FALL 2006 WWW.ENGINEERING.UALBERTA.CA

U of A Engineer

Keeping in Touch with Alumni

Following the Family Flight Plan

Reagan Williams (Mechanical '92) and his father and company founder, A.D. Williams

Plug and Play the Oil Game | Poisson's Ratio | PCL: The Pooled Collective | Invested With Success

Message from the Engineering Representative on the University of Alberta Alumni Council

As Engineering representative on the U of A Alumni Council, I will represent thousands of my fellow graduates, as well as our collective interests. What does it matter if we stay in touch with the Faculty of Engineering and our classmates? How important are alumni to the University? We are a source of inspiration and motivation for students, staff, and administration. Our pictures hang on the walls so that current students have a constant reminder that it is possible to pass and move into this proud career. Names of alumni and their various corporations are on buildings and classrooms and walls—constant reminders of the success our education has brought us.

What can you do to show appreciation to the Faculty of Engineering? Start by showing up at Reunion Weekend. It will be a fabulous opportunity to network. In my life, I can truly say that the most important part, so far, has been the people I meet and the friends I make. I need you to be involved; otherwise my voice on Alumni Council will carry little weight. Why should you do this? Because you were asked.

Yours truly,

Jim Funk (Mechanical '86)

President, Lubex Enterprises Ltd.

Edmonton, AB

Faculty of ENGINEERING
University of Alberta

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.*

NEW to www.engineering.ualberta.ca

by Rusti Lehay

Cultural Diversity Engineer

When Peter Janele (PhD Mechanical '88) entered engineering, he discovered that oil exploration was a bit more complex than he thought. As international team leader of reservoir modelling and characterization for Chevron, Janele has learned firsthand that oil exploration can pose cultural and political challenges as well as technical ones. Janele's work has taken him around the world, including a five-year stint in Indonesia and four years in Kuwait. Meet a "cultural diversity" engineer online at www.engineering.ualberta.ca.

To read the complete article, log onto www.engineering.ualberta.ca

Table of Contents

Fall 2006

FEATURES

COVER STORY

DEPARTMENTS

Message from the Editor

It is my pleasure to introduce a new colleague, Jim Sellers, who is development and communications coordinator for Electrical and Computer Engineering (ECE). Sellers has put together a four-page discipline-specific insert for this magazine. If you are a graduate of Electrical and Computer Engineering you have received a special issue *of U of A Engineer* with this insert.

This insert features an intriguing device that will regrow teeth naturally, using ultrasound. This low-intensity pulsed ultrasound (LIPUS) device is the creation of Dr. Jie Chen of the Department of Electrical and Computer Engineering.

The insert introduces another professor, Dr. Chris Backhouse, who is finding new methods of making health technologies more accessible through miniaturization and integration. He is directly tackling the problem of incorrect medical diagnosis.

You will also be introduced to Kenneth Chau, a doctoral student working at the Ultrafast Photonics and Nano-optics Laboratory in Electrical and Computer Engineering. Chau is redefining the understanding and applications for terahertz (THz) light—invisible light whose frequency lies between that of far infrared and microwave radiation.

If you a graduate of a discipline other than ECE and interested in this insert, please contact me at sherrell.steele@ualberta.ca

I hope you enjoy this special insert. In fact, I hope you enjoy all the content in fall issue of the magazine. Feedback is always welcome. Contact me at 780.492.4514 or at sherrell.steele@ualberta.ca.

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Fall 2006 Issue 21

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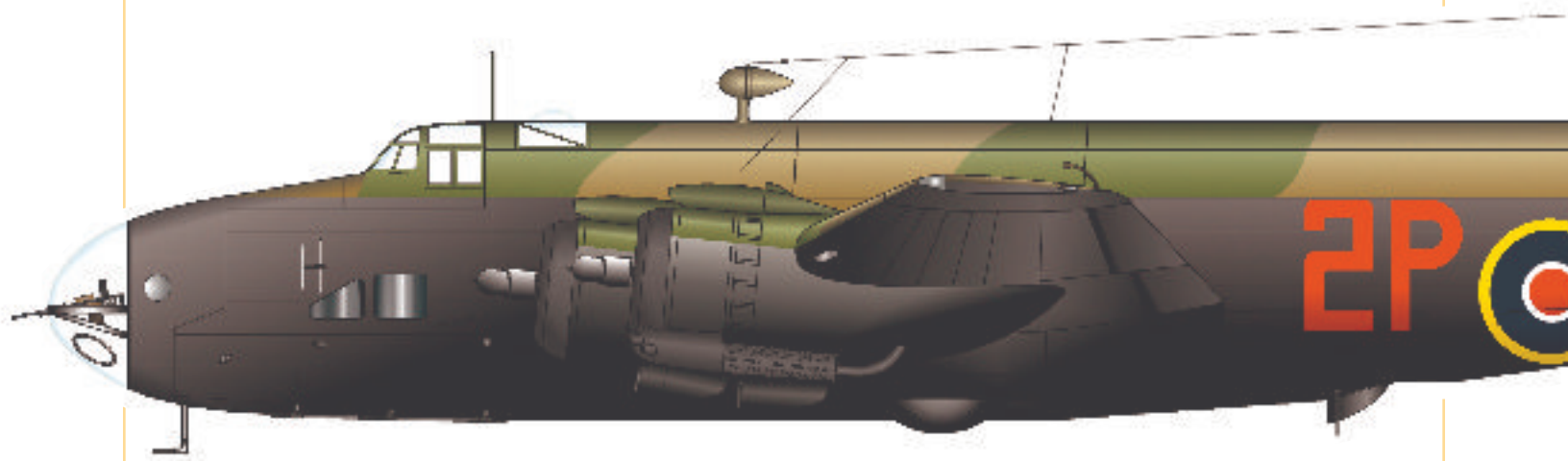
Dear Editor:



I am writing in reference to the article, "Restoring NA337, A Labour of Love." More specifically, I am responding to the letter to the editor in your last edition. The letter was written by Ken E. Townend (Electrical '55). Townend suggests errors in three places that are misleading and can confuse the real circumstances. I would like to present our case and point of view and let your readers decide.

The words "the Halifax Bomber was raised from its watery grave" are noted as being incorrect in that Townend claims NA 337 was, in fact, not a bomber. We disagree. While NA337 is designated as a Mark VII Halifax, it was built to specification P 13/36, an air specification for a bomber. It was fitted with bomb sights and 11 bomb racks. At the time of the "drop" it was under the command of flight sergeant Gordon Russell Tuckett, Bomb Aimer. (Tuckett perished in the icy waters of Lake Mjosa.) Number 644 and other special operations squadrons routinely carried out bombing missions. To the best of our knowledge, every aircraft in this squadron was fitted for bombing missions. The fact that these missions were covert made these aircraft special ops and hence labeled as Halifax A Mk VIIs. We tend to downplay the bomber aspect ourselves, but would not fault anyone for labelling it as one.

The comment, "None exist intact today" meaning that there are no other intact Halifax Aircraft in existence is very true. The writer suggests Halifax LV 907 (Friday the 13th), located in Yorkshire England is a Halifax Bomber fully restored to WWII condition. This is neither true nor correct.

The Yorkshire re-creation of a Halifax Bomber shares its roots with us. It started when the McKenzie family of Stomaway, Isle of Lewis, purchased two Halifax rear fuselage sections from a local scrap dealer. They simply added barn doors to each end and used them as hen houses.

While NA337 is designated as a Mark VII Halifax, it was built to specification P 13/36, an air specification for a bomber.

I use as my reference a story from a Scottish newspaper (*The Sunday Post*) from the Isle of Lewis dated December 12, 2004. The title, "Halifax henhouses were all the rage on Lewis," reveals that the rear fuselages of the Yorkshire Halifax and our NA337 were both donated by the Mackenzie family. It suggests that we all owe a lot to the people of the Isle of Lewis and to the homeless chickens.

In 1983 they donated one fuselage section to the Royal Air Force. The Yorkshire Air Museum has done marvelous work creating a very respectable aircraft from it and a myriad of other bits and pieces. However, the bottom line is that this is not a restored Halifax, as no part of it originates from LV907.

Townend refers to the remains of Halifax Wl048, a Mk II Bomber recovered from a fiord, as being an intact Halifax. The remains of this aircraft were recovered with the intention of restoring it. It proved impractical and unaffordable and the attempt was abandoned. The remains are on display. We have tended not to consider them as surviving aircraft. Quite simply, they weren't.

Of interest, the construction of the Halfax was unique and innovative. When the more powerful Bristol Hercules engines were fitted to the Halli, an innovative low-drag cowling called a townend ring was fitted.

Could it be that Townend comes from a long line of aeronautical engineers?

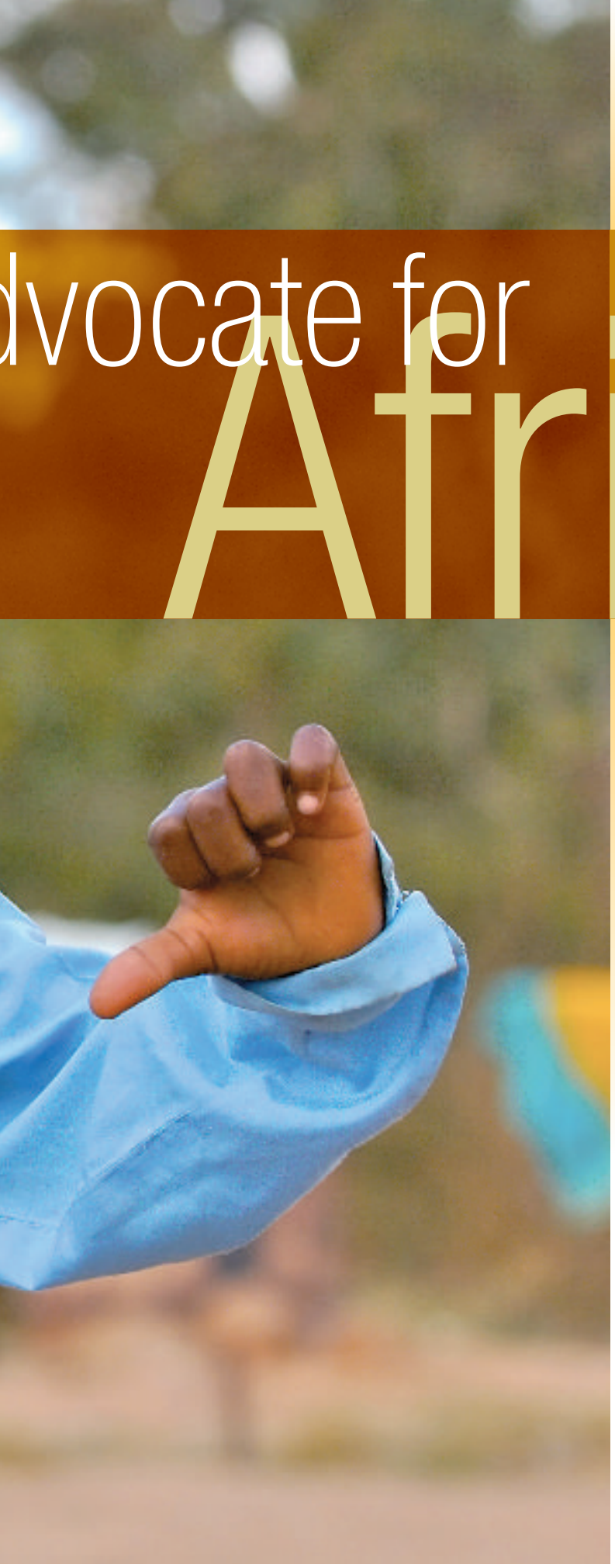
Regards,

BILL TYTULA
Lieutenant Colonel (Retired)
Halifax Restoration Project Manager
(Mechanical '60)

errors and omissions

There was an error on page 36 of the summer 2006 issue. It was incorrectly noted that Bill Matheson, the author of the note on the Halifax aircraft, was a graduate of Civil '68. The author is a graduate of Commerce '49 at McGill.

Ac



dvocate for Africa

by Andrea Collins

Recent graduate RACHEL MASER (Mechanical Co-op '05) has decided to spend her first year after university volunteering with Engineers Without Borders (EWB). She is in Malawi—a small landlocked nation in southeastern African with a population of nearly 13 million people—applying her education to challenges that at first may not seem like the traditional domain of engineers. While with EWB, Maser is assigned to Action Aid International Malawi (AAIM), where she dedicates her time to a combination of engineering and development projects.

As a woman, not only is Maser a minority in a profession dominated by men, she is also an educated white woman in a country where the rules of patriarchy govern gender relations. While she splits her time between engineering and development projects, she focuses much of her attention on improving the status of women who have traditionally been excluded from making decisions.

"There is a huge disparity between men and women," says Maser.

"Many women still have to kneel to greet a man."

This attitude has proven particularly hard for Maser to overcome.

"Sometimes I get the same treatment, but I also try to treat them the same way. I see myself as a woman like other women, and so any treatment that emphasizes that I'm different makes me feel uncomfortable."

Maser works with community members to plan development projects.

Maser leads a rights workshop for community women.

Malawians have a deep respect for white westerners, and Maser recognizes that her race is a source of political empowerment as well as one of cultural isolation.

"I make sure that my voice is heard and people understand where I'm coming from," she says.

"I'm not afraid to challenge authority. Women in engineering, especially mechanical, are strong women because we have to be, if we're not assertive people walk all over us.

"[Melawian] women are often denied an education, they are discouraged from speaking up, and therefore they have few choices. Our workshops encourage them to use their own initiative, to challenge the status quo, to empower them to stand up for their rights, to ask for better health care and education."

Not surprisingly, local men don't always approve of Maser's efforts.

"In many cases, if the men are not included in the efforts to empower local women, there have been instances where men subvert the intervention. For example, many interventions aim to economically empower women, but traditionally men control the money. So a woman may make money from the initiative, but the man will take it all from her. Or men have been known to sabotage the intervention because they see it is a threat to their power over women and dominance in the economic and social sphere."

To address this gender conflict, Maser is helping to develop beekeeping as a source of financial empowerment for local women. She's also looking for ways to involve local men.

"When designing this project we did not include men, and one of my roles will be to go back and find ways of including men so they do not feel marginalized and support the women. We'll include men by having them be a part of the training (gender, business, and finance) so they gain skills and can learn about gender relations. We may also include men in the work groups, but we'll have to be very clear that the men are in a supporting role only, not a leadership role," she says.

To design engineering solutions for problems in the developing world, it's important to use technology that functions as simply as possible. This reduces the likelihood that ongoing maintenance and training will be a burden to the local community once the engineers have left.

"Beekeeping technology is very simple, but it can be a profitable business as there is considerable demand for local honey," Maser explains.

She will be assisting to introduce technology "that is supposed to be environmentally friendly and less labour intensive, which is especially important for women who are living with HIV/AIDS, and therefore are not in optimal health."

Maser is training and motivating villagers to be independent and to advocate for services they need.

"Sometimes I feel very isolated here," she says.

"Though English is the official language of Malawi, a former British colony, most people speak the native language, Chichewa, so communication can be difficult. There are volunteers here from other organizations I can share experiences with. However, those groups have a different vision and mission than we do; our focus is human development and cultural integration."

Her engineering project involves rehabilitating a gravity-fed water system built by AAIM in the late 90s. This ingenious network involves channelling fresh spring water from the mountainous areas into holding tanks. From there, pipes lead to taps in numerous small communities. It is a straightforward concept, but it takes time to repair it.

Maser observes that, "People here have little sense of community ownership and let it fall into disrepair. We're working with engineers from Blantyre (Malawi's largest city) to survey the system so we can calculate the positioning of the pipes and delivery pressures along the route. We will then fix leaking tanks and broken pipes to make it functional and prevent contamination.

"The gravity-fed scheme is brilliant for its simplicity, and parts can be found locally. However, it does get run down after a few years and needs to be maintained. This is best done by the beneficiaries themselves—which is where the critical aspect of ownership comes in."

While EWB plays a crucial role in undertaking engineering projects, it seeks to create solutions that can be managed by the local community, and to cultivate a legacy of indigenous empowerment.

Though the project requires engineering skills, Maser places even more importance on training locals to handle maintenance and financial management, and on developing a sense of ownership. After consulting with surrounding communities, the team has secured an agreement that each household will make a monthly contribution for maintenance (equal to 10-15 cents in Canada). The communities will also form water point committees to oversee maintenance and operations.

Maser has also helped train individuals and community groups in planning, financial, and organizational management, to help them launch businesses such as beekeeping, wine making, and dairy cattle. The success of each project depends on trust. Maser gains this trust in workshops and by visiting homes and villages, where she joins local people in their daily lives.

Maser describes carrying water on her head as "one of the most painful experiences of my life."

One such woman is Chrissie Hausi, director of MWASO, an AIDS support organization. Besides this demanding volunteer role, Hausi teaches school, and is raising six children, three of her own and three orphans. She has also taken one of the business courses Maser has helped to developed and has started to make fruit wine from bananas, tangerines, and papayas.

"She walks an hour and a half from her home village, Mphete, to Mwanza every day but never complains," marvels Maser.

"She is always smiling and laughing.

"I've spent a few weekends with her and her family, carrying water, picking pigeon peas, and making nsima (a thick corn-based staple with the consistency of mashed potatoes). Carrying water was one of the most painful experiences of my life. It gave me tremendous respect for the men and women here who carry just about everything on their heads."

Maser advocates for Africa, both in Malawi and at home. She has written articles for the *Edmonton Journal*, the EWB newsletter, and the CIDA website. On July 29, 2006, the *Journal* published her story about a visit to a refugee camp on World Refugee Day, where she was moved by the stories told by women brutally violated in war-torn countries. Other themes she's exploring are a day in the life of a villager, the contrast between engineering in Alberta and Malawi, and the story of a local AIDS support organization.

Though a Canadian by birth who still calls Edmonton home, Maser had first-hand experience in Africa during her childhood. Her family lived in Zimbabwe, where her journalist father was assigned the sub-Saharan beat.

"Living there gave us all a special affection for Africa. Family dinner discussions about African politics and economics influenced me."

Maser is passionate in both her defence and love of Africa.

"In my articles, I don't focus only on the problems. I try to show the multi-dimensionality and dynamism of Africa. There is so much more to this continent than war and hungry children."

Andrea Collins is an Edmonton-based freelance writer and communications consultant.

Engineers Without Borders at U of A

EWB began at the University of Waterloo and now has chapters in 24 universities across Canada. The U of A chapter of EWB began in 2000. Now, it boasts approximately 50 fully committed members and close to 1,000 people interested in the group's local, national, and international activities.

The local EWB organized 17 community outreach events reaching over 4,000 people, and made presentations to over 2,000 high school students in Alberta and several hundred in Saskatchewan this past year.

One of the community outreach events was "a day in the life of the majority." Participants performed tasks similar to those of a typical Ghanaian woman (hauling wood and water, gardening, cooking, and processing food) to encourage them to take action on issues of global poverty.

"For this year, the group has plans to reach over 10,000 people, including 50 presentations to high school students alone," explains EWB U of A president Justin Wheeler.

"Engineers have skills and resources that can positively impact millions of people all over the world, and EWB is working to engage members of the engineering profession to use their opportunities to benefit the people who need it most."

Traditionally, alumni involvement has been vital to EWB's activities, and many alumni make very valuable contributions to our member education, public outreach, high school outreach, and other activities. Alumni can also support the group financially by contacting the Dean's Office.

"We have a professional member category specifically for alumni and other members of the public. Our meetings and events are open to everyone, including non-students and non-volunteers."

Wheeler adds, "We want Edmonton to become one of Canada's leading communities for supporting international development. I think we can create some real change in the world by starting right here at home. We are putting our engineering skills toward really positive things for the world, and are confident that as people learn more about us, they will want to support us, ideologically and financially."

For more information on supporting EWB at U of A, contact Matt Ferguson in the Dean's Office at matt.ferguson@ualberta.ca.

Pierre Crevolin
(Metallurgical '70)

If not for one fateful phone call, Pierre Crevolin's (Metallurgical '70) life would have run a much different course. That was before Poisson's Ratio. But we're getting ahead of the story . . .

by Phoebe Dey

Poisson's RATIO

In 1973, Crevolin's engineering days seemed to be behind him. A promised job at Celanese had fallen through, and Crevolin had returned to university to become a teacher. He had spent two years teaching classes at his old alma mater, Edmonton's St. Francis Xavier High School, and he and his wife Sylvia (a graduate of Home Economics '69) were preparing to head out of town for the holidays.

Then the phone rang.

It was Darwin Hawn (Metallurgical '70) who called to say that Caproco Corrosion Prevention was looking to hire an engineer for a summer job. Crevolin took the job and, at the end of the summer, was offered a permanent position. He reluctantly decided to leave his teaching career behind.

It was a wise move. With Caproco, Crevolin travelled to places like Iran and Kuwait before heading into the management stream. He helped restructure departments and, by 1979, was named the company's Canadian manager—a huge responsibility, considering that 90 percent of business came from this country.

In 1984, Crevolin and four co-workers left Caproco to form their own company, United Corrosion Consultants Ltd (UCCL). It would be the start of a 15-year run of building, buy-

ing, diversifying, and selling companies.

UCCL grew quickly to 30 employees during its initial year, performing cathodic protection services mainly in the oil and gas industry. In early 1985 the firm diversified into a pipeline business and purchased SureLok Coupling Inc., a company that had developed a mechanized method of joining internally coated steel pipe used in saltwater injection systems in oil production.

By late 1985, UCCL had a staff of around 70. The company's ownership had grown to 20 key employees, most of who stayed with United through the years and whose investments would eventually pay handsome returns.

Then, in 1986, Crevolin and his colleagues came up with an invention that changed the corrosion industry.

They created a tight-fitting high-density polyethylene liner for steel pipelines, to prevent the extreme corrosion caused by saltwater when the pipe is put in the ground. One of the major shareholders, Dale Kneller, conceived the idea of using the "elastic band" approach to inserting a plastic liner into a steel pipeline.

Crevolin recalled a mechanical engineering class given by Dr. George Ford (Civil '42, MSc Civil '46, DSc [Hon] '88) in 1968, when the instructor introduced Poisson's Ratio.

"When a cylinder is elongated, the diameter gets smaller," says Crevolin.

"It was such a simple concept, and I remember the day I sat in class and Dr.

"We created a tight-fitting high-density polyethylene liner for steel pipelines, to prevent the extreme corrosion caused by saltwater when the pipe is put in the ground using the "elastic band" approach to inserting a plastic liner into a steel pipeline. This was inspired by Poisson's Ratio: When a cylinder is elongated, the diameter gets smaller. Using this simple principle, United Pipeline Systems Inc. (UPSI) built liners. The industry responded. UPSI soon took 90 percent of the market share—all thanks to Poisson's Ratio."

George Ford told us about it. We used that simple principle to build our liner and it ended up becoming the strength of a separate corporation we spun off from UCCL, called United Pipeline Systems Inc. (UPSI).

"UPSI was the first to develop a one-step process that was quick and efficient and technically, the best solution out there."

The industry responded. UPSI soon took 90 percent of the market share—all thanks to Poisson's Ratio.

UPSI became known as the world leader, and its product was not only attractive to clients, but to other companies as well. Insituform Mid-America, a St. Louis-based operation looking to expand to the oil field industry, looked all over the world and found United Pipeline Systems' liner to be the best. Insituform ended up purchasing UPSI in 1991, and today boasts that United Pipeline has constructed and internally lined more than 10,000 kilometres of pipelines on five continents.

So, after all this, Crevolin and the other owners were left with the original cathodic protection company, United Corrosion Consultants Ltd. (UCCL), which, in turn, had purchased CSI Coating Systems Inc., a company that preformed protective coating services to tanks and pipelines in the oil and gas industries.

But the exchange in ownership didn't end there. In 1994, Corrpro Canada, an Alberta-based subsidiary of a public company that traded on the NYSE, Corrpro Companies Inc., bought United Corrosion Consultants Ltd., including CSI, almost ten years to the day after UCCL was incorporated. But, after three months, Corrpro decided it wasn't interested in the coating business, so Crevolin bought CSI back.

Immediately bringing in four partners, Crevolin was back in business. And as usual, he advanced the industry again. CSI developed a quality assurance program to document his company's philosophy and operating procedures, and the program continues to guide every CSI project.

"The system we developed was quite unique, and it was through that and a lot of hard work that we built up our business," says Crevolin.

"We decided CSI had to concentrate on doing business in a different manner. We incorporated stringent quality assurance programs and employee bonus programs, rewarding all employees for increased customer satisfaction. We believed that no matter how big or small a project, or whether the job was in the middle of winter, we could tackle it."

That philosophy worked. CSI started turning increasing profits and attracted the attention of Corrpro Canada (yes, again). So, after many months of negotiations, Crevolin and his partners sold CSI to Corrpro in 1999. Crevolin stayed on with a three-year management contract, and finally left in 2002. At the time he officially retired, but he remains as busy as ever.

In 2003, Crevolin was elected president of NACE International, a Houston-based 16,000-member engineering/technical society, becoming only the fifth Canadian to hold the post since its inception in 1943.

Crevolin knew NACE well. He first started volunteering with the organization more than 25 years earlier in the Edmonton section, a strategic move that would pay off along the way.

"In the mid-1970's, as a rookie in my 20s, I organized NACE education courses for people to attend.

"I met every single new person coming into the industry, and a lot of them would end up being customers. The payback might not have been direct but, because I met everybody in Canada in the industry, it definitely had its indirect benefits that couldn't be measured."

Crevolin's involvement in NACE went from local, to national, to international, before he finally ended up as president. If he didn't know the answer to a problem, he could easily find someone who did.

"That helped establish a technical credibility, and I and our companies got so much back from the experience."

Once his post as NACE president ended in 2004, Crevolin stayed connected. He remains on the board of the NACE Foundation, which raises funds and develops programs to increase the profile of corrosion control with high school and post-secondary educational institutions.

And, just as he did when he developed his innovative pipe liner, Crevolin credits his success to the common sense engineering principles he learned at U of A Engineering.

"We used an engineering approach to the 'business of business' and would develop different ways of doing things in the shop and in the field that made us stand out," says Crevolin, whose two sons, Jeff (Mechanical '96) and Patrick (Materials '02), are both engineers.

"We had a really analytical approach to evaluating what we were doing and, if we and other shops would offer a similar service, we would figure out a more efficient way to do it." (Crevolin credits his wife for his success and that of his sons.)

Crevolin's short stint as a teacher also helped prepare him for the business world. It taught him public speaking, thinking on his feet, and team building—personal training you might not receive with a technical degree.

"That's why I migrated to the managerial side in business. With high school kids you can't lead by an iron fist. You have to get your students, just like clients in business, to buy into what you are selling."

Still, he might never have put those business skills to work, if not for that one fateful phone call.

"If that friend had not called in the summer of 1973, I would have retired as a teacher and missed out on a fortuitous career. It's funny how things work out."

Phoebe Dey is an Edmonton-based freelance writer.

Jimmy Hsu (Electrical '75)

INVESTED WITH SUCCESS

BY PHOEBE DEY

When asked about memorable moments in their lives, few people would cite the time the mystery of electromagnetic theory was unravelled for them. But **JIMMY HSU** (Electrical '75) is one exception.

Hsu has Dr. Schmidt Weinmar to thank for explaining electromagnetism. Not only did the professor impart his profound knowledge on his students, he "was also a great amateur pianist regaling us, at his modest university quarters, with his unique renditions of Bach, Schumann, and Strauss," says Hsu, who also studied German in summer school after being nudged by Weinmar.

Born in Singapore, Hsu came to the U of A in the early 1970s on a Canadian government scholarship. He later parlayed his background in engineering to become one of Asia's most knowledgeable private equity investors.

Like many others drawn to field of engineering, Hsu's pet subjects in junior high were math and physics, so studying electrical engineering at university seemed a natural extension of those interests. When he arrived on campus after receiving a Canadian International Development Assistance (CIDA) award, he made his rounds at most of the residences—St. Joseph's College, Lister, and Hub. And believe it or not, he cherished the Alberta winters for their clean, unpolluted skies—a nice change from Singapore's equatorial climate.

But only a month after his 1975 graduation, Hsu had to return to Singapore. Like all Singapore males, he had to serve two and half years in the Singapore Armed Forces before commencing eight years' employment for the government.

"It was tough initially to adjust to the highly regimented military life, especially after four years of soft living at the U of A," says Hsu.

"But in retrospect, the experience was good. The military helps to mould character and toughens you, not only physically, but also mentally to deal with stress. Moreover, the friendships and networks that you forge there become useful contacts later."

Once Hsu left the army, he was assigned to the government's Economic Development

Board as an investment's promotion officer. He worked on the United States desk and then on the Japanese. He became fluent in Japanese while marketing Singapore to technology and industrial companies. After an assignment with the Ministry of Communications, he helped negotiate some of the open-skies treaties that have allowed Singapore Airlines to expand its flights to many cities worldwide.

In the middle of these high-profile positions, Hsu found time to earn his MBA in the evenings at the National University of Singapore.

Then, in 1984, Hsu left the government and decided to try his hand at private industry. Joining British Petroleum, he worked in that global firm's non-petroleum, hard-rock minerals development efforts in Papua, New Guinea and Indonesia.

When a job opened in California in 1986 with the Singapore Government's Investment Corporation (GIC), the temptation to return to North America was too strong. After a year of training in the venture capital (VC) side of the private equity business, Hsu and his wife, (Shu) settled in Silicon Valley, where he and his team made GIC's first private equity investments in North America.

"At that time, I dealt a lot with entrepreneurs full of innovative ideas—mostly engineers who had a vision to change the world with their inventions," says Hsu.

"Being an engineer, I spoke their language and could understand and empathize with their ideas and their dreams. We funded some of these small companies, which later became giant enterprises."

One of those burgeoning businesses was Cisco Systems.

Although Hsu wasn't directly using his engineering degree in his new position, his education laid the groundwork for what was to come. His time at the U of A trained him to "analyze problems methodically, view issues with a certain detached objectivity, and arrive at various alternative solutions," he says.

"The heavily quantitative engineering training also made it a breeze for me to pick up finance and accounting later. All of these skills served me well in the various government-assigned positions."

After a successful run in California, GIC capitalized on Hsu's talent and transferred him to London, England, where he set up a similar office to run the European operations. Once he established a thriving workforce and GIC's presence there—and after welcoming a daughter to the family—he returned to Singapore in 1994 to head its north-east Asian operations in private equity funds and co-investments.

Five years later, in 1999, the Singapore government wanted in on the Internet boom. Planning to invest money in information technology companies related to cyberspace, the government created a billion dollar "techno-preneurship" fund. Half of those dollars were given to the National Science and Technology Board (NSTB) and the other half was given to GIC to invest. Hsu was chosen to lead the portion allotted to the GIC.

Later, the NSTB and GIC merged to create a single investment entity called TIF Ventures. Again, the government appointed Hsu to lead the newly formed group.

His goal is not only to invest Singapore's money to deliver "superior financial performance," but also to explore how the country can benefit from his investment activities. For example, Hsu has helped attract more than 20 top tier global VC firms to establish operations in Singapore.

"These firms undertake various activities here, from bringing their portfolio companies to market, to selling and establishing joint ventures here, to using Singapore as a hub into the rest of Asia," says Hsu.

"Personally, my goal is to further enhance the role and reputation of Singapore as a facilitator for innovative companies that want to do business in Asia."

Today, TIF Ventures manages $1.3 billion in assets and has 165 investment professionals and more than 70 primary fund managers around the world.

Despite, his hectic schedule, Hsu always finds time to learn, no matter the arena. Last year, for example, he and his daughter took a course together in Chinese calligraphy. Hsu is also currently studying Korean.

In the end, Hsu's most rewarding triumph is simple: that he has been able to use his education to do a meaningful and enriching job. Coming from Hsu, that is no surprise.

When asked about memorable moments in their lives, few people would cite the time the mystery of electromagnetic theory was unravelled for them. **But Jimmy Hsu (Electrical '75) is no ordinary person.** Born in Singapore, Hsu came to the U of A in the early 1970s on a Canadian government scholarship and is now one of Asia's most knowledgeable private equity investors.

Hsu greets a delegation from the Middle East.

Phoebe Dey is an Edmonton-based freelance writer.

engineer.alum @ualberta.ca

Electrical Engineering

Bath, Duncan (Electrical '45)

This is referring to the *U of A Engineer* summer, 2006 issue—particularly the article on page 34 on the Brooks Aqueduct. You might be interested in some lapses in the use of SI in that interesting piece.

The table of "Brooks Aqueduct Technical Statistics" notes the "anticipated capacity" at 25 cms. This, of course, should have been 25 m^3s. And, although correct, "50,600 hectares of land" would have been better expressed as 500 km^2. Further, 18,350 m^3 of concrete would have provided plenty of precision for the purposes of an article such as this.

And, just imagine: "Construction costs of $600,000."

Oh, for the good old days of the five-cent ice cream cone!

I had my beginnings 100 kilometres straight east of Calgary and, though I remember references to the Bassano Dam, the Eastern Irrigation District, and Lake Newell etc., I never saw any of those places.

I look forward to seeing the Brooks Aqueduct on my next trip west.

This is coming from your Metric Monitor from Standard, Alberta.

Truderung, Harry (Electrical '70)

I am enjoying life in the environs of Calgary, Canmore, Vancouver, and Maui, after 33 years in the telecommunications industry, most recently as president, AT&T Canada, and president of Telus Mobility. Greetings and best wishes to all my Engineering friends and faculty.

Zaputowycz, Roman (Electrical '56)

I read with great interest "Nova's Supernova" by Tom Keyser about Val Mirosh's life story. I must however, point out a gross error in the beginning, namely that the German–Soviet war broke out in 1941, not 1940 (to be precise: Sunday, June 22, 1941 at 03:00 hours, with a cloudless sky). I was awakened at 02:58 hours by the roar of the flying formations of hundreds of Heinkel 111, Junkers 87 ("Stuka") and 88 bombers as well as many Messerchmidt 109 fighters, flying over our house in city of Cholm, 50 km west of the Soviet border. We expected the impending conflict, because of the amassed German military near the border with the Soviet Union.

There is also an apparent confusion as to the location of Poltava. The city of Poltava, Ukraine, is located about 130 km north west from the Dnipro (Russian name was/is Dniepr) river, and is on the river Vorskla. The strategic bridge and others across Dnipro bombed that day is in the city Kremenchug, on the river Dnipro. Was it perhaps the bridge in Poltava, across Vorskla, also strategically important? It is some 150 km west of city Kharkiv (its Russian name was Kharkov), a very big industrial centre.

In the ending (the last sentence, in the second paragraph from the end) Keyser writes: "...he grew up in, the old house near the Dnieper, was still intact."

Well, as I pointed out, Poltava is not on the Dnipro river. Was he in Poltava or in some village on Dnipro?

By being a Ukrainian, or so it sounds to me, Mr. Mirosh's name was probably abbreviated from something like Miroshnychenko, a popular name in Ukraine. Also, how did he manage to be a Russian citizen, by being born in Germany (near Dresden)? It's another moot point.

Mechanical Engineering

Labossiere, Pierre Dr. (PhD Mechanical '87)

First, please find below a link to a brief news item that was published on Thursday, May 4, 2006, in *Liaison*, the Université de Sherbrooke's journal. This is an advertisement of an exhibition of some of my own photographs of the Northwest Passage. The exhibition took place here at the Université de Sherbrooke.

http://www.usherbrooke.ca/liaison_vol40/n17/a_expo.html

The news item is in French, of course. It basically reports that I have been a frequent traveller to the Arctic and the Antarctic in the recent years, and that my most recent trip has taken me from Anadyr (Russia) to Resolute (Nunavut), thus crossing the Bering Strait and then sailing along the coasts of Alaska, Yukon, and Nunavut. It says that I took "striking images" of the Northwest Passage, photographs that I shared through an exhibition that took place in June, 2006. The quadruple image of a bear that was used to accompany the news item is reproduced above. I also include below a copy of the invitation card to this exhibition.

For the record: I obtained my Ph.D. in Mechanical Engineering in 1987. After a few years at the Université de Moncton, I joined the Department of Civil Engineering at the Université de Sherbrooke in 1992.

And, yes, I am planning another voyage in the North this summer—this time around Baffin Island.

Following the Family Fli Pl

It was a simple enough supper conversation, but one that left an imprint on Reagan Williams' (Mechanical '92) memory. by Phoebe Day

Williams, Jr. was 11 years old at the time when his father, Allen, started his own Edmonton-based engineering firm. The family was sitting around the dinner table trying to come up with a name for the new company. Someone suggested keeping it simple by using the founder's name. That marked the birth of A.D. Williams, and the first of many brainstorming sessions between father and son.

Williams, Sr. is now slowly stepping back after handing over the company reins to Williams, Jr. last year.

The business has come a long way since Williams, Sr.'s first day in his one-person shop.

"I had no clients, no real office, no bookkeeping services or anything like that," he says from his stunning downtown building perched on the banks of the North Saskatchewan River.

"I never thought I would fail, but I also never thought we would be where we are today."

Today, the full-service shop employs more than 130 people at offices in Edmonton, Red Deer, Winnipeg, Calgary, and Yellowknife. But Williams, Sr. first became interested in engineering by a process of elimination, when other careers didn't appeal to him. He had always loved math, and had grown up on a farm with a mechanically inclined father, so he pursued an engineering degree from the University of Saskatchewan.

Math wasn't his only passion. Williams, Sr. always wanted to be a pilot. He knew of a consulting firm that had its own airplane, so, to accommodate both loves, he equipped his own business with a company plane. Today, Williams Jr. has a commercial pilot license.

That first aircraft and several others that followed—the newest plane, a Jetprop, arrived in August—have helped keep the family firm competitive.

"We have the ability to react quickly, since our engineers can be on site within a matter of hours," says Williams, Jr.

"We can go out and do an inspection and be back later that day. Our staff love it. And we get to enjoy it a little bit as well."

They've earned it. When Williams, Sr. started in 1978, he focused on mechanical and forensic engineering. But to meet demand, the company soon expanded to include the broad spectrum of engineering disciplines.

The in-house team of engineers means the company can provide the full range of services without having to contract out for their vari-

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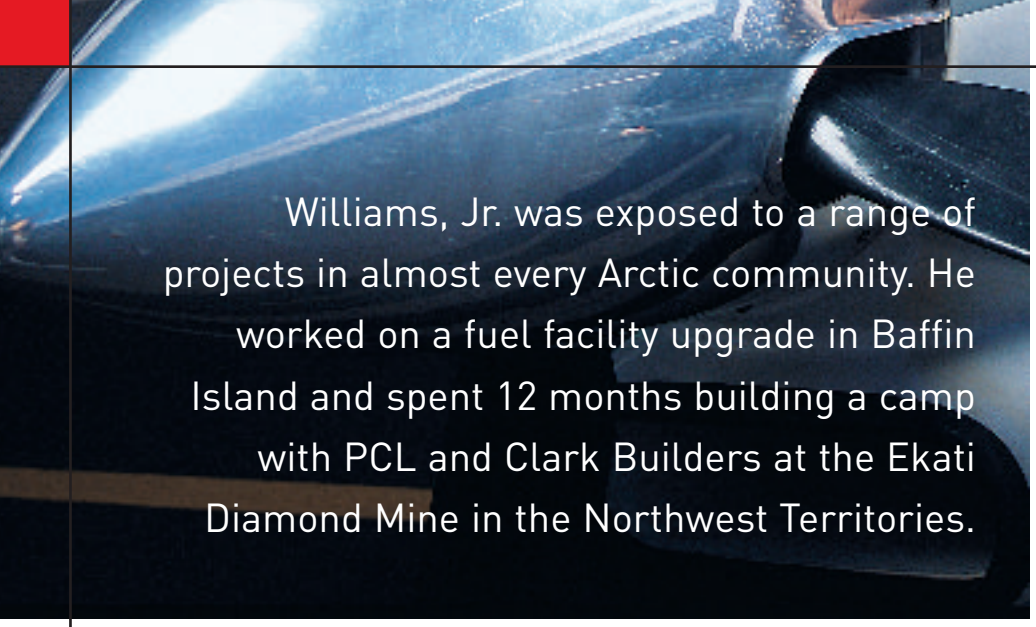
(left to right) Reagan Williams (Mechanical '92) and his father and company founder, A.D. Williams



Williams, Jr. was exposed to a range of projects in almost every Arctic community. He worked on a fuel facility upgrade in Baffin Island and spent 12 months building a camp with PCL and Clark Builders at the Ekati Diamond Mine in the Northwest Territories.

ety of projects. For instance, the firm recently worked on Edmonton's South Light Rail Transit System (LRT) and conducted all of the utility relocations related to the transit's extension. Their services included the designs of electrical underground and aerial power distribution, street light power, fibre optic and telephone communications, as well as water and sanitary gas design. On the forensic engineering side, the company recently investigated the collapse of a pedestrian walkway in Calgary that sent debris and workers into the river.

Williams, Jr. also remembers some of the company's more simple, yet exciting, developments along the way. He was at the office when A.D. Williams got its first computer and a Wang word processor—it took up an entire room. The firm also boasted one of the first fax machines in Edmonton. They were working on a large casino hotel in the Bahamas and needed an easy way to communicate.

Williams, Sr. quickly became involved in the engineering community, first as a board member and then as president for the Consulting Engineers of Alberta. In 2004, he was named Chairperson of the Board for the Association of Consulting Engineers of Canada. The post took him to Washington, where he met astronaut Neil Armstrong (and learned that the two men both started out with the same airplane).

Right from the beginning, A.D. Williams put the emphasis on the clients. Believe it or not, that wasn't a common philosophy at the time, says Williams, Sr. It paid off. Almost 95 percent of the company's clients are now repeat customers.

"We very consciously decided that we need quality clients," says Williams, Jr.

"We're in a business where the quality of the client—one who knows exactly what he wants—is a reflection of us."

Williams, Jr. learned many tricks of the trade from watching his dad, but he also put his time in before being named president. Right out of university, he worked for an oilfield manufacturing company that serviced clients such as Imperial Oil. Then, in 1995, he joined A.D. Williams's Yellowknife office ("We put him in exile," jokes his dad).

The remote location helped the junior mechanical engineer gather invaluable experience. Williams, Jr. was exposed to a range of projects in almost every Arctic community. He worked on a fuel facility upgrade in Baffin Island and spent 12 months building a camp with PCL and Clark Builders at the Ekati Diamond Mine in the Northwest Territories. Because they were in such a remote location, everything had to be flown in, making planning and logistics one of the most central parts of the process.

"If you order 32 two-by-fours and you later find out you need 34, getting those last two are going to be really tough," he says.

"The thoroughness of planning becomes really important."

Williams, Jr. also recalls going to the opening of a centre and being called on to fix some of the building's electrical problems. When he explained he was a mechanical, not an electrical engineer, "the response was, 'You're the only engineer here, so fix it.' I obviously learned a lot during that time."

After three years in his northern post, he returned to Edmonton and held a number of positions in the company before being named to the top.

Aside from competing for a range of jobs—the firm just recently won the bid to design the lieutenant governor's residence as well as to provide consulting services for a $19.5 million dollar multi-use facility in Whitecourt—Williams, Jr. has put a lot of effort into human resources. He has developed an industry-leading web-based Career Path program that promotes growth and advancement within the company. Engineers and technical staff can choose between the technical and business streams of the firm, to become technical specialists or high-level managers.

"Our firm has to grow for our people, and we have to give our staff the opportunity to advance," says Williams, Jr., who also encourages his colleagues to take university classes during work time.

"Because we're an employee-owned firm and our staff is given the ability to have equity in the company, we believe that's how we can be the most successful.

"Compared to other industries, we're still doing a lot of technical stuff, but you also need the soft interpersonal skills or you can lose the confidence of your client."

Williams, Sr. agrees, saying that most people don't understand that engineering is as much a business as any other. Students, he says, should have at least a rudimentary knowledge of the business side of the consulting industry.

It is a side Williams, Jr. now knows well. Looking ahead, he welcomes the opportunity to lead this already successful company, especially knowing his mentor is close by.

The younger Williams concedes he isn't very good at leaving work discussions at the office; he has been known to bring up a project or two while on a family ski or fishing trip.

And while Williams, Sr. tries to ease off from the business, he admits it is hard to let go.

"It makes it easier that Reagan is doing such good work. And as the company gets larger you have to have good people in place that you can trust. I definitely do. It is in great hands."

Phoebe Dey is an Edmonton-based freelance writer.

Plug and Play
The Oil Game

by Michael Chomitsch

Dr. Bruce McGee (Electrical '80), MEng Electrical '84, PhD Electrical '98)

"Basically, you plug it in and get oil," Dr. Bruce McGee (Electrical '80), MEng Electrical '84, PhD Electrical '98) jokes.

Heat bitumen-rich oil sands with electricity and remove the oil from it. This idea mesmerized McGee from the moment his professor Dr. Fred Vermeulen (Electrical '60, PhD Electrical '66) gave a presentation on his research in 1980.

McGee saw the huge potential in the idea pioneered by two of his professors, Vermeulen and Dr. Steve Chute, at the University of Alberta in the 1970s.

"It was technology I believed in then and still do," McGee says.

"I felt committed to doing something with it."

That he has, though there were many who doubted anything would come of it. McGee had faith and persevered, driven by his firm belief in the technology.

He took Vermeulen and Chute's approach and made it better. He brought it from the classroom to the field, in one of the most successful technology transfers to happen at the U of A.

McGee, who has a diverse engineering background, solved an electro-thermal dilemma that had plagued practitioners for years: the finite length electrode problem. Essentially, McGee discovered how to efficiently transfer heat between electrodes, making that single, mesmerizing idea feasible.

McGee's life's work has culminated in his patented Electro-Thermal Dynamic Stripping Process (ET-DSP™). ET-DSP basically passes electrical current between electrodes placed in soil, heating the oil in bitumen-rich deposits to allow it to be pumped out.

The process has several remarkable features. Oil can be recovered from deposits very quickly—75 to 80 percent of oil can be

ET-DSP™ in the field.

recovered in one year. It is environmentally friendly; small wells are drilled for electrodes and pumps while the rest of the land is disturbed as minimally as possible. It is scalable—as more oil is recovered, more wells can be drilled and more capital generated. Finally, the costs for electricity are inexpensive when compared to more conventional methods of oil extraction, such as surface mining.

No other oil extraction/recovery process can boast such quick, cost-effective returns with such minimal environmental impact. While McGee patented the process three years ago, he's only now drawing his first drops of oil from the bitumen-rich Athabasca Oil Sands.

McGee and E-T Energy, the company he formed in 2004 to apply ET-DSP in the oilfield, are currently conducting a field test at a one-hectare test site approximately four kilometres north of Fort McMurray. If the technology works, E-T Energy can begin to develop the approximately 1.25 billion barrels of oil in place on its oil sand leases.

In a stroke of good fortune, the one thing ET-DSP needs the most—power—is supplied by a power line that runs right through the test site.

"The stars couldn't line up better," McGee says with a smile.

ET-DSP's potential is even more remarkable. According to McGee, nearly two-thirds of the estimated 2.5 trillion barrels of oil in the oil sands is either too shallow to be reached by conventional drilling methods or too deep to be extracted via steam injection. The alternative is an in-situ process like ET-DSP.

In other words, if McGee's claims are correct, E-T Energy has a possible niche market of 1.66 trillion barrels of oil—enough oil to sustain the world's current needs for 55 years.

Despite this phenomenal forecast, McGee had trouble convincing oil industry companies to test ET-DSP on their leases. Generally conservative by nature, the oil industry didn't leap to support new technology such as his. But McGee wasn't fazed.

"If they didn't do it, I would. I know this process will work," he declares.

So, he formed E-T Energy. A friend, who is now a partner in the company (McGee retains 38 percent ownership), had some influence in the oil industry, and helped line up some investors. However, they needed $12 million to start the field test. McGee took his pitch to potential investors in New York City, Boston, Toronto, and Calgary.

"The hardest part was letting go of the technology to the investment community," McGee admits.

"But by doing it right, you can get the best people in the world working with you."

In the end, he raised the money he needed. His lifelong work was about to take its next giant step.

Some of the major oil industry players from Canada, the U.S., and Europe are now investors, and even partners, in ET-Energy. In addition, the Alberta Government helped fund the project with a $675,000 grant.

Once the results of the field test are evaluated, McGee will seek additional investment to go commercial.

Regardless of the outcome of the field test, E-T Energy is already poised to make its mark. With an estimated 1.25 billion barrels of oil in reserve in the 14.5 sections of land it owns, the company is currently the largest junior oil company in the Athabasca Oil Sands.

McGee has faith in ET-DSP and believes the field test will be successful.

"I know it will work. I've seen it work and I've built a company around it."

As it turns out, he actually built two. Somewhat ironically, it was the work of the other company he founded, McMillan-McGee Corporation (McC^2), that helped make believers out of the investors. McGee established McC^2 in 1995, while working on his PhD. McC^2 first used ET-DSP to reclaim contaminated sites.

"The principles are the same regardless of what ET-DSP is used for," says McGee.

A cross-section of an electrode.

"You heat the soil and the chemicals will vaporize. They can then be collected and extracted from the soil. Oil gets hot and it flows easier. It's the same process, but the end-product is usable."

Environmentalists were the first to

embrace the technology, applying it to environmental problems.

"During the first ten years, we were cleaning soils in urban areas where we couldn't disturb the infrastructure," McGee says.

"Focussing on the environmental aspect of the process became more and more important over time. It is really gratifying to clean up a site, to make harmful soil clean."

The expected recovery rate of oil using ET-DSP—between 75 to 80 percent—demonstrates McGee's commitment to the environment.

"The timeline (for oil recovery) is very short," McGee points out.

"When you compare environmental disturbance to the benefit, it's almost negligible."

His goal is to recover oil in the first year of a project and begin environmental reclamation in the second.

McC²'s work proved to be a huge advantage for E-T Energy. It proved ET-DSP works.

"Some of our biggest environmental clients were oil companies. They examined McC² and were confident that E-T Energy could create wealth."

McC² is very successful in its own right. ET-DSP is currently deployed on $150 million in contracted environmental projects, and there are plans to increase that to $200 million next year. Its customers include the U.S. Department of Energy, the U.S. Environmental Protection Agency, the U.S. Department of Defence, and large companies such as TOTAL, Esso, and Shell. McC² has offices in Florida and California.

Despite McC² success, McGee's sights were always set on using ET-DSP in the oil sands.

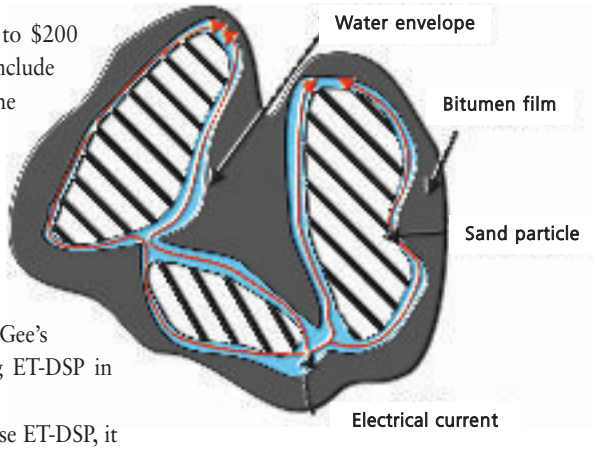
Given that both companies use ET-DSP, it should come as no surprise that they work seamlessly together. They share a brand new office and manufacturing facility in Calgary.

ET-DSP involves high-level calculations, and it takes a multi-disciplinary engineering team to make it all work. The staff of 20 includes environmental, electrical, power, chemical, and petroleum engineers. Any blue-collar work required is contracted out.

McC² manufactures all the circuits used in the process and monitors the projects in real time over the Internet. Clients are leased power supply units, sold electrodes, and receive engineering consulting services as part of their contract.

McGee works hard, averaging 70- to 80-hour workweeks. He currently spends nearly three quarters of that time on E-T Energy, but he expects to focus entirely on the company when things really get rolling.

"We're up for the challenge. We'll make it work; there's no doubt about that."



The extraction process.

Michael Chomitsch is an Edmonton-based freelance writer.

Electro-thermal Dynamic Stripping Process

At the basic level, ET-DSP™ places electrodes in a bitumen-rich oil sands formation and passes an electrical current between the electrodes. Additionally, water is injected into the electrodes to transfer the heat rapidly into the oil sands. This heats and displaces the oil so that it flows easily in the reservoir and can then be extracted at production wells using surface pumps.

In actuality, it is a phenomenally complex multi-disciplinary feat of engineering. It involves applied electromagnetic fields, non-linear physics, mass and heat transfer coupled to the electro-thermal processes.

In a target volume of soil, electrode wells are drilled in a dense grid. This maximizes efficiency in heating, which occurs as electrical current is passed between the electrodes. They can be stacked and drilled to reach a maximum depth of 300 m.

The bitumen has half the heat capacity of water, which means, as McGee points out, "We heat with the most efficient thing we can use—the oil!"

When oil gets hot, it flows better and is easier to extract, which is done via small surface pumps on the surface. Indeed, multiple extraction points are a key component to ET-DSP's effectiveness.

Other key features of ET-DSP include:

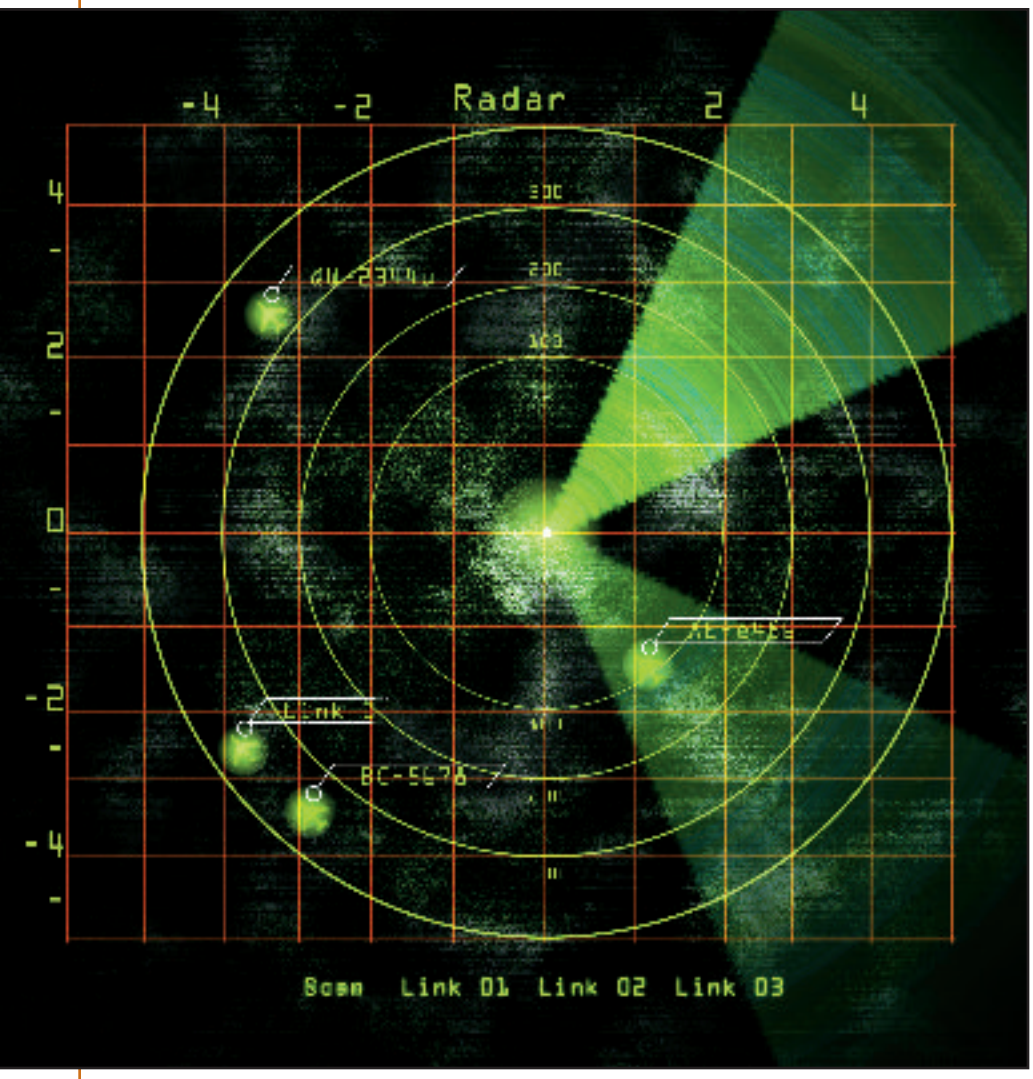
- Quick return on investment—Oil recovery begins within 30 to 60 days of start-up. This creates a revenue cycle, where, as more oil is recovered, more electrodes can be drilled, more pumps can be used, more oil can be recovered. A "pay as you go" economic model is quickly established.
- Water conservation—ET-DSP uses only one barrel of water to recover one barrel of oil—far less that other oil recovery methods. The issue of water usage in the oilfield is becoming an increasing concern for the Alberta Government, which has hinted it may start charging for water usage in the province.
- Energy efficiency—Electricity is actually a by-product of the waste heat of refining, so, exclaims McGee, "We're producing energy without adding one molecule of greenhouse gases into the environment." (He admits that, while electricity is an expensive form of energy, the ET-DSP process is so thermally efficient that its use more than offsets the cost of the electricity.)
- Minimal environmental impact—Oil is recovered in one year and the only environmental impact is the number of wells and pumps that need to be drilled. Environmental recovery, using methods proven by the forestry industry, can begin in the second year of operation.
- Year-round operation – ET-DSP can be conducted 365 days per year.

U of A Engineering alumni are making an impact across Canada and around the world. "Virtual Engineer" features online interviews with alumni working outside of Edmonton.

Virtual Engineer

Ross Ulan *(Electrical '84)*

Here we meet Ross Ulan (Electrical '84), doing voice communications with Nav Canada in Greely, Ontario.



What has been your career path from graduation to now?

Over the years, my work with NAV CANADA has been quite varied and interesting. Upon graduation, I worked as a technician at the CNCP switching office in Calgary for a year. This provided valuable experience from the practical viewpoint to complement the theoretical viewpoint learned in University. At that time the commercial personal computer was just being developed in the industry.

After that I was employed as a design engineer with Transport Canada in the western region (Edmonton) for three years. I next moved to the Microwave Landing System (MLS) group in Ottawa for four years. In the subsequent five years I worked for modular aeronautical communications system in Ottawa. This was an early digital voice switch to replace the analogue voice consoles then in use.

My current job is in voice communications. I have been with the radio group project two years.

What has been the most memorable/ exciting/rewarding aspect of your career thus far?

I found moving to Ottawa to be very exciting when I first did that back in '88. There has certainly been much growth and change since then. It felt great to be part of the microwave landing system project team, and I still keep in touch with many of those people to this day. Much of the work we do is out of the glare of the public spotlight, but is important as it is what keeps the air navigation service and infrastructure running. There have been challenges with time and resource conflicts but these are generally resolvable as long as one keeps the overall view of safety in mind.

What has been your proudest achievement, personally, professionally or socially?

I've really enjoyed most of the work I've done over the years, even though it has occasionally become quite bureaucratic. No one particular project stands out; rather I've been proud of all the various assignments I've done over the years.

What have been your greatest disappointments or lessons learned?

It can be very disappointing when projects are cancelled after putting sometimes several years of work into them. Often the cause of the cancellation is outside of your control, being either politically or market driven and you just have to accept that. I've learned time and task management skills over the years, and have improved my human relations skills—all being very helpful in getting the job done. It's important to follow certain procedures, documents, standards, etc., even though these items appear to take longer initially.

How did your education or experience at Faculty of Engineering/University of Alberta equip you for your current work?

I learned how to look carefully "below the surface" to analyze and solve problems, and not just blindly accept the obvious. I appreciated the opportunity to attend the Faculty of Engineering as it opened my eyes to many possibilities and taught me how to learn.

What are the greatest challenges facing the airline/regulatory industry in Canada in 2006?

Fuel costs are becoming a big concern, and competition has reduced ticket costs. But a cautious balance must also be maintained between controlling costs and operating a safe system and aircraft.

What emotional/sentimental/intellectual/professional connections/associations still remain with the Faculty of Engineering/University of Alberta?

I still keep in touch with many of the people I went to school with, and I have an emotional attachment to Edmonton as that is where I grew up. In fact, I was in high school and University during the Edmonton Oilers dynasty years and Calgary rivalry, so there are a great many good memories from this. Having visited many other cities over the past years has given me a renewed appreciation of how nice Edmonton is, with its big river valley, etc.

What fosters pride for you as an alumnus?

While University was relatively hard, I have many great memories of those years, and indeed it was a special time in my life. I have enjoyed attending the alumni meetings in Ottawa to find out how the programs are changing at U of A. These have also given me the opportunity to meet some interesting people that made history (for example people that have worked on the Avro Arrow, etc.).

What messages do you have for potential students, undergraduates, and young professionals just entering their fields?

Life is an ongoing learning process; don't be afraid to keep learning new things. People are interesting to deal with, and some are more emotional than others. Keep a professional outlook on things, as the Engineering Ethics courses convey. Take time to take breaks and smell the roses once in a while, it's all important.

There appears to be some big energy issues developing in the world, and while Alberta is awash in oil, it is important to start the focus on alternative energy programs. This is where the U of A Engineering Facility could definitely have a presence—I saw some of this at the 20-year open house last fall.

NAV CANADA

NAV CANADA is the non-share capital, private corporation that owns and operates Canada's civil air navigation service. With coast-to-coast operations, NAV CANADA provides its customers—airlines and other owners and operators of aircraft—with air traffic control, flight information, weather briefings, aeronautical information, airport advisory services, and electronic aids to navigation.

The Corporation is responsible for the safety and efficiency of the air navigation service (ANS). ANS facilities include seven area control centres, one stand-alone terminal control unit, and over 100 airport control towers and flight service stations. These facilities are supported by a network of 1,400 enroute and terminal aids to navigation and landing aids.

NAV CANADA co-ordinates the safe and efficient movement of aircraft in Canadian domestic airspace and international airspace assigned to Canadian control.

It is a private company and not a federal agency. However, the company's safety performance is regulated by Transport Canada. The system was purchased from the Federal government, on November 1, 1996, for a cost of $1.5 billion.

Some 5,400 employees work at NAV CANADA, including air traffic controllers, flight service specialists, electronics technologists, operational support specialists, engineers, managers, and administrative staff.

What is their approach to safety? Rather than trying the fix problems after they have happened, as was done in the past, the new focus is to design redundancy into systems and procedures. This way, if and when things fail, either backup systems take over or procedures are in place to deal with the failure.


PC

the pooled collective

by Joan Marie Galat

Pearson International Airport, Toronto.

PCL Construction has been around for a century now, but its impact on Alberta's landscape far exceeds its corporate lifespan. Despite the highly competitive, high-risk nature of construction, this western-rooted company has more than 500 projects across North America in progress at any one time.

How did PCL hit the hundred-year mark in such fine style?

Fred Russell (Civil '72) and Nadine Harder (Civil '81) are PCL employees—and PCL shareholders. They both agree that employee ownership contributes significantly to the staff commitment that pervades PCL projects. The company has been employee owned since 1977.

"It definitely does influence your feelings about the company," says 56 year-old Russell, a PCL project director for 34 years.

"You're part of the company and you benefit from the collective effort. There are a lot of decisions we make on a daily basis where we don't just consider our project, we think of the district and the company as a whole."

The company employs more than 2,500 professional and administrative staff. Of these, more than 2,000 are shareholders. There are around 5,000 hourly tradespeople, depending on the season and stage of construction. About 60 percent are located in Canada and 40 percent in the United States. Once a year since 1977, the vast majority of salaried staff at all levels have been offered the opportunity to purchase shares. Employee ownership encourages future-focused thinking and low turnover.

Harder, with PCL for more than 18 years, was one of only five women out of her graduating class of more than ninety. She began her career as a structural design engineer, eventually returning to the U of A to obtain a Master of Arts (Communications and Technology) in 2004.

Now manager of operations support, Harder lives in Calgary with her husband, John Harder (Civil '80, MEng Civil '84), a principal with the structural engineering firm Read Jones Christoffersen Ltd. Every week,

Scotiabank Place, Ottawa.

Roy Grogan

Supreme Court of Canada, Ottawa, 1995.

she flies to Edmonton to facilitate communication and network operations across North America, focusing on internal communications and operational training.

"The company embraces sharing knowledge and has a commitment of getting people to know each other, which is somewhat unique to an organization as spread out as this one," says Harder.

"The real strength of employee ownership is in the relations you have with the people you work with."

Employees with ownership are much more conscious of overhead costs and show a greater willingness to help each other out and see each other succeed," suggests Harder.

"I've seen some amazing things from retirees who are strongly committed to coming back to mentor and deliver formal training. It's a huge sense of family. Every year, a few more people hit a 25-year milestone. That has quite an impact to new folks coming in."

Now, those coming back to deliver training will enjoy a 2,700-square-metre addition to PCL's four-hectare business park in south Edmonton. The $13-million Centennial Learning Centre (CLC) is a legacy to mark PCL's 100-year anniversary. As home to PCL's College of Construction, the CLC includes high-tech collaboration meeting rooms for conference calls and web-based meeting spaces. These can be used to host workshops, training seminars, and best practices forums, previously held across North America.

The CLC is eligible for silver certification under the international LEEDS program, which recognizes the use of alternative materials and environmentally sound construction and design methods. This is timely, as an increasing number of PCL clients consider certification for their projects.

Less structured training, in the form of mentoring, also plays a role at PCL. Both new and established employees benefit from a willingness to advise others and accept coaching.

"One of the fun parts of the business is mentoring," says Russell.

"I've been around for 34 percent of the company's history and know some who were around for 34 percent before that. I see a lot of training take place through storytelling and word of mouth."

Sharing ideas is particularly critical in the engineering and construction business. Companies live and die on their abilities to innovate, and to find faster and more economical ways to do things.

"You have to be on the ball to stay alive," says Russell.

"There's no such thing as not being in a mindset of continuous improvement. There are a lot of good people in this industry and they're all trying to get the same jobs. You have to be that little bit better and you have to make sure you don't get arrogant."

With that in mind, Russell's own management style reflects a sincere respect for individual contributions. Accustomed to dealing with hundreds of people on a project, he appreciates individual dedication to a common goal.

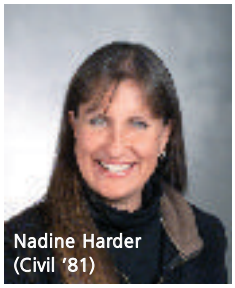
"You develop some really good relations, you meet talented people, and you get

exposed to the brilliance of the common person at times. By involving people, you can find solutions. Sometimes someone on the job will make a comment that leads to a wonderful solution. Giving a person the power to be heard can lead to some very brilliant things."

Russell also credits PCL's success to its history and its strong leadership.

"The province is just a hundred years old and the company rose from the roots of a strong western Canadian entity," says Russell.

"PCL's growth is mirrored in the development of western Canada and the north. Our expansion is part of the development of the country. I think there's something about coming out of Saskatchewan that has shaped the organization. It's a very comfortable fit for me."


Nadine Harder (Civil '81)


Fred Russell (Civil '72)

PCL was founded in Saskatchewan, but moved its head office to Alberta in 1932.

PCL projects range in value from $20,000 to more than $2 billion and include the Pearson International Airport Redevelopment (Toronto), Hard Rock Cafés (Minneapolis and Toronto), UE-1 Upgrader Oil Sands Expansion (Fort McMurray), and Lee Roy Selmon Crosstown Expressway (Tampa).

"It's very interesting managing this type of work because you do have a sense of accomplishment," says Russell.

"You drive around and you see projects you were involved in years ago, and that's kind of nice. No one can ever say, 'I built that.' You're just part of it. And years later when you drive by, you're still part of it."

Russell's PCL career began with survey work on the Beverly Bridge after accepting a summer job with the company in his last year of at the U of A. After graduating, he designed shoring systems for deep excavations on projects in Edmonton, including the Westin and Edmonton Centre. A transfer to Regina in 1973 placed him as estimator, and he eventually moved into project management.

After being named president of PCL Constructors Northern Inc. in 1990, Russell returned to Edmonton to take charge of special projects. Eventually, he began to work as construction manager on major projects.

His latest Edmonton project, located on the U of A campus, is the Health Research Innovation Facility (HRIF), which consists of two buildings in different phases. Construction challenges include massive size—both buildings are 68,000 square metres—as well as the challenge of building a very large containment level three laboratory for biological research. This requires additional barriers, respiratory protection, and other features to minimize the risk of releasing infectious organisms into the working area and environment.

"They're interested in keeping bugs out and keeping bugs in," says Russell,

"The size presents challenges. You have more seals to deal with. Details have to be perfect. The larger the lab, the more details to perfect."


Edmonton water treatment plant, 1947.

Russell's U of A education prepared him well for facing challenges.

"The U of A gave me a good solid view of what an engineer was and generated an enthusiasm for the disciplines they were teaching, and the concept of what an engineer is—the optimal use of materials and the scientific knowledge to create."

Harder agrees.

"I don't think you can have a better foundation for facing any challenge. You always know there is a way to get the job done."

"I've known some fantastic leaders and excellent engineers," adds Russell.

"What we're really doing is celebrating the people. When I look at that 100 years, I'm looking at all the people who have contributed to that. It's a celebration of their accomplishments."

Joan Marie Galat is an Edmonton-based freelance journalist.

PCL yesterday

- Founded by Ernest Poole in 1906.
- Edmonton became home to the corporate office in 1932.
- Led by Bob Stollery (Civil '49, LLD [Hon] '85), a group of senior employees purchased the company from majority shareholders Dr. John (Civil '37, LLD [Hon] '87) and George (Civil '43) Poole, the sons of Ernest Poole in 1977.

PCL today

- In 2006, PCL was named:
  - A Platinum Member of the Best Managed Program
  - One of Canada's 50 Best Employers
  - One of Financial Post's Ten Best Companies to Work For and one of Alberta's Top 20 Employers
- PCL's annual billings are approaching $5 billion.
- PCL is Canada's largest contracting organization and the 10th largest in North America.
- Work spans commercial, institutional, multi-family residential, industrial, agri-business, and civil markets.
- Projects are directed from more than 27 major North American cities.

Editor's Note — Each year during a Reunion Weekend at the Dean's Brunch, Dr. Lynch provides an informative overview of the history of Alberta, the history of the Faculty of Engineering, and the many significant contributions U of A professors and engineers have made to the province and the nation. Engineering alumni frequently ask for copies of Dr. Lynch's speech. This article is a partial response to such requests.

Engineering *over the decades*

People and events that have shaped engineering from 1909 to 1958.

SETTING THE STAGE

1867 Confederation of Canada is celebrated.

1880s Natural gas is discovered at Medicine Hat and other places in eastern Alberta.

1885 The Canadian Pacific Railway is completed.

The first telephone service starts in Edmonton.

1887 The Canadian Society for Civil Engineering is founded.

1891 The Calgary and Edmonton railway (now CPR) reaches Strathcona.

1901 The first automobile arrives in Alberta.

1902 The Low Level Bridge opens with the first railway across the North Saskatchewan River at Edmonton.

1903 The first powered flight takes off.

1905 Alberta becomes a province.

1906 The first automobile trip between Edmonton and Calgary takes two days.

1908 University of Alberta opens with 45 students and four professors in classrooms in the Duggan Street School in Strathcona, which is now part of Edmonton. The University's first president, Dr. Henry Marshall Tory, is a physicist, mathematician, and theologian.

HISTORICAL HIGHLIGHTS

1909 The Department of Civil and Municipal Engineering is created.

William Muir Edwards is the U of A's first engineering professor.

Important Events *1909-1958*

Up to 1909 When the teaching of engineering at University of Alberta began, engineering was not yet formally organized as a profession in Canada. The university was only a year old, and the province itself only four.

In 1909, most Albertans were farmers and ranchers, but the population also included miners, railroaders, and growing numbers of city dwellers.

Engineers had already begun to shape Alberta, dating back to the railway engineers from Montreal who connected Alberta with the rest of Canada in the 1880s.

A flood of immigration and settlement quickly followed. By 1909, most of the hardscrabble pioneering was over with, but there was plenty of growth still to come. By the next census, in 1911, there were 374,000 people living in Alberta.

Only a few dozen of these early Albertans were university students, including the five who enrolled in the U of A's first engineering program in 1909 and graduated in 1913.

One of the Faculty's first engineering classes gets ready to survey.

The 1910s The second decade of the 20th century began as a period of continuing migration to Alberta; another 100,000 people arrived within the next few years.

Railways continued to expand, and a second transcontinental route was completed.

Charlie Chaplin's movie debut as the "Little Tramp" gave birth to the mass entertainment industry.

A new Department of Mechanical and Metallurgical Engineering opened in 1914.

The same year a terrible "war to end all wars" began, tearing Europe apart for the next four years and costing millions of lives. U of A faculty members contributed to the scientific war effort, through such achievements as helping develop sonar to detect submarines.

The war was followed by a worldwide flu epidemic that took millions more lives, including that of William Muir Edwards, the U of A's first professor of engineering.

The first post-war class in 1919 had a record enrolment of more than 1,000 students (and plenty of parking space in the fields of Strathcona), the student ranks swollen by returning soldiers who had postponed their education to serve their country.

The Lethbridge Viaduct opens, the longest and highest railway bridge of its kind in the world.

1912 Athabasca Hall opens with seven classrooms, five laboratories, offices, library, kitchen, and dining room, and living quarters for 50 students.

Robert William Boyle becomes head of the physics department; he later establishes the Department of Electrical Engineering.

1913 Edmonton's High Level Bridge, designed by P.M. Motley, is completed. It carries trains, streetcars, and automobiles on two levels across the North Saskatchewan River.

U of A convocation includes the first graduating class of engineers, consisting of five students.

1914 An offfice is created to oversee commercial research done by the University.

The Department of Mining and Metallurgical Engineering opens.

The Brooks Aqueduct begins to carry water from the Bow River to irrigate farms in southeastern Alberta.

1915 Construction of the Civil Engineering Building (South Lab) begins.

There is completion of the Canadian Northern Railway (now Canadian National) via Yellowhead Pass.

1916 Because of the war, engineering classes are suspended until 1919.

1918 Professor Muir Edwards dies, a victim of worldwide influenza.

Canadian Society of Civil Engineers changes its name to the Engineering Institute of Canada.

Cross Hairs on History

Engineering students in a drafting class in 1944.

The 1920s After so much death, a spirit of renewed optimism returned to Alberta and its young university.

Dr. Karl Clark joined the university to begin a long career in oil sands research.

The Alberta Research Council was born in 1921—government-backed research having played a role in winning the war.

Engineering matured as a profession by 1925, with the introduction of the professional oath and iron ring ceremony.

CKUA, Canada's first educational radio station, went on the air in 1927 from the U of A Power Plant, its transmitters providing the platform for many electrical engineering student projects.

The 1930s The 1930s began with a severe economic depression and ended with a world war. Yet the news wasn't all bad; civil aviation came of age and roads began to compete with railways for the transportation of goods and people.

Radio brought us "Hockey Night in Canada" live from coast to coast in 1933.

Alberta, dependent on depressed farm commodity prices, experienced the hardest times in its history during the 1930s. The province was forced to close down the Alberta Research Council for a while. But even as funding for education and research dried up, university enrolment was on the rise. In the early 1930s, the U of A was admitting roughly 2,000 students each year, of which about 280 were enrolled in engineering.

Mining was one of the few fields that offered employment prospects for engineers; consequently a third to a half of grads in this era were mining engineers.

But as the decade progressed, the world spiraled ever deeper into conflict, and engineers once again marched off to war.

1919 The South Lab is expanded; construction begins on North Lab for Mining Engineering and agriculture departments.

Driven by post-war boom, U of A enrolment passes 1,000 students for the first time.

The Engineering Students' Society is founded.

1920 Norman Charles Pitcher is appointed head of Mining and Metallurgical Engineering; he would hold the post for 25 years.

Dr. Karl A. Clark begins his 45-year career in oil sands research, as a professor in the Civil and Mechanical Engineering department.

1921 The Alberta Research Council, then known as the Scientific and Industrial Research Council of Alberta (SIRC), is founded with offices on the U of A campus. Development of the province's natural resources was a priority for the Council.

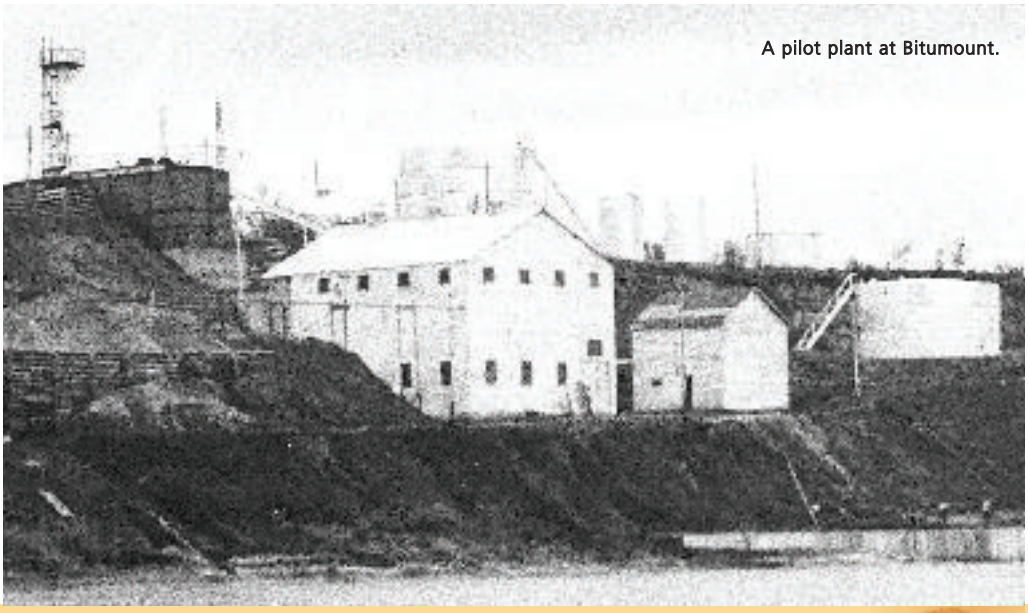
The 1940s Barely two decades after the "war to end all wars," Europe and the Pacific were once again embroiled in violent conflict. The decade that brought us Dunkirk, Pearl Harbor, and Hiroshima also marked a coming of age for Canada, which ended the war with the world's third-largest navy. Demand for aircraft, ships, and munitions helped transform Canada into a leading industrial power.

Alberta's contribution to the war effort included the building of a network of pilot training bases, the forging of air routes over the North Pole to theatres of war, and acting as the command post for construction of a highway to defend Alaska from a feared invasion.

As always, engineers were in the thick of things. The mad scramble to create terrible weapons also brought about innovations—including rocketry, jet engines, atomic energy, and computers—paving the way for a peaceful technological revolution in the post-war era.

Alberta found its future at the end of a drill bit in 1947, when a major oil deposit was struck near Leduc—a victory for seismic oil exploration.

Two years later, Dr. Clark's bitumen processes were demonstrated at a pilot plant at Bitumount, north of Fort McMurray.



A pilot plant at Bitumount.

The 1950s A twinned version of Highway 2 opened between Edmonton and Calgary in the 1950s, slicing 45 hours off the travel time by road five decades earlier.

"Hockey Night in Canada" moved from radio to television.

Computers began to appear in large corporations and institutions. The U of A got its first taste of the future with a $50,000 mainframe monster.

A refining and petrochemical complex grew up around Edmonton to process the prodigious outpouring of crude from Leduc, Redwater, and numerous other oil fields. Pipelines were built to carry Alberta oil and gas across most of North America.

The teaching of engineering at the U of A expanded rapidly, with petroleum engineering among the new offerings.

Alberta began to look as it does today.

Dr. Henry Marshall Tory is the Council's chair and Dr. Karl Clark becomes its first staff member.

Professor Edgar Stansfield becomes chief research engineer for SIRCA; he would be instrumental in the development of Alberta's coal mining industry.

1922 Herbert Haultain, professor of civil engineering at the University of Toronto, suggests an oath for young professional engineers to remind them of their professional and social responsibilities. Haultin asks Rudyard Kipling to write "The Ritual Calling of an Engineer."

1925 First Ritual of the Iron Ring in Canada inducts engineers into the profession.

Clark and graduate student S.M. (Sid) Blair build an experimental plant in Dunvegan in northwest Edmonton. This plant is the first to continuously separate bitumen from oil sands.

U of A engineering professor J.W. Campbell publishes a paper proving that space travel would be impossible for humans.

1927 CKUA radio, Canada's first educational broadcaster goes on the air.

1928 The first degree is granted in Chemical Engineering.

1929 Dr. Henry Marshall Tory leaves the U of A to become president of the National Research Council.

Robert Starr Leigh Wilson becomes dean of engineering; he would hold the post until 1946.

1930 Camp 6 is established, the official establishment for the engineering profession in Alberta.

1933 Funding for Alberta Research Council is halted due to the Great Depression. U of A absorbs its remnants and Dr. Clark becomes a lecturer in Civil Engineering.

1935 The federal government passes the Trans-Canada Highway Act.

1909-1958 Notable People


William Muir Edwards

William Muir Edwards, an Ottawa native trained at McGill University in Montreal, was one of the University of Alberta's original four professors when it opened in 1908. The following year he became its first engineering professor. At age 47, during the worldwide influenza epidemic of 1918, Professor Edwards volunteered to care for the sick in Pembina Hall, which had been converted into an emergency hospital. There, he contracted the disease and died.

Dr. Karl A. Clark is the father of Alberta's oil sands industry. A geologist trained in Ontario and Illinois, Clark arrived at the University of Alberta as a research professor in 1920 and began four decades of oil sands research and development. In 1925, his pilot plant in Dunvegan (now northwest Edmonton) was the first to continuously extract bitumen from oil sands. Contrary to popular myth, his wife's washing machine was never used for bitumen extraction.


Dr. Karl A. Clark

Clark also was the first researcher hired by the Alberta Research Council and a highly respected professor in the U of A Civil and Mechanical Engineering Departments, where his lectures were renowned for their clarity. As a teacher, he believed that if someone couldn't explain something simply, they probably didn't understand it themselves.

He died in 1966, only nine months before Alberta's first commercial oil sands plant opened using his hot-water separation method.

Dr. Henry Marshall Tory had more influence in shaping Canada's universities and research institutions than any person before or since. A farm boy born in Nova Scotia in 1864, Tory earned honours in mathematics and physics from McGill University. He later studied theology, preached for two years, and then joined the faculty of McGill University in 1893 as a lecturer in mathematics, eventually earning a doctorate and associate professorship. He

1936 Oil is discovered at Turner Valley.

1939 Germany invades Poland.

1940 Driven by wartime demand, and with Turner Valley production already in decline, the government of Canada seeks ways to increase domestic oil production, including heavy oil and bitumen.

1941 The Department of Electrical Engineering begins to give special courses in electronics for naval and air force personnel.

The Engineering Students' Society banquet, a rowdy highlight of the year for students (although not for the rest of the city), is banned for the duration of the war.

1942 The Japanese invade the Aleutian Islands.

Funding is reinstated for the Alberta Research Council, with oil sands development a priority.

Edmonton is a hub for three major war-effort construction projects: the Northwest Staging Route, a series of airfields linking the continental United States to Alaska and the Soviet Union; the Alaska Highway; and an oil pipeline from Norman Wells, N.W.T.

Edmonton's population rapidly rises from 75,000 to 100,000.

The 2,432-kilometre Alaska Highway is built in just six months.


U of A engineers participate in a secret study of the feasibility of using giant ice islands to build floating air bases to protect North Atlantic and Murmansk convoys from U-boat attack. The study includes secret ice research at Patricia Lake, Jasper National Park.

Dr. Henry Marshall Tory

helped to establish McGill University College of British Columbia (a milestone in the evolution of UBC) and, in 1908, became the first president of the University of Alberta.

The U of A Engineering Faculty was established the following year.

After the First World War, Tory convinced the government of Alberta to establish the Alberta Research Council, and became its first chairperson.

After 20 years at the helm of the U of A, he moved to Ottawa to become the president of the fledgling National Research Council, which he also helped to create.

At the age of 78, Tory started yet another university: in 1942 he became the first president of Carleton in Ottawa, a post he held for last five years of his life.

Robert William Boyle joined the U of A in 1912 as the head of the Physics Department. He also established the Department of Electrical Engineering and during the First World War did secret research into the use of sound waves to detect submarines. After the war, he became the dean of the Faculty of Applied Sciences; he later joined Tory at the National Research Council.

Dr. John A. Allan, a geologist, joined the U of A in 1912 and became the first head of the Mining Engineering Department in 1914. He systematically mapped Alberta's mineral resources for the government in the 1920s.

Allan also was responsible for geologists being included in a separate wing of the Association of Professional Engineers—he became APEGGA's 11th president in 1930.

He was a consultant to Calgary Power when it built a series of hydroelectric projects on the Bow River system.

Robert William Boyle

1943 No. 2 Canadian Army University Corps sends 60 soldiers to U of A for first-year engineering studies; many survive the war and return to complete their studies.

The federal government takes over wartime oil sands research but its venture ultimately ends in failure.

1945 The first atomic bomb is exploded.

1946 Enrolment in engineering soars by one-third over the previous year to 874 students as soldiers return from war.

Robert M. Hardy, a specialist in soil mechanics, becomes dean of engineering.

1947 Discovery of oil west of Leduc marks beginning of Alberta's modern oil and gas industry. Some of the first crude to reach the surface was saved for Ralph Rutherford, a U of A geology professor who had promised to drink the first bucket of oil that anyone ever found by seismograph.

1948 The Department of Chemical Engineering holds first "mud" school for petroleum industry.

Engineering students steal, then return, the cornerstone for the Rutherford Library.

1949 The Alberta government demonstration plant at Bitumount, north of Fort McMurray produces synthetic oil using Clark's hot-water separation process.

I.F. Morrison, a Massachusetts native, came to the U of A as a lecturer in Civil Engineering in 1912 by way of MIT. For the next 35 years, Morrison taught every engineering student who graduated from the U of A. He also was the first professor in Canada to teach soil mechanics and worked closely with Allan on consulting projects, including the Edmonton "Rathole" and the Bow River hydroelectric projects.

Robert M. Hardy, a specialist in soil mechanics, believed that an educator should participate in the profession he teaches. He was dean of engineering from 1946 to 1959, left for a time as a consultant in private practice, then was reappointed dean from 1963 to 1971. As a researcher and professor, he helped put the U of A on the map for graduate studies in engineering.

His favourite saying was, "Old deans never die; they just lose their faculties."


Robert M. Hardy


Robert Starr Leigh Wilson

Robert Starr Leigh Wilson, an expert in railway building, came to the U of A in 1919. He was a strong advocate for the Alberta Engineering Profession Act passed in 1920. He was the dean of engineering from 1929 to 1946, and is remembered for ramping up the faculty to accommodate a tripling of student enrolment at the end of the Second World War.

Leonard Eustace Gads was born in Russia to a prosperous family that fled to China to escape the Russian Revolution. The young Gads was penniless when he arrived in Wetaskiwin in 1926. He worked as a farm labourer for 10 years before he enrolled at the U of A; he graduated in Civil Engineering in 1939. Gads enlisted in the RCAF during the war as an instructor in navigation, after which he returned to teach at the U of A. He was appointed professor in 1956 and associate dean in 1969.

Bruce White (bruce@bizedmonton.ca) is an Edmonton-based business writer and editor.

1950 The first graduates in petroleum engineering and irrigation engineering enter the workforce.

1951 Enrolment in engineering in 1951–52 falls to 460 students, less than half the post-war peak only four years earlier. However, demand for engineers would accelerate through the rest of the 1950s.

Dr. S.M. Blair undertakes a feasibility study of extracting oil from tar sands.

1954 The Civil Engineering building opens.

Karl Clark retires as a professor in the Mining Engineering Department.

1955 Alberta Research Council opens new headquarters on campus. It would move to the Edmonton Research Park in 1986.

1956 U of A establishes Canada's first graduate program in civil engineering specializing in highway engineering.

A Metallurgical Engineering degree is offered.

1957 The U of A becomes the third university in Canada to acquire a computer, an LGP-30 that costs $50,000.

1958 The Department of Mechanical Engineering is created, ending a cost-saving arrangement between Alberta and Saskatchewan in which chemical engineering was offered at the U of A and mechanical at the U of S.

SOURCES

ONLINE SOURCES– Alberta Research Council, Canadian Society for Civil Engineering, Wikipedia, Corporation of the Seven Wardens Inc., University of Alberta, University of Calgary, *Edmonton Journal,* Edmonton Economic Development Corp.

BOOKS– *Sons of Martha: University of Alberta Faculty of Engineering 1913-1988,* George Ford, 1988; *Leduc* by Aubrey Kerr, 1991; *Canada's New Main Street: the Trans-Canada Highway,* David W. Monaghan, 2002; *The Story of Canadian Roads,* Edwin Guillet, 1966; *Oil Sands Scientist: The Letters of Karl Clark,* Mary Clark Shepherd, 1989.

Kudos

Taking pride in achievement

BARTLETT, F. MICHAEL DR.

(PhD Civil '94) PEng

has been appointed a fellow of the Canadian Society for Civil Engineering (CSCE). Bartlett received his M.A.Sc. in Structural Engineering from the University of Waterloo in 1982. Following graduation, he worked for almost eight years with Buckland & Taylor Ltd. in Vancouver, before completing his PhD in Civil Engineering from the University of Alberta in 1994. He began his academic career at the University of Western Ontario in 1995, where he is now a professor. Bartlett's expertise has also been recognized outside the University, with important appointments in the fields of bridge code development and calibration. He was a member of the team assigned to the innovative calibration work on the Confederation Bridge (linking P.E.I. and New Brunswick). He also worked on the bridge's design criteria, including unique load and resistance factors to achieve the stringent target reliability levels and design life required. Bartlett was appointed to two committees of the Canadian Highway Bridge Design Code and made important contributions to the code now used countrywide as a National Standard of Canada. He is the designated project leader for research team implementing the "Three Little Pigs" facility at Western, a $6.8 M laboratory to test full-scale houses and light-frame construction to simulated hurricane-force winds. The lab received Canada Foundation for Innovation funding in 2004. Bartlett was awarded the Donald Jamieson Fellowship in Structural Engineering in 1990 and 1991. Since 1992 he has been a four-time recipient of the P.L. Pratley Medal for best paper on bridge engineering and was twice awarded an honourable mention. In 2002, he received the Sir Casimir Gzowski Medal, Canada's oldest engineering award. Bartlett is a registered professional engineer in British Columbia, Alberta, the Yukon, and Ontario. He is a member of the Canadian Institute of Steel Construction, the American Concrete Institute, ASCE, and the International Association of Bridge and Structural Engineering. He has been an active member of the CSCE since 1982.

BASHIR, NASEEM

(Electrical '92) PEng

has been appointed a director of the 2005/2006 board of directors for the Consulting Engineers of Alberta. Bashir is principal and vice president of A.D. Williams Incorporated. Bashir has provided support, engineering, and project management services to clients in western and northern Canada for over 20 years.

BECKETT, WILLIAM JAMES

(Electrical '73) PEng

is a councillor continuing in office for the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA).

CAMPBELL, ROBERT

(Mechanical '68, MEng Mechanical '70) PEng

has been appointed to the 2005/2006 board of directors for the Consulting Engineers of Alberta. Campbell is principal mechanical engineer with Hemisphere Engineering Incorporated, and has been with Hemisphere since 1978. With over 37 years of experience, Campbell has been involved with heating, ventilation, air conditioning design, and management throughout his career. He currently manages Hemisphere's Edmonton office.

CHAMBERS, DON

(Civil '70) PEng

is now past president of the Consulting Engineers of Alberta (CEA) board of directors. Chambers is the president of Walters Chambers & Associates Ltd. and has 32 years of experience in the consulting engineering industry. He has worked on varied projects, from LRT stations to chemical plants, often as the prime consultant.

DMYTRUK, CHRYS.

(Chemical '60) PEng

has been re-elected for a second term to Council for the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

HAUGEN, JAY

(Electrical '82) PEng

has been appointed partner at Parlee Mclaws LLP, a legal firm in Edmonton, Alberta. Haugen joined the Edmonton law firm as associate lawyer in December 2000. As a patent and trade-mark agent, he advises clients on patent, trade-mark, and intellectual property protection and enforcement. His engineering experience was primarily with AGT and EdTel (the previous government owned telephone services) and TELUS. Haugen's work included the design and development of fibre optic systems, but he later graduated to regulatory services. He continued this area of work, assisting TELUS with their CRTC applications while attending law school.

HOLE, HARRY

(Civil '44, LLD [Hon] '05) PEng

received an Order of Excellence from the University of Alberta as part of Reunion Weekend 2006 activities.

JAGER, CHRIS

(Metallurgical '75)

was promoted to president and CEO of AltaSteel. Jager was formerly vice president of operations, and has worked at AltaSteel for 31 years.

LABOSSIERE, PIERRE DR.

(PhD Mechanical '87) ENG

was awarded a fellowship by the Canadian Society for Civil Engineering. The award was peer recommended and awarded in recognition of his contribution for civil engineering and his professional leadership. Labossiere is currently the associate vice-rector at the Université de Sherbrooke.

LOEWEN, DALE

(Civil '84) PEng

was recently appointed general manager of southern Alberta operations for the Associated Engineering group of companies. Previous to this appointment, Loewen was manager of infrastructure services in Calgary. Loewen is a senior civil engineer and project manager with more than 20 years' experience on infrastructure, water, transportation, and environmental projects.

Kudos

Taking pride in achievement

LUEKE, JASON DR.
(Civil '97, MSc Civil '99, PhD Civil '05) PEng

received the Outstanding Paper Award for co-authoring "Relining of an Irregularly Shaped Double Barrel Sewer," his presentation to the North American Society for Trenchless Technology. The awards were presented in Nashville earlier this year.

MAIER, GERALD DR.
(Petroleum '51, LLD [Hon] '99) PEng

was awarded the Alberta Centennial Medal in 2005 in recognition of his contributions to the province.

MCGHAN, TOM
(Electrical '80) PEng

has been appointed vice president of project engineering for ATCO Power Limited. McGhan will be responsible for overseeing all aspects of project engineering and the technical analysis and execution of new projects for ATCO Power Canada Ltd. He started with ATCO as a senior instrumentation engineer in the generation engineering section with Alberta Power Limited in 1988. He has held several successive management positions in his 26 years of working in the electrical energy utility industry, including four years as station manager at the Osborne Cogeneration Facility at Adelaide in South Australia. McGhan's experience in constructing and managing large thermal stations and gas turbine plants has resulted in expertise in commercial, project and operating management, and has contributed to technical, industry, and community organizations during his working career.

MCTAVISH, MARK
(Mechanical '78) PEng

has been appointed director of alarm solutions and global training at Matrikon, where he provides leadership to improve the safety of operations at processing facilities around the world.

MORGAN, GWYN
(Mechanical '67) PEng

received the Centennial Leadership Award for highest distinction as an executive or director of a continuing enterprise from the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA). Morgan devoted three decades to building the largest company ever to be headquartered in western Canada. Morgan created EnCana Corporation from the merger of the Alberta Energy Company (AEC) and PanCanadian Energy in 2002. Before creating EnCana, Morgan was president and CEO of AEC, which he joined at its start-up in 1975.

PETHER, DON
(Metallurgical '70)

has been appointed chair of the board of directors for Dofasco Incorporated.

RABOUD, PAUL
(Civil '84)

has been appointed president and chief operating officer for Bird Construction. Bird Construction is one of Canada's top 10 general contractors. Raboud has been with Bird Construction since 1984 and began in the Toronto office of the company as a junior estimator. In 1990 Raboud was asked to open an office for Bird in Vancouver. The annual volume of this operation grew to over $100 million by 2000 when he moved to the corporate office in Toronto as executive vice president.

Bird Construction Company Limited was founded in 1920 in Moose Jaw, Saskatchewan as a small partnership and has grown to become one of Canada's top 10 national general contractors with operations across Canada and in the United States. Annual revenues total $450 million. The company recently converted to an income trust. The company is listed on the TSX and has a market capitalization in excess of $200 million.

RAJOTTE, RAY DR.
(Electrical '71, MSc Electrical '73, PhD Electrical '75) PEng

received an Order of Excellence from the University of Alberta as part of Reunion Weekend 2006 activities.

ROSS, BRIAN
(Civil '78) PEng

has been elected treasurer for the Consulting Engineers of Alberta (CEA) board of directors. Ross has worked with AMEC Earth and Environmental and its predecessor firms throughout western Canada since 1978. He is senior vice president of AMEC Earth and Environmental, responsible for the geotechnical and material lines of business as well as their regional offices in western Canada.

SABOURIN, MARC JEROME
(Civil '77) PEng

is a councillor continuing in office for the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

SAMEK, ROBERT
(Chemical '85)

has been elected as a director of the worldwide partnership of McKinsey & Company's Canadian Practice. Samek serves major North American and global companies in the energy, mining, pulp and paper, and manufacturing sectors, specializing in capital projects management, operational performance improvement, and growth strategy. He is a co-leader of McKinsey's global petroleum practice, responsible for research and knowledge development, and he heads the Canadian industrial practice. He joined the firm in 1992.

SAUNDERS, R.J. (Bob)
(MEng Civil '89) PEng

has been appointed senior geotechnical engineer in the Calgary office of Thurber Engineering. Saunders has worked on a wide range of projects in northern and western Canada, primarily in oil and gas, pipeline, and mines. He has also undertaken site investigation and assessments for bridge and compressor station foundations, wastewater and tailings ponds, cofferdams, and waste dumps. Saunders has extensive experience with slope stability assessment and remediation, having worked much of his career with landslides, especially related to pipeline projects. He recently worked on permafrost related issues for the Mackenzie gas project.

SMITH, JIM
(Chemical '72) PEng

is newly elected to the council of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

Kudos

STAMBAUGH, WES

(Civil '79) PEng

has been appointed to the 2005/2006 board of directors for the Consulting Engineers of Alberta. Stambaugh is the Calgary branch manager and director of ISL engineering and land services (formerly Infrastructure Systems Ltd.). Since joining ISL in 2001 as the Calgary branch manager, Stambaugh has been responsible for the overall corporate direction and coordination of ISL's resources in Calgary and the southern Alberta region. He has worked in the private and public sectors in various roles as project engineer and senior manager responsible for a wide range of municipal and transportation related initiatives.

STAPLES, LARRY

(Civil '74) PEng

received an honorary life membership for eminent service and leadership as president of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA). A member of APEGGA since 1974, Staples has assumed numerous leadership roles with the association, serving on council (1982-1985 and 2004 to present) and as president (2005-2006). He currently heads the business development activities for the prairie region of Acuren Group Incorporated.

STOWKOWY, STEVE

(Civil '79) PEng

has been appointed to the 2005/2006 board of directors for the Consulting Engineers of Alberta. Stowkowy is vice president Calgary region for UMA Engineering Ltd., responsible for administrative and financial management, market development, strategic planning, staff development, and client management. He serves on the UMA office of risk management, the UMA quality management steering committee, and the AECOM organizational peer review team.

STEFFLER, PETER DR.

(Civil '78, MSc Civil '80, PhD Civil '84) PEng

has been appointed a fellow of the Canadian Society for Civil Engineering. Steffler began his academic career at the University of Alberta in 1980 as a research assistant, rising to full professor in 1993. From 1997 to 1998 he served as associate chair for graduate studies and from 1998 to 2001 as associate dean in the Faculty of Graduate Studies and Research. Professor Steffler's primary field of research activity is computational hydraulics.

TROVATO, NICK

(Civil '79, MEng Civil '84) PEng

is a councillor continuing in office for of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

VERHAPPEN, IAN

(Chemical '82) PEng

has joined MTL Instruments Group as director of industrial networking technologies. Verhappen is highly respected in the process automation sector and has served as project lead, engineer, designer or independent review consultant for numerous companies spanning several industries.

VILCSAK, CHRIS

(Mechanical '85) PEng

is president and CEO of Solution 105 Consulting and has been nominated as one of the prairie regional finalists in the Ernst & Young Entrepreneur of the Year 2006 awards. The competition honours entrepreneurs who have demonstrated excellence and achieved extraordinary success in areas such as innovation, risk taking, company development, financial performance, and personal commitment to their businesses and communities.

WALTERS, DICK

(Civil '64, MSc Civil '66) PEng

is newly elected to the council of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).

WORKMAN, CHRIS

(Civil '88, MEng Civil '92) PEng

has been appointed principal and director of Thurber Engineering Ltd. in Calgary. Workman has served as a geotechnical engineer throughout Alberta and the B.C. interior. His experience includes foundation investigations and design for heavy industrial plants, terrain hazard mapping, landslide assessments, and dam safety.

in memoriam

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

Cole, Leslie C. (Chemical '58)
Edgecombe, Rodney (Chemical '49)
Enarson, Ernest (Civil '45)
Laing, Colin (Metallurgical '62)
Little, Herbert (Mining '49)
O'Brien, John (Civil '49)
Medhurst, Charles (Mining '40)
Metzner, Dr. Arthur (Chemical '48)
Moore, Kenneth (Civil '48)
Peterson, Benjamin Norton (Civil '49)
Simpson, Charles (Electrical '37)
Szojka, Frank (Electrical '61)
Shook, Dr. Clifton (Chemical '56)
Woodlock, David (Mechanical '63)

The Faculty of Engineering was recently made aware that the following alumni passed away more than a year ago.

Kuspira, Major Carl (Electrical '56)
Strum, Herbert (Electrical '51)

In memory of William David Martin, (Civil '44)

William Martin was born on April 16, 1916 on a farm about seven miles southeast of south Edmonton (Strathcona). He grew up helping out at the farm and attended the local Mill Creek School. He went on to complete his secondary education and entered pre-engineering at the University of Alberta in 1935.

Martin spent the next few years studying in Mining Engineering and working for Sherritt Gordon in Manitoba as well as helping with the construction of the Ft. St. John Airport in the summer of 1941. He returned to the University of Alberta in 1942 and switched to Civil Engineering, graduating in 1944. During 1943 and 1944 he was involved in surveying and redesigning roads in the national parks, including the one from Castle Mountain to Radium Hot Springs.

On December 1, 1944, Martin married Elma Brooks. They had three children. In the early 1950s he was involved in pipeline and pulp and paper mill construction in Quebec and Ontario. From 1957 to 1959 he managed a pulp and paper construction project in east Pakistan (now Bangladesh). He returned to Niagara Falls where he was the resident engineer on the Seagram Tower. In 1962 he moved to San Diego to work in international consulting. He then returned to East Pakistan to work on an extension of the pulp and paper mill. In 1964 he went to San Diego, where he remained until 1969, contributing to a variety of projects in many parts of the world. He then moved back to Nanaimo on Vancouver Island in British Columbia.

Upon retirement, Martin pursued private and personal interests. In 1986 he moved to Surrey, British Columbia, where he lived until he passed away on July 16, 2004.

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& Learning Complex
Edmonton, AB T6G 2V4

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Including a charitable bequest in your will is an effective method of supporting the Faculty of Engineering without compromising your current standard of living. Bequests are usually one of the largest gifts an individual can make. They minimize the income and capital gains to the estate, thus allowing more of the estate to be used as you desire.

For further information contact:

David M. Petis, Assistant Dean
External Relations, Faculty of Engineering, University of Alberta
E6-050 Engineering Teaching & Learning Complex
Edmonton, AB T6G 2V4
Tel: 780.492.5080 Fax: 780.492.0500
E-mail: david.petis@ualberta.ca

Christine Thom (Computer '92) wanted to ease the financial strain on future Engineering students. She made a charitable bequest to the Faculty of Engineering and established an endowed scholarship.

I wish to make a gift of:

☐ $100 ☐ $500 ☐ $1,000 ☐ $2,500 ☐ Other $_____

☐ Cheque (made payable to the University of Alberta) ☐ VISA ☐ MasterCard

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* To best meet Faculty of Engineering's needs, donations may be directed to endowed funds. Donations made to endowment funds are invested in perpetuity and the investment earnings are used to advance the specified purposes of the fund within the University.

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$ _____ Faculty of Engineering in support of undergraduate student projects, new educational initiatives in all disciplines, and general student life enhancement activities.

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$ _____ Mining and Petroleum Engineering Fund*

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☐ I would like information on how to include the Faculty of Engineering at the U of A as part of a will, life insurance, or other planned gift instrument.

☐ I have provided for the Faculty of Engineering at the U of A in a will or trust agreement.

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