

SCIENCE contours



UNIVERSITY OF
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FACULTY OF SCIENCE ALUMNI MAGAZINE

Faculty of Science catches world-renowned dinosaur hunter

For decades, our fascination with dinosaurs has provided seemingly endless material for movies, books, toys, and video games. Understanding the majestic creatures that once roamed the earth - their make up, habitat, and day-to-day activities - not only provides us with a glimpse into history, but also fuels our imagination. For Dr Philip Currie, the stuff of bones has captured his imagination since a young age.

"I was six years old when I found a plastic dinosaur in a cereal box, and that really started the whole thing off," explains the soon-to-be professor of Biological Sciences at the University of Alberta.

Dr Currie is an expert on meat-eating

dinosaurs, travelling the world to uncover and examine dinosaur fossils. He has excavated feathered dinosaurs in China, Albertosaurus bones in the badlands of central Alberta, and the king of carnivores in Argentina. Most recently, his adventures have taken him to Antarctica.

"There are many areas of the world, especially in Africa and Antarctica, that should produce good dinosaur specimens but still have not been searched," he says. "The next big dinosaur find could come from virtually anywhere, and we are constantly being surprised by what we find."

However, he is quick to point out that it is not only new regions that need to be explored. For example, the feathered dinosaur remains that shook up our understanding of the origin of birds in 1996, were recovered from a fossil site that had been searched constantly since 1930.

Currently the Curator of Dinosaurs at the Royal Tyrrell Museum in Drumheller, Dr Currie will join the Faculty of Science in

October, bringing his expertise and years of experience to a growing team of palaeontologists.

"One of the main reasons I decided to move to the

University of Alberta

is the long history of research in paleontology and its solid reputation with vertebrate paleontologists", comments Dr Currie. The move also gives him an opportunity to con-

tinue his research on the dinosaurs of Alberta in a more academic environment, and have more direct involvement with the training of graduate students.

Because of his familiarity with the enormous and important dinosaur collections at the Museum, he will continue to be associated with Drumheller as a Research Associate of the Tyrrell Museum.

"The Museum collections will provide great material for graduate student projects, an invaluable resource for linking teaching and research," comments Currie, who believes the connection between the two is what makes the difference between a great university and a mediocre one.

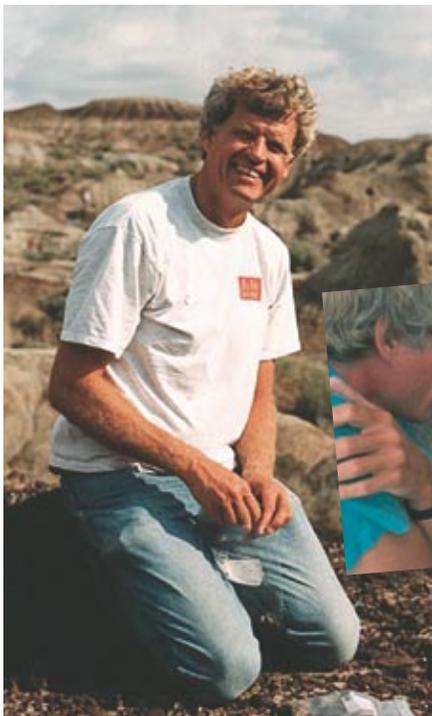
"The international fame of a university is invariably determined by the quantity and quality of the research it produces," he explains. "I feel that teachers who are also active researchers have more depth in what they can say."

Dr Currie will also be on the look out for fossils in and around the Edmonton area. "Although most people consider Drumheller to be the center of the dinosaurian resources of Alberta, few seem to realize that dinosaurs can be collected within the city limits of Edmonton as well."

So keep your eyes peeled.

INSIDE

Message from the Dean	2
CCIS Update	2
Outstanding Partners	3
Outstanding Students	4
Outstanding Support	4
Outstanding Research	5
Outstanding Faculty	6
Awards & Accolades	7
Outstanding Alumni	7
Reunion Weekend	8



Growing Pains

As many of you know, the Faculty of Science has experience unprecedented growth over the past few years. This Faculty's reputation has grown into one of the top Faculty's of Science in the country. Our efforts to recruit and retain top researchers and teachers has been met with great success, and students are clamoring to get in.

Much of our growth has been fueled by our success in research. Our researchers attract funding from a broad array of funding agencies, including NSERC, CIHR, AHFMR, Alberta Ingenuity, and many others. In 2003/04 total sponsored research revenues exceeded \$67.7 million, up \$10.1 million from the previous year. Funding from industry has also increased from \$2.8 million in 2002/03 to \$3.1 million in 2003/04.

Our success in capturing faculty positions from external programs and competitions, including the Canada Research Chairs Program, AHFMR, Alberta Ingenuity, iCORE, ACCESS, and NSERC has provided us with an unprecedented opportunity to shape the future of the Faculty of Science. These visionary new programs have revitalized our Faculty; indeed our faculty compliment has grown by 23% since 1996-97.

In addition to the outstanding researchers we have in this Faculty, we also have outstanding teachers. Finding a balance between teaching, research, publishing, and administrative duties, they have stood out in the minds of those they seek to educate and influence: the students.

All indications show that our student applications for September are up once again. We will make every effort to enroll



as many students as possible, however resources, such as physical space and instructors, are already at capacity. Our flagship initiative, the Centennial Centre for Interdisciplinary Science (CCIS), will address much of this growth in the long term, and is a priority project for the Faculty, the University of Alberta, and the Government of Alberta.

*Gregory Taylor
Dean of Science*

Centennial Centre for Interdisciplinary Science (CCIS) - making progress!



Bringing industry to campus

One of the questions students most frequently ask is: "What am I going to do when I graduate?" Some of this uncertainty stems from not knowing the breadth and scope of career paths available to science graduates. In an effort to provide students with information regarding potential employment fields, the Faculty of Science initiated an Executive Business Seminar Series.

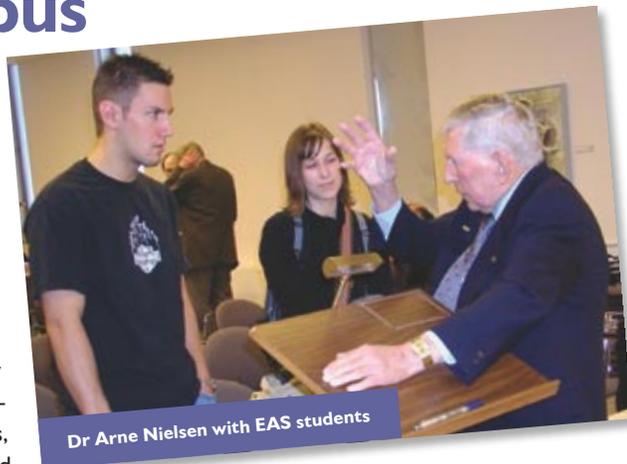
This year, five dynamic individuals spoke to our students about their own career path, illustrating the choices they made along the way and providing advice on how to achieve one's goals.

The series began with Colm O'Carroll, the President and CEO of Epsilon Chemicals, a company that is in the business of solving sanitation problems for the food industry. Next was a presentation by Terry Bayrock, President and CEO of Advanced Mobile Medical Services Inc. AMMS provides specialized medical imaging, medical communications technology and

mobile health care services.

The new year saw Morris Maccagno (BSc '87, MSc '91), Senior Hydrogeologist and Operations Manager from Komex International Ltd Edmonton, discuss his experiences as a junior hydrogeologist working in the field, and how he was able to gradually move into positions with greater responsibility. Rick Wartars, a familiar face on campus, talked about his rise to his current role as Vice-President of Exploration (North) for Burlington Resources Canada Ltd.

The series wrapped up with a true pioneer in the oil and gas industry. A geologist for over 60 years and most notably known for discovering the Pembina oilfield, Dr Arne Nielsen (BSc '49, MSc '50, Hon LLD '00), shared his experiences growing up on a farm near Standard, Alberta, his



Dr Arne Nielsen with EAS students

search for oil throughout North America, and most recently, starting up Shiningbank Energy Management Inc.

Thank you to all of these individuals, along with past speakers Rod Wartars and Stewart Roth, who are strong supporters of the Faculty of Science and believe in our efforts to increase the linkages between industry and academia.

Prime minister questions researchers on nanotechnology

Prime Minister Paul Martin recently met with some of the world's leading nanotechnology researchers to discuss everything from new diagnostic tests for Mad Cow Disease to the origins of humankind.

Martin said his tour of the University of Alberta-based National Institute for Nanotechnology (NINT) was "very, very interesting." Martin had toured three NINT research labs before sitting down for a roundtable discussion with university and National Research Council researchers and administrators.

Afterwards, Deputy Prime Minister Anne McLellan told reporters that, with the creation of the \$120-million National Research Council facility on its campus, the U of A is home to one of five such facilities in the world.

"This is a place where, it doesn't matter if you are from India or China or Vegreville, this is the place to be," she said.

U of A President Dr Rod Fraser said the conversation with the prime minister covered practical applications of nanotechnol-

ogy, including research being conducted at the U of A that could virtually eliminate the threat of Mad Cow Disease.

"He was really pushing the scientists, asking them what nanotechnology is going to tell us . . . and what is nanotechnology going to contribute to our quality of life," said NINT director Dr Nils Petersen.

Petersen said the prime minister also raised the fact that, while Canada is a world leader in research and nanotechnology today, it needs to consider where it will be positioned 25 years from now, as nations such as India and China expand in scientific capabilities. While the meeting was scheduled to last just 20 minutes, the prime minister apparently became so immersed in the conversation he didn't want to leave. Instead, he extended the conversation another 20 minutes to discuss, in part, questions about the origins of life itself.

"He was asking all sorts of questions," said Dr Bob Wolkow, a U of A physics professor who is also group leader of the molecular scale devices program at NINT.



Dr Bob Wolkow discusses issues of atomic manipulation with Prime Minister Paul Martin and Deputy Prime Minister Anne McLellan.

"He was asking where atoms came from. I told him the atoms he is made of used to be part of a dinosaur, and that gave him pause. I also told him atoms never wear out and that we are working on the ultimate green technology, that we are using the smallest molecules to make things and that those things will consume the smallest amount of energy. He seemed very interested in that."

Wolkow said he was impressed with the prime minister's interest and grasp of science. "He was clearly engaged. He wasn't just walking through the paces, he was acutely interested. It's inspiring and gratifying to know the prime minister is aware of at least the salient issues in leading technologies and that he recognizes we need to invest now to thrive in the future."

Northern Exposure

For Chantal Nixon, spending 16 weeks in Iqaluit, Nunavut was like living in another country.

“I had a more culturally-enriched experience than I’ve ever had in my life,” she recalls. “I was excited to learn everything about traditional Inuit culture and knowledge, but also to observe how these were changing and coexisting with northern development and mining, and southerners living and working in the north.”

Nixon, a PhD student in Earth and Atmospheric Sciences, recently came back from an internship in Iqaluit as part of the inaugural NSERC Northern Student Internship.

She spent her time teaching courses at the Nunavut Arctic College, including an Introduction to Canada’s North course covering the physical Arctic environment (geography, climatology, glaciology, and oceanography) and the biological environment (plant, bird, mammal, fish and insect adaptations to Arctic environments).

“I felt that this was a valuable experience to take advantage of because it is important for young scientists who hope to pursue research careers in the Arctic to

be aware of the values, current and changing attitudes, politics, and culture of northern people, and to develop positive relationships with northern communities and individuals.”

A student with Dr John England (NSERC Northern Chair), Nixon has been traveling to the High Arctic for 5-6 weeks each summer documenting the chronology of growth and decay of the Melville Ice Cap, research that will contribute to a better understanding of western Canadian High Arctic climates and help determine whether known global climatic deteriorations have influenced this region.

“This routine leaves little room, if any, for interaction with Northerners,” she explains.

“The sensitivity and awareness required to develop relationships cannot be gained without spending time living and working with northerners in their home



(L to R) Steven Curley, Chantel Nixon, Andrew Dunford

communities and fostering long-term relationships,” something Nixon gained through the internship program.

Incorporating current research and theory into all the topics covered in lectures, Nixon was able to expose the students to the latest scientific research happening in the Arctic. Two of the students she taught, Steven Curley and Andrew Dunford, were recently in Edmonton for the International Arctic Workshop. Curley will be joining Nixon for a month on Eglinton Island, NWT, as her field assistant.

OUTSTANDING SUPPORT

People make donations to the University for a variety of reasons. For some, it may be to say “thank you” to an institution that provided them with a foundation of knowledge that will be with them throughout their lives. For others, it could be to provide students with financial assistance in an ever-increasing market. For Alexis McGregor, Gwen and George Molnar and others it was in memory of a father, brother and friend who was near and dear.

The *John Ross McGregor Gold Medal in Mathematical and Statistical Sciences Award* honours the former Chair of the Department of Mathematics and Dean of Graduate Studies.

Every two years, a student with superior academic achievement graduating from either the specialization or honours



(L to R) Alexis McGregor, Andy Hammerlindl, and Gwen and George Molnar

program in mathematical or statistical sciences is given the IOK Gold Medal.

The inaugural recipient, Andy Hammerlindl, is no stranger to receiving awards. He received the Faculty of Science Lieutenant-Governor’s Gold Medal last year, showing the highest distinction in scholarship. Andy is now pursuing a Masters degree in mathematics at the University of Toronto, with hopes of carrying on to a Ph.D.

Andy and the McGregor family were recently introduced in an ongoing effort by the Faculty of Science to link donors with the students who benefit from their generosity.

Chemist receives Kaplan Award

Dr David Bundle has earned a reputation as one of the world's most renowned carbohydrate scientists. But he says the best thing he ever did was come to work as a postdoctoral fellow with the late Dr Ray Lemieux, the pioneering chemist who revolutionized the field.

"The best move I ever made was coming to work with Ray," said Bundle, who now holds an endowed research chair named for his mentor and serves as director of the Alberta Ingenuity Centre for Carbohydrate Science.

Bundle has followed a similar career trajectory, bucking conventional wisdom to produce pioneering research which has changed his field of study and which will have implications in immunology and drug and vaccine development.

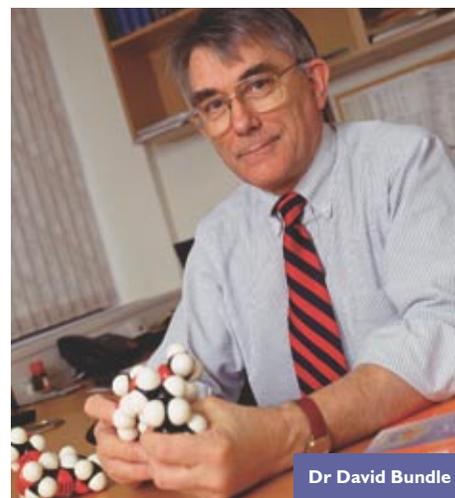
In 2000 Bundle and his colleagues revealed their construction of the synthetic, so-called 'starfish' molecule. The molecule's shape prevents the toxins

from entering and destroying healthy cells. The approach is currently the only viable intravenous treatment to combat E.coli infections.

More recently, Bundle's research group has turned its attention to development of a vaccine against *Candida albicans*, a fungal pathogen that affects immunocompromised patients, all too often with fatal outcomes. Bundle's research team proved that, contrary to common thought, small synthesized *Candida albicans* cell wall fragments appear to be far more effective in evoking an immune response than larger fragments. Until then, many other research teams had been working on the assumption that larger fragments would be more effective.

For his achievements, Bundle has been awarded the J Gordin Kaplan Award for Excellence in Research.

"I knew Gordin Kaplan while I was at the National Research Council and he was



at the University of Ottawa. We were part of a small group that started an Ottawa immunology club. Once, we had the meeting at his home and I recall he asked me my impressions of the U of A when he was offered a position here."

Having known him makes the award "extremely gratifying," he said.

New virtual reality chair to explore frontier of 'telepresence'

The closest many of us have come to imagining virtual reality is the holodeck, a fantasy playground featured on the television series *Star Trek*.

Such flights of fancy are no longer the stuff of science fiction, however. Computer scientists at the U of A have already created technology allowing people to sit across from three-dimensional recreations of each other, even though in reality they may be thousands of miles apart.

It's only the beginning of a revolution in virtual reality technology expected to take us by storm in the next decade or so, says Dr Pierre Boulanger, a U of A computer scientist who received an iCORE/TRLabs Industrial Research Chair worth a total of \$1.7 million to develop his groundbreaking work in collaborative virtual environments.

Imagine a world, for example, where professors of surgery transmit hand and scalpel movements, as well as what they see while operating, thousands of miles across a computer network, where it is recreated in an operating room.

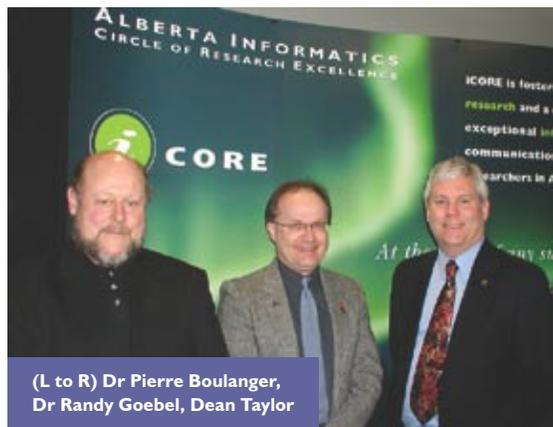
"The student will actually look at that and actually feel what the doctor is doing," said Boulanger. "On the other hand, the doctor can feel what the students are doing and give them a nudge in the right direction...It's like being in virtual residence with doctors."

Boulanger explained how scientists are now able to create

and manipulate a model of the earth's core by feeding computers highly sophisticated mathematical equations. Once recreated in 3D, the average person is fully capable of understanding such complex physical phenomena, he said. "People can actually interact with it, and say, 'What happens if we have that instead of this?'"

"A three-dimensional visual model will allow you to explain complex systems, and understand how the world runs. People understand complex systems because daily life is actually very complex...the new technology is truly human-centred. Computers are smart enough today to adapt to people, and that's really a recent shift in computing."

"From my perspective, an absolutely essential part of Pierre's work on the collaborative virtual environment is described by the word collaborative," said dean of science Gregory Taylor. "It's at the very forefront of what I like to call the new science, interdisciplinary science where the collaborative team becomes the vehicle for discovery."



(L to R) Dr Pierre Boulanger, Dr Randy Goebel, Dean Taylor

The contributions and efforts made by our faculty and staff are what makes the Faculty of Science one of the top faculty's in the country. The faculty has made it a priority to recognize and celebrate those who are making a difference.

Faculty of Science Research Award

This award provides recognition and career enhancement for the Faculty's most outstanding and highly promising young researchers.

Dr Dennis Hall, Chemistry

This year's recipient, Dr Dennis Hall, is no stranger to research awards. The chemistry professor is adding the Faculty of Science Research Award to his long list of accolades that includes the Petro-Canada Young Innovator Award and the Martha Cook Piper Research Prize.

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, 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.



Dean Gregory Taylor, Dr Dennis Hall

Faculty of Science Innovation in Teaching Award

Dr Lois Browne, Chemistry

This year's award for creating an improved teaching and learning environment goes to Dr Browne. As the Coordinator of the Organic Laboratory, Dr Browne was instrumental in developing a way to help students develop hands-on skills while simultaneously acquiring an understanding of the theory behind each practical step as it was being done.

Under her guidance came the development of eleven videos, followed by web-based learning tools on techniques in organic chemistry to help students retain their knowledge of the basic practical skills needed for experimental organic chemistry.



(L to R): Dr Al Meldrum, Dr Gerda de Vries, Dean Gregory Taylor, Dr Lois Browne, Dr Albin Otter

Faculty of Science Service Award

Dr Albin Otter, Chemistry

Dr Otter joined the Department of Chemistry as a Faculty Service Officer in 1998 to meet the department's growing needs in Biomolecular NMR spectroscopy. In August 2002, he assumed the duties as Supervisor of arguably the best University NMR facility in the country.

Dr Otter has been extremely proactive in modernizing the NMR laboratories. He is committed to introducing as many researchers as possible to NMR techniques and has implemented a simple system that permits even the most inexperienced student to use modern sophisticated NMR techniques without needing extensive expertise in the theory of NMR.

Faculty of Science Excellent Teaching Award

The importance of teaching can never be overstated. As such, the Faculty of Science hands out the Excellent Teaching Award to recognize outstanding teaching and acknowledge the key role it plays in allowing the Faculty to attract and develop excellent students.

Dr Al Meldrum, Physics

Dr Meldrum teaches undergraduate and graduate physics. Students consistently comment on his ability to make material interesting while clearly explaining concepts using demonstrations. As one student observed, "his passion for knowledge is contagious!" Dr Meldrum received the Students' Union Recognizing Talented Teaching Award in 2001, and the PetroCanada Young Innovator Award in 2002.

Dr Gerda de Vries, Mathematical & Statistical Sciences

Dr de Vries does not let the large 100 level calculus classes prevent her from teaching each student as if they were in a classroom by themselves. Perhaps the best example of her teaching prowess is the number of students who are not registered in her class but attend it anyway; "she is so popular that people from other lectures fill the room before you can even get a seat, she's that good."

AWARDS & ACCOLADES

University

- **Mike Belosevic** (*Biological Sciences*)
– Killam Award for Excellence in Mentoring
- **David Bundle** (*Chemistry*)
– J Gordin Kaplan Award for Excellence in Research
- **Ruth Butler** (*Dean's Office*)
– Support Staff Recognition Award
- **Laura Deakin** (*Chemistry*)
– William Hardy Alexander Award for Excellence in Sessional Teaching
- **Russell Greiner** (*Computing Science*)
– McCalla Professorship
- **Andrzej Prus-Czarnecki** (*Physics*)
– McCalla Professorship

- **Samuel Shen** (*Mathematical & Statistical Sciences*) – McCalla Professorship
- **Maziar Shirvani** (*Mathematical & Statistical Sciences*)
– Rutherford Award for Excellence in Undergraduate Teaching

National

- **Margaret-Ann Armour** (*Chemistry*)
– Montreal Medal (The Chemical Institute of Canada)
- **Pierre Boulanger** (*Computing Science*)
– iCORE/TRLabs Industrial Research Chair (Collaborative Virtual Environments)
- **David Schindler** (*Biological Sciences*)
– Lifetime Achievement Award (Canadian

Institute for Environmental Law and Policy)

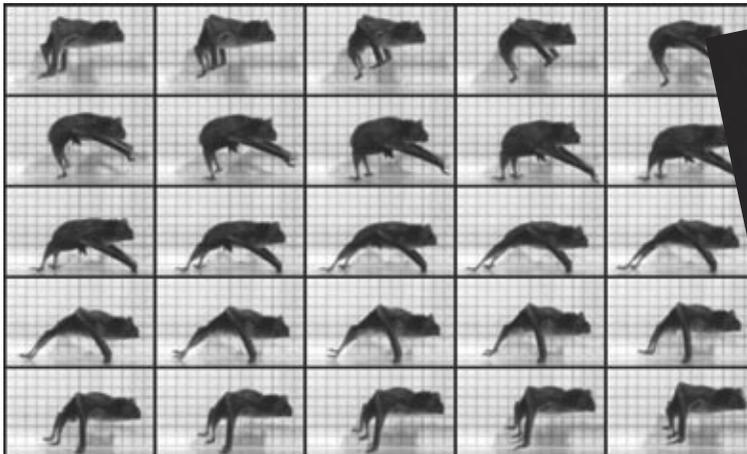
- **Hong Zhang** (*Computing Science*)
– NSERC/iCORE Syncrude/Matrikon Industrial Research Chair (Intelligent Sensing Systems)

International

- **Jillian Buriak** (*Chemistry*)
– The Forum of Young Global Leaders (in partnership with the World Economic Forum)
- **Todd Lowary** (*Chemistry*)
– Horace S Isbell Award of the Division of Carbohydrate Chemistry (American Chemical Society)

OUTSTANDING ALUMNI

U of A's own Batman



A vampire bat using a running gait (*Nature*, March 17, 2005)



Daniel Riskin

Daniel Riskin (BSc '97) is not the famed caped crusader we all know from comic books and movies. Nonetheless, he is truly a bat man. The Cornell PhD is the first to discover that vampire bats can do more than fly; they can also run.

"We set out to see how fast vampire bats move their legs," he explains, "and found that these bats walk the same way terrestrial mammals do. But to our complete surprise the vampire broke into a running gait at high speeds."

Riskin's research made the March issue of *Nature*, and represents the first discovery of a bounding run by a bat. He explains that the gait of a vampire bat is unlike that of any other animal, and interestingly, it is powered by the forelimbs rather than the

hind limbs.

"Most bats are horrible crawlers," Riskin comments. "In general, one could say that the ability to fly puts constraints on the way in which a bat is built that works against the ability to crawl." Yet, he points out, vampire bats are incredibly agile on the ground (so they can sneak up on prey animals to get a meal from them), as well as being able to fly perfectly well. His research goal was to explain how anatomical differences between vampires and the other bats explain the differences in crawling ability.

Riskin's fascination with bats began during his undergraduate days. Born and raised in Edmonton, Riskin was a zoology major at the U of A, studying with Drs Bill

Samuel and Margo Pybus.

"As part of my final project I went through an old folder of unpublished Fish & Wildlife data on bats," he recalls. "There were two years of observations of little brown bats on the sides of buildings around Alberta which resulted in my first publication."

Riskin continued on the bat theme as he completed his MSc with Dr Brock Fenton at York University. He is now part Cornell's College of Veterinary Medicine studying with Dr John Hermanson, associate professor of biomedical sciences.

Riskin is now working on comparing the terrestrial locomotion of the Trinidad vampire bats to the locomotion of a New Zealand bat, which walks well.

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The planning for Reunion 2005 has begun!

Mark September 29th - October 2nd on your calendar and make your way to the U of A for a weekend of alumni activities.

Do you ever wonder what happened to some of your classmates? Is there anyone that you would like to see again? If so, Reunion 2005 may be a great opportunity for you to re-connect with some of your friends and colleagues from your days on campus.

All graduates are invited, and 2005 marks a University of Alberta graduation anniversary for anyone who graduated in a year that ends in a '0' or a '5'.

Check the Alumni Association's website for more details, at www.ualberta.ca/alumni or contact Claudia Wood at claudia.wood@ualberta.ca.

Hope to see you there!



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