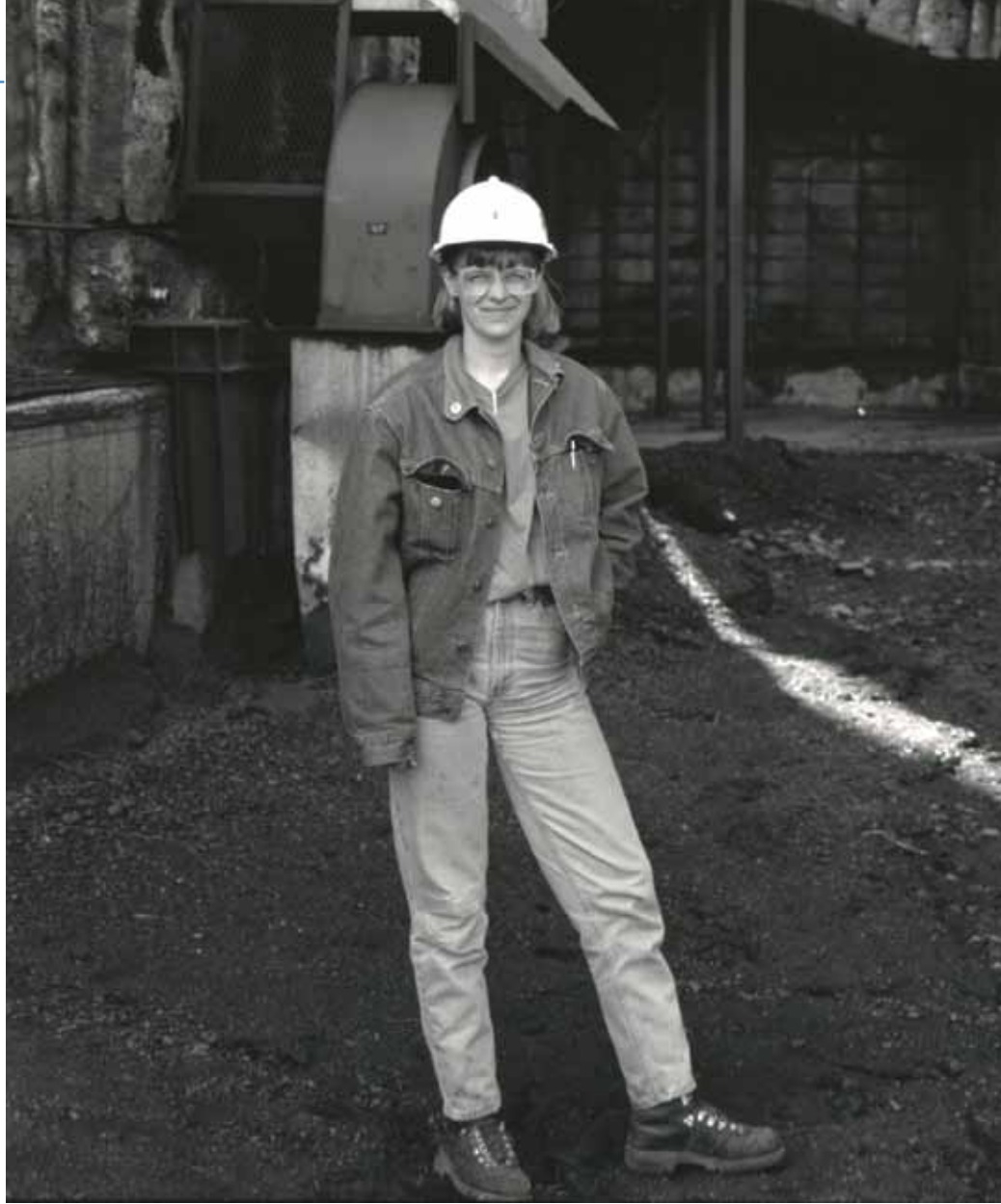
People ask her about women in mining and, if she tires of the questions, she answers graciously. “I value curiosity,” she says. In her graduating class of 13, there were three women, but in the 1980s it was not typical to see women at mine sites and Toutant was the first female engineer at her company when she graduated. An early mentor at the Cardinal River Mine, mine manager Rocky Morin was egalitarian. “Rocky had lady operators in the ’80s, so I never thought twice. Maybe he was just forward-thinking. We’d go to conferences, people would say, ‘Oh, we don’t let women in our mine’—I mean, it’s back in the ’80s, right?”

When Toutant hires, she looks for talent, open minds, a sense of safety and value for others. “I want to attract people who problem-solve and look for improvements,” she says. “MiHR (Mining Industry Human Resources Council) says Suncor’s mining averages of women on staff are higher than the industry’s. I don’t look to hire women, but it’s a bonus if you get a diverse workforce. Better decisions are made with more diversity.”

She describes mining 25 years ago as hierarchical. If her management style started that way, over the years her techniques have matured to encompass more horizontal, collaborative leadership. She learned some lessons the hard way, and growth didn’t come without mistakes and effort.

“But to be a global competitor you have to unlock the capability of your workforce. It requires everyone to make their best contribution to the business. It doesn’t mean command and control. Leaders must know what’s going on, encourage people, remove roadblocks and, yes, redirect work when necessary.” She is proud of her high-performing team. “My job has become so much easier,” she says. “While the plate has expanded tremendously, so has the capability of the team.”

The plate includes reclamation. “Mining is what it is: a temporary land use,” she says. She spent time at her first mine site



Anne Marie Toutant (above and on facing page) knows the importance of being at the leading edge, in order to move forward and adapt to change.

in Cardinal River on reclamation design work, some of which has been recognized by the Alberta Chamber of Resources. Other projects she has worked on have won reclamation awards. Most notably, Suncor Energy won the 2011 President’s Medal from the Canadian Association of Petroleum Producers for its work on the reclamation of Tailings Pond One. The 220-hectare site is now called Wapisiw Lookout. A \$1.2-billion tailings management process aims to reduce reclamation time by as much as 20 years over current methods. “We have to design with the end in mind,” Toutant says.

Her portfolio is expansive but she’s a firm believer that people have to find their passion and have fun at work—it’s one

of the lessons she took from her mentor, Rocky Morin.

Once, in the late ’80s, the two were walking at the top of a pit, surveying operations. “Rocky said, ‘Anne Marie, watch this,’” she recalls. Morin radioed down to a dozer in the pit. “He said, ‘I noticed that the last truck spilled a bit of rock. Do you think you can get your dozer over there and remove it before it damages tires?’” The dozer turned around and moved the errant rock. “Rocky looks at me with this huge grin on his face and says, ‘What do you wanna do next?’”

It’s still fun. Recently, at the Suncor Energy site in Fort McMurray, the team found a full ankylosaur skeleton. “Imagine it,” she says. “The biggest toys in the world and dinosaurs—what more could you want?”

FANTASTIC FOUR

When APEGGA presents awards to four professors, it means something to their students—and the profession By Scott Rollans

the RADICAL

Murray Gray



Richard Caliney

Scientific director of the Centre for Oil Sands Innovation, Murray Gray is supporting the discovery of game-changing technologies in the oilsands industry.

Murray Gray has spent more than a quarter century immersed in the oilsands—figuratively speaking. A professor in the Department of Chemical and Materials Engineering, Gray has devoted most of his academic career to seeking more efficient and sustainable ways of extracting bitumen from Alberta’s massive oilsands reserves.

These days, Gray serves as director for the U of A’s Centre for Oil Sands Innovation (COSI), a role that earned him APEGGA’s Centennial Leadership Award. He also holds the NSERC-Imperial Oil Industrial Research Chair in Oil Sands Upgrading and the Canada Research Chair in Oil Sands Upgrading.

You won’t find COSI on the U of A campus map—there’s no actual physical centre. It’s a multimillion-dollar project linking researchers at the U of A with colleagues across Canada and beyond.

COSI researchers hope eventually to transform the oilsands industry, making it both more efficient and more sustainable. “We try to get the people with the best ideas and the best capability, to try to make a difference in oilsands processing,” Gray

explains. “We’re looking for ways to develop this resource with significantly reduced environmental impact.”

One of the industry’s biggest challenges, of course, is the issue of wet tailings. Bitumen mining sites often end their lives as tailings ponds, storing the goopy sludge left over from hot-water extraction. The industry itself is concerned with managing tailings and more: it is looking for ways to reduce or eliminate its use of fresh water.

“We try to get the people with the best ideas and the best capability, to try to make a difference in oilsands processing.”

— Murray Gray

Researchers at COSI are looking for ways to recover bitumen from the oilsands by using solvents or other chemicals instead of water. “Instead of creating tailings ponds, we want to create a mixture of dry sand and clay that can go right back into the mine immediately,” says Gray. “So, no tailings pond, fewer environmental liabilities, and

no delay in being able to reclaim the mine site much, much faster.”

Gray envisions a future where companies can begin reclaiming a site virtually as soon as they finish mining it. He draws a comparison to surface coal mining. “If you look at the mine on the north side of Highway 16 beside Lake Wabamun, every year a portion of the coal is mined, and every year a portion of the mine is reclaimed and revegetated. So they are able to maintain a balance between mining and reclamation.

“It’s simple because there’s no wet tailings. If there were no wet tailings from the oilsands, then it could look a lot more like one of those coal mines.”

In an industry with a huge and costly footprint, COSI is working towards environmental solutions that actually save money. Its stated vision for the oilsands production facility of the future is “one that uses little or no water, less energy, occupies less area, integrates upgrading operations and costs less to build and operate.”

As much as he appreciates the APEGGA accolades, that future would be Gray’s finest reward.

on the leading

Tian Tang **EDGE**

Tian Tang is officially off to a great start in her career. A professor in the Department of Mechanical Engineering, Tang received APEGGA's Early Accomplishment Award for 2011.

To be sure, Tang has built an impressive list of early accomplishments. She has already earned several other awards for her work, including the 2009 Outstanding Young Adhesion Scientist Award from the Adhesion Society and the prestigious Alberta Ingenuity New Faculty Award, which provided close to \$300,000 for her research. She has also published 28 papers in high-quality international journals.

Tang looks at this latest honour as a challenge to continue her momentum. "It will motivate me to do better in my future career," she says.

Tang currently leads a team of seven graduate students researching mechanical and interfacial properties in materials at the micron to nano scale and in biological systems. For example, the team has been working with hybrid structures combining carbon nanotubes and DNA. A strand of DNA can wrap around a carbon nanotube like a vine climbing a fence. Tang and her team use molecular simulations to visualize and understand the resulting hybrid structures and the ways that the different materials interact with each other.

"Such structures have been shown to be useful for processing carbon nanotubes, to separate them according to their electronic properties and to place them with certain orientation on a substrate," she explains.

Tang's work has wide-ranging real-world implications. She is currently collaborating with Hasan Uludag in the Department of Chemical and Materials



Bluerish Studios

Mechanical engineering professor Tian Tang's research collaborations include an investigation of how DNA and carbon nanotubes interact. The results could have an impact on how drugs are delivered so they only treat only diseased cells.

Engineering. Together, they're working towards developing and refining polymers to deliver nucleic acid-based therapeutics to individual cells. This could improve the treatment of diseases such as cancer.

**"There are good facilities, good researchers and a lot of opportunities for interdisciplinary collaborations. I also feel that the U of A has a good balance between teaching and research."
— Tian Tang**

With the National Institute for Nanotechnology (NINT) right on her doorstep, Tang says the U of A provides an ideal environment for her research. "The U of A has focused on

nanotechnology as well as biomedical science and engineering. NINT has a group of scientists with a focus on nanoscience and nano-engineering."

Tang shares a high-performance computing system with NINT and uses it to perform molecular simulations. The U of A also offers a rich environment for interdisciplinary collaboration. In addition to her work with Uludag, Tang has lent her expertise to projects with the Faculty of Agricultural, Life and Environmental Sciences.

All things considered, Tang is clearly grateful that her early career path brought her to Edmonton. "It's a very strong environment for my work," she says. "There are good facilities, good researchers and a lot of opportunities for interdisciplinary collaborations. I also feel that the U of A has a good balance between teaching and research."

the **LEARNING** game

John Nychka

John Nychka was grateful to receive an Excellence in Education Award from APEGGA. “I am thrilled to be recognized for teaching—something I love,” he says. But he insists that his success as a teacher can be traced to one simple thing: a love of play.

“When you were a kid, how did you learn? Through playing,” says Nychka. “You actually did very effective learning through playing and experimentation. However, when you get to high school, and university, play is cut out. And play is an untapped resource.”

Every year, Nychka teaches a service course, an introduction to materials engineering. With many of his students coming from outside the department, he faces a major challenge. “A lot of this stuff

is technical. How do you bring them up to that high level, but keep them excited about it, too?”

He begins by connecting the subject matter to his students’ own lives. “On the first day, they’re like, ‘Why am I taking this course?’ You have to make it immediately clear to them that, first of all, they know what it’s about, and secondly, that they’re going to be interested in it.”

That’s where Nychka’s love of play comes in.

As part of their course materials, Nychka’s students are required to purchase a kit he developed called “What’s in the Box?” It’s filled with everyday objects we take for granted, all of which help him communicate the concepts of materials engineering.

“I could go along with the usual examples of turbine engines and things, but many of my students may not even know what a turbine engine is, or how it works,” Nychka says. “But if they open up a box of paper clips, some Silly Putty and some mechanical pencils, they know all that stuff—accessibility is the key.”

By illustrating materials engineering with tangible (and usually playful) examples, Nychka helps his students absorb the subject’s key principles. He also sparks their curiosity, inspiring them to learn more deeply.

“When we talk about very technical topics, such as phase transformations, it sounds scary,” says Nychka. “But really, it’s boiling water. So I tell them, ‘OK, let’s boil some macaroni.’ Now, why does the water boil over when you add the noodles? It’s a

common occurrence, but there’s actually a very technical explanation. We can get into that, but I need you to have that idea—‘OK, we have noodles boiling over. Lots of bubbles, lots of foam. There are critical concepts in there! What’s going on? Why would that be?’ ”

Outside the classroom, Nychka enjoys engaging his colleagues in conversations about teaching. He is a co-chair of his department’s teaching enhancement committee, and he regularly mentors graduate students.

“Five pounds of Silly Putty gets people’s attention pretty quickly! Knowing what to do with it helps to keep their attention and inspire curiosity.”

— John Nychka

But, with everything Nychka does, there’s a sense of play. Ask him, as a materials engineer, to name his favourite material and he doesn’t miss a beat.

“I love Silly Putty,” he says. “I actually took a test online and got a fake Master’s of Silly Putty degree from the Silly Putty University. I love playing with Silly Putty, and I figured out how to take Silly Putty, form it into an axe, cool it in liquid nitrogen and chop wood. I can also pound nails with it.

“Five pounds of Silly Putty gets people’s attention pretty quickly! Knowing what to do with it helps to keep their attention and inspire curiosity.”



Richard Cairney

Materials engineering professor John Nychka (Metallurgical '97) has won the APEGGA Award for Excellence in Education, as well as the U of A Provost's Award for Early Achievement in Undergraduate Teaching Excellence.

a spark of CREATIVITY

Wilsun Xu



Electrical engineering professor Wilsun Xu, who holds the NSERC/iCORE Alberta Power Companies Senior Industrial Research Chair in Power Quality, is working on ways for homeowners to monitor household energy use by each appliance.

The world, very slowly, is making a shift to renewable energy, a transformation that will require countless small-scale technological breakthroughs along the way. Wilsun Xu, a professor in the Department of Electrical and Computer Engineering, received APEGGA's Research Excellence Award for his eight years of research and development working toward one such breakthrough.

These days, a tiny (but steadily growing) portion of our electricity comes from distributed generation, or DG. In contrast to traditional electricity generation, which relies on massive, centralized power plants, DG collects and distributes electricity produced by many small, local generators, powered mostly by renewable resources.

For example, if you have solar panels on your roof to supply the electricity for your home, you can sell any excess electricity to the grid. Meanwhile, your neighbour down the street may produce electricity with a geothermal-powered generator, and the local swimming pool may have a couple of wind turbines—all contributing to the grid.

However, when the grid encounters a major problem, your household system might find itself suddenly disconnected from the grid. This situation, called "islanding," can be hazardous. "The

voltage could go very high, or very low," Xu explains. "That's dangerous for power workers and also for consumers. Their appliances and equipment could be damaged."

In the "anti-islanding" system developed by Xu and his team, power substations constantly communicate with local DG generators, through a signal in the power line. If the connection is lost, say through a broken line, that signal disappears—and a sensor in your home immediately shuts your solar power down. "This has to be done very fast," says Xu. "We're talking about 100 milliseconds."

"I always suspected that my fridge consumes lots of power. But actually, it doesn't. The one thing that consumes the most energy on my power bill is the lighting."

— Wilsun Xu

Xu's system proved very reliable and responsive in tests, leading to its licensing and deployment by Edmonton's Enertia Engineering.

Enertia has the product up and running in a demonstration installation in Ontario

and is negotiating sales with companies in Florida and Australia. Xu hopes the momentum will continue to build. "The utility industry is slow to make decisions; it's very conservative. But once one company makes a decision, the rest follow."

Xu and his team are now working on an easy-to-install technology to allow homeowners to monitor their energy usage. The unit recognizes the different electrical signatures of various appliances in your home, analyzes their power consumption and uploads the data to the Internet. "You can see your total home energy consumption, minute by minute," Xu says, "and you can also find out which appliances consume how much energy."

With that kind of detailed feedback, you can learn which strategies would best help you reduce your power bill. The results can be surprising, as Xu discovered when he tested the system on his own home.

"I always suspected that my fridge consumes lots of power. But actually, it doesn't. The one thing that consumes the most energy on my power bill is the lighting.

"So now I pay more attention to turning off the lights, and I don't worry about always closing my fridge door immediately!"

Aerial view of ICE in relation to surrounding buildings.



Street view of the Innovation Centre for Engineering from 116 Street.

ICE will transform Faculty of Engineering

Work has begun on a project that Dean of Engineering David Lynch describes as “transformative” for the Faculty of Engineering, the Innovation Centre for Engineering (ICE).

Located between the Chemical and Materials Engineering Building and the Windsor Car Park, ICE will provide approximately 26,000 square metres (gross) of space to support expanded educational and research activities.

The ICE has been designed to achieve, at a minimum, the Canada Green Building Council (CaGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System Silver certification. The current design and construction status indicates that the higher-level LEED Gold level certification is within reach.

Lynch says ICE will house the faculty and department administrative offices, graduate students and professors, laying a solid foundation for the faculty to accommodate future growth.

“It will enable us to add another 50 per cent to our graduate student population, to move from 1,600 to 2,400

graduate students and it will also enable us eventually to increase our undergraduate student enrollment and number of faculty and staff—literally a 50 per cent expansion in the Faculty of Engineering,” said Lynch.

Constructions of the “core and shell” of the ICE is scheduled for completion early in 2013. While funding is not yet available to construct the interior finishes of the ICE, this final phase of the ICE project will likely occur during 2013 and 2014 subject to the availability of funding at that time.

Preliminary floor plans have been developed for the ICE and discussions on ways to create optimal work space and conditions for departments, faculty, staff, and students and provide efficient and effective services are ongoing.

For more information visit the Faculty of Engineering ICE website, www.engineering.ualberta.ca/ICE.



Ground on campus view looking south.



Ground-level view looking south on 116 Street.

RISING



STARS



A new group of engineering graduates enters the profession with confidence and enthusiasm, while the Class of 2010 tells stories of unforeseen challenges, risks and rewards

By Richard Cairney

AMANDA SCHNECK

Finding balance

“I didn’t watch television as an undergraduate,” Amanda Schneck (Materials ’11) says when asked how she managed to be heavily involved with the Engineering Students’ Society, captain the Pandas Track and Field squad and earn a near-perfect grade point average.

Students need time to unwind, and every day after classes, Schneck did so by training with the track team. She broke team records in pentathlon six times in the past two years—four of them in her final season. She won bronze at the CIS national track and field championships and was named the U of A’s Female Academic All-Canadian of the year for the 2009-2010 season.

In student activities, she was awarded the Shell Canada Limited Scholarship in

Engineering, based on academic standing and involvement in extracurricular activities.

Now engineer-in-training with RAE Engineering, she’s looking forward to getting more fieldwork. “There is a ton of value in going out and doing fieldwork—it’ll be a great learning experience,” she says. “I’m really excited about it!”

Schneck is still competitive in track and field, but now that she is out of school, the question begs to be asked: What will she do with all her free time?

“I don’t see myself having a ton of free time. Working full time is a bit different than going to school; I think in its own way it is more demanding, more mentally tiring. But I also plan to be involved in something—I’ll find a committee to join somewhere.”



KATE MAGUIRE

Still learning

There are no more midnight assignments or group projects that run on until 2 a.m., but Kate Maguire (Mechanical ’11) will certainly be prepared for those kinds of demands.

Working as a maintenance engineer with Enerflex in Calgary, Maguire brings with her not only a degree in engineering but also a deep well of experiences many professionals would envy.

In her four years of study, Maguire completed a sustainable energy course at the University of Freiberg in Germany and participated in an international space project at the Andoya Rocket Range in Norway. There, she joined an international team of students that built a sounding rocket, launched it and analyzed the data it collected.

“They were both great experiences, and now I can say I am a rocket scientist,” Maguire says with a laugh.

International assignments and study marathons may be gone, but she’s still gaining new knowledge at work and employing the discipline it took to complete a demanding academic program in the Faculty of Engineering.

“There is definitely a lot of learning to do,” she says of the workplace. “It’s challenging, for sure, but I’d say that the U of A has taught us how to learn. I think that is what the engineering degree is all about and I am trying my best to apply it here.

“In the profession, it is so collaborative, and in school you are learning for four years to work in teams—and it is actually kind of fun working in a group until two in the morning.”

ROBERT TEED

Finding a needle in a biomedical haystack

In one respect, Robert Teed (Electrical '11) started his career before setting foot in an engineering class. After graduating from high school, Teed took on a summer job with Dr. Sanjiv Sam Gambhir, director of molecular imaging and chair of radiology at Stanford University, researching photoacoustic imaging—a new medical-imaging technology. Teed has returned to the Stanford lab every summer since then and has recently been hired as a research assistant.

There was, of course, a lot of work over his four years of study, including working on a Dean's Research Award project with electrical engineering professor Roger Zemp, an international authority on photoacoustic imaging.

In his new job, Teed will shift his focus from designing imaging devices to designing proteins.

"I guess you could call it protein engineering," Teed says of his assignment, adding that the lab is working far ahead of current medical technology—anticipating technology that can detect cancer at its earliest stages, when the very first cancerous cells appear.

"Suppose you have a dozen cancerous cells in your body. How do we find them?"

"I will be building proteins that can be injected into you and find cancer cells and give us a signal as to where they are," says Teed, who is clearly thrilled with the creativity and potential of the idea.

"The first time I met Dr. Gambhir, I became interested in bioengineering. I didn't know at the time how any of this would fall together, but this is the dream job. It's pretty surreal that I get to do this right out of university."



ELAINE RIPPON

The creative environmentalist

How many people can say the highlights of their university education included hurtling downhill in a 300-pound concrete toboggan on national television with comedian Rick Mercer?

Elaine Rippon (Civil '11) isn't dismissing this as an insignificant event, but as a student she kept her eyes on the prize and says her degree and new career are beyond compare.

Rippon was interested in the design aspects of engineering but when she entered the civil engineering environmental option program, everything came together.

"In my first year, I was really interested in the design aspects of engineering, but environmental is also a very creative program," she says.

Rippon also found challenges and rewards in student activities. As captain of the U of A's Great Northern Concrete Toboggan Race team, she learned about

project management. Her team hosted over 400 students from across the country for the national championships. Her team's toboggan was piloted by Mercer, who featured the race on national television. Rippon also volunteered as a mentor for girls interested in engineering and science.

"When you volunteer at university, you aren't just going to school. You get a sense of community; you see how the university is impacting young women. It's more than book learning; you see the bigger picture."

Today, Rippon is beginning her career as an engineer-in-training with Alberta Environment's cumulative effects program, which monitors the cumulative impacts of industrial activity on the province. And she is loving it.

"Environmental engineering kind of fell in my lap," she said. "I am so happy with the degree and with the program, I can't think of anything better."

MARK HLADY

A word of advice

If there is one word Mark Hlady (Materials '10) could use to describe his first year after graduation, it's this: "Wild." He's less concise, however, in describing exactly what he does as a consultant with McKinsey & Company, a pre-eminent global management consulting firm.

"It's hard to get my head around a succinct description of what I do," he says, "because it is so different from day to day."

In a nutshell, he helps leaders of Fortune 500 companies manage pressing corporate issues. Hlady helps devise innovative ideas to improve performance or resolve problems.

"It's like the senior leadership engaging the firm as partners. What happens is that they will say, 'This issue is keeping me up at night. I don't know what to do. I need

help to solve this.' We deal with their most pressing issues—the stuff that is front-of-mind for them."

Hlady is thriving in the environment. When clients see improvements after consulting with the firm, Hlady feels gratified.

"The results are in the numbers," he says, adding that he feels confident because no matter what issue a client brings up, someone in the company's network has some expertise in it.

While he's learning a lot, Hlady has also been putting on miles.

"It has been an opportunity to travel," he says. "It has been a wild, wild year. The number of places I have been and the industries I've experienced and the people I have met is just crazy."



HILARY COSTELLO

The best-laid plans

A funny thing happened on the way to Cambridge. Hilary Costello (Mechanical [Co-op] '10) was working for Suncor Energy last summer before heading off to begin her PhD when she received a somewhat cryptic email from her supervisor, Dr. Hugh Hunt.

"He asked if I wanted to bounce bombs and blow up dams," Costello recalls. Hunt was recreating the engineering behind the Second World War air raids by the RAF, which deployed bouncing bombs to destroy two German dams, for a documentary film.

It was an interesting diversion for Costello, who had imagined immersing herself in renewable energy studies at Cambridge. That notion, too, has gone a bit off track. The topic of her PhD research is controversial and steeped in ethical questions.

She is part of a project being worked on by teams at Cambridge and the universities of Bristol and Oxford, to cool the Earth in the event of sudden and radical heating. By pumping reflective particles into the stratosphere, similar to a large volcanic eruption, a reduction in mean global temperature could be achieved.

Costello's group is working on pipelining the particles up 20 kilometres with a massive tethered balloon. She is researching the tethering dynamics, which could also have applications to structures such as high-power lines and offshore oil rigs.

"It is an extreme project," she says. "I was skeptical at first. But I did come here to try different things, and this is a really interesting project plagued with fascinating technical and ethical challenges."

DARYL TRAN

The human factor

Daryl Tran (Electrical '10) credits hard work not only in academics but also in his various capacities with the Engineering Students' Society (ESS) for preparing him for a leadership role professionally. Tran became involved with the ESS in his first year and eventually served two terms as president, adding a fifth year to his studies to ensure he achieved his goals in the classroom and out.

Following graduation, he travelled to Vietnam, where he met his extended family and decompressed from the hectic pace he'd been keeping. With the economy in a deep rut, Tran was unsure of his professional future but confident in his abilities.

That confidence was well-founded: Tran recently joined DCM Group Inc. as a junior project engineer, working on Canadian Natural Resources Limited's Horizon oilsands project, and he is being groomed

to take on a project leadership role on a construction site of his own.

It's a lot of responsibility for a 23-year-old engineer-in-training. But his time leading ESS volunteers gave Tran a keen understanding of the dynamics of trust and relationship-building.

"It is a little tougher in industries where you're dealing with a lot of tradesmen and women because a lot of young engineers feel they have a degree and deserve all this power and influence—but you are still the new guy and you need to work at building relationships," he says.

"Once my coworkers start to respect the person I am, I can start working from a position of authority," he says. "I wouldn't have access to the opportunities that are opening up to me today if I hadn't been volunteering for the ESS, expanding the status quo of what was an engineering degree."



BOBBY WILLIAMSON

The calling

When Bobby Williamson (Petroleum '10) puts his mind to something, things happen. With few jobs available after graduation, Williamson worked as a roofer and janitor for the summer, then joined a friend on a trip to Germany, travelling the continent on weekend excursions and pondering his future. This idyllic period was short-lived.

"My sister was born deaf and has gone for speech therapy at different points in her life, and speech therapy was something I'd always been interested in," says Williamson. Once the idea to pursue a graduate degree in speech therapy took root, Williamson got to work. He enrolled in seven university prerequisite courses ("It turns out that the petroleum engineering program doesn't really prepare you for

speech therapy," he says, tongue-in-cheek) and booked a flight home.

By the end of the spring semester, Williamson had completed four online courses and three U of A courses, earning four A-pluses, an A-minus, an A and a B-plus. He has been accepted into the U of A's speech therapy program and is working with speech therapy professor Bill Hodgins at the Misericordia Hospital's Bone Conduction and Amplification Laboratory.

"All I can do is my best at the stuff that I can affect. To look back now at where I was last April—I wasn't sure what I was going to be doing. Then in mid-November saying, 'This is what I see myself doing' and just putting a whole new pile of work on my plate. I am pretty proud of that."

Gary Michalchuk followed his father's footsteps in environmental engineering and added his own entrepreneurial flair into the mix

By Scott Lingley



M.R.C.

One of the truisms you're likely to hear about an engineering education is that it equips an individual with excellent problem-solving skills. That's certainly the first thing that comes to mind for Gary Michalchuk (Civil '84), founder and president of Edmonton-based E.I.L. Environmental Services.

"Engineering teaches you a logical thought process to analyze and solve problems—that's the most valuable thing I got from my education at the U of A," Michalchuk says. "And, of course, that spills over into the real

Jason Franson



LEAN

Gary Michalchuk (Civil '84) struck out on his own to establish E.I.L. Environmental Services. He has sold the company twice but retains control of the firm, which today employs 25 people and has offices in Regina and Grande Prairie, and a transfer station in Onoway, north of Edmonton.

Gary Michalchuk has used his early career experience in waste management to build a bustling company. E.I.L. Environmental Services has a transfer station in Onoway, Alberta and branch offices in Grande Prairie and in Regina, Saskatchewan.



Jason Franson

world when you're running a business. You can solve any problem that arises."

Michalchuk's accomplishments—including national recognition as one of Ernst & Young's 2010 Entrepreneurs of the Year—stand as proof that an engineering education is also part of the formula for innovative business success. The flipside of solving problems is recognizing opportunities to improve the way things are done, a skill Michalchuk has combined with a passion for customer service to turn the "one-man show" he started in 1991 into a leader in hazardous waste management, with 25 employees and branches across Alberta and Saskatchewan.

Michalchuk recalls that he, like a lot of young people, wasn't sure what he wanted to do once he finished high school. He felt more drawn to the sciences than the arts or education, and when it came time to decide which career path to pursue, he looked to his dad for inspiration.

"My father was sort of a pioneer in the industry—he was an environmental technician starting in the early '70s working in an asbestos mine in northern Yukon. Back then, there weren't too many guys involved in the environment, so he was a

forerunner there," he says. "I remember living up there for a year when I was around 10 years old. He got a job with Environment Canada and we moved back to Edmonton a year later and, unfortunately, he passed away in an industrial accident.

"It was always in the back of my mind, you know, you kind of want to follow in your dad's footsteps if you can. At the time, there was no formal environmental engineering program, but there were a few environmental options within civil engineering, so that's why I chose civil engineering."

Upon graduating from the U of A, Michalchuk landed a job with the company that operated the newly opened Alberta Special Waste Treatment Centre in Swan Hills. He enjoyed his job creating waste profiles, taking samples and drawing up contracts for multinational petrochemical firms, Alberta's utilities providers and other large companies. But he also became intimate with the frustrations experienced by his clients.

"It was a tough time for the plant because they had more volume of waste scheduled to come into the plant than they had capacity for in the incinerator and

the various processes up there," he recalls. "At times, we were telling some customers they had to wait for a year because of the backlog."

Long waits meant clients had to assume liability for storing their own hazardous waste over protracted periods, potentially bringing them into conflict with Alberta Environment's regulations regarding those materials. Rather than accepting the state of things, Michalchuk recognized a chance to improve the situation.

"I figured there had to be a better way to service these customers, and that's when I decided to form my own company and find solutions to some of these customers' problems," Michalchuk says. "That's where the engineering experience comes in—you look at the situation from a logical viewpoint, you put some thought and planning into the process and make sure you approach opportunities with your eyes open."

Working solo, Michalchuk sought out alternative ways to safely handle the types of material usually bound for Swan Hills.

"What I'd do is go on-site and, for example, change the composition of the waste, at which point there's a different waste stream for it and it doesn't have

to go to Swan Hills. I looked at sending materials down East or to the U.S. for recycling. I looked at options the Swan Hills guys weren't offering and that's how the company began."

Michalchuk knew he was on to a good thing when his former employers became his biggest referrers, sending clients his way who, for one reason or another, couldn't wait in Swan Hills' long lineups. It wasn't long before Michalchuk had to start expanding his workforce and facing the learning curve involved in the human resources end of the business.

"Meeting the demand and keeping the level of service up during the rapid growth—E.I.L. grew quite quickly in the early years—was the biggest challenge. You start with one guy, me, and then you keep adding people. And adding employees is always going to be a challenge when you want to maintain that high level of service."

Today, E.I.L. Environmental Services has branch offices in Regina and Grande Prairie, and a transfer station in Oneway with 10 million litres of storage capacity and a distillation facility. Michalchuk says a "good chunk" of E.I.L.'s business is in recycling used oil and solvents, turning them into saleable products for industrial use. He says they recycle about 85 per cent of the material they collect.

"Instead of using virgin material which is more expensive, [companies] can buy the recycled material—we usually get them to 96 or 97 per cent purity—which is appropriate for their applications. Another thing we do with unchlorinated solvents is clean them up and blend them with recycled oil in compliance with Alberta Environment's specifications, then that's used as an alternative fuel source for companies, like asphalt companies that are paving Alberta highways in places where there's no other fuel options."

It didn't take long for E.I.L.'s innovative services to attract the attention of bigger companies and, in 1997, Michalchuk sold to a publicly traded environmental company that was looking to expand and allowed Michalchuk to continue as manager. When that company went into receivership a year and a half later, Michalchuk was able to buy his company back at a reduced price.

"That worked out perfectly because when the company bought E.I.L., part of the deal was they were going to put some infrastructure money in—they expanded our tank farm and added a couple of new trucks—so when I bought it back, the upgrades came with it."

(In the intervening time, Michalchuk also seized on a real estate opportunity he spotted while vacationing with his family in Hawaii, which he has turned into a side business renting three renovated vacation properties on Maui and two in Panorama, a concern he manages with his usual pride in customer satisfaction and the repeat business it generates.)

Once back in charge at E.I.L., Michalchuk sold part of the company to some key employees, enabling them to enjoy E.I.L.'s success as partners and lightening his workload in the process: "It was the best thing I ever did," he says. In 2007, a private equity company based in Toronto bought 70 per cent of E.I.L., but Michalchuk retained the leadership responsibility for the company's growth and longevity.

Soon after, Michalchuk was surprised to learn he'd been nominated for Ernst & Young's 2010 Entrepreneur of the Year Award among a national field of innovators in the "Cleantech" category.

"I was up against some very stiff competition," he says. "On the shortlist was a guy who designed and operated wind turbines for alternate energy; another guy was into setting up gasification plants to make energy from burning garbage, a very solid company doing really well; then someone out of Calgary, she set up a process for gas plants to reduce their emissions. And I was thinking, I'm just a guy doing some recycling and hazardous waste disposal—I didn't think I stood much of a chance to win."

Michalchuk was pleased to receive the award itself, but says the best part was revisiting the path that had brought him to that moment.

"The part I found the most gratifying was going through the history of the company during the submission process. It was a bit of work putting together all the information for the judges, but it gave

me a chance to go through the history and realize how many people contributed to the success of the company—family, friends, employees, customers, suppliers—and it made me realize how fortunate I've been to be surrounded by pretty decent people who have helped me out along the way. It definitely wasn't just one guy."

He's also pleased to reflect on how attitudes have changed over the two decades he has been in business. While environmental regulations have become more rigorous and the penalties for their violation more punitive, Michalchuk sees individuals and businesses of all sizes voluntarily stepping up to limit their environmental impact.

"I think everyone has become aware of their individual responsibility to make sure they're doing the right thing with respect to the environment. It's good to see."

— Gary Michalchuk



"I think everyone's come a long way, whether it be the householder that's recycling their material and using the depot to drop off their used solvents, or businesses," he says.

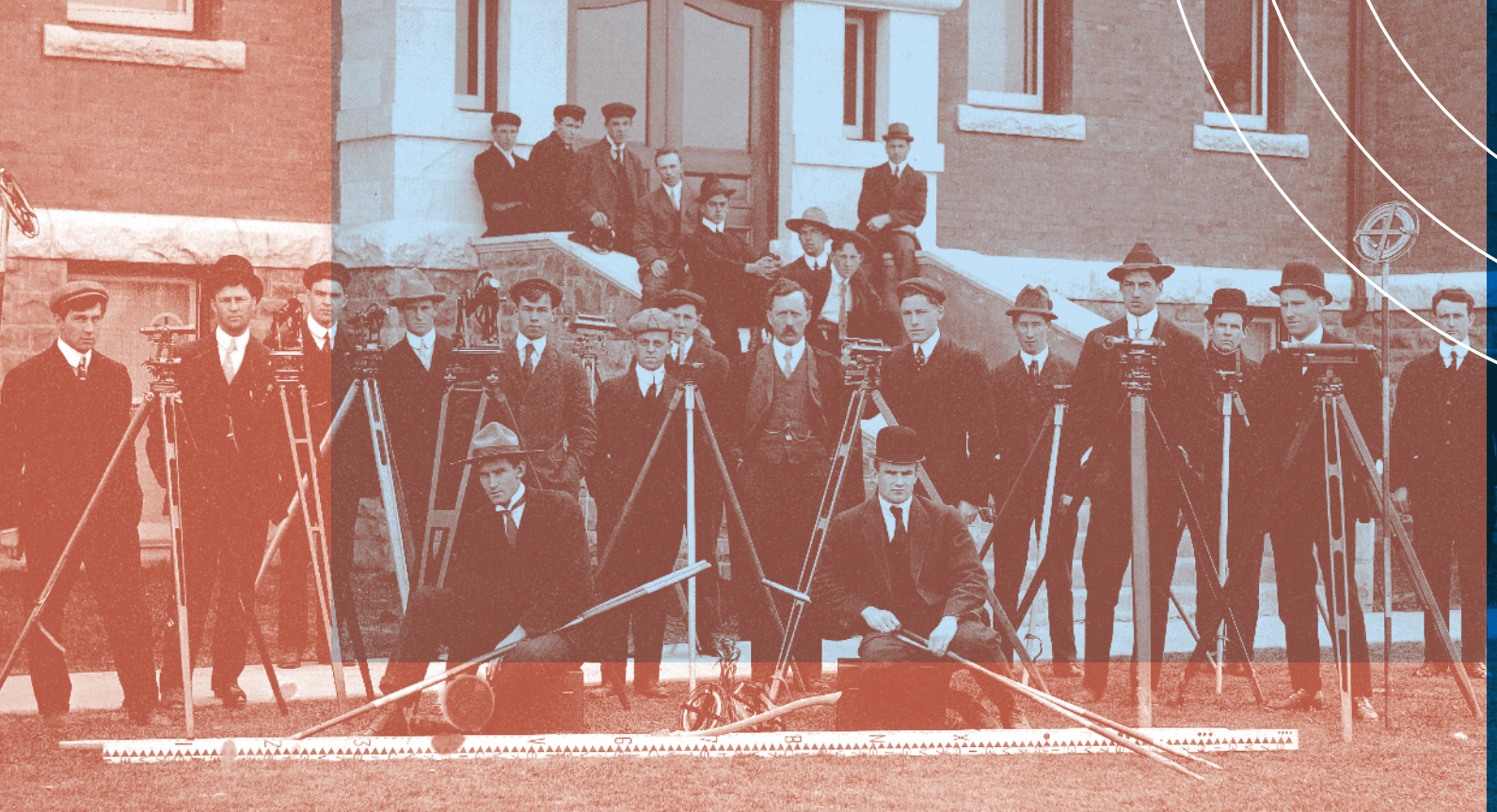
"In the old days, everybody used to throw everything in the garbage. Now they realize it's going to the landfill and over time it leaches into the environment, and I think everyone has become aware of their individual responsibility to make sure they're doing the right thing with respect to the environment. It's good to see."

Despite changes over more than a century,
Survey School is one course that has withstood
the test of time By Jen Reid

IN TRANSIT

Among the first classes offered at the University of Alberta after its inception in 1908 was Survey School, an attempt to quickly educate young engineers in surveying—one way to assist in developing the industry and infrastructure the young province desperately needed.

For many years, Survey School was a month-long course, taking students to mines and camps around the western states and provinces to train them in surveying for mining and civil engineering. From 1908 to 1965, all engineering students, regardless of discipline, were required to take Survey School at the end of their first and second years. Some students



One of the first courses offered at the U of A was surveying. In this photo U of A founding president Henry Marshall Tory can be seen, centre. Professor William Muir Edwards, an engineer and the first of the original four professors hired at the university, is pictured at the far right.

leveraged this employable skill into summer jobs. But the lessons learned are enduring.

“If students miss out on Survey School, they can miss out on certain elements in classes later on and may not have an appreciation for the detail and skill of surveying,” says mining professor Tim Joseph. “You’re also not behind a desk, but with a team out in the field—you can’t survey alone. It builds those people skills and vital communication on-site as part of being a team in an adverse situation.”

The art and science of surveying for engineers may have evolved over the years, but the principles remain the same: accuracy, spatial awareness and adaptability. The skills taught to the second-year students who take the class—traverses, mapping, levelling and so on—continue to provide the practical basis of knowledge for students to appreciate accuracy and precision as an engineer, and the role of a surveyor in an engineering project.

The survey school course was a direct response to the needs of industry in Western Canada in the early 1900s: railways were expanding through the West, coal mines were popping up all over the province, speculators were

subdividing residential areas beyond the city limits, and new mansions, hotels, highrises and bridges were needed to accommodate the growing population. Engineers were in high demand, and they required a balanced education.

For many years, Survey School was taught by Alan Emerson Cameron, who joined the U of A in 1914 as a lecturer in mining engineering after five years of rail and mine survey work across the West.

Several classes were suspended in 1917-18 to allow students and professors, including Cameron, to serve in the First World War. Cameron returned from the Royal Canadian Engineers after the war and continued as a government advisor and geological consultant, conducting explorations and surveys of northern Alberta, British Columbia and the Northwest Territories for the Geological Survey of Canada and mining and petroleum companies, many times with the assistance of students from the U of A’s Department of Mining and Metallurgy.

Cameron’s career included roles with regional and international research councils, and he was recognized with three honorary doctorates across the country.

The art and science of surveying for engineers may have evolved over the years, but the principles remain the same: accuracy, spatial awareness and adaptability.

His excellent citizenship set a precedent for mining engineers and professors to protect the resources they mine, to integrate students and young engineers in real work, and to be active in the development of their industry.

Throughout the 1920s and 1930s, classes were held all over the West, from Boy Scout camps near Sylvan Lake to mines and land in southern Montana. The Survey School of 1927 involved a trip to tour mining and building sites in southern Alberta and British Columbia, including Lethbridge and Kimberley.

The transfer of control of natural resources to the provincial government buffered surveyors from the early part of the Great Depression. Changes in town

planning legislation and the continued growth of Alberta's cities meant there was still a great deal of work for surveyors and young engineers seeking experience.

Later in the Dirty Thirties, the mining industry was one of the few areas where engineers could find jobs. The mining engineering department had the largest enrolment of all branches of engineering at the university at the time. As a result, the survey school class focused on mining for several years.

In 1942, Edmonton had become a hub for men, material and management of the Alaska Highway. U of A engineering graduates and undergraduates on summer employment were directed to work on the highway, and the project was completed within eight months, linking airports, resources and manpower for the war effort. Many young men not already on active duty would hurry off to seek survey and

engineering work on the northern highway, returning to classes in the fall.

As veterans returned from the Second World War, engineering enrolment more than tripled. More than 600 students were enrolled in the 20-day Survey School course in 1946. These unprecedented numbers required the few technicians and instructors to make frequent and hasty repairs to the old and sometimes homemade equipment, becoming experts in the two-peg test to adjust levels, checking and adjusting transits in minutes, and mending chains while young engineers waited.

Despite the region's economic recuperation, funds at the university were low enough that the administration had to search hard to raise money to replace surveyor's chains.

Mid-century editions of Survey School varied from year to year. Sometimes students would complete their staking and measuring at "home": the U of A campus, which continued to expand over the next several decades and is likely unrecognizable to students of that era. Several male students have since reported setting their sights on the women's dormitories during an on-campus surveying lesson.

The Alberta Land Surveying Society lobbied in the 1970s to have a full surveying program instituted at the U of A. While it ultimately failed to institute a full undergraduate or graduate program, the course has remained as a vital element of many engineers' education.

The 1990s brought the advent of new technologies, which have revolutionized surveying. The 1995 Survey School students were the first to get their hands on a global positioning system (GPS) unit which could provide the height, latitude and longitude of their area without the manual

calculations and measurements needed using traditional equipment. At the time, this type of GPS unit cost nearly \$100,000, but the equipment was loaned to the U of A at an extremely low cost.

"It's great to use the old technology and new, state-of-the-art technology side by side," said civil engineering professor emeritus Art Peterson at the time. "The concepts remain the same."

While the GPS units now used are much cheaper and more effective in certain situations, they require line of sight, so the "analog" transits, levels and compasses still frequently find heavy use.

The Survey School field course (CIVE251) is now an intensive, weeklong course in early May, with a separate, prerequisite course that teaches the fundamentals.

The course has been held southeast of Edmonton at the Blackfoot Grazing Reserve near Cooking Lake since the 1990s. Students get their hands dirty, learning to determine earthwork volumes, levelling, traversing, conventional and digital mapping, aerial photography—and yes, GPS. This year, all 189 students spent their days taking measurements and staking, their evenings hurriedly completing the assignments, and much of the final Friday afternoon retrieving their stakes from the public lands.

As Joseph says, classes such as Survey School are vital and communicate knowledge in a way that lecturing can't. "These classes give students experience you just can't provide in a classroom. To understand surveying, you need real hills and real earth piles. The principles need to be physically put into practice to understand the issues coming from errors in calculation."



"It's great to use the old technology and new, state-of-the-art technology side by side. The concepts remain the same."

— Art Peterson

Kudos

Taking pride in achievement

CHECKEL, DAVID PEng (Mechanical '76)

Has completed the Canadian Death Race solo ultramarathon at Grande Cache, Alberta. Checkel, a professor emeritus in the Faculty of Engineering, and mechanical engineering professor Brian Fleck both finished the 125-kilometre cross-country run in just over 23 hours.

ELLIOTT, JANET PEng

Has been nominated for a prestigious ASTECH Award from the Alberta Science and Technology Leadership Foundation in the Technology category. Elliott is a professor in the Department of Chemical and Materials Engineering and an internationally respected thermodynamics researcher. The award winners will be announced October 28 in Calgary.

FACEY, RODERICK PEng (Civil '87, MEng '92, PhD '99)



Has expanded his role as vice president, technology solutions with Gemini Corporation by assuming the position of vice president, engineered solutions. Facey has been employed with Gemini since 2004

and has been actively involved in the development of Gemini's client base and the delivery of engineering services. Gemini offers services including project management, engineering, fabrication, construction, and maintenance of oil and gas and industrial facilities within Canada and internationally.

FLECK, BRIAN PEng (Mechanical '89)



Has survived a gruelling solo ultramarathon, the Canadian Death Race, at Grande Cache Alberta. Fleck and professor emeritus David Checkel both finished the 125-kilometre cross-country run in just over 23 hours.

KJOSNESS, DONALD PEng (Electrical '66, PhD '71)

Has been nominated for a prestigious ASTECH Award from the Alberta Science and Technology Leadership Foundation in the Energy and Environment category. The award winners will be announced October 28 in Calgary.

MANZ, DAVID PEng (PhD Civil '85)

Has been nominated for a prestigious ASTECH Award from the Alberta Science and Technology Leadership Foundation in the Energy and Environment category. The award winners will be announced October 28 in Calgary.

MORAN, KEVIN PEng (PhD Chemical '01)

Has been nominated for a prestigious ASTECH Award from the Alberta Science and Technology Leadership Foundation in the Energy and Environment category. The award winners will be announced October 28 in Calgary.

PACHAL, PETER (Eng Phys '99)

Has been appointed as news director for *PCMag.com* in New York City. Paschal is the former editor of *DVICE*, an online technology news and review site, and has also served as associate managing editor of *Sound & Vision* magazine. Pachal is a former managing editor of the Gateway at the U of A and broadcaster with CJSR.

SIKORSKY, MICHAEL PEng (Computer '96)



Has been named as one of Alberta's 50 most influential people by *Alberta Venture* magazine. Sikorsky, the CEO and co-founder of Robots and Pencils, is making his mark in developing smartphone "apps."

In 2010, his company created the fourth-highest-grossing app in North America, *Minecraft World Explorer*, and saw an iPad app hit second-place in the U.K. Sikorsky is the Faculty of Engineering's Entrepreneur in Residence and mentors young entrepreneurs.

THACKER, HEMI (Computer '86)



Has been named as Ernst & Young's Entrepreneur of the Year in central Texas. This award recognizes outstanding entrepreneurs who demonstrate excellence in innovation and commitment to their businesses and community. Hacker

is president and CEO of Anue Systems in Austin, Texas. Anue partners with leading network-monitoring companies to provide network engineers with complete visibility into network traffic.

VANCE, BRIAN PEng (Mechanical '81)

Has been appointed as the chief administrative officer for the town of Slave Lake, Alberta—the municipality's highest administrative office. Disaster struck the northern Alberta town in May, when a forest fire destroyed 40 per cent of the town. Vance is playing a major role in rebuilding efforts.

In Memoriam

The Faculty of Engineering sincerely regrets the passing of the following alumni and friends.

Mr. Howard Atkin, Civil '50, in March 2011
Mr. Kenneth Balderson, Electrical '39, in March 2011
Mr. Otto Bergen, Civil '63, in February 2011
Mr. Henry Bertrand, Chemical '50, in March 2011
Mr. Donald Bissett, Electrical '39, in May 2011
Mr. Bill Bishop, Civil '55, in June 2011
Professor Patrick Bouthillier, Civil '44, Professor Emeritus, in April 2011
Mr. William Brander, Chemical '49, in April 2011
Mr. George Brown, Civil '56, in May 2011
Mr. Nickolas Cherniwchan, Mining '50, in January 2011
Mr. Sheldon Donvito, Chemical '41, in March 2011
Mr. Dan B. Fajayan, Mechanical '06, in July 2011
Mr. Mohammad Fazil, MSc (Petroleum) '65, in December 2010
Professor Eldon Fowler, Civil '48, MSc (Civil) '50, Professor Emeritus, in June 2011
Mr. Antti Halinen, Electrical '83, in March 2011
Mr. Nick Huculak, Civil '52, in September 2010
Mr. Clarence Kent, Petroleum '52, in March 2011
Mr. Leonard Klingbeil, Civil '81, in May 2011
Mr. Ivan Kraemer, Civil '60, MSc (Civil) '62, in February 2011
Mr. Thomas Lavolette, Civil '51, MSc (Civil) '54, in April 2011
Mr. Wally Lindberg, Mining '49, in March 2011
Dr. David Matheson, Civil '66, MSc (Civil) '68, PhD (Civil) '72, in June 2011
Mr. Ken McCready, Electrical '63, in July 2011
Mr. Peter McLean, Electrical '64, in August 2011
Mr. Gerald Neave, Civil '67, in April 2011
Mr. Gordon Raisbeck, Electrical '50, in May 2011
Mr. Boris Sakowsky, Electrical '50, in August 2011
Mr. James Stewart, Petroleum '55, in April 2011
Mr. Bernard Van Hees, Civil '49, in July 2011
Mr. Gordon Weisser, Mining '48, in August 2011
Mr. Dick Wytsma, Electrical '46, in March 2011

The Faculty of Engineering was recently made aware of the passing of the following alumni more than a year ago:

Dr. Edward Gates, Mechanical '71, in December 2008
Dr. Roop Gupta, PhD '70, in December 2002
Mr. Henry Happy, Mechanical '61, date unknown
Mr. Harry Hencher, Chemical '40, in March 2006
Mr. Francis Hickey, Chemical '50, in March 2008
Mr. Colin Karasek, MSc '60, in November 2003
Mr. Donald Moore, Civil '48, in November 2008
Mr. Donald Patterson, Electrical '51, in January 2006
Mr. Gordon Sissons, Mining '42, in 2006
Mr. Brian W. Smith, Electrical '51, in December 2004
Mr. Roman Zaputowycz, Electrical '56, in May 2010

VERHESEN, PAUL PEng (Civil '88)



Has been named as one of Alberta's 50 most influential people by *Alberta Venture* magazine. Verhesen is the president of Edmonton-based Clark Builders, president of the Edmonton Construction Association and an advisory board member for the National Research Council Canada – Institute for Research in Construction.

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University of Alberta ENGINEERING

Planned Giving

Mechanical Engineering professor emeritus Doug Dale (Mechanical '61, MSc '63) wanted to ease the financial strain on future engineering students. One of the things he has done is made a charitable bequest to the Faculty of Engineering.

If you would like more information on how you can support future U of A engineers through a planned gift, please contact:

Nena Jovic-Andrejevic,
Planned Giving Officer, Faculty of Engineering, University of Alberta
E6-050 Engineering Teaching & Learning Complex
Edmonton, AB T6G 2V4
Tel: 780.492.8969 Fax: 780.492.0500
E-mail: nena.jovic-andrejevic@ualberta.ca



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If you are an Alberta resident on December 31, 2011 and have already given \$200 elsewhere, your combined income tax savings will be:

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| Your donation to the U of A: | \$100 | \$500 | \$1,000 | \$2,500 |
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