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Following in **Galileo's Footsteps**

Jason Hessels Observational
Astronomer Four Centuries Later

MESSAGE FROM THE DEAN

Fostering an Interest in the Next Generation of Scientists

In April I attended a donor event to celebrate the International Year of Astronomy. During the question period following Dr Ian Mann's presentation, grade 6 student Alex Mc Phee asked an interesting question that surprised everyone in the room.

The question had to do with the Maunder Minimum a phenomenon that happened about 300 years ago when sunspots became very rare. Apart from the fact many of us in the room did not even know what this was, we were all struck by the poise and maturity of this young enthusiastic astronomer in our midst. It reminded many of us of our own youth and the events that shaped our motivation for getting a science degree.

I always imagined myself as a biologist from the start. We spent our summers on a lake in northern Ontario, so I always had plenty of time to explore nature. Life in the water and life on land seemed different to me then. As a young student, this dichotomy began to break down and there were always so many interesting questions about how biological systems functioned.

But in many respects, it was the passion of the biologists that I learned from, first in high school and particularly at University that made it easy to learn. The more I learned, the more it seemed there were fascinating things to explore. I have always found science to be fun. Having fun always seemed like a good thing to keep me focussed on my career.

Fostering this interest and enthusiasm in the next generation of scientists is important to the Faculty and we have outreach programs to motivate students like Alex to get involved at an early age. The first question Alex asked after the presentation was whether or not he was old enough to attend the Faculty's first ever Space Academy in July 2009.

The Space Academy is just one of the outreach programs offered on campus. Many are run through DiscoveryE, a not-for-profit, student-run program at the U of A to foster an interest in science, engineering, and technology in youth. In 2008 alone DiscoveryE programs impacted the lives of almost 18,000 youth.

There is a saying that we have not inherited the world from our parents, but that we are merely borrowing it from our children. Science is a part of our daily life. Everything we do and deal with in life is science, from cooking, playing ball, growing a garden and understanding how technologies work to watching a rain storm. Finding fun ways to encourage future scientists into the field of discovery will inspire them to commit to this proverb just as many of us do today. Have a great summer.

Gregory Taylor
Dean of Science



SCIENCE contours

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Awards and Accolades

Provincial Distinguished Service Award

Dr. Ronald Cavell was honoured with the Saskatchewan Distinguished Service Award for his vision and effort in securing one of the world's most advanced synchrotron facilities, located at the University of Saskatchewan. A founding member of the Board of Directors for the Canadian Light Source, Cavell is also supervisor of X-ray Spectroscopy Projects for the Alberta Synchrotron Institute and served as president of the Canadian Institute for Synchrotron Radiation from 1999-2006.



Prestigious Research Prize

Dr. Dennis Hall was named the 2008 winner of the prestigious Steacie Prize for outstanding scientific research carried out in Canada. The prize is one of Canada's most prestigious science awards encompassing a wide range of disciplines including mathematics, engineering, chemistry, physics, and biology.

Dr. Hall is an organic chemist working on applications of compounds known as boronic acids and esters. While today's chemists can make virtually any molecule they choose, the real challenge is figuring out which molecule will serve a useful, specific purpose, then finding a way to produce that compound efficiently. Doing so could save millions of dollars in drug development or improve current industrial processes.



Top International Appointment

Chemistry professor **Dr. John Vederas** has been elected as a Fellow of the Royal Society (London).

Vederas's research focus is investigating the way Nature assembles molecules, a prerequisite to rationally influence life processes in medicine and agriculture.

The election to this prestigious group recognises Vederas's work at the cutting edge of science worldwide. He joins an outstanding group of over 1400 Fellows and Foreign Members of the Royal Society, and ranks as an international leader in his research field. Other Fellows elected over the years include scientists like Isaac Newton, Charles Darwin and Stephen Hawking.



Congratulations to all the Faculty of Science award winners who routinely receive prestigious international, national, provincial and university awards that recognize their excellence in research and teaching.

International

Mark Wilson (Biological Sciences) *Society of Vertebrate Paleontology Joseph T. Gregory Award; John Vederas* (Chemistry), Fellow of the Royal Society (London).

National

Michael Caldwell (Biological Sciences), *Geological Association of Canada W.W. Hutchison Medal; Dennis Hall* (Chemistry), Steacie Prize; **Liang Li** (Chemistry), *Canadian Society for Chemistry Maxxam Award; Glen Loppnow* (Chemistry) *Society for Teaching and Learning in Higher Education 3M National Teaching Fellowship; David*

Schindler (Biological Sciences), *Royal Canadian Institute for the Advancement of Science Sandford Fleming Award; Eleni Stroulia* (Computing Science), *iCORE Chair (Services Systems Management); John Waldron* (Earth and Atmospheric Sciences), *Atlantic Geoscience Society Gesner Medal.*

Provincial

Ron Cavell (Chemistry), *Saskatchewan Distinguished Service Award; James Hoover* (Computing Science) *AVAC/iCORE/ASTech Outstanding Achievement in Information and Communications Technology and Innovation; Douglas Schmitt* (Physics), *University of Lethbridge Distinguished Alumnus of*

the Year; Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA) Voluntary Service Award.

University

Dennis Hall (Chemistry), *Rutherford Award for Excellence in Undergraduate Teaching; Alexander Melnikov* (Mathematical and Statistical Science), *McCalla Professorship; Donald Page* (Physics), *Killam Annual Professorship; James Pinfold* (Physics), *McCalla Professorship; Osmar Zaiane* (Computer Science), *Killam Annual Professorship.*

The first evidence of pre-industrial mercury pollution in the Andes

The study of ancient lake sediment from high altitude lakes in the Andes has revealed for the first time that mercury pollution occurred long before the start of the Industrial Revolution.

University of Alberta Earth and Atmospheric Sciences PhD student Colin Cooke's results from two seasons of field work in Peru have now provided the first unambiguous records of pre-industrial mercury pollution from anywhere in the world and his research finds were published in the Proceedings of the National Academy of Sciences (PNAS).

"The idea that mercury pollution was happening before the industrial revolution has long been hypothesised on the basis of historical records, but never proven," said Cooke whose research was funded by the National Geographic Society.

Cooke and his team recovered sediment cores from high elevation lakes located around Huancavelica, which is the New World's largest mercury deposit. By measuring the amount of mercury preserved in the cores back through time, they were able to reconstruct the history of mercury mining and pollution in the region.



Competition may have led to new dinosaur species in Grande Prairie area

The discovery of a gruesome feeding frenzy that played out 73 million years ago in northwestern Alberta may also lead to the discovery of new dinosaur species in northwestern Alberta.

University of Alberta student Tetsuto Miyashita and Frederico Fanti, a paleontology graduate student from Italy, made the discovery near Grande Prairie, 450 kilometres northwest of Edmonton. Miyashita and Fanti came across a nesting site and found the remains of baby, plant-eating dinosaurs and the teeth of a predator. The researchers matched the teeth to a Troodon, a raptor-like dinosaur about two metres in length. This finding has opened new doors in dinosaur research on this part of the continent: "It established that dinosaurs were nesting at this high latitude," said Miyashita. "It also shows for the first time a significant number of Troodons in the area [who] hunted hatchling dinosaurs."

Solar Energy Breakthrough

Dr Jillian Buriak and colleagues from the Department of Chemistry and the National Research Council's National Institute for Nanotechnology have engineered an approach that is leading to improved performance of plastic solar cells (hybrid organic solar cells). The development of inexpensive, mass-produced plastic solar panels is a goal of intense interest for many of the world's scientists and engineers because of the high cost and shortage of the ultra-high purity silicon and other materials normally required.



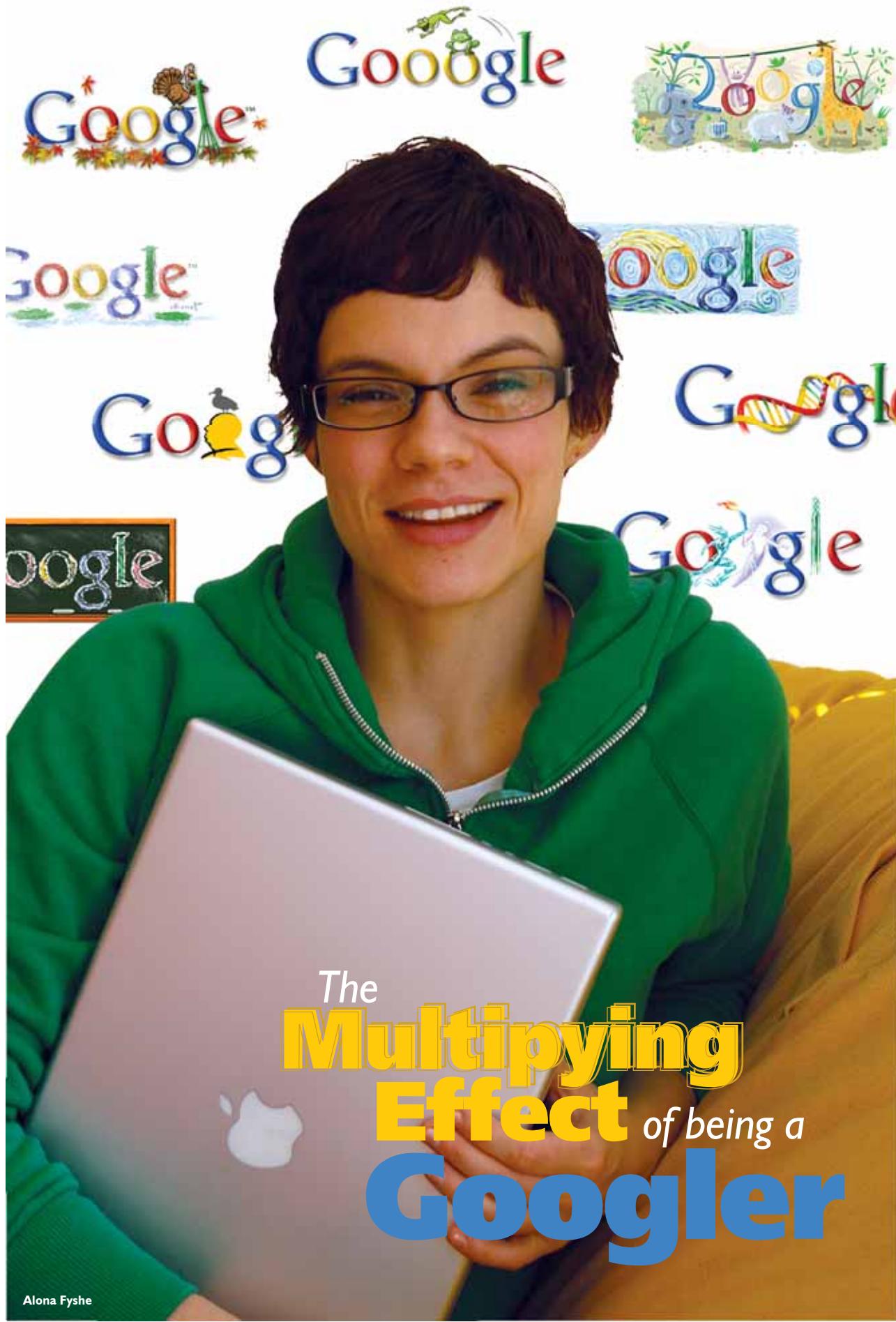
Fishy fight-or-flight response may hold answers to human nerve damage

Edmonton Researchers at the University of Alberta are looking to the tiny zebrafish for a way to regenerate damaged nerve cells in people. Zebrafish, a common fresh-water tropical fish, share the same fight-or-flight reaction that humans do. This synaptic response—the complicated brain to muscles signals—catapults an embryonic zebrafish to safety and has been partially unraveled by Declan Ali. Ali, associate professor of biological science, says zebrafish are a good match for humans because nerve cells deliver their instant messaging the same way for fish and people.

Smallest ever quantum dots bring real world applications closer

Single atom quantum dots created by Dr. Robert Wolkow and colleagues from the National Institute for Nanotechnology and the Faculty of Science make possible a new level of control over individual electrons, a development that suddenly brings quantum dot-based devices within reach. Composed of a single atom of silicon and measuring less than one nanometre in diameter, these are the smallest quantum dots ever created. Quantum dots have extraordinary electronic properties, like the ability to bottle-up normally slippery and speedy electrons. This allows controlled interactions among electrons to be put to use to do computations. Until now, quantum dots have been useable only at impractically low temperatures, but the new atom-sized quantum dots perform at room temperature.





The
**Multiplying
Effect** of being a
Googler

Alona Fyshe

Everything they say about working at Google - the bean bags, the foose ball tables, colourful work spaces, the flexibility to spend 20 percent of your work time on what you are passionate about, but most importantly the incredibly talented people you get to work with - is entirely true according to "Googler" Alona Fyshe ('05 BSc, '07 MSc).

Consistently ranked in international business surveys as one of the best employers in the world and often quoted by members of Generation Y as the "coolest place on the planet" to work, Fyshe says thanks to all of this she is now, "ten times the engineer I was two years ago when I started at Google."

28-year-old computer engineer Fyshe is based in Google's Pittsburgh office where she works on programs that will refine product searches, a feature of online shopping that she considers to be ineffective in its current form.

"I am working right now on a project related to one of the biggest frustrations I personally have about online shopping," says Fyshe.

"It's hard to narrow down the results from a shopping query - I personally fit shoes anywhere from 7.5 to 8.5 - but most sites will only let you choose one size."

"Then, often I'm looking for shoes that will fit a certain kind of outfit - like casual, warm coloured, flat shoes. Any warm color would be okay but there are not a lot of sites that allow you to do this multi-faceted attribute breakdown with ranges of values," says Fyshe.

"The examples get even more complicated when you start to incorporate attributes that are related to the product, but not supplied by the product's manufacturer - I'm looking for an LCD monitor, for less than \$500, but that has pretty good user reviews, and is offered by an online merchant with a good sales history," she adds as another example to illustrate what she is working on right now.

The project fits in perfectly with the expertise Fyshe developed working on

her Masters dissertation with Computer Science Professor Duane Szafron. For her research Fyshe used a natural language processing (NLP) technique to improve the text classification of biological journal abstracts.

Her supervisor Szafron said while Fyshe did not invent the technique she used, she did become the first person to use term generalization to analyze biological abstracts and her findings formed the basis of a major paper published in the international Bioinformatics Journal.

For the last two years Fyshe's programming efforts have, however, been applied to something that should make life a whole lot easier for online shoppers.

"This work fits in perfectly with what I did at the U of A," says Fyshe from her cool office on the Carnegie Mellon University campus. Google has located several offices on university campuses to give staff the opportunity to attend academic talks and means interns at the company don't have far to go to classes.

When Fyshe first began at Google she was struck by the sheer volume of information the company has to deal with. "The problems change when you have to multiply things by millions," she said.

"I have learned so much from working here with some of the smartest engineers in the world who have real pride in their programming," she added.

Words of advice from Fyshe to students keen on working at Google are simple.

"Network, keep in touch and make sure people know who you are," she said. "For sure you can put your name in a hat but the best thing is to stay in touch with networks."

Those networks might, however, have been quite different had Fyshe - an art lover - stayed on her original career path of becoming a graphic designer. When she discovered that the U of A homework for her optional computing science course was the only stuff that

really excited her she promptly changed her focus and direction.

"My marks went up an entire grade point and I got to be creative and think for myself," she said.

Her decision to then go on and do a Masters was the result of a research internship she completed at the U of A for her BSc.

"It totally changed my life," she said when talking about the work with Drs Szafron and Paul Lu on the Pence Proteome Analyst Group. The project helped biologists focus their research by using computers to process the large amounts of information available.

While at university Fyshe worked hard to get other young women interested in the traditionally male-dominated field of computing science. She was president of the Computing Science Graduate Students' Association and the Undergraduate Association of Computing Science, served on the mentorship program, assisted with WISEST and was even a keynote speaker at one of their conferences.

She has kept up this commitment at Google where she devotes much of her 20% Personal Passion Project time on getting women interested in computing science. More recently she became a founding member of the Pittsburgh Women in Technology Advisory Council.

"The great thing about working at Google is that it really is a "bottom up" organization that listens to what its staff has to offer. There is incredible energy around here and people are really enthusiastic about what they do," she said.

As for her future, Fyshe says her life is always a creative work in progress. She has been accepted into a PhD program in Carnegie Mellon University's Computing Science program - considered one of the top five in the world.

"I think computing science is really creative - problem solving creative. Good solutions are always beautiful and elegant and I have always found that attractive," said Fyshe.



Hugh O'Neill and
Jennifer Newton

Academic All Canadians

Hard work creates the perfect mix of science studies and sports

Creative Services

Golden Bears kicker Hugh O'Neill is destined for a great sporting career according to Edmonton's top coaches, but this star athlete knows that a promising future also requires him to remain on top of his studies.

O'Neill, now in his second year of a general sciences degree, was awarded the Mark Goodkey Memorial Trophy for being the U of A most outstanding male academic All Canadian at the end of 2008. The award adds to a growing list of accolades for this talented sportsman who in 2007 was described by Eskimos Head Coach Danny Maciocia as being, "definitely pro material."

In 2008 O'Neill was also named the University of Alberta Outstanding Male Rookie of the Year.

O'Neill, at 18 years old, has taken a practical approach to balancing his sports and studies and says he plans his time efficiently around football season.

"You have to find the right balance to be able to excel at sports and at school," said the former Ross Sheppard High School student.

"Over the years my parents and coaches have helped me to keep that balance," said O'Neill who has been a starter for the Golden Bears since he arrived at the U of A in 2007.

"Fortunately the football season is not too long, so during that time I try and plan a lighter course load," he added.

O'Neill says he has not yet decided what area of science he wants to specialise in, and for now will simply focus on keeping his 3.5 grade point average.

Jennifer Newton doesn't remember a time when she didn't have a hockey stick in her hand. Growing up in Norglenwold Alberta, a small community just west of Sylvan Lake, Newton spent the summer's water skiing and the winter's playing hockey.

Playing competitively throughout her elementary and high school years, Newton knew exactly where she wanted to go when it came time for University.

"I came to the U of A for its hockey program," said Newton.

Over five years the general sciences student has been part of two national championships, and was named Canada West Player of the Year and a CIS First Team All-Canadian in 2007-08 when she led the conference in scoring as captain of the Pandas. Earlier this year, she played on the inaugural women's ice hockey team that brought home Canada's only gold medal at the 2009 Winter Universiade games in Harbin, China.

Panda's head coach Howie Draper said he was not surprised that Newton - who has been team captain for the past two years - was named Academic All Canadian Athlete.

"Over the past 5 years, I've seen Jen become a strong, confident leader, not to mention one of the most complete student-athletes that we've ever had come through the Pandas hockey program."

Newton's advice to the rookies? "Stay on top of your studies. My parents always stressed school first, then hockey."

It's obviously worked. Newton will be entering law school at the U of A next year, and will be working towards a spot on the women's national hockey team.



Growing up in Albuquerque, New Mexico, Loppnow pegged himself to be a truck driver like his cousin. No one in his family had gone past Grade 12, but with encouragement from his high school English teacher Susan Frye, Loppnow decided to apply to colleges across the US. After graduate work at both Berkeley and Princeton, Loppnow was recruited to the U of A. He knew he was coming into a chemistry department highly regarded for its world class research, and after years of building up a successful research program in bioanalytical and biophysical chemistry, Loppnow recognized a need to strike a better balance between his passion for research and his teaching interest.

He began to re-evaluate his classroom technique through the eye of the student, an approach that revolutionized the way he taught and recently earned him a 3M National Teaching Award, considered to be Canada's highest award for undergraduate university teaching excellence.

Loppnow says the roots of his teaching success sprouted when he decided there must be a better way to connect with his students who weren't chemistry majors.

"We were just expecting students to know these things without them having any reason to know it," said Loppnow. "I was expecting a long-lasting understanding of the concepts that we were covering, and that wasn't necessarily how I was teaching."

Loppnow overhauled his approach, drawing on a series of live experiments—the most potent of which measures the reaction rate of contact explosives—and challenging his students to be creative.

"I asked students to use things that were important for them to convey the concepts that they were learning," he said. "All of a sudden I had students doing rap songs and making music videos on the thermodynamic laws, which are very abstract concepts in science."

As one of the driving forces behind Science 100, a unique program that integrates material from seven departments into a single, year long course designed to encourage students to think beyond disciplinary boundaries, Loppnow has introduced group projects, active and discovery-based learning in all levels of chemistry. In an effort to engage all students, games, demos, and clickers are a regular part of the learning experience.

Perhaps one of the things he's most proud of is the introduction of science citizenship projects in SCI 100. "Science citizenship is one of the best ways of changing students from passive absorbers of knowledge to active doers and contributors," he said. In these projects, students present the science behind a global issue, but also implement a local solution. From advising companies on how to tie their new solar energy systems into the electrical grid to educating students on nutrition to reducing university waste by making available recycling containers for the classroom,

these students are contributing to the community and learning about science at the same.

His risk taking has inspired colleagues and accelerated a bit of a revolution in the undergraduate curriculum. Loppnow has organized and participated in numerous workshops that have created a network of instructors from Western Canada who share his vision.

In an effort to acknowledge and reward undergraduate chemistry students who take on experiential components, Loppnow and some of his chemistry colleagues have established two prizes.

"It had been in the back of my mind for some time to try and pull together an endowment to recognize the students who excel in other ways of learning, particularly in the experiential components offered, like a research project or an industrial internship," explained Loppnow.

As for the 3M honour, Loppnow says he is both overjoyed and humbled by it, adding he had never thought of his teaching style as standing apart from any of the many great instructors at the university.

"But if it helps me change how teaching and learning is perceived at the university, that's great."

Loppnow is a part of a group of 10 recipients of this prestigious annual award. Of the 238 3M National Teaching Fellows awarded to professors in 43 Canadian universities, the U of A leads the way with 30 awards to date.

Jason Hessels

Observational Astronomer



Keeping his eyes on outer space

There is a scene in the science fiction movie *Contact* where the character Eleanor Arroway gazes up at the giant Arecibo radio telescope. Watching that movie as a high school student, Jason Hessels ('01 BSc) dreamed that one day he too might be poised underneath this same monstrous structure with a purpose.

Initially thought I wanted to study medicine, but after seeing the Arecibo Telescope in *Contact* I thought about how amazing it would be to use an instrument like that," said Hessels from his office in Amsterdam where he works as a staff astronomer and is the Veni Fellow at "ASTRON", the Netherlands Institute for Radio Astronomy.

"The Arecibo telescope in Puerto Rico is 305 metres across and spans your entire field of view," he said. "It is an awe-inspiring instrument."

Hessels eventually got to use the world's largest radio telescope to gather data which resulted in him leading a

team to discover the world's fastest spinning pulsar. This discovery formed part of his award-winning PhD thesis - completed at McGill University in 2006 under the supervision of Canada Research Chair in Observational Astrophysics Dr Victoria Kaspi.

In 2008 Hessels was presented with the Canadian Association for Graduate Studies (CAGS) distinguished dissertation award in the engineering, medical, and natural sciences category.

Hessels now works as a radio astronomer (someone who studies stars and galaxies using their radio light). In particular, he studies millisecond pulsars which are a type of neutron star that spin

extremely rapidly, literally hundreds of times a second. These are the fastest-spinning stars we know of and the fastest-spinning one known, spins 716 times a second – the discovery Hessel made as part of his PhD research.

An all-out celebration of this incredible discovery had to wait, however, almost a year.

"It wasn't a sudden joyous occasion because it took almost a year to reobserve the pulsar well enough to confirm its rotation rate was in fact the fastest known. There was a long period of being tentatively excited about this discovery," said Hessel.

He roundly credits U of A Professor Emeritus Doug Hube and Professor Sharon Morsink with the inspiration and support that enabled him to embark on the career path that now lies ahead of him.

Hessel at 30 years old is now considered an international expert in the field of millisecond pulsars. He has a dream job as an astronomer and is currently working as part of a Dutch and European team building the largest radio telescope ever made.

"We are definitely breaking new ground with this technology," said Hessel. He said this new telescope – called LOFAR – will enable observations of extremely low frequency radio waves. The ability to sensitively observe these longer waves of light – with wavelengths between 1-10 metres – will open up a world of possibilities for observational astronomers like him.

LOFAR will use an array of roughly 25,000 simple omni-directional dipole antennae, instead of large, conventional reflecting dishes. The electronic signals from the antennae will be digitised, transported to a central digital processor, and combined in software to emulate a conventional dish-shaped radio telescope, and to steer the pointing direction of the combined array.



Jason Hessel
and Doug Hube

In many ways, the basic technology of radio telescopes has not changed since the 1960's: large reflecting dishes bounce radio signals from space to a receiver which detects them. Half the cost of these telescopes lies in the steel and moving structure.

The novel technique of combining many thousands of small receivers together, being developed in LOFAR, was identified as critical in making the next step in sensitivity needed to unravel the secrets of the Universe.

For astronomers like Hessel, LOFAR will enable them to "see" things never seen before.

"Being able to study stars at many different wavelengths of light is critical for our understanding of how they work," he said.

"We are really pushing the boundaries with this technology because we will have a much larger collecting area with which to see light at the lowest available radio frequencies. That opens up all sorts of new scientific possibilities," he said.

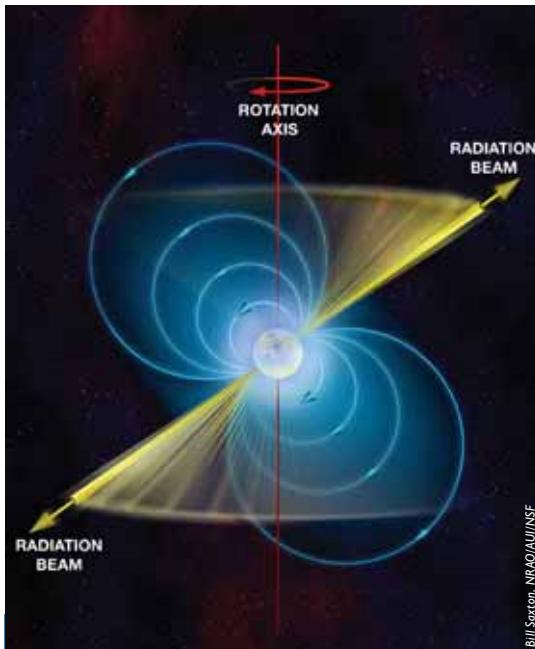
"One of the biggest hopes in astronomy is always that there is something new and unexpected out there for us to discover, and this new technology makes that possible," he added.

Hessel's conversation becomes much more animated when you ask him what he likes about astronomy, physics and millisecond pulsars in particular.

"What I find most amazing about millisecond pulsars is how incredibly fast they rotate. They have as much mass as our Sun, squeezed into the size of just a large city, and yet they rotate so rapidly that their surface sweeps by at close to 20% the speed of light."

Progress in the field of radio astronomy will be greatly accelerated by what Hessel and the LOFAR team in Holland are working on.

"To think that in the 1940s astronomers predicted the existence of neutron stars but were not able to see them until the 1960s. Similarly, we are now verging on being able to see things astronomers have



Bill Saxton, NRAO/AUI/NSF

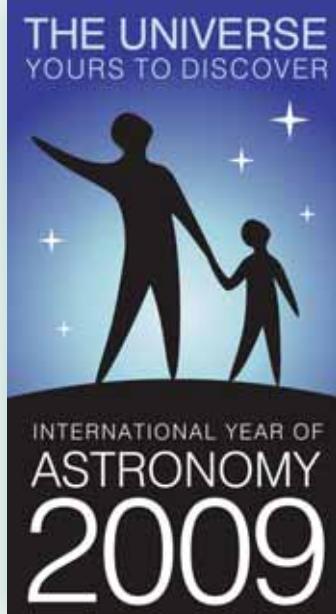
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only theorized to exist," he said.

Working in Holland has been an easy fit for Hessel, whose parents are both Dutch and who spoke the language at home. Living in a country famous for being flat and having more bicycles per capita than almost anywhere else, Hessel has joined the ranks and has a return journey of almost 30km a day getting to and from work.

Hessel loves his work and relishes the challenges that lie ahead in his adopted homeland, but admits there are one or two things he misses about Canada.

"Field hockey is far more popular than ice hockey here in Holland," said the former goaltender of the McGill University physics hockey team, aptly named "The Absolute Zeros". It's a small price to pay though for having the opportunity to work at the cutting edge of a profession that is sure to propel him in more than one way to stellar heights.



Four centuries ago Italian physicist Galileo Galilei pointed his telescope to the heavens and changed the way the world saw itself and its place in the universe. Through his observations many, but not all, came to understand and believe that the earth was spinning around the sun and this and many other discoveries led to Galileo being described by scientists who followed as the "father of modern science."

The International Year of Astronomy 2009 (IYA 2009) celebrates his discoveries and is a global effort initiated by the International Astronomical Union (IAU) and UNESCO to help the citizens of the world rediscover their place in the Universe through the day- and night-time sky, and thereby engage a personal sense of wonder and discovery.

IYA 2009 organisers have said everyone should realise the impact of astronomy and other fundamental sciences have on our daily lives, and understand how scientific knowledge can contribute to a more equitable and peaceful society.

IYA2009 activities are taking place locally, nationally, regionally and internationally. National Nodes in each country are running activities throughout 2009 which will establish collaborations between professional and amateur astronomers, science centres and science communicators. Over 200 countries are expected to take part.

U of A Supports The International Year of Astronomy

The Department of Physics at the U of A has teamed up with organisations around Edmonton to host and organise a number of activities to celebrate the International Year of Astronomy 2009. Check the IYA website for events in your region. www.astronomy2009.org

Recurring Events in the Edmonton region

Star-gazing at the U of A:

Summer Hours - on the roof of the Fine Arts Building. Once a month; Thursday June 25, 9 - 10 pm, Thursday July 30, 9 - 10 pm Thursday August 27, 9 - 10 pm. Starting September every Thursday; September 9 - 10pm; October 8 - 9pm; November 7 - 8pm. Free.

Star-gazing at Telus World of Science (TWOS): Every Friday, Saturday & Sunday evenings at TWOS. January - June, 7-10pm; September - December, 7-10pm. Free

Solar Observing at Telus World of Science: Every Saturday & Sunday afternoon from 1-4pm at TWOS. Free and totally safe!

Public Lectures: Throughout 2009 public lectures on astronomy will be presented at the University of Alberta, Grant MacEwan College and at Telus World of Science.

Planetarium Shows: at Telus World of Science in the Margaret Zeidler Star Theatre.

Special Events

July 20 - The 40 Year Anniversary of Apollo 11 landing on the Moon.

July 2009 - Space Academy hosted by The Institute for Space Science, Exploration and Technology (ISSET) at the U of A.

September 6 - Party Under the Stars: Star Party at Beaver Hills Dark Sky Preserve (Elk Island National Park).

September 15 - 20 - Northern Prairie Starfest: Star Party at Black Nugget Lake (about 1 hour drive East of Edmonton).

September 26 - Space Exploration Symposium: 2pm at Telus World of Science. Presented by the Institute for Space Science, Exploration and Technology (ISSET)

October 16 - 18 - The George Moores Astronomy Workshop is an astronomy retreat run by the local RASC members, teachers, and general public. Enrollment in this workshop is limited and preference given to teachers and RASC members.

November 30 - Galileo First Observes the Moon in 1609.

The History of Astronomy at the U of A

The history of astronomy at the U of A began in the early 1920s with the appointment of Dr J.W. Campbell and E.S. Campbell. While their research and teaching responsibilities were mainly in mathematics, both spent the summers and sabbatical time at the Dominion Astrophysical Observatory.

In the early 1960s, responsibility for teaching astronomy courses was officially transferred to the Department of Physics.

The first University Observatory opened in 1943 when the Wates Telescope was installed on what is now the parking lot of the Northern Alberta Jubilee Auditorium. In 1967 Professor G.L Cumming supervised the purchase of a 12-inch Tinsley reflector and the building of the Devon Astronomical Observatory. In 1977 the 12-inch Cassegrain telescope was mounted inside a roll-off-roof structure on top of the now demolished Physics building. This telescope was eventually moved to the top of the Fine Arts Building in time for the International Year of Astronomy in 2009.

Research tools at the U of A now include classical and modern techniques and although the atomic physics and spectroscopy program ended with the retirements of Dr Tony Kernahan and Dr Eric Pinnington, space physics, optical astronomy and radio astronomy remain as cornerstones.

The Centennial Centre for Interdisciplinary Science will eventually provide the U of A's astrophysics program a state of the art home from which to continue building on its already stellar international reputation.



Science Titles

Ovid Wong (70 BSc, 72 M.Ed, 77 PhD) began writing science books for kids because kids liked the way he taught the subject.

"I thought to myself, if they tell me I can do it, well why not share it with other kids," said Wong from his home in Illinois where he has been living and working since 1977.

Since making the decision to write books back in 1982, Wong has gone on to produce 22 publications, some of them for children and more recently books for teachers and education administrators. "I never imagined I would end up being a writer but I have got a knack for taking complicated concepts and explaining things in a way that is understandable to kids, he said.

His first book "A Glossary of Biology," published in 1984 was written using a notepad and a typewriter and Wong

admits the computer age has made his work a whole lot easier.

"I really try and put myself in the shoes of students when I write a book," he said.

"I ask myself what is the big picture and then go into the finer details and then find ways to reinforce the ideas being taught," Wong added.

His published titles have covered a wide range of topics from prehistoric people and pandas, to experimenting with electricity and magnetism and the human body.

"I still consider myself a teacher first," said Wong.

"Writing is just a thing on the side, but, I am definitely a long way from



where I started in 1982," he says downplaying the impact of his work on the teaching and learning community.

In 1989 Wong received the National Science Foundation's Science Teacher in Illinois award and the National Science Teaching Achievement Recognition award by the US National Science Teacher Association. He has also been given an outstanding alumni award from the U of A.

Wong's advice to people thinking about writing a book - just go out and try it.

"I really did not have much of an idea when I was starting out, but I thought it was a good idea and pursued it," he said 22 published books later.

His focus nowadays is more on writing for teachers and education administrators and he is currently working on a book that incorporates 2500 year old Chinese philosophies into a modern setting.

"I like to keep things fresh," he laughs adding there are a few more book ideas in the pipeline.

Liftoff for the U of A's First Ever Space Academy

Students in grades 7-9 will get the chance to try their hand at being space scientists when the U of A's Institute for Space Science, Exploration and Technology (ISSET) holds its first ever Space Academy in July.

ISSET co-director Ian Mann said two sessions of the space academy will be held and the programme will give enthusiastic, aspiring young scientists an opportunity to engage in a wide range of exciting activities that include; building Galileo telescopes, building interactive robots using LEGO, mindstorms robotics kits, spending time in a virtual reality environment (in the advanced Man-Machine Interface Lab in the Computing Science Centre) and simulating work as ground control and a space mission crew.

"Space will be limited to just 20 kids in each session and on our last day we hope that participants will be able to launch the rocket they will assemble as part of the week of activities," said Dr Mann, who holds the Canada Research Chair in Space Physics.

"We are making sure that this programme will be highly interactive and exciting for all participants," added Dr Mann.

Registration for the Space Academy is being managed through DiscoverE, a not-for-profit, student-run program at the U of A that fosters an interest in science, engineering, and technology in youth through in-class workshops and summer camps.



David Schmidt

Geography graduate

creates road maps for rebuilding communities and countries



Binod Shrestha

In 1986 Binod Shrestha (84 MSc Geog) opened the first official Canadian International Development Agency (CIDA) office in Kathmandu. With no budget he resorted to borrowing a table and chair from the restaurant next door and then jerry rigged a makeshift phone line to come into the “office” from the same building.

The extra cable protruding from the restaurant was probably barely noticed by the proprietors, because a quick glace upwards in any Kathmandu street reveals that a “spaghetti-bowl” approach to wiring is completely normal.

Fast forward 23 years and Shrestha - who is currently based in Afghanistan with the United Nations - laughs easily about his early days as a development worker trying to create a permanent presence for Canada in Nepal.

“First Secretary Bill Young (based at the Canadian Embassy office in Dehli) was very interested in opening an office in Kathmandu and as I had been working with him for a number of years he put me in charge of setting up the office,” said Shrestha during a brief home visit to Nepal in March 2009 to celebrate his 25th wedding anniversary.

A U of A pin is attached proudly to the lapel of his blazer and Shrestha talks fondly of his time in Edmonton even though he was regularly mistaken for an Indian because not many people knew much about Nepal in the early 1980s when he was on campus.

Shrestha is currently employed as Chief Technical Advisor for the UN’s Learning for Community Empowerment Programme (LCEP), a five-year project aimed at improving functional literacy levels in Afghanistan.

Since 2003 Shrestha has worked in crisis ridden countries on United Nations Human Settlement (UN-HABITTA) projects. His responsibilities in Afghanistan are to integrate literacy and numeracy education, stimulate self help group development for establishing community banking and develop productive



Marc Virequin

skills training. Working in Afghanistan presents formidable challenges, but Shrestha's experience in rural Nepal has prepared him well.

Previous projects with the UN include a major role as UN-HABITAT Program Manager in the rebuilding of Banda Aceh after the 2004 Boxing Day Tsunami that devastated a huge swathe of South Asian coastal countries.

The decision in 2002 to stop working on projects in rural Nepal after 35 years was a tough one for Shrestha. Deeply committed and connected to his country he found the political situation in Nepal had made it almost impossible for him to be effective anymore.

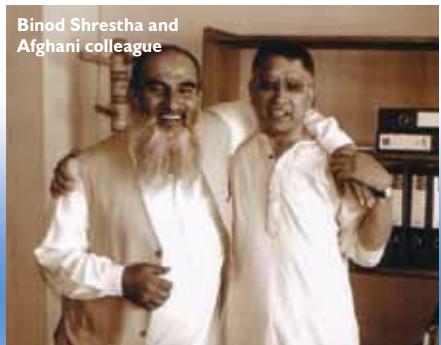
A Maoist rebellion that started seeping through remote rural areas of Nepal in 1996 frustrated and challenged Shrestha's abilities to help those who needed it most.

In 2002 he decided to apply his expertise elsewhere and began working for Concern, an Irish NGO in Sudan, Somalia and Kenya.

To get to this point in his life Shrestha took a somewhat interesting path that involved the sale of a much-loved motorcycle, a soccer game, work at a Jesuit school in Kathmandu, handy contacts, all of which eventually led him in 1983 to the doors of the University of Alberta where he studied geography.

Were it not for a series of unlikely events, Shrestha might have graduated from the U of A two years earlier. Instead he first began his life as a rural development expert in 1979 after working as an assistant to the principal of Kathmandu's esteemed St. Xavier School.

Binod Shrestha and Afghani colleague



His first contact with the U of A came in the late 1970s when he was hired as an assistant by Dr Peter Apedaile, a professor in Rural Economy who initiated the Karnali Bheri Integrated Rural Development Project.

"After being offered the job I was on a plane to Surkhet (in mid-Western Nepal) the next day and began to work on this CIDA funded project," he said. So began his long association with Canada.

The work Shrestha and the team did to improve rural development in this most remote part of the country commanded significant respect from scholars, academics and activists in Nepal and became something of a benchmark for projects of this nature.

Shrestha eventually convinced his employers, CIDA that he should go back to university and in 1983 he entered the Faculty of Science Masters Program. His dissertation looked at the impact of grazing on erosion, a proposition that had received little attention in Nepal because everyone was pointing the finger at deforestation.

The time at the U of A also provided Shrestha with a unique opportunity to meet fellow science graduate Dr Helen Huston who just happened to be the person who delivered him into this world.

"I was listening to CBC one day and they were talking about a doctor who had been working in Nepal when King Tribuhvan died in 1955."

"Well that was the time I was born and I had been told I was delivered by a Canadian 'Helen doctor' so I phoned CBC to find out more and from that event I was able to meet her in Edmonton while she was here on a short visit from Nepal," he said with a smile.

Shrestha retains strong ties with Canada, both his sons are at Canadian universities and when he retires he would love to come back and reconnect with some of his old friends.

But for now his focus is firmly on getting the work done in Afghanistan a formidable but rewarding challenge Shrestha is perfectly suited to.



On January 3 1955 Helen Huston (49 BSc, MD51, 85 LLD (Hon)) received a letter that changed the course of her life.

The request in this letter was straightforward: "We urgently need a doctor to replace Dr Bethel Fleming in the old cholera hospital in Kathmandu. Can you possibly come for three months?"

Less than a month later Dr Huston – who had been based in India as a medical missionary since 1953 – landed in Nepal, then a tiny kingdom of 8.5 million people that had only just been opened to foreigners four years earlier.

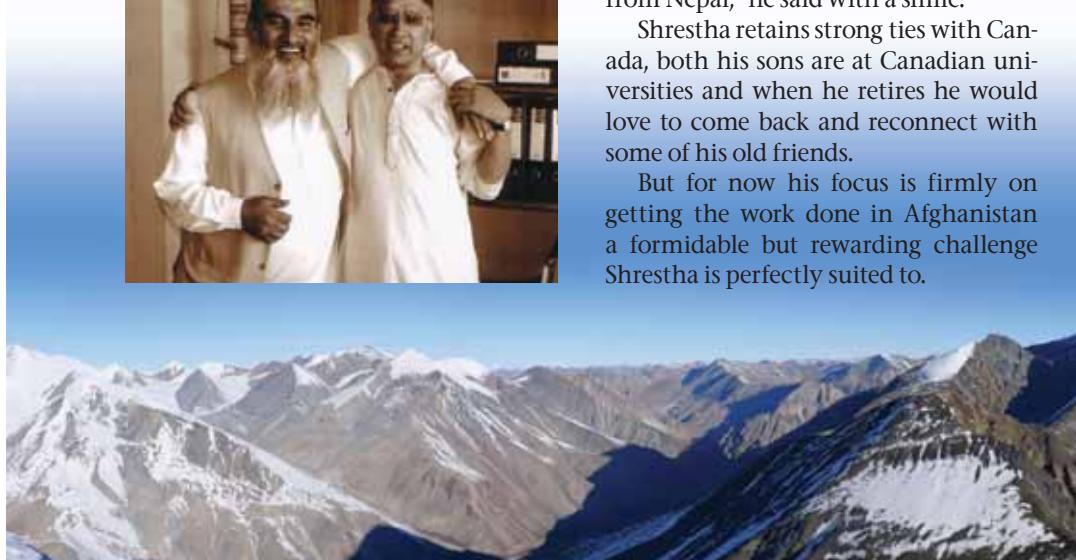
It was during this three month placement that Dr Huston found her calling in life and vowed she would find a way to return to Nepal and help its people. It was also during this time that Binod Shrestha (84 MSc) was born.

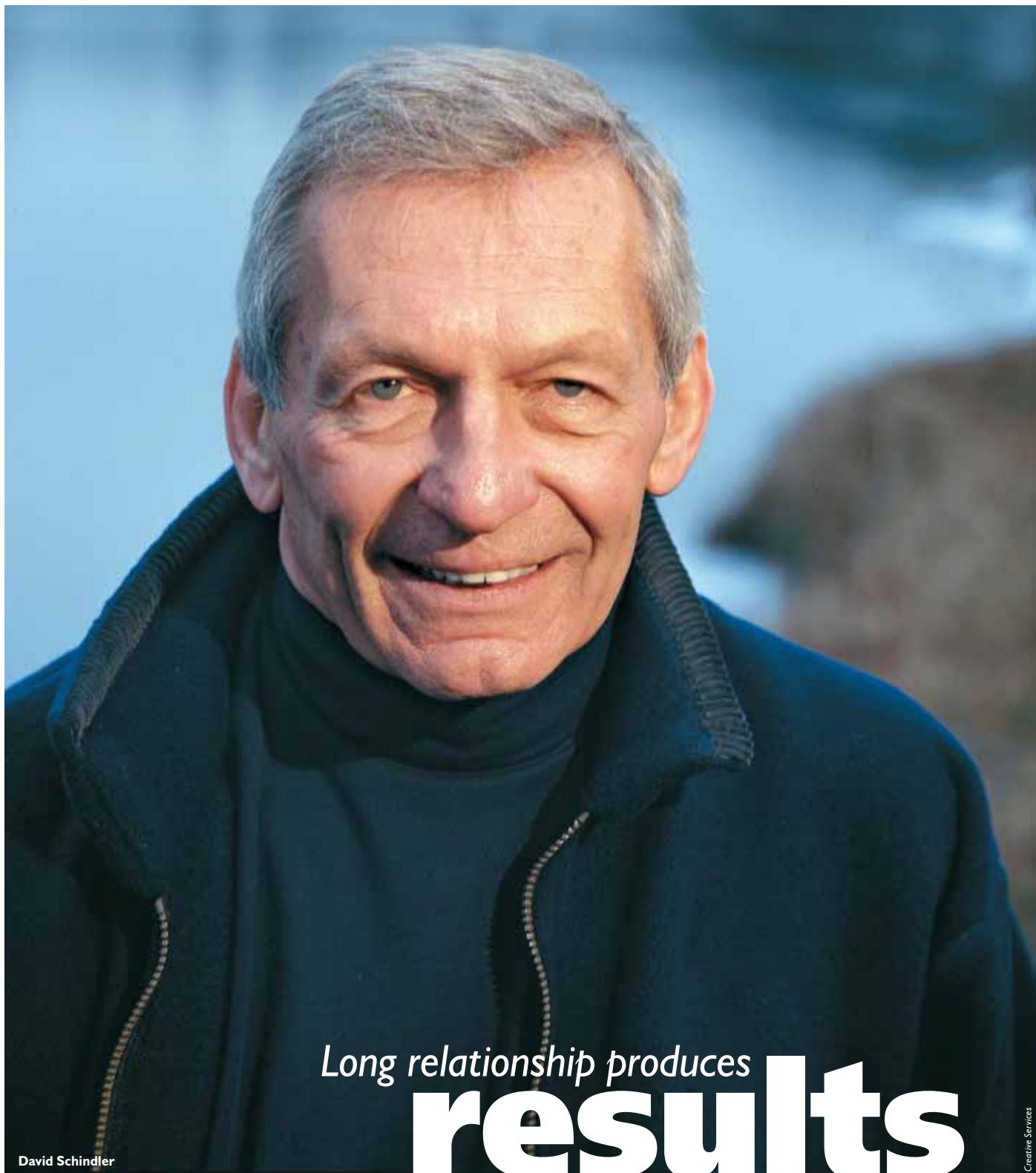
Helen Huston's dream of returning to Nepal to work finally came true in 1960, and for the next 32 years she lived in the tiny village of Amp Pipal in remote central Nepal where she and a team of doctors and Nepali staff established a mission hospital that delivered all manner of medical services.

Working in primitive conditions Dr Huston worked tirelessly to improve the health of poor Nepalese, most of whom had only ever had to deal with traditional healers before she arrived.

In 1991 Dr Huston was the first recipient of the Sir Edmund Hillary Foundation Award for Humanitarian Services for her dedication to Nepal and was also the first person to be given an honorary life membership of the Nepal Medical Association.

Dr Huston, who is a member of the Alberta Order of Excellence, retired in 1992 and returned to Alberta in 1993 and now lives in Edmonton.





David Schindler

Long relationship produces
results
for the public good

Creative Services

For over two decades the University of Alberta's internationally acclaimed environmentalist Dr David Schindler and Canada's Walter and Duncan Gordon Foundation have enjoyed a special relationship.

For almost two decades the University of Alberta's internationally acclaimed environmentalist Dr David Schindler and Canada's Walter and Duncan Gordon Foundation have enjoyed a special relationship.

The timing of their coming together was perfect. Around the same time as the Gordon Foundation begun to focus its attention on more specific areas, Schindler rose to prominence as a scholar promoting science for the public good.

It was also around this time that Schindler joined the University of Alberta. He found himself a concerned academic wishing to challenge some of the polished performances of big industries trying to push through legislation.

In 1989, he was a member of a federal-provincial panel reviewing Alberta Pacific Forest Industries proposed use of the province's resources. "The industry, as I expected, had very polished presentations by high paid consultants," said Schindler. But he says groups critical of the province and the forest industries were out-gunned at public forums. "The public opponents had just abysmal presentations. In my new appointment as the Killam Memorial Chair and Professor of Ecology at the University of Alberta, I decided to try to change that."

The long-term relationship with the Gordon Foundation has enabled Dr Schindler, his students and fellow researchers to play an often vital role in doing science for the public good and most recently, in September 2008, allowed him to continue his studies on the contamination of the Athabasca River from oil sands mining.

"The Gordon Foundation is one of just a handful in Canada that fosters and supports the research needed to collect valuable data that allows for the development of sound and innovative public policy," said Dr Schindler.

"The Foundation occupies a valuable niche and has allowed me to do things, often at short notice, that are critical for making a meaningful and timely contribution to an issue," he said one day after being awarded one of Canada's most

prestigious environmental prizes, the Sandford Fleming award.

The award was presented to him in Toronto in May. It recognises Schindler's efforts to help the Canadian public and the world better understand science. It was awarded by the Royal Canadian Institute for the Advancement of Science. Institute president Roy Pearson said Schindler was "a scientist who is able to bridge the gap between the lab and people."

Previous winners of this award have included David Suzuki and Nobel Prize winner John Polanyi. In an interview conducted after receiving the award, Schindler said the public has a right to know the relevance of publicly-funded research that can affect their lives.

Dr Schindler says his association with the Gordon Foundation and the work they have funded has enabled him contribute effectively to environmental debates and the development of sound public policy.

"There have been times where their funding has allowed us to do research that produces clear evidence at short notice, for example when the issue of mercury pollution at Lake Wa-bamun surfaced," said Dr Schindler.

His first association with the Gordon Foundation came in the early 1990s when he and former Parliamentary Secretary to the Minister of the Environment Karen Kraft-Sloan sought funding to organise scientific information sessions for parliamentarians to discuss water and air pollution issues with prominent Canadian scientists.

"These information sessions were a great success. A few years later people came to me suggesting we work on ways to train more young people to get involved in what I was doing," he said.

"The Gordon Foundation was looking to promote the field of science for public interest and so from this developed our long-standing relationship," he added.

"The people who work for the Gordon Foundation really look ahead. They are sharp people from a variety of backgrounds. While they do not have a great amount of money to distribute, they really know how to make their dollars go a long way," he said.



The Walter and Duncan Gordon Foundation was established in 1965 by Walter Lockhart Gordon, his wife, Elizabeth, and brother, Duncan.

The initial focus of the Foundation was intentionally broad and the letters of incorporation, which govern the Foundation to this day, describe its mandate as "to promote, assist and engage in charitable work throughout Canada." Its particular interests are promoting work with freshwater resources, Canada's north and promoting global citizenship.

Today this independent grant making Foundation is dedicated to the development of sound and innovative public policies. The Foundation has supported initiatives designed to foster new ideas and advance thinking in a variety of policy fields including the economy, politics, health, education and the environment.

The Foundation has also sought to promote public discussion and the testing of new ideas as a means to improve public policy and enhance the well being of Canadians. The Foundation has not promoted particular policy positions or views. Rather, it has sought to inform public policy by ensuring that a broad range of innovative and creative ideas are given encouragement and ample public discussion. This approach to grant making continues to guide the Foundation today.

www.gordonfn.org



Water World

Swimming sensation Michael Phelps once said “Swimming is normal for me. I’m relaxed, I’m comfortable, and I know my surroundings. It’s my home.” Ask Mike Morrow ('70 BSc, '76 MSc) what swimming means to him, and the sentiment is the same.



Chris Kindratchuk

The one thing that may dominate my life more than my university connections is competitive swimming."

And for Morrow, that's saying a lot.

His parents were associated with the university for as long as he can remember - his father pursued a degree in agriculture and was president of the Agriculture Club, and his mother was a nurse at the U of A Hospital. Six of the eight Morrow children graduated from the U of A, and now the next generation is making their way through.

"Counting my parents, siblings, nieces and nephews, we may have close to fifty years and thirteen degrees from there," calculates Morrow.

As for Morrow, he entered the Faculty

of Science in "pursuit of objective knowledge." He majored in physics, and while he remembers most of his undergraduate professors quite well, one in particular stands out.

"The one I remember the best is Frank Weichman, my first year Physics professor," recalls Morrow. "Amazingly, I bumped into him 40 years later when I visited the campus for the 2008 Homecoming."

It was during his undergraduate days that Morrow got serious about swimming. He had started years back when he and his siblings were given a membership to a competitive swim club for Christmas. He swam several years with the local club, but entering university gave him the opportunity to try out for the varsity swim team. He made it, and competed

with the Bears for five years while completing his undergraduate degree.

"My career was modestly successful," he reflects. "I made appearances in two Olympic Trials, the FISU Games in Italy, and the Canada Games."

With his five years of eligibility up as a varsity athlete, Morrow stayed active with the team when he decided to continue his studies. Under the supervision of Edward Lozowski (now a Professor Emeritus, Earth and Atmospheric Sciences), Morrow studied hailstorms and earned an MSc in meteorology.

After almost ten years as a consulting meteorologist, Morrow turned into a computer consultant and now works at the University of Calgary doing system support for Web services.

Morrow's time at the U of A has had a strong and positive influence on his life. Last year during the university's centenary, he decided he wanted to celebrate his time by establishing a scholarship recognizing the two constants in his life - swimming and academics.

Named after a favourite swimming hole in the St. Mary River not far from the small town in Southern Alberta where Morrow spent his younger days, the Steele's Crossing Scholarship recognizes the outstanding academic achievement of a science student who is also a member of the Golden Bears or Pandas swimming team. The first of the awards will be given out next academic year.

Morrow knows the challenges varsity athletes face especially at a large research intensive university such as U of A, and the Steele's Crossing Scholarship is one way to help a present Panda or Bear make his or her time "in the pool" the best it can be.

"I thought the centennial was a good milestone to celebrate," he explains. "It was financially painless to fund the scholarship, and getting it set up went smoothly and pleasantly. May it help those to come."

Still with some competitive fire for swimming, Morrow swims for the Calgary Masters Swim Club. His philosophy for today's students?

"I proposed the following: Apply yourself to your studies, apply yourself to extra-curricular activities, and have fun. You can do any two of them well. You should do two of them."

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