

U of A. Engineer

Keeping in Touch with
Alumni



RISING STARS

Ray Rajotte:
biomedical pioneer

Sounds like
success

Frank Gue thinks
of the future

Young alumni feel
prepared for anything

Message from the Engineering Representative to the University of Alberta's Alumni Council

A few months ago, I was honoured to be asked to be the new Engineering representative to the University of Alberta's Alumni Council.

I've had the good fortune of being able to stay closely connected to the Faculty of Engineering for most of the 33 years since I graduated in Electrical Engineering. I've been the organizer for our class reunions and have attended a number of engineering alumni functions hosted by the Faculty. Through my professional association with Stantec Consulting, I've had a firsthand view of the growth of the Faculty's infrastructure over the past decade—working on many of the new Engineering buildings constructed in this period.



Being a U of A Engineer has a lot of personal meaning to me as well—we have six U of A Engineers in our family and are proud to have our names on the faculty's "Engineering Generations" wall.

As the Faculty of Engineering's representative on the U of A Alumni Council, I am your voice. I will ensure Engineering's perspective is included as the Council determines the short- and long-term goals of the U of A Alumni Association, sets and reviews policy, and identifies programming needs. If you would like to share your ideas regarding how the U of A can continue to enhance its interactions with and services to its alumni, please e-mail me at glenn.stowkowy@stantec.com. I will be happy to pass your

thoughts on at future council meetings.

My role also involves ensuring that we support, recognize and celebrate our alumni in their accomplishments—and with U of A Engineers, there is much to support, recognize and celebrate! For this, I am happy to have the resources and expertise of the Faculty of Engineering's External Relations Office to draw upon.

I'm proud to represent a group of alumni who have a strong reputation on campus and in the community as being enthusiastic, committed leaders. I look forward to being the voice of U of A Engineers.

Yours truly,

Glenn M. Stowkowy, P.Eng. (Electrical '76)
 Vice President
 Stantec Consulting Ltd.

U of A Engineer is the Faculty of Engineering alumni magazine. It is published three times a year by the Dean's Office and is distributed to Faculty of Engineering alumni, friends, students and staff.

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

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

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

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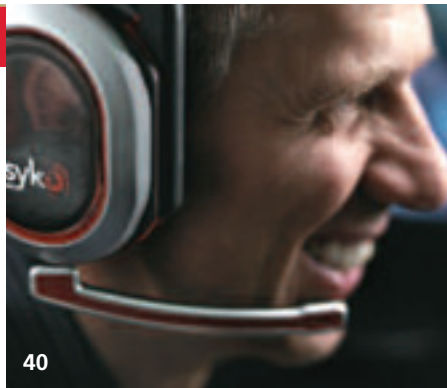
When it comes to teaching, Dr. Brian Fleck doesn't let the walls of a classroom or the borders of a campus restrict him. His work on television, including a spot hosting *The Nature of Things*, allows Fleck to share knowledge with the general public.

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Rod Precht (Chemical '92) is one of the up-and-comers in Alberta's new economy. He is pouring heart, soul and "love money" into a nanotechnology-based line of products that battle and prevent bacterial infections.

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Ray Rajotte (Electrical '71, MSc Electrical '73, PhD Electrical '75) pioneered the Edmonton Protocol treatment for type 1 diabetes, the first major diabetes treatment since the development of synthetic insulin in 1922. And he credits his education as an engineer in helping improve the lives of diabetics around the world.



24 Best Supporting Actor

James Bond had Q. And behind every successful student and research is a clever technician. Allan Muir helped Ray Rajotte on his journey to discovering a new treatment for diabetes; and Dave Waege helps students reach new heights at international competitions.

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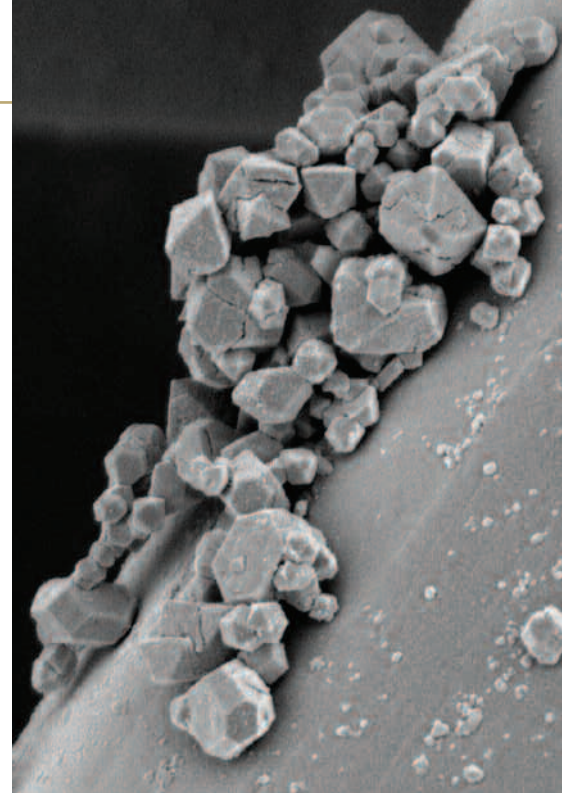
Bill Kent (Civil '31) knows tough times. As a student during the Great Depression, he'd scrape by on 10 cents a day. Now, he's giving back to help Engineering students who are on the edge, financially.

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The Faculty's Co-op program is enormously popular. Blending an exceptional education with practical work experience, the program is a win-win for students and employers. But the economic downturn is having an impact, and more companies are needed.

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Allan Scott (Mechanical '68) has been involved in Edmonton's growth for decades. Under his leadership, the new Art Gallery of Alberta will open in January.



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It is a video gamer's dream come true: a sound system that matches the quality of graphics on a video game. James Hildebrandt (PhD Mechanical '82) takes video game audio to the next level.

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The halls are alive with the sound of learning



Kids. The Faculty of Engineering is thick with them these days. And by kids, I mean kids—not our students, but kids. You know, the kind who run too fast and laugh too loud and scream and shout. Okay, our students do that too, but not to the same degree.

The kids inhabiting our classrooms and lecture halls are here for the summer Discover E engineering and science camps that run until the end of August. They're learning about engineering, and having fun at the same time. They're writing computer game programs, building robots, and launching rockets.

They're being inspired. They are being encouraged. They feel a sense of belonging. And because of this maybe one day they will become engineers.

Discover E also reaches well beyond the boundaries of campus. This summer some 1,700 campers will visit the U of A, and Discover E instructors will connect with nearly 500 more in 16 communities outside of Edmonton, as far away as Tuktoyaktuk. Last year, Discover E reached 17,943 youth through in-class workshops, camps and community events in over 32 communities. So far this year, Discover E has staged workshops for youths in 50 communities.

Discover E inspires kids and instructors alike. As profiled in our Spring 2009 edition, three of our young professors, Amos Ben Zvi, Anastasia Elias and Ania Ulrich all served as Discover E instructors while they were students here. The experience

contributed to their decision to become teachers.

It's an interesting example of the lessons teachers take from their students; of the fluidity of teaching and learning. During the summer months on campus, as kids run too fast and laugh too loud and scream and shout, we are inspired by the sounds of learning.

We hope you enjoy this edition of *U of A Engineer* as much as our team enjoyed producing it. As always, send letters, comments or possible story ideas to me at richard.cairney@ualberta.ca .

Richard Cairney

Richard Cairney
Editor



You're invited ALUMNI WEEKEND 2009

All Faculty of Engineering events are **FREE** to alumni and their guests. Unless otherwise noted, events will take place in the **Solarium, located on the 2nd floor (Maier Learning Centre) of the Engineering Teaching and Learning Complex (ETLC).**

Individual Class Gatherings

Many Engineering reunion classes will be holding private class dinners, social evenings, or other events throughout Alumni Weekend. For information on individual class events, please call your department contact as noted below:

Chemical, Materials, Metallurgical

Leanne Nickel 780-492-4159 or leanne.nickel@ualberta.ca

Civil, Environmental, Mining, Petroleum

Stephan Bogner 780-492-4004 or stephan.bogner@ualberta.ca

Electrical, Computer, Engineering Physics

Jamie Reid 780-492-8351 or jamie.reid@ece.ualberta.ca

Mechanical

Linda Kelly 780-492-4160 or linda.kelly@ualberta.ca



Alumni Weekend brings our Faculty of Engineering family together. Here, Howard Moss (Civil '50) tries his hand at the Punch Punch Revolution System, an Electrical Engineering student project.

Class of 1949 Engineering Alumni Luncheon

Friday, Oct. 2, 11:30 a.m. - 2:30 p.m.

Union Bank Inn, 10053 Jasper Avenue

Dean's Engineering Reception

Friday, Oct. 2, 4:30 - 7 p.m.

Dean's Engineering Alumni Brunch

Saturday, Oct. 3, 9 - 11 a.m.

Open House, Tours, and Lectures

Saturday, Oct. 3, 9 a.m. - 4 p.m.

Place: Engineering Teaching & Learning Complex (ETLC), Maier Learning Centre (ground and 2nd floors)

For further information, visit www.engineering.ualberta.ca/alumni

Flashes of brilliance

New welding chair addresses an economic hot spot

by Richard Cairney

Welding and metal fabrication play a major economic role in Alberta. With approximately \$14 billion per year of existing activity, Alberta is one of Canada's major metal manufacturing centres, behind only Ontario and Quebec.

With that in mind, the Faculty of Engineering, Edmonton-based Weldco Companies and several industrial partners have established the Weldco/Industry Chair in Welding and Joining.

"We are setting out to revolutionize welding in Alberta, Canada, and beyond," says Dr. Patricio Mendez, who holds the new research chair.

"Welding is the critical enabling technology of Alberta's metal products fabrication sector, which over the period 2005 to 2010 is expected to generate \$48 billion in revenues, with \$12 billion directly accounted for by welding," he adds. "In the oil sands sector alone, estimates of investment in major projects—all of which depend heavily on welding—for the next 25 years exceed \$200 billion. These are enormous numbers, even if the current economic crisis tempers them somewhat."



Foto Projekt

Weldco CEO Doug Schindel, Dr. Patricio Mendez, who holds the new research chair, and assistant professor Dr. Adrian Gerlich, who is working with Mendez in establishing the Canadian Centre for Welding and Joining.

Mendez will investigate the science of welding while educating the next generation of engineers who will help industry improve productivity, safety and environmental stewardship. This industrial research chair will be the cornerstone upon which the Canadian Centre for Welding and Joining will be established.

Weldco Companies President Doug Schindel says the centre will help industry address important challenges.

"In this country we must improve our production efficiency and worker and environmental protection," he says. "And we need to fulfill all of our requirements of supporting the community and education. We cannot expect to hire qualified people if we are not actively supporting the educational institutes that produce those candidates."

Weldco's \$750,000 support for the chair was made "because it was the right thing to do,"

says Schindel. As a field of scientific inquiry, welding is dramatic and mysterious. Gas in an arc weld, for example, reaches 20,000° C—hotter than the surface of the sun—and travels at speeds of 300 meters per second.

At the core of welding is the field of magnetohydrodynamics, developed by 1970 Nobel Prize recipient Hannes Alfvén to study the behaviour of the fluid surface of the sun. "It's incredibly complex, but that's what you need to know to understand welding at the molecular level," says Mendez. "We understand the basics, but there is a lot more going on."

The chair program will conduct research into well-established and new welding techniques including laser beam welding and friction-stir welding, in which friction is used to heat but not melt metals, creating a stronger, environmentally friendly bond between components.





Rising STARS

by Debby Waldman

Convocation is one of the most exciting times of the year at the Faculty of Engineering. Young, bright, educated students begin their careers and they find out how good they are: they draw upon their education, applying their knowledge and problem-solving skills to real-world problems. This year, we begin an annual feature in which we follow four students as they enter the profession, and ask four young alumni to reflect on their first year in the working world. In a year's time, we'll revisit the four young alumni to learn about their first year in the profession.

REBECCA PINTO

The engineering advantage

Rebecca Pinto (Chemical '09) was in her first year at the Faculty of Engineering when she decided she wanted to be a physician. But instead of heading over to biological sciences, Pinto embraced her major.

"After that point I loved engineering," she says.

An Engineering Co-op Program student during her first couple of years in university, Pinto was fascinated with what she was learning. After an eight-month work term researching oil sands chemicals, Pinto realized that she needed a change.

"I didn't want to do managerial stuff," she recalls. "I didn't want to do research."

"I want to be in a job where I can develop relationships with my patients, and I honestly think engineering can help," she says. "We approach problems differently and

look at things from different angles than people who are going into sciences."

Pinto maintained a perfect 4.0 average throughout her academic career. At the end of her first year, she won the prestigious C.D. Howe Memorial Foundation Engineering Award, as the top female engineering student in the country.

The award included a \$7,500 stipend for three years, freeing Pinto to volunteer for organizations such as Engineers Without Borders, Canadian Blood Services, and the Chemical Engineering Students' Society.

"The work ethic you develop in engineering will serve you in any field, but especially medicine, because it is such a rigorous field," she says. "We've worked so hard these last five years, I almost think medicine will be a cakewalk in some ways."



MIKE VANDEN HAM

Into the deep end



Mike Vanden Ham's dream job would be to design, build, test, and analyze vehicles and their components. Given the state of the North American auto industry, such positions are likely to be hard to come by, but Vanden Ham (Mechanical '09) is optimistic.

"The downturn in the economy may make it more challenging for me to get a traditional job in my field, but I am hopeful that it will create a wave of ingenuity and the growth of some leading-edge businesses and ideas," he says.

"It would be very exciting to be involved in that process."

Captain of the Golden Bears swim team, Vanden Ham's interests in math, physics, and the mechanics of bikes and cars led him to

study engineering. He says the highlight of his four years in the Faculty of Engineering was working on design projects.

"I enjoyed the freedom and creativity associated with applying my engineering skills to real-life problems and, in some cases, getting to see a final product and its performance."

Vanden Ham is excited about entering the profession.

"I'm looking forward to making an impact, assisting or leading the way to dramatic developments that will cause a shift in the way we do things and think," he says. "Innovation has been changing the world for centuries, and I think that's great. Now I feel it's my turn to step up to the plate and hit one out of the park for our generation."

CHRIS PICHURSKI

Diamond in the rough

One of Chris Pichurski's favourite childhood memories is visiting the Leduc No. 1 Historical Site with his friends and his dad, an oil field equipment truck driver.

"He could explain every rig from 1950 on," recalls Pichurski, who grew up on a small farm south of Devon, Alberta.

Pichurski (Civil '09) would have been happy as a mechanic, but his parents wanted him to continue his education. He was so resistant that his mother had to complete his registration for him at Grant MacEwan College and even picked out his courses—in Arts.

It wasn't a good fit: Pichurski was asked to leave. Three years later he returned to school and eventually entered the Co-op program in mining engineering. His first work term, in 2006, was at the Diavik Diamond Mines 200 km north of Yellowknife. He

enjoyed the work so much he spent every Co-op term there.

Now working full-time at Diavik, Pichurski is applying his interest in heavy equipment and his problem-solving skills in the kind of remote environment that he loves.

"In the summer it's absolutely beautiful—the lake is so pure it's basically distilled water," he says. Pichurski works two weeks at the mine, then comes home for two weeks. And he has begun a master's program in engineering.

"It's one of those things where it opens more doors. It leaves open the chance of a PhD, which I would do for the teaching aspect. I've tutored kids before, and I saw how good our teachers are at the U of A, and it's something we have to think about—who is going to teach in the future."



JIM MURPHY

The prodigal student

Jim Murphy (Electrical '09) entered the Faculty of Engineering nearly 20 years after flunking out of Brock University in Ontario. "I was a crazy young guy," he admits. "I was a wastrel."

But he was a determined wastrel. After being turned away from the Army Reserves because he was overweight, Murphy took the most physically demanding job he could find, limited his daily diet to one carrot, one apple, two boiled eggs and unlimited water for two weeks, and dumped the requisite 20 pounds.

Fast-forward to 2003: Murphy is named the top junior non-commissioned officer in the Canadian Armed Forces. He had studied at the Army's electronics communications school, but wanted a more thorough education. The Faculty provided that and more.

"I have the ability now to attack technical problems with more rigour, and hence more motivation, than I could have before," he says. "I can look at developing solutions to problems and actually making them happen as opposed to daydreaming."

Murphy, who is married and has four children, is headed back to the Armed Forces. He's not sure what job he'll be assigned, but knows he'll be better prepared for it thanks to his four years in the Faculty.

"Now that I've done the degree and met the people that I've met, especially the professors, and discovered the breadth of applications for knowledge I've acquired, it's astonishing how much there is out there," he says. "Basically, the world is your oyster."

NICK SCHWINGHAMER

The China effect

Within a month of earning his degree, Nick Schwinghamer (Electrical '08) was hired as a design engineer at Edmonton's Eleven Engineering. His work at the wireless audio company included designing hardware and writing software for everything from iPod docks for household use to wireless audio packs for arena rock concerts.

Between work, playing for a Division 1 men's recreational hockey team, and spending time with his family and girlfriend, Schwinghamer was challenged, busy, and entirely content. Then his boss sent him to China—and his life changed in ways he never could have imagined.

"It was incredible," he says of his stint in Shenzhen, designing fixtures to test Eleven Engineering products produced in Chinese factories. "It was something I never would

have expected. But working with a small company, it's great to be thrown into the action, and you get a lot more opportunities that you wouldn't get with larger companies."

In September, Schwinghamer will once again become a full-time student, this time in the U of A's combined MBA/MEng program. He's looking forward to going back to university, where he developed the problem-solving skills that have taken him so far during his relatively short time in the work force.

"Ninety percent of this job is trying to figure out why what you designed didn't work the first time," he says. "The ability to work through the problems is the biggest thing I got from my time at the U of A. It's really something that will help me through my entire life."



JESSIE SMITH

Engineer for life

As a newly minted junior process engineer at Bantrel in Calgary last year, Jessie Smith's assignment was to help revamp a sulphur processing plant near Montreal. Because there weren't many new engineers on the project, Smith had the opportunity to assist senior engineers in a variety of tasks.

"Often it seemed as if I was capable of more than they expected," says Smith (Chemical '08). "U of A graduates are given an education in a number of areas, and we're kept very busy throughout our degrees. Fast-paced work doesn't come as a shock."

The more senior engineers were willing to mentor and assist Smith with new tasks, she adds. "The support system for new graduates was great."

But as the economy was beginning to crumble, large projects at Bantrel were scaled down or cancelled. The sulphur plant was postponed. In early December Smith was laid off.

"It did give me incentive to work as hard as possible for my remaining time," she says. "I wanted to leave a good impression with the company should I ever come back."

Smith is still looking for a new job, and encourages new graduates to be flexible when it comes to the job market. "Anything that allows for learning and new experiences will be beneficial in the long term," she says. "A job may not be what someone assumed they would be doing upon graduation, but it may still end up being a rewarding experience."

KAYLA DAWSON

Wind in her sails

Of the six job offers Kayla Dawson (Environmental '08) received when she graduated, the most appealing came from Finavera Renewables Inc., a wind energy company based in Vancouver, B.C.

Dawson knew next to nothing about the industry, but a year into her career is more confident than ever that she made the right choice.

"I love my job," she says. "I get to go to every meeting and, because the office is so small, I'm exposed to what's happening not only with wind development activities but on the financial side of things, the marketing side of things, everything. I have never learned as much in my life as I have in the past year."

Dawson oversees the engineering elements of wind farm development including

turbine procurement and management of technical consultants and contractors.

During much of her first year, Dawson prepared proposals to construct and operate four wind farms in northern B.C. She drew heavily on lessons from Dr. Daryl McCartney, whose classes taught her to put together a complex and comprehensive report.

"I work with a lot of non-engineers, and I found I was able to help everyone focus on how we were going to organize the report before we began to get into it," she says.

Finavera encourages teamwork, another skill Dawson developed in the Faculty. "We put in a lot of long hours putting the proposal together, and coming out of engineering that wasn't odd to me," she says. "You have a project, you put the hours in."



DUSTIN BIRTCH

The race to success

During his five years in the Faculty of Engineering, Dustin Birtch (Mechanical '08) may have spent more time with the Formula SAE (FSAE) Race Team than in a classroom. His devotion to extracurricular learning has had a positive impact on his career prospects.

Both of Birtch's post-graduation jobs have come as a direct result of his FSAE experience.

Dr. David Checkel, one of the professors Birtch had worked with on the team, offered a short-term project researching traffic flow for the City of Edmonton.

Then, FSAE advisor Dr. Curt Stout forwarded a call from CSP Innovative Engineering in Edmonton to the Formula Team. Birtch got the job.

CSP designs, builds, and maintains cast-steel products such as crushing rolls for

diamond and coal mines, and counterweights and flywheels for the oil field industry. "I'm involved with everything," Birtch says. "I'm not stuck just designing. I get to head to the machine shop and see parts being built, and to the field and see them in use."

The FSAE experience gave Birtch the edge he needed to succeed. Students are responsible for everything from fundraising, to designing and building the cars, to travelling to Los Angeles for races.

"In the classroom, you learn the fundamentals of engineering, why things are designed a certain way," Birtch says. "Outside, you get to really learn more hands-on. I learned how to work with a team, how to work with machine shops, the importance of communication, and understanding what makes a good design."

Lights Camera Teaching!

by Richard Cairney

Dr. Brian Fleck is afraid. He is sitting in an ultralight aircraft filming the debut episode of Project X, a CBC TV program modeled after the sort of “extreme science” programming offered by cable stations like Discovery. The theme of the pilot episode is flight, and Fleck, a newcomer to television, is literally and figuratively flying by the seat of his pants as he repeatedly improvises an introduction to the

series, being filmed by a camera bolted to the aircraft’s frame.

“Hi. My name is Brian Fleck. Welcome to Project X,” he shouts into the camera. “Today, we’re going to talk about flight.”

To hear him describe the scene from the safety of his Department of Mechanical Engineering office, it seems Fleck (Mechanical ’89) regards the term “aircraft” as perhaps too grand a description of an ultralight.



“These things are suicide machines! They’re like flying motorcycles! A person would have to have a death wish.”
—Brian Fleck

“These things are suicide machines! They’re like flying motorcycles! A person would have to have a death wish,” he says of the experience. “The pilot was diving down towards crops and you’d get so close to the ground that you could feel the change in temperature and humidity. You could smell the canola.”

Fleck has tested the metal of medieval armor, driven muscle cars along the Pacific Coast Highway in search of the car of the future, and eaten at one of the finest restaurants in the world—all in the name of science.

Last year Fleck and Marc Huot, one of his graduate students, were regular cast members on CBC’s Project X. Earlier this year, Fleck served as guest host of CBC’s long-running science program, *The Nature of Things*. In the episode he hosted, “The Future of the Car” (available online at www.cbc.ca/documentaries/natureofthings/), Fleck travelled the world, following the leading edge of new car design from race tracks in America, to leading-edge designers planning to mass produce communal cars, to a small Italian automaker whose manufacturing process still involves craftsmanship.

It isn’t a stretch to say that Fleck is teaching even when he’s hosting television programs. In fact, in his capacity as a science broadcaster and public intellectual, you could say that he has lectured millions.

“When you’re doing these programs you have to remember that people aren’t watching TV to learn,” he says. “You have to sneak up on them. You have to teach them something without them knowing it.”

Educating students, on the other hand, is a completely different challenge, and one that Fleck approaches with equal passion.

Whereas television hosts want viewers to like them, a university professor needs to strike a balance between respect and friendship, serving as an educator and mentor. Fleck feels that learning is best achieved when students discover information on their own. As if to illustrate the point, a group of his students knock on the lab door (in the middle of an interview for this article) to ask Fleck about an end-of-term design assignment due later that afternoon. Politely, Fleck listens to their questions and, without giving away answers, points the students in the right direction.

“The key for teaching to work is to realize that the teacher is a pointer,” he says.

“You point students to information. A good university has to provide students with opportunities to discover things. If, as a professor, you just stood there and said some stuff in a classroom—well, you could just put your lectures in a book.”

Fleck admits he never experienced any sort of epiphany where clouds parted and he felt an educational calling. And yet, his position as a professor seems in some ways preordained. Fleck first became involved with teaching and research after an argument with one of his own U of A professors, Dr. Dave Wilson.

“I admonished him because his eyes seemed to be roving around in a suspicious manner,” Wilson recalls. “Usually miscreants would just put their tails between their legs and slink off, but Brian came to me afterwards and explained it was all very innocent.” Fleck’s sincerity and communication skills impressed Wilson. “I immediately thought that someone who could speak whole paragraphs with words of more than one syllable might be a worthy candidate of a lab position. He was a quite exceptional undergraduate student because he had seen the world and knew who Shakespeare was—and he has capitalized on that.”

At the time Fleck worked in his lab, Wilson was researching the way air leaks out of houses, an area of study that came to have important public safety implications. The experience had a lasting impact on Fleck.

“I decided I wanted to focus on human safety and hazards, and my first job as an engineer was looking at how sour gas might be dispersed in the atmosphere.”

But after a while, Fleck worried that his research in industry wasn’t having an impact, so he moved on to earn his master’s degree at Laval University, writing a thesis



Mechanical Engineering professor Fleck tested the strength of armor during an episode of CBC TV’s Project X.



With a camera mounted on the windshield of a Mustang convertible, Fleck prepares to take a drive down the Pacific Coast Highway.

(in French) on fluid mechanics and direct numerical simulation. Craving more industrial work, he then applied for research funding from British Gas to finance research on natural gas burners in steel reheat furnaces, while earning his PhD through Queen's University.

His next stop was a faculty position at the Royal Military College of Canada in Kingston, Ontario, teaching classes with as few as four students—a considerably more intimate setting than a current U of A lab course, in which he teaches 140 students with the help of 14 teaching assistants.

As an educator Fleck relies, in part, on his experiences as a student.

"I really came to understand that what I liked about the university teaching experience was the challenge when things were left open-

ended, when you were allowed to play with things. I know some students don't like that, but I find it best prepares you for life and simulates reality—and I don't think rote learning captures any of that.

"No one is going to graduate from here and write exams... No one learns anything exciting while studying for exams, and you certainly don't learn anything from writing exams. And because engineers don't write a lot of exams in the course of their careers, exams are not necessarily good predictors of who's going to be a good engineer."

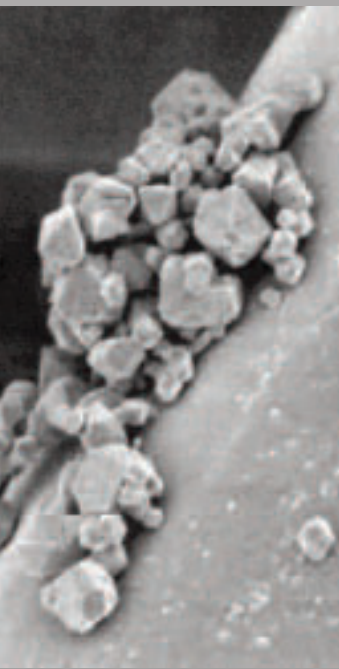
Wilson agrees: "No one teaches anyone much. Students have to go in and learn it. You have to convince the students that it is really worth pursuing a subject on their own. All you can do is be persuasive and inspiring and convincing."

At the same time, Fleck knows that students need hard and fast structure and lessons, even if it means he's unpopular.

"Good educators can get good evaluations and still be firm. My job is not to get the best teaching evaluation. I'm not trying to get the best teaching evaluation. If the course content says you have to learn how an aircraft engine is made, I can't let that one slide.

"One of the jobs of a professor is to be fair and firm and, in some ways I think, to be more like the person who will be their supervisor in the workplace."

On the other side of the coin, students are responsible for becoming active learners. "You have to work and think and problem solve," says Fleck. "It's not always about getting straight As."



A New Lustre

ON AN OLD IDEA

Rod Precht (Chemical '92) is on the leading edge of a nanotechnology-fuelled revolution in wound care and disease prevention.

by Larry Johnsrude

Silver, used throughout history for jewellery and currency, has also been known since ancient times for its healing properties. Early Mediterranean civilizations fashioned vessels out of the precious metal to keep water fresh and free of contamination. Royalty used silverware cutlery to stop the spread of disease. Folk remedies used silver in various forms to ward off illness.

Now Rod Precht (Chemical '92) is taking this old metal high-tech with a medical application that helps heal wounds and stops the spread of harmful bacteria.

With the help of the University of Alberta and Economic Development Edmonton, through their technology commercialization centre TEC Edmonton, Precht plans to launch his product this fall. It's a bandage, infused with microscopic grains of silver, that kills bacteria and stops infections more efficiently and inexpensively than any other product on the market. Next year, he plans to

Rod Precht's company, Exciton Technologies Inc., is on the verge of commercializing a new bacteria-fighting bandage. The wound dressing is coated with nanocrystalline silver (insets) that has anti-bacterial properties.



Precht became fascinated with the ability of minute amounts of silver to kill and halt the reproduction of bacteria without posing a risk to human cells or the environment.

follow up with another product line: silver-based cleaners designed to keep surfaces free of disease-causing bacteria.

It will cap a decade-long pursuit of an idea so powerful he could not let it fail.

"I believe in the technology," Precht says in his airy fourth-floor TEC Edmonton office in Enterprise Square (the old Bay building). "Hospital-related infections leading to death are greater than breast cancer, car accidents, and heart attacks combined. That is a huge problem. We want to be part of having a solution to it."

Born and raised in Edmonton, Precht enrolled in chemical engineering at the University of Alberta to prepare for a job in the province's oil industry. But he was diverted from that path when he went to hear a campus lecture from Dr. David Suzuki. It inspired him to follow an engineering path that had more to do with the living than the dead.

Taking microbiology and biochemistry as electives—a challenge for someone who had-

n't even taken high school biology—Precht became fascinated with the ability of minute amounts of silver to kill and halt the reproduction of bacteria without posing a risk to human cells or the environment.

"I devoted my efforts to understanding the properties of silver," he says. "I thought if I understood it well enough, I could create my own company."

After graduating in 1992, Precht got a job with Westaim (which later acquired Nucrust Pharmaceuticals Inc.), where he co-developed a method for spraying silver crystals onto fabric for wound treatment. He then went to Nucrust Pharmaceuticals Inc. As product development manager at Nucrust, Precht worked with Dr. Rob Burrell, a Faculty of Engineering professor who now holds the Canada Research Chair in Nanostructured Biomaterials and serves as chair of the Department of Biomedical Engineering. Burrell developed Acticoat, a bandage lined with nanocrystalline silver, which revolutionized wound dressing.

The disinfectant products will be used first to sterilize medical implant devices.

Working on projects that had immediate clinical applications appealed to Precht. He was impatient with the idea that it could take a decade for a pharmaceutical he helped develop to hit the market. “I saw a far greater opportunity in medical devices, which can get regulatory approval and out on the market in a fraction of that time,” he says.

In 2001, he set out to start his own company, Exciton Technologies Inc. Drawing on his expertise with Nucryst and the expertise of Dr. Stojan Djokic, an adjunct professor in the Faculty of Engineering, Precht took the wound-dressing one step further. Instead of spraying fabric with silver crystals, Exciton treats the fabric with silver salts using a patented new technology called exSALT. This requires less silver and is therefore less costly. At the same time, the silver permeates the fabric for more thorough treatment of infections.

An energetic 39-year-old, Precht personifies Exciton, named after a highly charged, excited electron. He started the company with what he calls “love money”—almost \$1 million in cash borrowed from friends, relatives, and anyone else he could get to share his dream.

“I couldn’t attract industry partners because they wouldn’t pay for research and development. They didn’t know if our technology was unique, and there were all kinds of issues related to getting a patent before anyone would make a commitment,” he explains.

When he got the patent in 2007, the response from industry wasn’t much better.

“We had companies beginning to take a look at us, but they were telling us to get a product to market first,” he says. “They didn’t want to pay for that, either. We needed to raise money. It’s been a fundraising issue from the get-go.”

Having exhausted his sources of “love money,” Precht hit a wall that many small start-ups face, that awkward stage between the hundreds of thousands of dollars they can raise to get their projects onto the drawing boards, and the millions they need to get into production.

That’s where TEC Edmonton came in. A friend suggested that the business incubator, created to get ideas like Precht’s from the drawing board to a commercial reality, might just be his solution.

Precht didn’t exactly fit the model, though. TEC Edmonton usually takes ideas from the university lab to the business world. Precht hadn’t been in university since 1992; he had conducted most of his research at private labs in Edmonton and at his home.

“We didn’t get a whole lot of support out of the gate because this isn’t university technology and we couldn’t afford university resources,” Precht says. But he made his presentations to the right people and his persistence paid off. “As an engineer, my training was to be a problem solver,” he shrugs. “I had a problem and this is the way I found to solve it.”

Operating out of Enterprise Square with a lab and a prototype machine for infusing fabric with silver, Exciton now has a staff of 11. It also has access to business, marketing, and communications expertise, and gets help and backing when applying for government grants.

“We have a physical presence, a website (www.excitontech.com) and business support, and it all starts to snowball,” he says. “In the past year, we’ve raised over \$3.5 million.” Of that, \$750,000 came from government sources, including a \$500,000 commercialization grant from the Alberta Heritage Foundation for Medical Research.

“We’re well financed to build next year’s business plan that includes raising revenue,” he says.

The next step will be to leave the incubator and find a new home. With U.S. Food and Drug Administration approval for exSALT granted this summer, production will begin before winter. Production capacity should grow to 10 times its current level and the number of staff could triple, to 30. Precht also expects patent approval next year for his silver-based disinfectant cleaner, which would add a whole new line to the mix.

“The question is: How big can we make this?” he says. “We’re targeting a couple of applications that will generate X amount of

revenue. The question is: Can we generate 10X revenue by doing other devices and expanding our technology portfolio as well as our target portfolio?”

Initial applications will be in hospitals. The Fireman’s Burn Treatment Unit at the U of A Hospital will conduct the first human trials of the wound dressing once it receives approval. The disinfectant products will be used first to sterilize medical implant devices and for other hospital uses. After that, silver-infused bandages and liquid disinfectant may eventually hit the shelves of your local drug-store, depending on marketing plans, business partners, and licensing agreements over the next couple of years.

Precht recognizes there is a huge market for his products. More than \$12 billion is spent on wound-care products worldwide every year and an additional \$2 billion is spent on disinfectants. According to the Centers for Disease Control and Prevention, hospital-acquired infections in the U.S. alone cost up to \$30 billion a year and the average cost to treat an individual infection is up to \$15,000.

“When you’re dealing with numbers like those, all you need is a small percentage,” he says.

Along with success in the wound care and antiseptic liquid market, Precht would like to stay involved in the technology incubation and commercialization process that has brought Exciton this far. He thinks he has a lot to offer.

“I see a lot of companies that are now going through what I went through in the early stages,” he says. “They’ve got a good idea, but maybe they can’t find the right links and need the business skills to get to the next level. This model should work regardless of whether it’s silver technology or other types of technology.”

His advice to others: “Don’t jump off a cliff without a parachute. You can never tell a person not to go for what they believe in. It’s very important they assess their limitations and get help. Don’t think you can do it all yourself.”



Larry Johnsrude is an Edmonton-based writer and broadcaster.

Ray Rajotte has made medical history
—as an engineer

mistaken

IDENTITY

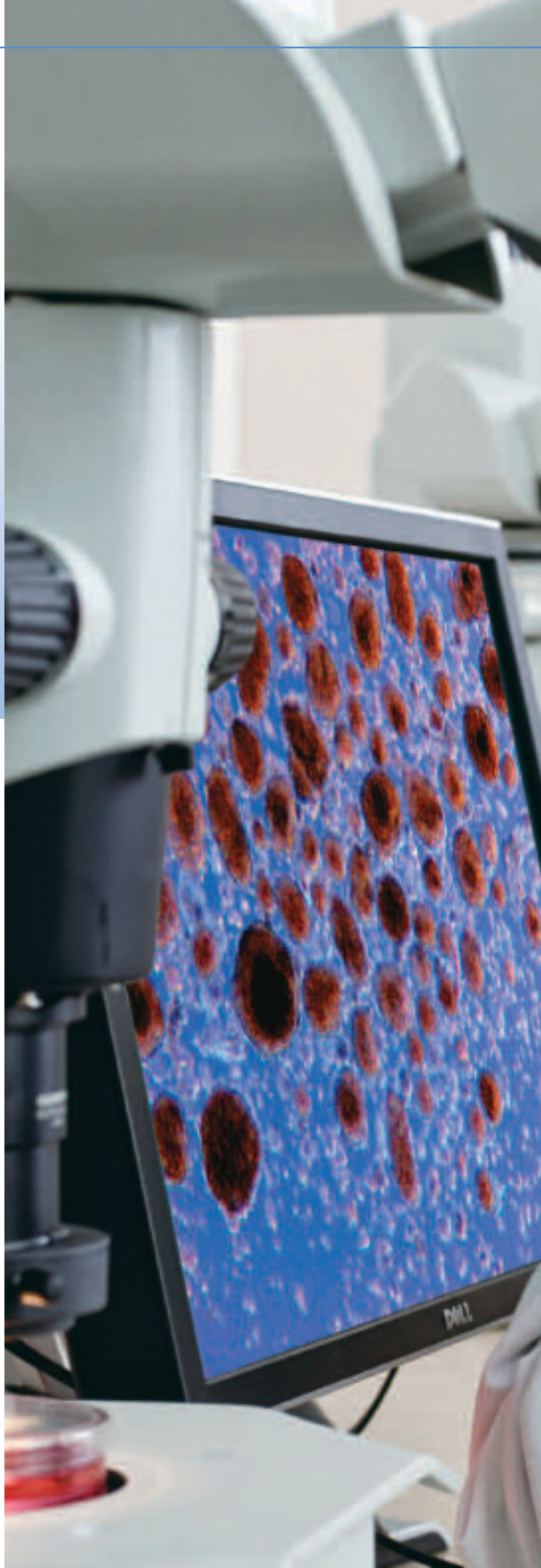
by Richard Cairney

Dr. Ray Rajotte is widely regarded as the first person in the University of Alberta's history to have the "biomedical engineering" designation on his PhD.

The multidisciplinary credentials aren't surprising. Rajotte has always been difficult to pigeonhole because he has never been satisfied with the status quo or sat in the same place for very long. Always the pioneer, he was part of the first graduating class from the Northern Alberta Institute of Technology in 1962, taking work at Edmonton's General Hospital as an X-ray technician. The job set him on a path of research and discovery that has dramatically improved the lives of diabetics around the world.

Rajotte became interested in medical research when working on a project with Dr. George Bondar, a surgeon at the General, studying X-ray images of blood flow in the heart and in tumours. At about the same time, Rajotte recalls, he picked up a news magazine and read an article about biomedical engineering. He was hooked.

"I didn't even know what a biomedical engineer was, but this article said it was the career of the future—and I wanted to be one," he says. Although the Department of Biomedical Engineering is now administered jointly by the Faculty of Engineering and the Faculty of Medicine and Dentistry, in those early days the Faculty of Engineering had no biomedical engineering programs. So, while working towards his degree in electrical engineering, Rajotte simultaneously took medical courses. And while working on his master's degree in electrical engineering, he learned surgical techniques at the Surgical Medical Research Institute in the Faculty of Medicine.

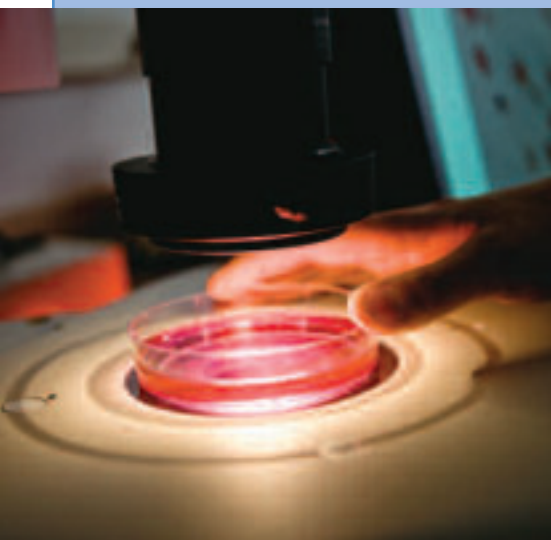




*Surgical Medical Research
University of Alberta*

Right: Ray Rajotte, as a graduate student, working with Geoff Voss measuring the viability of thawed fetal mouse hearts transplanted to the ear of mouse.

Below: Isolated islet cells under a microscope.



The blend of an engineering and medical education paid off handsomely. Rajotte had developed a suite of skills that enabled him to do everything from designing devices to perfuse stomach tissue, to performing delicate surgical procedures for his own research.

Rajotte and former electrical engineering professor Dr. Geoff Voss were among the non-medical faculty members to work at the SMRI, in part to establish credibility with their colleagues in medicine.

“Ray was brilliant at surgery. You had to know surgical procedures to re-implant a fetal mouse heart, and Ray was very good at it,” says Voss. “We used to say that Ray was too practical to be an academic. Now, he is a very practical academic.”

Rajotte might not argue with that point. But he will add that he’s also driven by curiosity. Curiosity fuelled his desire to follow his master’s degree with a PhD, taking his research into cryopreservation even further. In

1972, he read an article about successful transplant of the islets of Langerhans, the cells that produce insulin. Islet cell transplantation was becoming a hot research topic around the world, and Rajotte was interested.

“I said, ‘Geez’—and this is how research is—I said, ‘I wonder if I can successfully cryopreserve these islet cells, because it could have an important clinical application.’ And, using my engineering education, I began working on it. And this was my PhD, showing that you could cryopreserve the islets of Langerhans.”

It didn’t happen overnight. Research is typically accentuated by a string of failures, as you gradually learn everything you need to succeed. And Rajotte, along with supervisors Voss and Dr. John Dossetor, a nephrologist, had some memorable failures. For instance, if you freeze tissue in order to transplant it later, you need to be able to thaw that tissue without blowing it up.

Rajotte’s first research lab seems rudimentary compared to the facilities at the state-of-the-art Alberta Diabetes Institute (he took the lead in building the institute, and was its founding scientific director). That first lab, in the basement of the Dentistry Pharmacy Building, was a renovated wash-room. And with the guidance of Voss, Rajotte had to build a microwave oven with which to thaw cryopreserved organs and tissue.

“Back in the 1960s, there was no Toshiba microwave. You couldn’t buy one. Geoff was an expert, and we built ours from scratch,” says Rajotte. “And this was a big box—probably two feet by two feet. You’d turn these suckers on and the lights would go down.”

When it came time to try to thaw a cryopreserved kidney, Voss calculated how long the frozen organ should be in the microwave.

“Geoff said that, because ice doesn’t absorb a lot of energy, it would probably take an hour to thaw a frozen kidney that came in at -200°C ,” Rajotte recalls. “So we put our first kidney in there, and we cranked this machine up. And all of a sudden, within 30 seconds, there’s a big explosion—boom!”

“I said ‘What the heck is going on?’ and I opened up this big door and there was kidney all over the place.”

“That’s what makes labs and engineering fun,” Voss adds. “We were able to deduce a lot from that explosion. And it really put me in my place.”

The cryoprotectants had changed the rate at which the organ would absorb energy, to a surprising extent. The team learned that, if they could control the process, they’d be able to rapidly thaw tissues and organs. The experiment raised a host of new questions about the circumstances in which ice crystals would cause cellular damage.

To this day, no one has been able to solve the riddle of cryopreserving and thawing large organs. Rajotte achieved success with the fetal mouse heart and, eventually, with the islets of Langerhans (which are, so far, the largest multicellular tissues that can be frozen, thawed, and transplanted). Rajotte’s PhD work in the isolation, cryopreservation, and thawing of the islets would play a vital role in developing a new treatment for Type 1 diabetes.

After completing post-doctoral work at Tennessee, Missouri, and UCLA, Rajotte returned to the U of A, taking a position with

the departments of surgery and medicine as an assistant professor. There, he began building the islet transplant team he hoped would develop better treatments for diabetics, freeing them from daily insulin injections.

Because it was difficult to recruit senior researchers to Edmonton, Rajotte took on bright graduate students who had family ties to the province. After their graduate training, he'd send these students for post-doctoral training at leading research centres like Oxford and St. Louis, and then recruit them back to Edmonton. During the same period of time, he developed a breakthrough technique to isolate islet cells from the pancreas, overcoming a challenge that had vexed researchers for years.

In 1989 that team—Drs. Garth Warnock, Norm Kneteman and Eddie Ryan—demonstrated exciting success with islet transplants. At first, the transplant results were less than promising, with two patients still requiring insulin, albeit at reduced doses. But when Rajotte returned to the bank of islet cell tissues he'd isolated and frozen while establishing the islet cell transplant team, surgeons were able to thaw and implant even more islet cells. One patient remained independent of insulin for nearly three years, a remarkable achievement even by today's standards.

Still, fewer than 15 percent of transplant recipients were able to end their dependence on insulin. Researchers and funding agencies were giving up on the whole idea of transplanting islet cells. In 1995 the Medical Research Council of Canada and the Canadian Diabetes Association withdrew funding for Rajotte's research.

"The world was quite discouraged, and questioned whether islet cell transplants would ever be an effective surgery," says former Dean of Medicine Dr. Lorne Tyrrell. "I had individuals in our Faculty that encouraged us not to support this program any further as it was unlikely ever to be successful."

"We had hit a dead end," says Rajotte. "And people would say, 'You've been at this for 30 years—why don't you just give up?'"



Rajotte's 1971 graduation photo.

In 2000 a new series of clinical trials began on the so-called "Edmonton Protocol" for Type 1 diabetes with remarkable results: 100 percent of the patients who had received transplants remained free of insulin for a year.

We didn't give up because, day in and day out, we could make this work with small animals, and we knew we could take it to the next level."

When all seemed lost, Rajotte presented new ideas to Tyrrell, winning funding from the Faculty for six months. During that time, the team regained its support from the MRC and CDA and funds from the Alberta Diabetes Foundation.

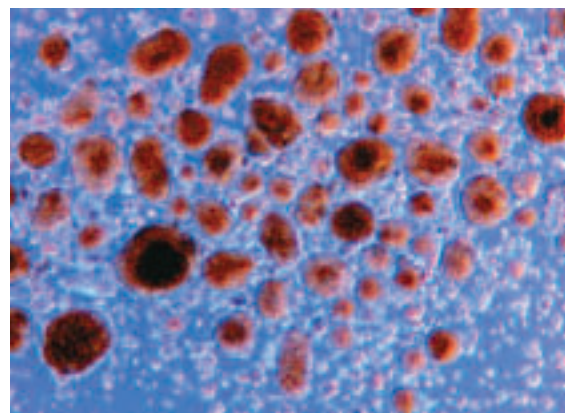
The next decade brought exciting changes. Rajotte continued building his team, including the key addition of Dr. James Shapiro and the development of anti-rejection drugs that weren't toxic to islet cells. In 2000 a new series of clinical trials began on the so-called "Edmonton Protocol" for type 1 diabetes with remarkable results: 100 percent of the patients who had received transplants remained free of insulin for a year.

The news made headlines around the world—it was the most important advance in diabetes treatment since the discovery of insulin in 1922. That discovery, incidentally, was made with the aid of University of Alberta biochemist Dr. James Collip.

With the enormous impact of the Edmonton Protocol, Rajotte continued to move forward, leading a team that secured \$28.5 million in funding from the Canada Foundation for Innovation. That grant, in turn, leveraged more than \$270 million in funding from the Government of Alberta and private donors to build the Alberta Diabetes Institute. The institute houses researchers from five university faculties who are working on the diabetes puzzle.

"We're the largest free-standing diabetes research institute in North America, and probably the world," says Rajotte. "The islet transplant group is the flagship of the institute, but we are fortunate because we have experts from across campus, we have a very strong nutritional group, a strong exercise physiology group, and strong population health and data self-signalling groups. And we have all these outstanding scientists under one roof."

Still, new challenges remain. As successful as the Edmonton Protocol is, Rajotte points out a fundamental problem. There are just 400 donor pancreases available for transplant in Canada every year, and every year



Isolated human islets prepared for transplantation. Each islet is approximately 200 – 300 micrometers in size and has approximately 2,000 cells.

there are 6,000 newly diagnosed cases of type 1 diabetes. Rajotte and his team are developing anti-rejection drugs and investigating the possibility of xenotransplantation—animal-to-human transplants.

Whatever comes next, Rajotte says his education as an engineer has been, and will remain, the ace up his sleeve. People outside of the medical profession often seem surprised to learn Rajotte isn't an MD. He has always proudly worn his engineer's iron ring.

"When people ask me who I am I just say that I'm a farm boy and an engineer from Wainwright, Alberta," he says. "I'm an engineer—a biomedical engineer—and that education allowed me over the years to take my basic research to the bedside. We engineers think in terms of process and machines. We think a little differently, and that has been an incredible asset to me."



As a Faculty of Engineering technician, Allan Muir played an important supporting role in the development of the Edmonton Protocol for islet cell transplants. Transplant pioneer Ray Rajotte (PhD Electrical '75) still calls upon Muir's expertise.

BEST SUPPORTING ACTOR

By Scott Rollans

James Bond wouldn't have gotten far without Q's talent for fabricating handy and ingenious gadgets. Mario Andretti would never have tasted a drop of champagne if not for his pit crew. And, every year, dozens of research and engineering student projects would stall at the planning stage without help from the Faculty of Engineering's crack team of machinist-technicians.

They translate ideas into action, these folks—people like Allan Muir (still pitching in, 11 years after his so-called retirement) and David Waage (a relative newcomer, three years in and counting). They stand ready to tackle any challenge that gets thrown their way, whether it's crafting a newly invented piece of specialized equipment for a research project or refining a vaguely sketched-out idea from a Mec E 260 student.

In Muir's case, the job involved making medical history—playing a technical support role in the development of the Edmonton Protocol for the treatment of Type 1 diabetes.

Seated in a boardroom at the Alberta Diabetes Institute on campus, Muir clearly loves his job. After a long and rewarding career as a machinist in the Civil and Mechanical Engineering departments, Muir has distilled his duties to the ones he enjoys most. "I've already been retired 11 years, but I hang out around here now, and I love it. I'm only three half-days a week. I have a little machine shop at home, and I can just carry on. I like doing that."

What brings a retired machinist to the diabetes institute? It all started in the early 1970s, when Muir's shop in Civil Engineering was just around the corner from the office of a young grad student named Ray Rajotte. Rajotte, who was beginning a decades-long quest for an alternative treatment for dia-

betes, soon discovered that he could wheedle favours from his technician neighbour.

"Ray would come over and ask me if he could get a little bit of stuff done," recalls Muir. "Sometimes he even drilled the odd hole himself. He told me he had no money, so I would just do it buck-cheap for him."

Eventually, Muir helped Rajotte design and build a perfusion chamber, a device essential to Rajotte's work with pancreatic islet cells. Rajotte had only a rough idea of what he needed. "Professors always seem to come along with just a little scribble on a hand towel," Muir laughs. "Ray would say, 'You know what I mean, Allan, it's kind of like this...' I always liked that, because it meant I always had an input into the project. It was kind of design-as-you-go."

The pair built a second, slightly modified perfusion chamber a few years later, then

Department of Mechanical
Engineering technician Dave
Waege helps enhance students'
learning experiences, and
supports professors with
technical know-how.



parted company—until shortly after Muir retired in 1998. “I was actually off on retirement for about three months, as my wife says. Then I got a call from Ray Rajotte asking if I was still around.

“He said, ‘Al, we want to build another perfusion chamber, but a bit different. Are you available, and can you have some access?’ So I started doing that in about 1999. Again, I built it from a little bit of hand-waving and a bit on some scratch paper.”

Once Muir and Rajotte refined their perfusion chamber, the device played a major role in the development of the Edmonton Protocol. Muir and Rajotte also evolved into a finely honed inventing duo. “Between Ray and me, with all this diabetes research, we’ve come up with at least 12 different things, found out they worked, and modified them. There are things for holding beakers, and shaker plates, and coils for cooling off little water baths.”

This professional marriage is matched by Muir’s happy—if sometimes unorthodox—life at home, with wife Jean. “My wife and I wind stainless steel tubing in our basement,” Muir smiles. “We’ve made lots of coils.”

These days Muir often hits the road, installing and maintaining specially modified blood processors around the world. Because the market is so small, Cobe Cardiovascular (the company that built the basic processor) allowed Muir and the U of A to take charge of doing the modification needed for the Edmonton Protocol. “So now I’m the manufacturer, the installer, the serviceman, and everything for this modification to blood cell processors,” Muir laughs.

The job has taken him to Switzerland, Sweden, Sicily, and numerous places in the United States—always with Jean at his side. “I say to her, ‘You know, I’m going to be in the lab, and if you want to go shopping or sightseeing, go ahead.’ And she says, ‘No, we’ll do it together.’ And we can do it way faster with two people. So, we’re down on our knees at the machine, and she’s on one side and I’m on the other side.”

Muir looks back on his long career with satisfaction and a well-earned feeling of accomplishment. He feels lucky to have stretched his skills in a university setting, and amazed at his ongoing professional connection with Rajotte.

“We’ll give him a drawing and he’ll look at us and say ‘You want me to build THAT?’ And he’ll help us find a better way of doing things.”

“It isn’t like working in an oilfield shop, making flanges,” he laughs.

At the opposite corner of campus, at his desk looking out on the Mechanical Engineering machine shop, machinist/technician David Waege also loves the diverse challenges of his job.

Waege gets the chance to stretch his mind every day. One moment he’s meeting with professors to discuss their research needs, and the next he’s lending much-needed direction to students who “kind of have an idea of what they think they might want” to complete a design project.

Those second-year lab projects can begin with nothing more than a rough drawing on a notepad, or a verbal idea expressed “with a lot of hand-waving.” Gradually, though, things literally begin to take shape. “You sit down with them and you work with them to create drawings,” Waege explains. “You make sure that it can actually be built for them. And then, once they’re close enough for that, you start actually building the pieces for their project.”

Waege relishes the endless on-the-job surprises. “Sometimes people build something that nobody’s ever seen before. It may or may not work as well as they hope, but it’s something different. It’s part of what makes this a great place to work.”

Waege’s support duties sometimes extend well beyond the machine shop. Every June for the past few years, he has accompanied the U of A automotive design team to the international Formula Society of Automotive Engineers’ student competition in California. It’s the culmination of a massive, months-long project, in which a team of students

designs, builds, and eventually drives its own Formula race car.

Along with numerous industry sponsorships, the team receives up to 400 hours of machine shop time. They also get countless hours of consultation with Waege. “It’s nice to have someone who has so much hands-on experience,” says FSAE team member Cahay Ho, following the team’s best-ever international competition. “We’re in the classroom most of the time, and I’m pretty sure that he has more experience than all of us combined.”

It also helps that, when it comes to the FSAE project, Waege has pretty much seen it all. “I know what’s happening on the car, and I know from year to year to year what’s happened, and what will happen from year to year. They have the same problems every year, just because there are new students every year.”

“He’s a great resource,” marvels FSAE team leader Marcus Beaudry. “He probably knows more about cars than anyone else in the Faculty. We’ll give him a drawing and he’ll look at us and say ‘You want me to build THAT?’ And he’ll help us find a better way of doing things.”

At competitions, Waege’s expertise allows him to assert a calming influence on the team—even under dire circumstances. “One year, the car wasn’t 100 percent complete when we went down there,” Waege recalls. “So they were trying to mount all of the bodywork to the chassis. And there are so many people, and everybody’s got their ideas and everybody wants to be right.” At times like those, Waege is part mechanic, part Jedi master. “You just sort of guide them down the path. It’s their car, but you give them ideas.”

Like Muir, Waege is constantly grateful that he ended up at the U of A, rather than in a typical machine shop.

“Most shops, you go in, and there’s your machine. You’ve got a bucket of parts to start machining—make your parts one after another, after another. And when you’re done those, there’s another bucket standing there waiting for you.

“Here, every day is different. It’s not a nine-to-five job.”



Scott Rollans is a writer, editor and musician living in Edmonton.



Born to Build

How Bill Kent beat the Great Depression

by Ellen Schoeck

B

ill Kent (Civil '31), the Faculty's most recent winner of an Alumni Honour Award, will turn a lively

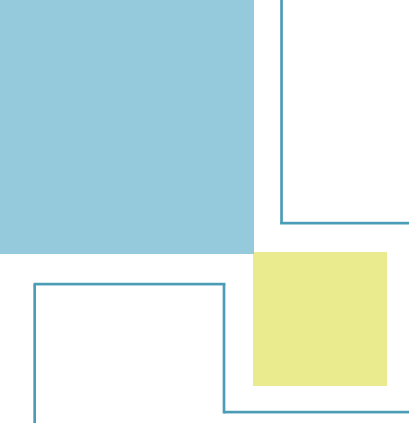
102 years old this October. "I grew up wanting to build things, and I'm still chomping at the bit to build something."

Kent is sitting in his Langley, B.C., living room, where he leads a fully independent, happy life. "This summer," he confides, "I'm going to build a sleeping cabin for a friend out on Salt Spring Island. I've already done the plans and the lumber list."

Just how early on did Kent show his inclination to build things? As a toddler, he would take a clock apart and put it back together. As a young boy, he saw a rotary snowplow clear the railroad tracks near his home in Delburne, Alberta. He made his own version from salvaged scrap metal—and it worked.

In addition to constructing bridges and power plants over his 37-year career, Kent has been building something else these past few years. When he turned 99, his daughter Jane and son-in-law Stan established a bursary to honour Bill and his late wife, Doris. The bursary is designed to help first-year engineering students who are on the edge financially.

Bill Kent endured tough times as a university student during the Great Depression. At 101, Kent wants to help Engineering students who are facing financial hardships.



“I well remember the struggle to make ends meet when I was in engineering, and I know how my parents sacrificed to get me through,” he says. “I am deeply grateful that this bursary has been established, and now contribute to it myself. I also make sure to meet each year with the student who has received the bursary. It’s a great feeling to know you are helping someone in need, someone with a passion to be an engineer.”

Kent was born in 1907 in the tiny town of Content, Alberta—his birth certificate actually notes that he was born in the Northwest Territories. When the railroad bypassed Content, the family moved to nearby Delburne.

“My dad ran a livery stable during an era when horses were the main form of transportation,” Kent recalls. “When cars started to rule the road, he had to find another career, and it was my mother who decided we should move to Edmonton. The reason? Simple. The University of Alberta was there, and she wanted me to live out my dream of becoming an engineer.”

Kent’s dad started work for a local lumber company, but in the 1920s Alberta was in a deep recession. His mom took in boarders, saving money for Bill’s education. During his final years of high school at what is now Old Scona Academic High School, Kent worked during the summers at the lumber company with his dad—for 35 cents an hour.

From his first day on campus in September 1925, Kent bonded with the U of A. He is the university’s oldest graduate returning each year for Alumni Weekend. He loves to “hang out” during those weekends with today’s engineering students, listening to their stories, their concerns about the cost of going to university, and their dreams for the future.

When Kent began his engineering studies in 1925, Engineering had been a stand-alone faculty for four years. The School of Nursing had just launched; the first medical students educated entirely at the U of A graduated that

year, and the Tuck Shop had been open for one year. Enrolment was about 1,220 and the government grant was some \$475,000. Only two students on campus had cars.

“If I had a dime in my pocket during those six years at the U of A, I thought I was rich,” Kent smiles. “And one day I had a clear choice while at the Tuck Shop. For 10 cents I could buy a pack of cigarettes, or I could get a cup of coffee and a cinnamon bun. I chose the latter. It was a wise spending choice, and I also credit that choice to my longevity!”

“Our pastimes were simple. There was suicide slide on campus, where you could hurtle down the hillside on a toboggan down to what is, today, Emily Murphy Park. Or you could skate at Jimmy Smith’s outdoor rink in Strathcona, at Whyte Avenue just off 109 Street, with a freshly flooded rink and a band on ‘skids.’ We’d also skate at the new Varsity Rink on campus, which all the students helped pay for.”

But most of all, says Kent, “We had close friends—from high school, and from church. A hike down to Whitemud Creek was free, and we’d roast wieners and buns. We all went down to the river as a group, but we came back as couples.”

Even leaner times soon followed. With Alberta already in recession, “when the stock market crashed in 1929, it had already been so bad that it could hardly get that much worse.”

Kent graduated from Civil Engineering in 1931, in the face of the world’s worst financial crisis. He was well-prepared, having gone through university in penny-pinching mode. “Dean Wilson suggested I go see the provin-

cial survey head. I did, and ended up surveying all over northwest Alberta. I was in the bush and muskeg every summer. In the winter, my classmate Dudley Menzies—later the city’s chief engineer—had me design concrete, arched bridges around Edmonton. You probably cross one of these old bridges if you drive anywhere near the city’s old core. But by the time I married in 1934, at the height of the Depression, I knew that spending the summers away from home wasn’t for me.”

So Bill and Doris rented a housekeeping room in a rambling Vancouver home where a tony condo building now stands. “There were six families and one bathroom,” he recalls.

Jobs were scarce, “and we did anything to survive.” Kent tried placer-mining near Kamloops, backbreaking work for about a dollar a day in gold flakes. “We’d get a gunny sack of apples for 50 cents and another gunny sack of onions for a dollar. That was our diet.”

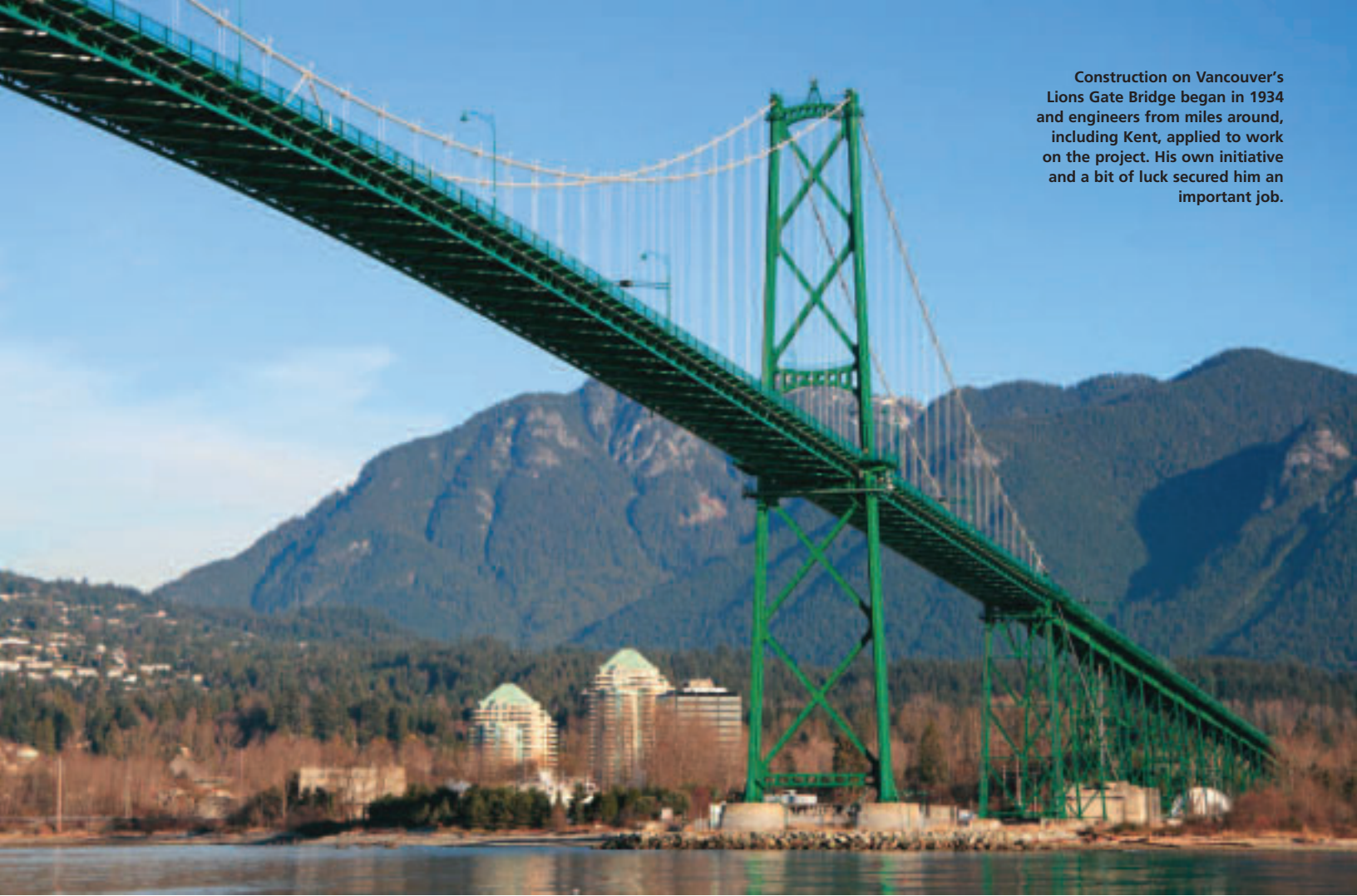
Then, in 1937, the Lions Gate Bridge was slated to begin construction. Every engineer within spitting distance, including Kent, applied for work.

But Kent had an edge. One night at the Vancouver library, he was sitting at a table studying bridges. “I was reading one book in particular about two swing bridges built over False Creek—the book was called *De Pontibus*—that’s Latin for “All about Bridges.” Little did I know that a Mr. Way, who was in charge of the bridge contracts, had spotted me. He had remembered my name from my application for work on the bridge and asked if I wanted to walk him back to the Hotel Georgia. Along the way, we shared a bag of peanuts and talked about bridge-building. I was hired the next day and worked continually as an engineer for 37 years.”

Kent helped prevent a serious snag in the Lions’ Gate construction. He had taken the first course in the “relatively new” soil mechanics area. So, as a young engineer on his first real job, he looked at the plans for the piers and thought, this is not the best way to build them.

“When we started the south anchor,” he explains, “the test pits showed that the soil was strong, lots of hardpan, very strong. So we convinced the head man, with this new science, to reduce the size of the anchor, change its shape—and it saved a bundle.”

He loves to ‘hang out’ during those [Alumni] weekends with today’s engineering students, listening to their stories, their concerns about the cost of going to university, and their dreams for the future.



Construction on Vancouver's Lions Gate Bridge began in 1934 and engineers from miles around, including Kent, applied to work on the project. His own initiative and a bit of luck secured him an important job.

Kent went on from there to design or build bridges and power plants in every province and territory in Canada. He lists some of his favourite projects: Powell River laboratory and concrete-arch dam; magnesium plants in Nevada during the Second World War; an Air Force training camp at Abbotsford; Churchill Falls generator installation; Canso Causeway connecting Cape Breton Island with the mainland; hydro plants at Grand Rapids, McArthur Falls, Exshaw, and Snare River; a powerhouse at Bennett Dam; the western half of the DEW line; buildings on the UBC and Simon Fraser University campuses; and the St. Lawrence Seaway excavation.

And, remember when Winnipeg almost flooded a few months ago? Kent built the Red River Canal around Winnipeg and the concrete control dam.

"I find it amazing to look back and think especially about the hydro plants I helped build," Kent says. "Until I was halfway through Grade 10, I did my homework with a coal oil lamp."

With his hard-earned life experience, Kent offers sage advice for getting through tough financial times.

First, "Don't spend needlessly."

Kent likes to point out that, when he travels back to the U of A for Alumni Weekend, he takes the Greyhound red-eye, saving \$85 each way over on-sale airfares.

Second, "Never give up your chance to follow your dreams."

Kent cites the experience of six Civil Engineering classmates who graduated with him during the Depression. "They all wanted to be engineers and they didn't let the Depression stop them. Let me tell you about just two. Frank Miller used to go to Camp Borden during school holidays, and he learned to fly. By the end of the war, he was the top man in the Air Force. And Charlie Nicks was an expert in engines. During the Depression he started a business repairing small engines—he prospered."

Third, "When you are able to, give back to others who need a leg up, a helping hand."

In his dining room, Kent has hung the plaque Dean Lynch gave him to honour the bursary that bears Bill's and Doris' names. Kent is particularly pleased that students receive their bursary dollars at the end of the first term, when their money is running out.

"If students are struggling financially, it affects their studies, and if they are worried stiff at exam time about paying school-related bills, that's not good, is it? I am grateful to my family for establishing this bursary and feel good, each day, knowing that it is helping students in these tough times."



Ellen Schoeck (BA '72, MA '77) served as Director of the University Secretariat for 27 years, and has written two award-winning books about

the U of A: I Was There: A Century of Alumni Stories about the U of A and a second book dedicated to Bill Kent entitled The University of Alberta: A Century of Campus Maps.

Co-op jobs vulnerable in a tough economy

Matchmaking in a Tenuous Time

By Judy Monchuk

Engineering Co-op student Matt Williams couldn't wait to get out of the classroom and into the oilpatch to figure out for himself how to implement the bits and pieces of knowledge he was getting from textbooks and lectures.

"In school they teach you how it should be," said Williams, a petroleum engineering student, who is finishing his final Co-op term at Talisman Energy Inc. "In the field you see how it is, how it works and how it doesn't."

Williams is one of more than 1,400 students enrolled in the Faculty of Engineering's Co-op program: about 40 per cent of all undergraduates after the first year of studies enter the program. Williams believes his hands-on experience in three different parts of the oil and gas industry will quickly enhance his future prospects, despite a tough economic market that has seen hundreds of engineers laid off in Alberta's notoriously volatile energy industry.

Co-op education has been part of the Faculty since 1981, having been established after requests from the province's energy industry. During the heady days of the province's 1970s boom, huge numbers of co-op students were coming from Ontario's

University of Waterloo to work in the oilpatch and getting a jump on Alberta jobs.

"Our students were finding themselves at a disadvantage when they went to look for a job because they were up against students who had already been working for four months," says Dr. Ken Porteous, Associate Dean of Student and Co-op Services.

The Faculty phased in a five-year Co-op degree program allowing for three paid and supervised work terms sequenced in the academic terms: two eight-month work experience terms and another lasting four months. In 1982, all 42 students in the program got Co-op jobs. By 2008, the 1,457 engineering students had nine full-time co-ordinators beating the bushes for positions across Canada, and 1,443 students were hired. Jobs come in all industries and all size of operations: from startup companies to corporate giants and everything in between.

While the work experience was invaluable, Laurie Kemp (Chemical '04) chose the Co-op program for an equally pragmatic reason: "This was an opportunity to pay my way through school without making my parents go broke." As the fourth of six daughters born to a Ponoka-area farmer and his schoolteacher wife, Kemp grew up understanding the impor-

Anthony Eshpeter (Computer Engineering, '02) found success as a Co-op student with Subnet Solutions. Today, he's vice president of the Calgary firm, and happy with the performance of Faculty of Engineering students the company hires for Co-op placements.



tance of practicality. Today, she works on Petro-Canada's Fort MacKay River oil sands project, utilizing steam-assisted gravity drainage technology on a commercial scale.

The paid work terms have added up over the years: between 1981 and 2008, students earned \$220 million on Co-op assignments. But most will cite networking opportunities and the chance to learn different corporate cultures as the program's greatest strengths.

Employer feedback sheets often state how impressed they are by what the student was able to bring to the job. Some employers are so impressed with the quality of student work that the only graduating engineers they hire are those with Co-op experience.

The connection with the big players in industry has traditionally paid huge dividends. Large companies, including energy and utility companies, consulting firms, manufacturing and government sectors regularly hire up to 10 students at a time.

But the recent economic maelstrom has wreaked havoc with work experience positions. Companies facing a collapse in business are cancelling student jobs or dramatically cutting back on the numbers of students they take on. It's hard to bring a student in the front door while full-time staff are being let go.

The changing marketplace will mean changes in recruiting job placements and looking to new industries and corporate partners.

Looking ahead, many employers are taking a wait-and-see approach before committing to any positions. The fall work term could be bleak, says Calgary-based placement co-ordinator Linda Lewington, who has been connecting students and employers since 1998.

"This is the first time in 11 years that only 16 (of 130) students were placed in the first round," Lewington said in late June. "Normally we would have placed at least one third."

Subnet Solutions is an exception in the current job market. The Calgary firm pro-

vides automation solutions for the utilities industry, monitoring and controlling power grids. With a growing slate of North American clients, Subnet recently added extra Co-op students to its staff list when other employers had to back out.

"We're booming in a time of bust," says Anthony Eshpeter (Computer Engineering '02), vice-president of software with Subnet. "Oil and gas may be busting, but the utilities industry is going strong."

But when Eshpeter arrived at Subnet Solutions in May 1999 for his third co-op placement, the fledgling company had a staff of fewer than 10. To the young engineer, limited resources offered limitless opportunity.

"I was probably the third person brought into the development team for their first product," he said. "There was as much responsibility as I wanted to take on and I welcomed it."

Eshpeter delayed his return to school, taking a year off to complete the project and see it implemented. After four months in university to complete his degree, it was back to Subnet, where he moved up the corporate ladder quickly. In his executive position, Eshpeter takes an active role in adding young Co-op students to the staff mix. Subnet currently has six interns among its staff of 70.

"We end up with a lot of jobs that are interesting and challenging for Co-op students," says Eshpeter. "And we're usually quite impressed at how well the students contribute to their team."

That's a sentiment often expressed in employer feedback. And the students rise to the challenges they are given. For example, one Co-op student was the project manager of a \$5-million compressor station. The ability to help find and groom young talent is part of the reason Co-op is deeply integrated in the recruiting strategies of many companies. That doesn't change, even when times are tough.

Because of the benefits of the Co-op program, some companies are maintaining their current student commitments for now, despite a hiring freeze elsewhere.

"The biggest vulnerability the (Co-op) program has is the economy," says Porteous. "In the past we've been able to manage through, but we will need help from employers out there."

The changing marketplace will mean changes in recruiting job placements, given the current economic outlook, and looking to new



Dr. Ken Porteous

industries and corporate partners. Lewington and other co-ordinators are knocking on doors of smaller companies who may not have considered hiring Co-op students in the past. Any new strategies will always include connecting with successful graduates.

"We expect alumni to go forth, be successful and eventually give someone else, another student perhaps, a break," says Lewington. "I'm seeing people I've placed who are now in supervisory roles and they want to give back."

Laurie Kemp at Petro-Canada agrees. Kemp mentored Co-op students for three years and found it a great learning experience. "When they do catch onto something, it's awe-inspiring," she said. "We know what the Co-op student expects from their mentors."

For students, the work-placement destinations may become more varied. Lewington wants companies to think about possibilities that may arise in the current market where work still needs to be done.

"My gut instinct is that there are still jobs out there," says Lewington. "It's cheaper to hire a Co-op student than someone full time or on contract. You've got bright young people who you can hire to bridge some of the gaps."

If your company is interested in Co-op students, call 1.800.661.4106 (toll free) or in Edmonton call 780.492.5152, or e-mail Engineering.co-op@ualberta.ca.



Judy Monchuk is an award winning journalist and author living in Calgary.

in memoriam

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

James Alfred Barnes, Electrical '51, of Edmonton, AB, in June 2009

Emil John Becze, Eng Physics '55, of Edmonton, AB, in April 2009

Peter Edward Den Hartog, Petroleum '55, of Calgary, AB, in April 2009

Robert B. Dryburgh, Civil '58, of Burlington, ON, in February 2009

James Thomas Flynn, Eng Physics '43, of Waterloo, ON, in June 2009

H Thomas Greaves, Electrical '50, of Edmonton, AB, in November 2008

John Gregory, Chemical '45, MSc Chemical '48, of Edmonton, in May 2009

Richard Eugene Harris, Chemical '44, of Thornhill, ON, in June 2009

Roger William Hill, Mechanical '69, of Calgary, AB, in April 2009

Bradley David Koberstein, Mechanical '94, of Edmonton, AB, in May 2009

Gary David Kraft, Metallurgical '91, of Fruitvale, BC, in January 2009

Robert George Mason, Electrical '48, of St. Albert, AB, in March 2009

Leo Francis McDonnell, Chemical '48, of Upper Providence, PA, in January 2009

Alec Duncan McEachern, Chemical '57, of Campbellford, ON, in January 2009

Donald John McNeil, Petroleum '50, of Trochu, AB, in May 2009

Raymond Clinton Miller, Civil '53, of Richmond, BC, in March 2009

Alex Sacuta, Chemical '51, of Edmonton, AB, in April 2009

William Schulz, Chemical '56, of Fort Saskatchewan, AB, in February 2009

Osman James Walker, Chemical '42, of Lansdowne, ON, in April 2009

John P Walsh, Civil '51, of Abbotsford, BC, in May 2009

Karl Michael Weiss, Electrical '74, MSc Electrical '78, of Kanata, ON, in June 2009

Peter Rollo Willette, Civil '88, of St Albert, AB, in May 2009

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

Luis Berríos Jamett, Electrical '89

Allister Scott Brekke, Mechanical '72, of Edmonton, AB, in August 2008

William Donald Broughton, Mining '49, in August 2006

James Joseph Burris, Chemical '46, MSc Chemical '48, of Lincroft, NJ, in February 2007

Lucien M Dworkin, Electrical '35

Francis William Kelly, Chemical '72, MEng Chemical '73, of Calgary, AB, in December 2002

John Charles Pratt, Mining '32, in October 2003

Kenneth Patrick Sheeran, Electrical '50, of Roanoke, VA, in August 2008

DAVID PANAR

1918-2009

Long-time Mechanical Engineering professor David Panar passed away July 9 in the Weinberg Residence of the Louis Briar Home and Hospital.

From the very beginning Panar wanted to be an engineer, so in 1937 he enrolled in Engineering at the University of Alberta, where he stayed two years. Mechanical Engineering was not offered at the U of A, so he completed his degree at the University of Michigan.

The Second World War was on. With his knowledge of aircraft engines, and through a series of interviews, he was selected to attend a course for the British Air Commission. Panar was then sent on various training courses to a number of aircraft factories that included the Hawker Hurricane factory in Fort William. This thorough training gave Panar an excellent background in aircraft manufacture and repair. A few years later when he went to Israel, this training was a major factor in the successful reconstruction of “the Black Spit,” the first fighter aircraft produced in Israel—engineered by David Panar.

The story began with the shooting down of an Egyptian Spitfire in May 1948. The aircraft made a wheels-up forced landing on the beach just north of Tel Aviv. Other than a separated right wing, broken propeller, damaged radiators, and bent crankshaft, this aircraft was in flyable condition. At least it seemed so to David and the fledgling Israeli Air Force.

The immediate concern was to repair that Spit and to maintain it in serviceable condition with no spare parts. The hunt for parts was on; spares were available at nearby airfields. A rapid inventory indicated that one, and maybe two, aircraft could be assembled from the spare parts. The project to repair the Tel Aviv Spit was abandoned, and the Israeli Air Force shops proceeded to assemble, under Panar’s guidance, “Daled 130,” later named the “Black Spit.” The aircraft was airborne on its first take-off attempt, then flown to an operational base near Hadera.

When the war ended, Panar returned to the University of Michigan to take his Master’s degree in Industrial Engineering. At that time the Faculty of Engineering at the U of A was reeling under the onslaught of the returning veterans. David was offered a teaching position. He remained as a full-time professor at the U of A for over a quarter of a century, but always found ways to work in a little “on the side” consulting. He is remembered as Mr. Everything—teacher, story teller, entrepreneur, Assistant to the Deputy Minister of Public Works, and the real brain centre of the Department. He was always a willing effective teacher who had an excellent rapport with the students. Busy as he was, he seldom missed a lecture. He flitted about the province in a small plane and once on a take-off he misjudged the height of a wire fence. The wheels caught and over he went in a perfect “wheels-up” landing. The next morning Panar staggered in with two black eyes, facial cuts, and a broken nose, but ready to give one of his best lectures.

Panar is survived by his wife Bea Goldberg, daughter Arna Poupko Fisher, and grandchildren, Avi (Shifra) Poupko, Tamar (Elliot) Smith, Hindy (Seth) Galena, Eliezer Poupko, Adina Poupko and four great grandchildren.

(With excerpts from George Ford’s article David Panar: The Black Spit and other reminiscences, U of A Engineer, Winter 2002.)



Engineering, art,
and the future
of our cities

Allan SCOTT

by
Bruce
White

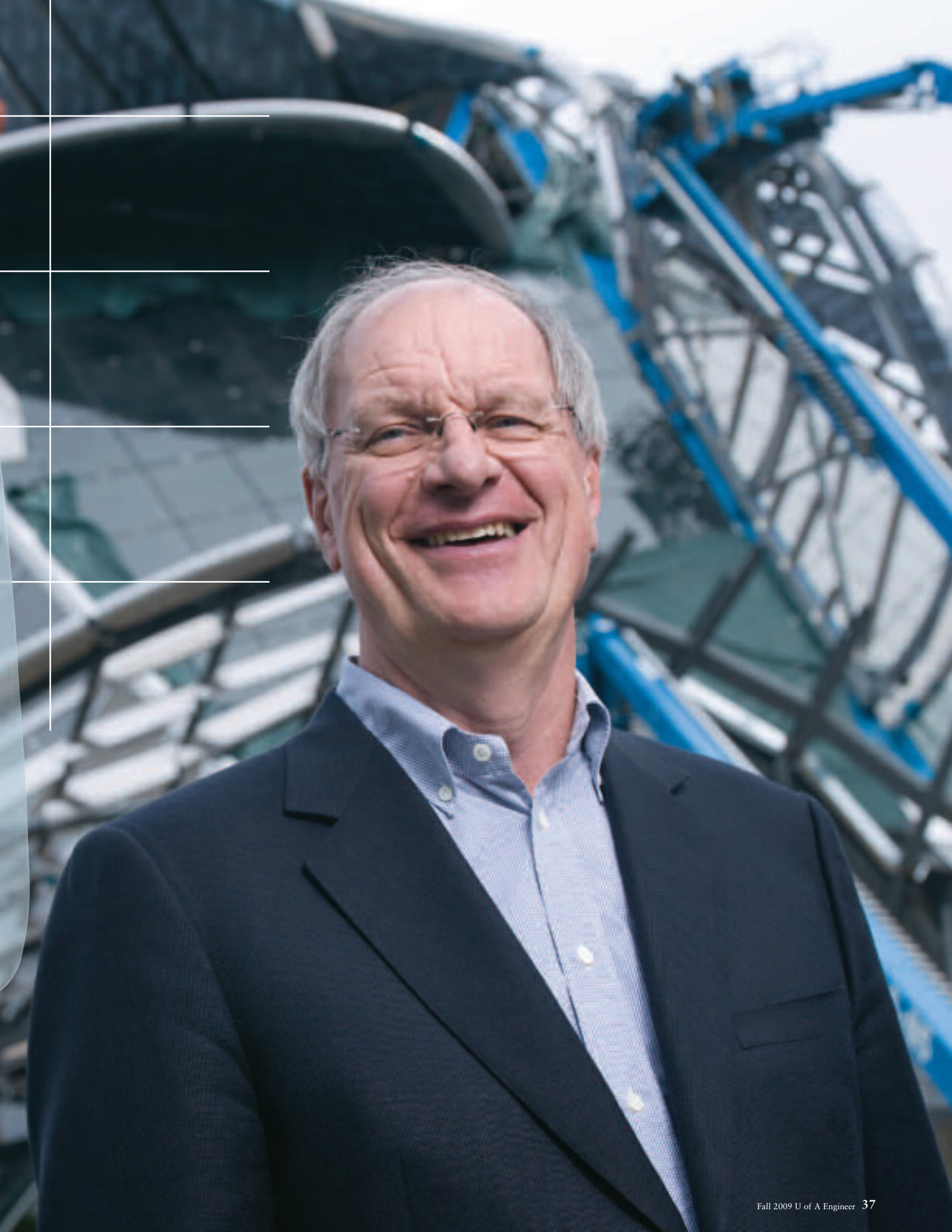
Later this year, the dramatic new Art Gallery of Alberta will be completed in the heart of Edmonton. The project involves demolishing half of the 1969-vintage Edmonton Art Gallery, grafting on a larger structure rising three storeys above the original roofline, and topping it off with a curved, soaring stainless steel sculpture inspired by the northern lights.

A key figure in the gallery's transformation is its chairman, Allan Scott (Mechanical '68). A keen promoter of his hometown Edmonton, Scott is also known for his sense of humour. Last fall he showed up at an exhibit opening wearing casual clothing and a hardhat to announce to the city's arts patrons that he'd just visited

the building site and that the job was on time and on budget (it's still on track to open next January).

After graduating from the U of A, Scott worked for a number of energy and utility companies. In the mid-1990s, he showed up late for a meeting of the board of Edmonton Telephones and found himself chairing the

With construction of the new Art Gallery of Alberta running at full speed this summer, Allan Scott is gearing up for the grand opening in January, 2010.



city-owned utility's privatization committee. ("That was the last time I was ever late for a meeting," he jokes.) A successful sale led to Scott's becoming president of Telus Communications, the company's landline division. He later became a partner in an Edmonton venture capital firm and served five years as president of the Edmonton Economic Development Corporation.

In addition to being chairman of the AGA, Scott is on the boards of Edmonton's Melcor Developments Ltd. and Associated Engineering Ltd. His wife, Marianne, a fine art dealer, owns the Scott Gallery. The Scotts have two grown children and two grandchildren. The following is an edited transcript of a conversation with Allan Scott in early May at the AGA's temporary location in Enterprise Square.

Q. What can you tell us about the new Art Gallery of Alberta?

A. Randall Stout, the architect, had two elements that he wanted to reflect. First, there were the northern lights because this is a northern city. And the reason he kept the box shape was that he wanted to represent the grid design of the streets in a prairie city. One is very strong and angular, while the other is flowing. It's a unique piece of architecture that really breaks the boundaries that existed 10 or 15 years ago.

Q. What are some of the challenges?

A. The borealis shape is a continuous stainless steel swoop that goes inside and outside the building. Parts of the borealis go through 360 degrees of movement, and all that has to be fit and put together. You start with the steel frame, then you put an aluminum sub-structure around it, then you wrap the stainless steel around it, and finally you have to fit the glass curtain wall to that, right? There are a lot of pieces to the puzzle on that part of the building.

Q. How did the project come about?

A. When the Edmonton Art Gallery was built in 1969, it was a tremendous addition that many people worked very hard to put in place. But over the years, the building began to have more and more liabilities associated with its inability to maintain top-tier environmental standards of temperature and



Architect Randall Stout's design blends swooping curves and hard angles to mimic the grid design of the city, and the northern lights.

Courtesy Art Gallery of Alberta

humidity to preserve works of art. It became obvious that something needed to be done if we were going to continue to have major travelling exhibitions come to Edmonton.

Some smaller renovations were considered in the 1990s, but finally in 1998 the board decided that to raise the funds we needed, we had to do something the people really identified with. So we adopted what we called the Go Big or Go Home strategy. But it couldn't happen unless you had a lot of people working towards the goal. The art gallery is fortunate to have the super-dedicated staff and many, many volunteers who have put all the elements in place.

Q. You held an architectural competition and then submitted the four finalists to the public for comment. Why did you choose that method?

A. That allowed us to get a sense of what people were feeling. Obviously, the selection committee had to make a decision based on a whole range of factors including the functional elements. Notwithstanding that, we had a feeling that a lot of people fell in love with Randall Stout's design.

Q. The last show at the old Edmonton Art Gallery was remarkable. You invited all the artists in Edmonton—kids, students, amateurs, everybody—to put their works up in the gallery.

A. Catherine Crowston, the deputy director here, came up with the idea—Art for All—in which people could hang any painting they wanted in the gallery. We thought we'd get

400 or 500 paintings, but the final total was 3,600, and we basically ran out of wall space. We had 12,000 people go through in three weeks. It beat some of the Picasso exhibitions that we've had.

Q. You have lived in this community for most of your life. What was it like growing up in post-war Edmonton?

A. It had a small-town feel to it, in some ways an idyllic quality of life. You'd ride your bike to school and you didn't worry about anything happening. We'd play sports from dawn to dusk, carry our sticks and skates to the hockey rink. You'd play hockey all day until your mother called you home for supper.

Q. Were you interested in art as a young boy?

A. Not really. But my wife has a lifelong interest in art and started collecting early in our marriage. She has educated me about art quite a bit and we've been fortunate to travel and to see a lot of interesting art galleries around the world.

Q. Some people consider art and engineering to be opposites: the so-called left brain and right brain. Is that a correct way of understanding things?

A. If ever there is an answer to your question, then you should look at Leonardo da Vinci, who had a great right brain and a great left brain, too. In Milan, you can visit the national science museum and see his models, and then down the street you can see his Last

Supper. There are similarities, I think, between the creative process of fantastic mathematics and the creative process that's involved in producing a painting.

Q. When did you decide you wanted to be an engineer?

A. My best friend growing up was Tony Hardy, whose father was R. M. Hardy, the famous soils expert and dean of engineering at the U of A. From chumming around with Tony and listening to all the fantastic jobs that his father was doing, I think from Grade 8 on, I knew that's what I was going to do. Talk about a straight-line career path.

Q. Was there any time at the U of A when you were confronted with the mathematics or physics of it, that you said, "I'm not going to be able to do this"?

A. Oh yeah. First-year calculus is always somewhat daunting, for sure.

Q. Are there any research projects that stand out in your memory?

A. In fourth-year mechanical engineering, a group of us were working on the concept of a heat exchanger to cool blood for brain operations. My career could have taken a vastly different turn if I decided that biomedical engineering was something that I wanted to do.

Q. What was your first real-world job as an engineer?

A. I went to Ontario Hydro and was seconded for six months to Atomic Energy of Canada, and was asked to help design a mechanical arm that would extract the fuel bundles from a reactor in an absolute emergency if there was no power. The fuel is in a long, long cylinder, and you needed to have this little hand that people could operate to clamp onto the fuel bundles and pull them out of the reactor. They built a prototype and I think it actually worked.

Q. You got into management pretty quickly.

A. I was always interested in the big picture, how decisions were made and how resources were allocated. That was one of the things that drove me to take my MBA. After I graduated, I moved into planning and economics roles at Interprovincial Pipe Line. We did a lot of studies, such as the Mackenzie Valley pipeline and the expansion of the pipeline system.

Q. Later, in the late 1990s, you also were a venture capitalist for a while. What attracted you to that?

A. I am really interested in the innovation process and the great ideas emerging from university labs. Successful venture capitalists I've seen and read about really provide a value-add to help emerging companies build management teams and to solve technical problems. The little bit of time that we spent trying to put the Riverview Venture Partners fund together and develop a bit of a deal flow, that certainly was interesting.

Q. Cities often evolve into rival pairs. How does the Edmonton-Calgary rivalry affect how our city is evolving?

A. I try to have a pan-Alberta viewpoint. We have the chance to go to Calgary to see all kinds of great things, but we have to make sure that here in Edmonton we continue to build on our strengths and enhance our identity. Edmonton has a rich cultural history that resulted from people having long-term roots in the community—people like Joe Shctor developing the Citadel Theatre and Phil Ponting and the folks who put together the Winspear Centre for Music. And we can't forget our sports

legacy; whether you're an Oilers or Eskimos fan, that's an important part of our identity. Calgary is a great city as well.

Q. Can Calgary and Edmonton ever wear themselves off the energy boom-bust cycles?

A. I think you have to recognize that the energy industry will be the driving force for a long time. What we have to do is evolve the industry so it meets world environmental standards to develop energy the way it should in the 21st century. That's using a lot of innovation and fantastic technology that has been and will be developed here.

Q. Looking out 50 years, what is Edmonton going to be?

A. Unless someone clicks a switch and hydrocarbon energy becomes obsolete, I see Edmonton continuing to grow. I would hope we have an advanced technology industry, maybe related to health care, maybe to energy. From a city-building perspective, all cities have challenges, and we just have to keep working to improve things. Hopefully the Art Gallery of Alberta will add another fantastic anchor around Churchill Square, which will make the city better.



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

SOUNDS LIKE SUIC

James Hildebrandt (MSc Mechanical ?82) was sure he had cracked the audio code leading to video game nirvana. He just needed hard-core gamers to be consumed by his mythological beast of a headset. The problem was he didn't know

In 2000, he began hanging around a Winnipeg gaming store listening to conversations until identifying the most avid players, then approaching them with an unusual request.

"I grabbed strangers," Hildebrandt laughs. He needed test subjects to evaluate early versions of his Psyko Audio gaming headphones with 5.1 surround sound.

Setting up a demonstration in his first subject's basement, Hildebrandt watched anxiously as his contraption of plastic plumbing tubes and high-tech speakers was placed on the gamer's head and the adventure began.

It's a good thing looks didn't count in those early days. Initial models of the headphones resembled a modern-day Medusa, the gorgon of Greek legend whose horrifying mane of live snakes would turn onlookers to stone. But the auditory payoff was no cautionary myth.

The test subject's response was instantaneous. "When he stopped playing he didn't even look at me," says Hildebrandt. "He said to his other friend, 'You won't believe what just happened: (a character) shot at me from this angle and I was able to spin around and get him.'"

Psyko: killer



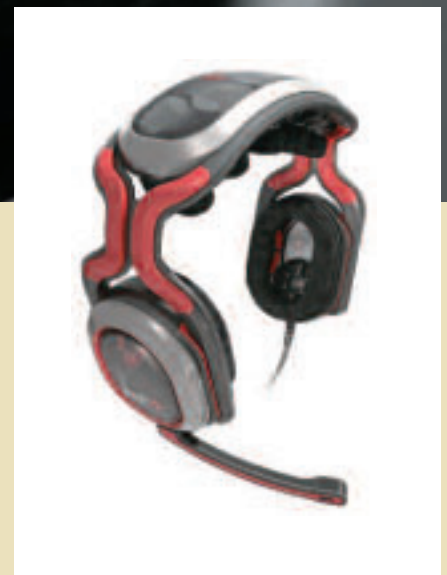
James Hildebrandt's high-performance headphones bring the sound game players hear up to the same level as the graphics in video games.



headphones for gamers

CESS

by Judy



“These guys didn’t care about what it looked like as long as it worked,” says Hildebrandt.

The breathless verdict provided a shot of positive reinforcement for Hildebrandt, whose efforts to develop a high-performance headset with “precision directional audio” had just begun. Almost nine years and \$1 million in development costs later, gamers from around the world have been pre-ordering the \$299 US headphones from the Psyko Audio Labs website (www.psykoaudio.com) and anticipating a fall launch. *Popular Science* recently included Psyko in its must-have product list for 2009.

The unusual spelling made it easier to secure a domain name, but the moniker is derived from psychoacoustics, the study of human perception of sounds. Key to the Psyko design is a bank of five speakers on the

headband, with a wave drive of channels guiding the sound to both ears. This transmits sounds in a far more natural manner than traditional headphones, allowing gamers to react more quickly to the direction of each gunshot, bomb blast, or snapping twig. In short, it creates a 3-D sound system.

“Every time I hear a person say ‘I can hear where the sound is coming from,’ the hair on the back of my neck goes up,” says Hildebrandt. The inventor of Psyko Audio’s patent-pending technology, Hildebrandt is listed as CEO, founder, and “head psyko” of the Calgary-based business.

“They can play better and get more out of the game. If you can tell where the sound comes from, your performance is improved,” he says. “Then you experience the game in a richer way.”

Despite the early rave reviews from play-

ers, a friend pulled Hildebrandt aside and pointed out a stark downside to the design: “He told me ‘guys that want your headphones aren’t going to have girlfriends.’ So I had to go from Medusa to something that really looks nice.”

The second step was improving the fidelity. Knowing where a sound comes from is only part of the information needed by your brain. Once the headset prototype was done,

the next challenge was creating a model that could be mass-produced. That proved tricky, and led to several design alterations and production delays.

“We think we’re within weeks of having a mass-production design,” Hildebrandt says (in April). “We think by the end of August there will be a small production run: the first batch will probably be 500 units.”

Hildebrandt’s long journey began in 2000, when a friend bemoaned the inability of traditional headphones to duplicate the audio experience of a surround sound system. He wanted to indulge in his gaming addiction without bothering the rest of his family.

“The problem was he had two kids and a wife who didn’t want to hear shooting and blasting at 2 a.m., which was the only time he would play.” Hildebrandt’s graduate degree focused on acoustics and gave him the tools to analyze, design, and build systems. Intrigued by the challenge, he soon became a regular fixture in the plumbing supply aisles of Rona and Home Depot, picking up small tubes that he would melt and mold at home.

“My (future) wife described it as arts and crafts for grown-up guys,” he laughed. “We’d both be in the kitchen: she’d be making dinner while I was making headphones.”

Many improvements to computer technology have been sparked by gamers demanding more intricate adventures, which in turn require better components. Increasingly complex graphics pushed the limits of computer processors. Avid gamers would “soup up” their hard drives to make them run faster, much like a hot rod. Those intensified computers would burn hotter, forcing development of better systems that have been used in other industries.

Hildebrandt had no personal passion for gaming—at least not at first. But he became hooked on gaming while testing his modified headphones on a series of electronic games.

“I thought it would take 10 minutes to test something, and suddenly four hours had passed,” he says. “I guess I got sucked into it.”

The headset has recently created plenty of Internet buzz. Hundreds of websites include reviews from gamers who have tried the Psyko headphones at electronics trade shows over the last year. Some are complimentary. But many more doubt that the headsets can live up to the hype.

Computer engineer Richard Chan attended a Calgary technology event in late 2008, where the swirling talk was that Hildebrandt had created the “best headphones ever.”

“I was skeptical, but they were exactly what he claimed: the best ever. It’s a marvelous piece of engineering,” says Chan, 24. An avid gamer, Chan spends his days creating video games for Apple’s iPhone.

Chan sees the Psyko headphones potentially getting a lot of use at LAN parties, where people bring their own computers and set up a local area network for multiplayer computer games or tournaments. But he says it’s too early to say if Psyko’s headsets are the new “it” gadget.

“It’s one of those things where you don’t realize you want it until you try it,” says Chan. “It’s more of an enabling technology. You don’t know it can be done better until you experience it. They are definitely ahead of their time.”

Self-described tech junkie Brendon Cook was stunned by the difference in sound in 2005 when he tried the headphones, “these funny looking black things that looked like they had been pieced together by hand.” Suddenly, his virtual gaming world was transformed. With better audio information, he could create a clearer mental map of other people and threats.

“Serious gamers will appreciate the peripherals to maximize their performance, their kill-to-death ratio and generalized wins,” says Cook, a geometrics engineer. “You’re able to own the other guy as much as possible.”

Hildebrandt knows the start of an economic recession is not the best time to launch a high-tech entertainment product. Not when a large number of gaming enthusiasts have seen their disposable incomes plummet in recent months.

Then again, the Wii home video game console was developed at a time when Sony’s PlayStation 3 and Microsoft’s Xbox were losing money on their console systems and looking to software sales to cover their costs. Since introducing the motion-sensing Wii controllers in 2006, Nintendo has soared to the top of the video game world with a collection of games and activities that have sold 50 million units.

“A tough economy doesn’t change the need for innovation,” says Hildebrandt.

“People still want entertainment. I’m well aware of the economic situation, but it only affects the degree of demand. We want to get into the marketplace and ramp ourselves up. This technology is providing a long-term solution.”

Not everyone is sold on the need for high-performance headphones for the general player. After all, gaming headsets can be purchased for under \$50. But competitive or professional gamers may find any edge they gain worth the additional cost.

Hildebrandt’s long journey began in 2000, when a friend bemoaned the inability of traditional headphones to duplicate the audio experience of a surround sound system.

“Gamers are pushing the technological envelope,” says Hildebrandt. “These people will pay extra to get it. I didn’t know that information about them when I got started.”

Will hard-core enthusiasts provide a large enough market? Only time will tell. “As a gamer, I think these are the coolest things ever. I’d give it five thumbs up, or even 10,” says Chan. “It’s hard to create hype for a product like this because you can’t believe the claims until you try it.”



Judy Monchuk is an award winning journalist and author living in Calgary.



Frank Gue (Electrical '51) and Fern, his wife of 62 years, remain actively involved in their community. Gue says the Faculty of Engineering was his springboard to a rewarding way of life.



thinking of the future

The Faculty of Engineering taught Frank Gue how to think
—he has applied the lesson well. **BY SUZANNE HARRIS**

On the phone Frank Gue has the easy-listening storytelling voice of a charming radio-announcer, a voice that belies his 85 years. A talk with him is embellished with quotes and anecdotes involving any number of his favourite subjects: engineering, education, philosophy, politics, and aerodynamics, to name a few.

Gue received his formal education in electrical engineering at the University of Alberta from 1947 to 1951, but the real lifelong benefit, he believes, is that he learned how to think.

Gue recalls vividly the day one of his lecturers stood at the front of the class and drove home the point: “You guys think that you’re here to learn how to be an engineer? You’re not here to learn how to be an engineer. You can do that later. You’re here to learn how to think.”

It is a lesson Gue has carried with him throughout his life, a lesson evident in his broad range of undertakings. He says his favourite occupation, still, is thinking.

“I owe so much to the university,” says Gue. His heartfelt gratitude for the education he received here has translated into a bequest

to the Faculty of Engineering in his will. It’s a “modest” amount, says Gue, waving away any hint of a suggestion that he may be doing something extraordinarily generous or noble. Call it what you will: the gift will enable a student who might not otherwise have the financial wherewithal to attend university to enroll in the Faculty of Engineering. In fact, Gue has been contributing to the University annually since he graduated in 1951.

“I’m happy to give it,” he says. “It’s automatic for me. I loved my time at the University of Alberta. I had such marvelous teachers. They were dedicated, thorough, patient.”

The professors wanted them to know things, and the students—the majority of them at that time young men returning from the war—were serious and eager to learn. But that’s not to say there wasn’t a lot of fun, too.

“In one of my classes an instructor was explaining atomic reaction, and he had filled a board and a half with calculus. He was one of these dramatic instructors who was passionate about things, and he pointed to the bottom right hand corner of the board and said, ‘See this? There is one electron missing from the equation!’ Short silence. ‘Where has that elec-

tron gone?’ Then a hoarse voice came from the back: ‘Don’t nobody leave dis room.’”

Gue speaks affectionately of professors such as Dr. E.W. Sheldon, who was contagiously enthusiastic about his students and mathematics. “He enjoyed young people, he liked lecturing. He always took a freshman course. He was terrific. Through his passion in the classroom he was able to bring calculus down to earth for us.” And he cared about the students.

“I remember he once defended me against a marker who wrote across my papers ‘use one side of the paper only.’ I wrote a note back saying ‘I’m trying to live on \$60 a month, mate, and I don’t spare one side of the paper.’ The marker I guess turned it over to Dr. Sheldon, and I got a note back from Dr. Sheldon: ‘Quite right, Mr. Gue, you carry right on.’”

Dr. Sheldon was always looking for ‘infinity’ and it became a bit of a running joke.

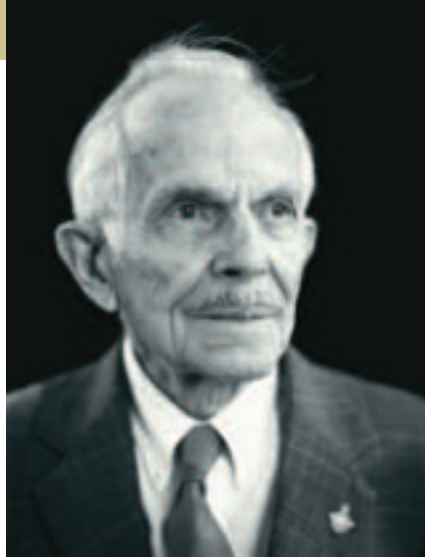
“When the Rutherford Library was being built there were huge hills of dirt all around, and students being students, well, they named every one of those mounds. One was named after the professor, and the big sign on it read, ‘Mount Sheldon—from here you can see infinity.’”

The education Gue received in the Faculty of Engineering provided the foundation for a long and successful career in his chosen field.

“The companies came in those days and recruited. I was offered a job by both GE and Westinghouse Canada.” He selected Westinghouse, where he began as manufacturing engineer. He stayed with the company for 36 years.

Gue’s very first task at Westinghouse was installing a system for insulating huge generator coils, coils that are used in quantities of 300 to 500 in huge generators such as the Sir Adam Beck Hydroelectric Power Stations in Niagara Falls, Ontario, or the Wabamun power plant in Alberta.

Working in the industry for as long as Gue has makes for some interesting experiences from time to time. “Last year I dropped in to the reception office at Sir Adam Beck II generator station, and I was greeted by a bright young woman who asked me if I would like to see the generator hall. I said, ‘Well, thank you very much, but...no thanks. I know what it looks like; I put those generators in!’”



Gue explains that as manufacturing engineer he was responsible for developing and installing processes. “So I designed experiments for abstruse things such as for drying out 300-tonne power transformers to get all the water out of them before they were buttoned up and tested,” he says. “At that time we were pushing the limits of high-vacuum technology. So much so that our consulting professor from McMaster University finally had to tell us that he’d helped all he could. He said we were on our own, that we’d reached the limit of what he knew. My people ultimately succeeded in getting a brand new world-class method of drying out power transformers, a method we trademarked as the Vapotherm process.”

Over the years Gue moved away from a strictly technical engineering role and into supervision and management.

And then one day Gue found his engineering education leading to a surprising ‘aha’ moment. “It dawned on me that Kirchhoff’s Law, an important law in electrical engineering, has a direct applicability in production management in a factory,” he says. Kirchhoff’s Law, simply put, says all input must result in output. “That doesn’t say useful output, just output. In production we bring in steel, copper, paper, oil...and all of that goes out either as useful saleable product or scrap. If you can track and better manage the process, increasing the useful output and decreasing waste, you have yourself a valuable production management tool.” He wrote a textbook about it: *Increased Profits Through Better Control Of Work In Process*. Reston, the textbook arm of Prentice-Hall, published it, and Gue finished the last 10 years of his career at Westinghouse Canada as their internal expert on production management.

It should be no surprise that someone who was so inspired by his professors even-

tually would turn toward teaching, too. From 1986 to 1993 Gue taught subjects such as factory management and statistical process control at Mohawk College and McMaster University, inspiring a whole new generation of thinkers.

Since then Gue has been following several passions, one of them being aerodynamics, a field in which he is largely self-taught. At age 58 he got his pilot’s license. He has been published on aeronautic subjects. And although he isn’t flying anymore he still has the passion, which he expresses by designing clever devices such as his patented hydrofoil take-off device for waterplanes, which eliminates the need for pontoons.

But his leading passion is, and always has been, education. “I do not think there is any more important enterprise that we have than education,” he says. “But the fact is you can’t get into education without getting up to your neck in politics.”

To that end, Gue is currently serving as curriculum chair for the Conservative Party of Ontario’s Education Policy Advisory Council. When the Conservatives form a government again in that province, the work his committee is doing will form the nucleus of an education policy for any new government reform.

Occasionally these days Gue gets confronted by people saying, “‘You’re an engineer. What do you know about politics? What do you know about education?’”

Gue says, “The answer is, ‘Do you really think my education stopped when I got my degree?’”

Of course not. He’s here to think. About education, flight, philosophy, the future. His gift to the Faculty of Engineering is a gift to tomorrow—to the future’s thinkers, dreamers, and do-ers. Contributions like Gue’s, no matter how ‘modest,’ testify to that rare magic wherein the output is so much more than the input.

To learn more about estate gifts, contact Nena Jovic-Andrejevic at 780-492-8969 or by e-mail at nena.jovic-andrejevic@ualberta.ca.



Suzanne Harris is a writer, editor and writing coach living in Edmonton.

AGHAYERE, ABI
(PhD Civil '88)

Has been appointed to the position of Associate Dean for Academic Affairs at the Goodwin College of

Professional Studies at Drexel University. Aghayere received his PhD in civil engineering, majoring in structures, from the U of A. Aghayere has published three structural engineering textbooks and has a fourth in progress.

BACKHOUSE, CHRIS
PEng

A team in Electrical and Computer Engineering led by Dr. Chris Backhouse has been awarded the Engineers Canada 2009 National Award for an Engineering Project for its work developing "lab on a chip" technology. Backhouse has been developing the technology with professors Duncan Elliott and Jim McMullin—combining microfluidics, microelectronics, microphotonics and nanobiotechnologies to develop compact and inexpensive instruments that may have a profound impact on public health.

DRIVER, ROBERT
(Civil '83, MSc Civil '87, PhD Structural '97) PEng

Has been awarded the APEGGA Summit Award for Excellence in Education. After spending six years

as a structural engineer in industry, Driver began teaching at Lafayette College in Easton, PA, in 1984. He joined the Faculty of Engineering in 2000 and soon became widely recognized as an outstanding educator.

FINLAY, WARREN
(Electrical '83, MSc Electrical '84) PEng

Has been awarded the APEGGA Centennial Leadership Award for his achievements in research,

teaching and impact on the

profession. Finlay is an internationally recognized educator and researcher who specializes in the delivery of aerosolized and inhalable drugs—like those delivered by asthma inhalers. His lab has developed a mouth-throat geometry that has been adopted worldwide by companies testing inhaler prototypes.

FLYNN, PETER
(PhD Chemical '74) PEng

Has been awarded the APEGGA Summit Award for Community Service. Flynn, who recently retired as a

professor in the Department of Mechanical Engineering, held the Ernest E. and Gertrude Poole Chair in Management for Engineers. Flynn is actively involved with Edmonton's Capital Region Housing Corporation, which operates 5,500 housing units for low-income individuals and families; and he was instrumental in the corporation's recent initiative to add 400 new units. Flynn is also president of the Norwood Neighbourhood Association, spearheading important, enduring improvements to the community.

GOMES, ROBERT
(Civil '78) PEng

Has been appointed president and CEO of Stantec Inc. Prior to joining Stantec in 1988, Gomes began his career working with a land development engineering firm. In 1991, he was appointed principal engineer in charge of the Edmonton office, and in November 1998, he was appointed vice president of Stantec's Edmonton urban land group. In January 1999, he was appointed vice president of Alberta North, responsible for all activities in the Edmonton office and in northern Alberta. In early 2005, he acquired the additional responsibilities of the corporate practice area leader for the energy and resources group and later in the year was appointed senior vice president.

HETTIARATCHI, PATRICK
(PhD Civil '86) PEng

Accepted the Association of Professional Engineers, Geologists, and Geophysicists of Alberta Environment and Sustainability Award on behalf of the Calgary Biocell Project. The project began in 2003 when the City of Calgary embarked on a collaborative venture with local consultants and Dr. Hettiaratchi. The result was a biocell able to break down biodegradable materials in the city's garbage, reducing the amount of waste that ends up in a conventional landfill.

HOLE, JACK
(Mechanical '78) PEng

Has been elected president of Ducks Unlimited Canada, Canada's leading wetlands conservation organization. Hole has served on DUC's volunteer board since 2000 and was elected vice-president in 2007. He has served on the boards of the Association of Professional Engineers, Geologists, and Geophysicists of Alberta, the Canadian Construction Association, and the B. C. Labour Relations Board and is a former chair of the Construction Labour Relations Association of Alberta and the Alberta Construction Association. In 2002-2003 he served on Alberta's Commission on learning.

MCGINNIS, GLEN
(MSc Chemical '72)

Has joined the advisory board for Planet Resource Recovery, Inc. a U.S.-based remediation and recovery technologies firm. McGinnis, who serves as CEO of Arizona Clean Fuels Yuma and is director and senior advisor to Alberta's First Nations Energy Centre, is recognized as a world expert in refinery design, development and operations.

ROSE, ROBERT
(Electrical '74) PEng

Has been awarded the Association of Professional Engineers, Geologists, and Geophysicists of Alberta Outstanding Mentor Award for pioneering professional mentorship. Rose recently retired after 35 years from his role as Supervising Engineer with ATCO Electric where he was a founding contributor to ATCO Electric's Engineers-in-Training program. He has also been a mentor in the University of Alberta's Co-op engineering program and an active APEGGA Outreach Program volunteer.

SANDERS, SEAN
(PhD Chemical '97) PEng

Has been awarded the University of Alberta Provost's Award for Early Achievement in Excellence in Undergraduate Teaching. Sanders earned his PhD at the U of A in 1997, and worked with Syncrude Canada for nine years leading multi-phase flow research projects and a process engineering team. Sanders, who teaches in the Department of Chemical and Materials Engineering, holds the NSERC Industrial Research Chair in Pipeline Transport Processes.

SCURTESCU, CRISTIAN
(MSc Electrical '07) PEng

Has won the TEC Venture Prize Fast Growth runner's up award for developing an exhaustive business plan for his company, SmileSonica Inc. SmileSonica is a medical device company focused on commercializing the first ultrasonic dental technology which heals the natural teeth on site. The company's product will benefit patients while generating new revenue opportunities for dentists.

**STEIGER, DENNIS**
(Electrical '86, MSc Electrical '89) PEng

Has been appointed group vice-president, engineering for Shaw Communications Inc. Steiger is responsible for all engineering activities within Shaw Cable, Star Choice, Shaw Broadcast and Shaw Tracking businesses. Steiger has more than 22 years of cable and telecommunications experience and has been a key leader within Shaw's engineering team for the past 12 years.

Do you have news to share?

Send your news of awards, appointments, and other successes to engineer.alum@ualberta.ca

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University of Alberta ENGINEERING

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tial component of each team's success. Supporters provide teams not only with much-needed financial assistance and mentorship, but also with equipment, technical advice, and public exposure.



For further information, contact:

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Acting Assistant Dean,
External Relations
Faculty of Engineering,
University of Alberta
c/o E6-050 Engineering Teaching
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