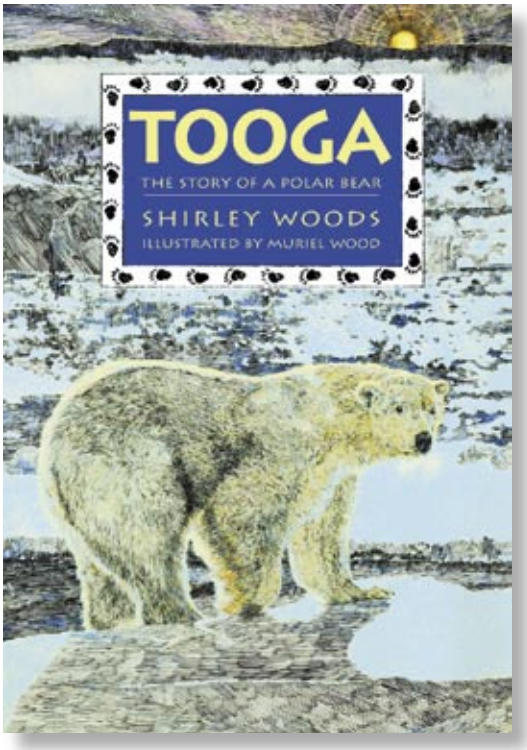
SCIENCE contours
FACULTY OF SCIENCE ALUMNI MAGAZINE
UNIVERSITY OF ALBERTA
VOLUME 14, NO. 2 FALL 2004

Children's author becomes unexpected donor

When Gregory Taylor, Dean of Science, was making his monthly phone calls to recent donors he came across an individual who had directed a sizeable contribution to the Ian Stirling Research Fund, yet had no apparent connection to the Faculty of Science.

"I was curious as to how someone who was not a science alumnus would not only hear about such a specific fund," comments Dean Taylor, "but also choose to make a donation." It turns out there was a unique connection.

When author Shirley Woods sat down to write his latest children's book, *Tooga: The Story of a Polar Bear*, he not only had four months of research behind him but also the ear of the foremost expert on polar bears, Dr Ian Stirling.



Aimed at children ages 8 and up, Tooga is the story of a young male polar bear that heads out on his own to hunt, only to find himself stranded on an ice floe surrounded by water. By the time the floe finds land again, Tooga is hundreds of miles from home and must make his way through unfamiliar terrain and face a new threat, civilization.

"Although the book is a novel I wanted to ensure it was as true to nature as possible," explains Shirley. "To do that I needed to speak to an expert on polar bears, which led me to Dr Stirling."

Dr Ian Stirling, an adjunct professor in the Department of Biological Sciences and a Senior Research Scientist with the Canadian Wildlife Service, has been doing research on polar bears and polar seals for over 35 years. He focuses on ecology, behaviour, evolution, relationships between polar bears and seals, and the conservation and management of polar marine mammals and ecosystems.

"We have never met," notes Shirley, whose home is in Mahone Bay, N.S. "I tracked down his phone number and gave him a call, and from there we exchanged emails. I was amazed that with his workload he was willing to talk with me."

Shirley is not the first writer to contact Dr Stirling. He gets calls and e-mails on a regular basis from writers wanting information on the northern bear, and with so much misinformation out there Dr Stirling is quite willing to provide the facts.

"It may take a bit of time, but I get back to any writer who contacts me. I believe it is the responsibility of every scientist to be involved in public education," notes Dr Stirling.

Asked why he made the donation, Shirley recounts how when he finished the book he got to thinking about the polar bear situation worldwide.

"The more you learn about a species the more you become sympathetic to it; you begin to understand life from the animals' points of view," he notes. "I am concerned about the state of our indigenous animals and wanted to make a contribution to current research aimed at addressing these issues."

Shirley made a projection of what the book might earn, and contributed that amount to the Ian Stirling Research Fund. The money will help support a current collaring project headed up by Dr Andrew Derocher, a professor in biological sciences and former PhD student of Dr Stirling's. The project will examine how the retreat of northern ice cover, caused by climate change, is affecting the movement and possible survival of polar bears.

"I am hoping children will learn about our indigenous animals while they are young," explains Shirley, "and be sympathetic to the issues as they grow up."

INSIDE

MESSAGE FROM THE DEAN

Hello!

Once again it has been a busy fall here in the Faculty of Science. Enrolment was up again this year, with a total of 6247 undergraduate students and 1028 graduate students.

We have also added a new position within the Dean's Office. The growth of the Faculty over the past 5 years and new demands associated with planning and construction of the Centennial Centre for Interdisciplinary Sciences has expanded the role of Dean. With increased internal and external demands, the decision was made to hire a Vice Dean who could share in the growing responsibilities of the Dean's office.

The job has been taken on by Dr. Duane Szafron (Computing Science), who has signed up for a 3-year term as Vice Dean. In this new position, Duane will be taking on much of the internal academic workload, leaving me to concentrate on expanding the Faculty's profile within government and industry.

It will also give me a chance to get out and touch base with alumni across North America. We had a great turnout at Reunion Weekend in October here at the University of Alberta, and in late November we will be hosting our second Edmonton alumni event. Please see the back of Contours for further details.

As you will see below, the Centennial Centre for Interdisciplinary Science is moving along. You can keep up to date with the progress of the CCIS through our construction WebCam, found at www.science.ualberta.ca.

All the best to you and your families in the upcoming holidays. See you in the new year!

Gregory Taylor
Dean of Science

Centennial Centre for Interdisciplinary Science (CCIS)

Despite the recent snow, progress is being made on Phase 1 of CCIS. We are now in the process of selecting our architectural consultants and our engineering sub-consultants for Phase 2 of the project, with full scale planning about to begin.

Doug Hagen, Stuart Olson site superintendent (L), Dean Taylor

Dennis Hall has been on a winning streak. The chemistry professor has received three prestigious awards over the past year, a testament to the outstanding research he and his team conduct.

"It's been a good year," he says, smiling.

In 2003 he received the Petro-Canada Young Innovator Award, followed later that year with the AstraZeneca Award in Chemistry.

"It was a surprise," Dr Hall commented of the industry award. "I was contacted by Dr Mirek Tomaszewski, the Associate Director of Chemistry for AstraZeneca, and he informed me I was the first recipient of the award in Canada."

The award, which carries with it $50,000 a year for two years, is aimed at fostering continued growth and development within research programs and supports excellence in chemistry across Canada.

"Dennis received the award for his outstanding contributions to the field of organoboron chemistry and solid-phase organic synthesis", commented Dr Tomaszewski.

Most recently, Dr Hall received the Martha Cook Piper Research Prize, which is awarded to recognize faculty members who are at the early stage of their careers, enjoy a reputation for original research, and show outstanding promise as researchers.

Dennis Hall

"Receiving the Piper Prize was a different feeling," explains Hall, "but it was also a pleasant surprise because I was compared to all the outstanding young researchers of all disciplines across campus."

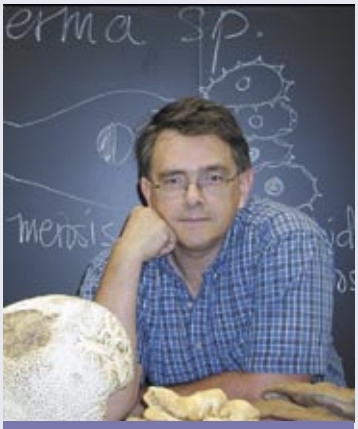
Dr Hall's research team focuses on synthetic organoboron methodology and combinatorial chemistry, fields that are showing increasing importance in biotechnology and pharmaceutical research. Combinatorial chemistry concentrates on developing new methods and techniques to synthesize and evaluate large pools of compounds, called libraries, with ease and rapidity.

There are many reasons for doing so, explains Dr Hall, from creating molecules with specific characteristics to developing new reactions that in turn could lead to new ways to access thousands of molecules that are currently unknown.

One highlight of synthetic organic chemistry is the overlap between fundamental and applied research. As a fundamental scientist Dr Hall can see the potential applications his research may have in the future.

"This research may have a long term influence on drug development", he explains, where discovering new tools to transform molecules is key. Hall has had success in this area, having developed the first solid support for boronic acid, which could be used to facilitate the synthesis of drug intermediates. Current research into polyboronic acids may lead to the discovery of molecules that can bind to sugars and accurately measure glucose concentrations under physiological conditions, a discovery that would aid in the development of new tools for diabetics.

Dedicated teacher and alumnus honoured



Randy Currah

For Dr Randy Currah ('79 MSc, '84 PhD), teaching is an integral part of his university life. And he's good at it. So good that he has earned the University of Alberta's Vargo Distinguished Teaching Chair, which honours U of A professors who combine excellence and a passion for teaching with an established record of substantive research.

"It is great to be recognized," the biological sciences professor explains. "I have sat on various UTA awards committees and it is impressive to see the quality of teaching at the U of A."

One key to Dr Currah's success is his ability to learn each of his students' names, whether in a graduate class of 10 or an undergraduate class of 200.

"We are all creatures of habit," he explains, "and for the most part students sit in the same spot, or at least the same area, each class."

Dr Currah passes around a seating chart asking students to write down their name and takes it home to study. Each class he tackles one section, putting names to faces, and by the end of the semester he pretty much has it down.

"I find it easier to break up a large class into individuals, it makes it easer to teach. Plus," he adds with a smile, "they seem to pay more attention when they think I might call on them by name."

There is no shortage of outstanding University of Alberta alumni, and every fall the U of A kicks off alumni weekend by recognizing these individuals. This year, three Faculty of Science alumni were honoured.

Distinguished Alumni Award

– recognizing the truly outstanding accomplishments of living U of A alumni who have earned national and international prominence as a result of their achievements.

Margaret-Ann Armour, 1970 PhD

Step foot on campus and you are likely to hear the name Dr Margaret-Ann Armour. For more than 20 years Dr Armour, Canada's premier ambassador of science, has volunteered tirelessly to encourage girls and young women to consider careers in the sciences and engineering through the creation and nurturing of a series of initiatives under an umbrella organization called WISEST (Women in Scholarship, Engineering, Science and Technology).

Margaret-Ann Armour

Dr. Armour has made an indelible mark at the University of Alberta, serving as supervisor of the undergraduate organic chemistry laboratories, Assistant Chair of the Department of Chemistry, and Vice-Chair and Convenor of WISEST. In addition, she chairs the Department of Chemistry Safety Committee and is a member of the American Chemical Society, the American Association for the Advancement of Science and the New York Academy of Sciences, and in 1989 was elected a Fellow of the Chemical Institute of Canada.

Her accolades are numerous, including the international *American Chemical Society Award for Encouraging Women into Careers in the Chemical Sciences* (2004); the *Gordin Kaplan Award of the Canadian Federation of Biological Sciences* (2003); the *Governor General's Award in Commemoration of the Persons Case* (2002); *Sarah Shorten Award* from the Canadian Association of University Teachers (2001); named by Maclean's Magazine as one of *10 Outstanding Canadians* in the national magazine's Honour Roll (2003); and most recently she was named to the *100 Edmontonians of the Century* (2004) list, recognizing the significant contributions made to the development of the Edmonton community.

Alumni Honour Award

– recognizing the significant contributions made over a number of years by University of Alberta alumni in their local communities and beyond.

Alison Jones, 1985 BSc

Ms Jones graduated from the University of Alberta in 1985 with a Bachelor of Science (Honours Geology). With a major in geology, she wasted no time in becoming a major player in the growing oil and gas sector in Alberta, specializing in evaluating prospects in central and northern Alberta.

Alison Jones

Ms Jones joined forces with two other University of Alberta alumni, Donald Archibald (B.Com, '82) and Howard Crone (BSc. Chem. Eng. '84), to co-found Cypress Energy Inc. Cypress successfully acquired, explored, developed, exploited and produced petroleum and natural gas in Canada. As vice-president of exploration, Ms Jones focused the company's exploration and development activity in three core areas in central and southern Alberta, with additional exploration prospects in the Peace River Arch area of northern Alberta.

Success was almost immediate and the company grew quickly, garnering the attention of not only the national oil and gas industry, but the national business community as well. Ms Jones, along with Cypress co-founders Donald Archibald and Howard Crone, was named to Canada's Top 40 under 40 in 1999 by the Globe and Mail's Report on Business.

In 2001, Cypress Energy was sold to Prime West Energy to form Cequel Energy Inc., and in July of 2004 Cequel merged with Progress Energy to form Progress Energy Trust.

Ronald Bercov, 1959 BSc

Dr Bercov has served the U of A for 41 years, five as associate vice-president (academic) and three with the Board of Governors. He was president of the Canadian Association of University Teachers and vice-president of the Canadian mathematics Society and editor of its bulletin. He was also chair of the Alberta Universities Pension Board. A university, college, high school, and wheelchair basketball official, he has refereed three national championship tournaments and four wheelchair basketball nationals. In 2002, he received the Canadian Association of Basketball Officials Wink Willox Award for improving officiating in Alberta.

Ronald Bercov

Science Alumnus to receive Honorary Degree

Dr C. Richard Harington will receive an honorary degree at the fall convocation ceremonies, held on Wednesday, November 17.

A distinguished graduate of the University of Alberta, Dr Harington is a pioneer and leader in the study of Canadian ice age vertebrate fossils and their environments. His research has assisted in both the interpretation of human activities in the past and the prediction of future climatic change.

Dr C. Richard Harinton

Dr Harington is Curator Emeritus of Quarternary Zoology and Research Associate at the Canadian Museum of Nature, as well as Adjunct Professor of Earth Sciences at the University of Waterloo. He planned and directed the National Museum of Natural Sciences Climatic Change Project, the first long-term multidisciplinary program on climatic change in Canada covering the last 20,000 years. With the help of First Nations peoples as well as individual farmers, geologists, and museum professionals across Canada, he expanded the national collection of Canadian ice age vertebrates from under 100 specimens in 1965 to over 40,000 today. The collection is now one of the finest in North America.

During his work with the Canadian Wildlife Service, Dr Harington pioneered the study of polar bear denning ecology and represented Canada and the International Union for the Conservation of Nature at the First International Scientific Meeting on the Polar Bear. He chaired the National Museum of Natural Sciences Publications Committee and served on the Editorial Advisory Committee of Canadian Geographic. Dr Harington received the Massey Medal in 1987, and is a fellow of both the Royal Geographical Society and the Arctic Institute of North America.

Dr Harington now lives in Gloucester, Ontario. He has done an outstanding and enthusiastic job of bringing the world of ice age mammals to the attention of the Canadian public.

U of A to host major northern research secretariat

More than $1 million has been awarded to the University of Alberta to host the Canadian International Polar Year Secretariat, an initiative vital to northern research.

The $1.2-million secretariat will provide leadership and support for Canada's participation in the next International Polar Year (IPY), which takes place in 2007-08.

"I can't imagine a better place for this to be housed," said Deputy Prime Minister Anne McLellan, who made the announcement in September. "The Government of Canada's support for these efforts is recognition of the university's expertise and the importance of research in the North.

"International Polar Year gives us the opportunity to reflect further on our presence as a northern nation, and what we need to work on as a nation (as it relates to) our polar existence. So much good work can be done," added McLellan.

International Polar Year in 2007-08 will be an intense, internationally co-ordinated campaign of research that will initiate a new era in polar science. The projected global IPY research budget is expected to exceed $1 billion, with about 100 countries participating..

Research in both polar regions will be conducted and it will recognize the strong links these regions have with the rest of the planet, especially their role in controlling global climate. Research programs will cross numerous disciplines, such as cultural, social, health, geophysical and biological studies.

Canadian researchers, including more than 250 U of A faculty and graduate students, are expected to play a major role in conducting innovative Arctic research programs and they will also participate in several Antarctic projects. The university's faculties have been conducting northern research for several years through studies in medicine, science, engineering, forestry and nursing.

Dr David Hik, associate professor in biological sciences and Canada Research Chair in Evolution and Ecology, is the director of the Canadian IPY secretariat.

Since the last IPY in 1957 (the first one was held in 1882, followed by a second in 1932), the North has seen many changes affecting all aspects of life there, and the upcoming event in 2007 allows the world's researchers to review and update what is known about the Earth's coldest climates.

Deputy Prime Minister Anne McLellan, Dr David Hik

"Much of the legacy needs to be renewed," said Dr Hik. The IPY aims to renew government and public interest in the future of the North's potential–economically, environmentally, socially and culturally–and launch a new and vigorous phase in Canadian polar research, he added.

Canada's biggest calculator

Dr Paul Lu, a professor in the Department of Computing Science, recently harnessed the power of 4,000 computers across the country to condense 20 years worth of computing work into 48 hours.

Dubbed the Trellis Project, the national effort helped medical research projects at the University of Calgary and Toronto's Hospital for Sick Children. The 48-hour project created a virtual supercomputer spanning many different universities, with the combined power to tackle problems that would otherwise be too large for one research group or institution.

In this case, the Trellis Project helped a University of Calgary research project headed by Dr Peter Tieleman. He and his research team are trying to understand the way a protein folds on itself. Proper folding is essential for a protein's function. Misfolding can lead to disorders such as Alzheimer's and "mad cow" diseases.

To study this process, they use detailed mathematical models that describe how the atoms in the protein interact. Computer simulations trace the motions of tens of thousands of atoms according to these models, showing in "real time" how a protein might fold.

The Trellis Project also aided a second study at Toronto's Hospital for Sick Children, which is examining the way protons are transported across biological membranes. The phenomenon is considered one of the most important chemical reactions in life. The physical basis for this reaction is difficult to characterize – a high level of molecular detail is required to understand how proton transport arises, and how it is coupled to other reactions.

At the project's peak, Dr Lu had more than 4,000 computers at 19 universities, three research institutions and six high-performance computing consortia working together.

He's as impressed with that achievement as he is with what he calls the "social infrastructure" assembled for the project.

"Our biggest supporters are Computing and Network Services here on campus, and WestGrid (a western Canadian grid computing consortium), and we got really strong support from Quebec and Atlantic Canada."

In November 2002, the Trellis Project set a Canadian milestone when it completed 3.5 years worth of computation in a single day, studying the fundamental properties of chiral molecules, using the first Canadian Internetworked Scientific Supercomputer (CISS) with 1,376 computers at 16 different partner universities. This is the third such project Dr Lu has piloted.

'Unsung species' ignored on endangered list

The global extinction crisis ignores thousands of affiliated species that are also at risk of being wiped out, making the list of endangered species much larger and more serious than originally thought, says a study produced in part at the University of Alberta.

"What we found is that with the extinction of a bird, or a mammal or a plant, you aren't just necessarily wiping out just one single species," said Dr Heather Proctor of the U of A's Department of Biological Sciences. "We're also allowing all these unsung species to be wiped out as well."

Dr Proctor and a research team led by Lian Pin Koh of the National University of Singapore and Robert Dunn from the University of Tennessee, calculated the expected levels of co-extinction across a diverse selection of host and associate systems. Their research is published in the current edition of the journal, *Science*.

The team first compiled a list of 12,200 plants and animals currently listed as threatened or endangered. They then looked at the diverse selection of insects, mites, fungi and other organisms that are uniquely adapted to the threatened host. The researchers found that at least 200 affiliate species already have historically been lost through co-extinction and that a further 6,300 should be classified as 'co-endangered'.

"What we wanted to learn was, if the host goes extinct, how many other species will go with it," said Dr Proctor. "It would be easy if there were always a one-to-one relationship with a host and its affiliate, however, not all parasites, for example, are restricted to a single host species. The trick was in trying to determine how many other species could act as hosts and factoring that degree of dependence into the study."


Heather Proctor

The researchers believe these processes have been largely overlooked in the past because some of the most susceptible organisms are uncharismatic parasites, but other more popular animals are also at stake.

Dr Proctor cited the example of a host plant vine that became locally extinct in Singapore, taking along with it a species of butterfly, Parantica aspasia, that was dependent on the vine for survival. "When we lose this vine, this beautiful butterfly dies off with it, and we'll never see it again except in photographs at museums," Dr Proctor said. "And when that happens, it can never be recovered."

While this new research has implications for theoreticians who calculate endangered species, the moral issue is even more significant and should suggest more efforts to maintain the original species, said Dr Proctor. The loss of species through co-extinction represents the loss of irreplaceable evolution and co-evolutionary history, say the researchers, and should have immediate implications for local conservation and management decisions.

University

- **Margaret-Ann Armour** *(Chemistry)* – Distinguished Alumni Award
- **Randy Currah** *(Biological Sciences)* – Vargo Distinguished Teaching Chair
- **Dennis Hall** *(Chemistry)* – Martha Cook Piper Research Prize
- **Liang Li** *(Chemistry)* – Killam Annual Professorship
- **Arturo Pianzola** *(Mathematical & Statistical Sciences)* – Killam Annual Professorship

National

- **Margaret-Ann Armour** *(Chemistry)* – 100 Edmontonians of the Century
- **Dennis Hall** *(Chemistry)* – AstraZeneca Award in Chemistry
- **David Hik** *(Biological Sciences)* – Director, Canadian International Polar Year Secretariat
- **Raymond Lemieux** *(posthumously)* – 100 Edmontonians of the Century
- **David Schindler** *(Biological Sciences)* – 100 Edmontonians of the Century
- **Gregory Taylor** *(Biological Sciences)* – Canadian Council of University Biology Chairs Distinguished Scientist Award

International

- **David Bundle** *(Chemistry)* – Claude S. Hudson Award in Carbohydrate Chemistry (American Chemical Association)
- **Subhash Lele** *(Mathematical & Statistical Sciences)* – International Statistical Institute, Member

Entering the alumni ranks

Hundreds of science undergraduate students were joined by family and friends at the annual Faculty of Science Spring Convocation Breakfast held in June. Hosted by the Dean of Science, Gregory Taylor, this year's breakfast featured an inspirational talk by science enthusiast Jay Ingram.

Over 820 science students went on to join the alumni ranks, picking up their Bachelor of Science degree as part of the 2004 University of Alberta Graduating Class. Four Faculty of Science students received an extra honour as they picked up the Faculty's top awards.

Andrew Hammerlindl, an Honors Mathematics student, received the Lieutenant-Governor's Gold Medal, showing the highest distinction in scholarship. His computing science minor came in handy for designing and programming path-finding artificial intelligence for robots, which had to navigate 162 feet of an obstacle course at the Intelligent Ground Vehicle Competition. This feat earned him and his team first place in the GPS Navigation Challenge in 2001 and place second in the Design Challenge in 2002. Andrew is moving on to the University of Toronto in the fall to do a Masters Degree in Mathematics, with hopes of carrying on to a PhD.

This year, in an unprecedented move, the awards committee decided to award the Gold Medal in Science to two deserving recipients.

Courtney Davidson graduated with a specialization in Molecular Genetics. She will be starting her Masters in Genetics at the U of A this fall, and would also like to carry on to do a PhD in the genetics field. Wilson Shieh graduated with a Specialization in Computing Science, with a Business Minor. He was part of the Industrial Internship Program, spending 16-months during his fourth year as a Systems Analyst for Fifth Dimension Information Systems, a company that develops software for the healthcare industry. Wilson's internship went so well the company has hired him on a full time basis.

(L to R) Courtney Davidson, Dean Taylor, Andrew Hammerlindl, Carrie Slatter, Wilson Shieh

Gregory Taylor and Jay Ingram

The Dean's Gold Medal in Science went to Carrie Slatter. Carrie has a Biological Sciences major and Physical Sciences minor, and over the past few years has worked as a summer student and part time assistant in the zoology laboratory. She has published in the Journal of Neurophysiology, and has submitted another article to the Journal of Comparative Neurology. Carrie also takes time to volunteer with the University of Alberta Hospital, a place she will be become even more familiar with in the fall as she enters Medical school.

A highlight of the day was the breakfast keynote, Jay Ingram. Not only is Jay a renowned science broadcaster, writer, co-host and producer of Discovery Channel's award-winning Daily Planet, he also walked across the green and gold stage over 35 years ago to receive his Bachelor of Science degree from the University of Alberta.

"We asked Jay to speak not only because of his broadcasting success and his alumnus status, but also because he embodies the diversity of what a science degree could mean for our graduates," commented Dean Taylor.

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The University of Alberta Alumni Association has more than 50 active branches that extend the boundaries of the University community to the far reaches of the province, the country and the world. Here is a list of upcoming events. For more information please visit the Alumni Association website, www.uofaweb.ualberta.ca/alumni.

Edmonton Faculty of Science Alumni Event, all graduates from 1980 or earlier
Wednesday, November 24, 2004
5:00 – 7:00 PM
Papaschase Room, Faculty Club
Host: Mark Polet, '77 BSc
RSVP: 492-6688 or
e-mail emily.lennstrom@ualberta.ca

Victoria Alumni Christmas Brunch
Saturday, November 27, 2004
11:00 AM
Guest Speaker: Chancellor, Eric Newell

Vancouver Alumni Christmas Brunch
Sunday, November 28, 2004
11:30 AM
Guest Speaker: Chancellor, Eric Newell

Calgary Alumni Reception and Theatre Event
Sunday, November 28, 2004
12:30 PM

Lethbridge Alumni
Tuesday, November 30, 2004
6:30 PM
Guest Speaker: Dennis Shigematsui, Director, Corporate Services, County of Lethbridge

Palo Alto and San Francisco Alumni
U of A Alumni Reception & Alberta Minister of Innovation and Science ExPat Reception
Thursday, January 27, 2005

New York Alumni
Skating and Pasta Party in Central Park
Thursday, February 3, 2005

Phoenix Alumni
Saturday, March 5, 2005
Guest Speaker: President Rod Fraser

Washington, DC Alumni
All Canadian Alumni Dinner
Saturday, April 9, 2005

SCIENCE contours

Science Contours is published twice a year by the Faculty of Science Office to provide current information on the many activities of the Faculty. The newsletter is distributed to alumni and friends of the Faculty.

Publications mail agreement No. 40063605.
Return undeliverable Canadian addresses to:

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