UNIVERSITY OF ALBERTA

BUILDING ON STRENGTH

Celebrating Research 2001

In the past five years, the University of Alberta has undertaken an unprecedented level of faculty renewal, having hired almost 500 new faculty since 1996. In the face of such dramatic change, we have never lost sight of our major goal of being internationally recognized for the highest quality of research and teaching.

This document, *Building on Strength : Celebrating Research*, highlights and celebrates many of the accomplishments of our researchers, with particular emphasis on achievements of the last five years. This record shows not only the strength of our renewal program but also demonstrates that the University is well positioned to continue the tremendous growth in research that took place in the 1990s, and even accelerate the pace.

Most of the awards celebrated in these pages are at a national or international level, where achievements have undergone rigorous scrutiny and evaluation by peers. Space limitations allow us to highlight only a few representative researchers in each award category, and we have chosen to introduce them to you informally. To find out more about their particular expertise and research accomplishments, please visit the websites at the addresses provided.

As well as celebrating individual achievement, this document demonstrates the diversity of areas in which excellent research is being conducted at the University of Alberta. Many of the areas are those identified in the companion document, *Areas of Established and Emerging Research Excellence*. As well, researchers are coming to the fore in new areas of growing strength, and there are also respected researchers with international reputations who nevertheless may not have the support of a large research group.

All researchers, students and staff contribute to the vibrant and innovative research environment at the University of Alberta, and we are proud to applaud these achievements.

NSERC EWR STEACIE FELLOWSHIPS, 1996-2001

Steacie Fellowships are awarded to enhance the career development of outstanding and highly promising scientists and engineers who are staff members at Canadian universities and have earned their doctoral degree within the last twelve years. Steacie Fellows are relieved of all teaching and administrative duties for two years, enabling them to devote their full time and energy to research. NSERC awarded four Fellowships annually up to 2000; in 2001, six Fellowships were awarded across Canada. The University of Alberta has the most Steacie Fellowships awarded to any university in the last six years.

Simaan AbouRizk
Civil and Environmental Engineering

Mark Freeman
Physics

Wayne Grover
Electrical and Computer Engineering

Jed Harrison
Chemistry

X Chris Le
Public Health Sciences

Jonathan Schaeffer
Computing Science

Under construction

Dr Simaan AbouRizk got an early start in the construction industry. As a young lad growing up in Lebanon, he helped his father build concrete structures, and dreamed of one day taking over the family business. Fate led him down a slightly different, but related path, to become a civil engineering professor. "I enjoyed teaching and research as much as I enjoyed the construction business," says AbouRizk.. "I settled into a different role than my childhood dream, but I wasn't too far off.

"When I came to the University of Alberta in 1990 our objective was to establish a program in construction research that would be competitive. Here we are now with the best construction programs in North America, and we have plans to be the top in the world."

Simaan AbouRizk
Civil and Environmental Engineering
Steacie Fellowship 2001
www.cem.civil.ualberta.ca/people/prof/abourizk/abourizk.htm

Simaan AbouRizk

NSERC INDUSTRIAL RESEARCH CHAIRS, 1995-2001

Industrial Research Chairs are funded jointly by NSERC and industry. Their purpose is to assist universities build on existing strengths and achieve the critical mass required for a major research thrust in science and engineering applications of interest to industry. The appointments are for five years, and are renewable for another five years if progress is satisfactory and industrial support continues. Chairholders are expected to focus their activities both on research and on training highly qualified personnel; it is expected they will carry a reduced administrative and teaching load. The University of Alberta has the highest number of NSERC Industrial Research Chairs awarded since 1995.

Simaan AbouRizk
Civil and Environmental Engineering

Stanley Boutin
Biological Sciences

Michael Brett
Electrical and Computer Engineering

Weixing Chen
Chemical and Materials Engineering

Fernand Ellyin
Chemical and Materials Engineering

Robert Fedosejevs
Electrical and Computer Engineering

Murray Gray
Chemical and Materials Engineering

Vic Lieffers
Renewable Resources

Jacob Masliyah
Chemical and Materials Engineering

Sirish Shah
Chemical and Materials Engineering

John Shaw
Chemical and Materials Engineering

Planning ahead

With an estimated $50 billion in economic development planned for Alberta in the coming years, Dr Stan Boutin sees a prime opportunity to coordinate environmental planning and sustainable development in Alberta. As the holder of a new chair funded by industry, university and government, Boutin is at the centre of a collaborative effort to minimize the 'industry footprint' on ecosystems.

"In the past there's been a lack of coordination, and costly mistakes have been made such as the building of separate development roads that could have been shared," he explains. "This is the first time there has been an effort among all the industries, especially forestry and oil and gas, to coordinate research and figure out the total environmental costs of development. All the parts are in place now, from scientists to industry to government policymakers, and there's no excuses."

Stanley Boutin
Biological Sciences
NSERC/Al-Pac/ACR Senior Industrial Research Chair in Integrated Landscape Management
www.biology.ualberta.ca/boutin.hp/boutin.html

Stanley Boutin

Turning data into information

There is not much point collecting data unless you actually use it. This is why Dr Sirish Shah is in such high demand. An expert on computer-controlled manufacturing processes, he studies how to take a company's stored data and turn it into information the company can use. The benefits include improved productivity and reduced operating costs.

Case in point: Unexpected disruptions in the chemical process industry alone cost the US economy $20 billion per year. The majority of disruptions are due to simple malfunctions or failure of process equipment. If the available process data is carefully scrutinized while the data is being collected, then many impending problems could be identified before they cause harm or disruption. "The industrial world is currently awash with data," says Shah, the holder of a new chair in computer process control funded by industry, the University and government. "The problem is that companies do not know how to turn it into valuable information."

Sirish Shah
Chemical and Materials Engineering
NSERC/Matrikon/ASRA Senior Industrial Research Chair in Computer Process Control
www.ualberta.ca/~slshah/

Sirish Shah

CANADA RESEARCH CHAIRS

The federal government created the Canada Research Chairs program in 2000 to enable Canadian universities to create outstanding research opportunities that will attract the global research stars of today (Tier 1) and the research stars of tomorrow (Tier 2). A key objective of the program is to enable Canadian universities, and their affiliated research institutes and hospitals, to foster research productivity and enhance their role as world-class centres of excellence. Over a five-year period, the University of Alberta will receive 129 Canada Research Chairs. The list that follows is of those chairholders appointed at the University of Alberta up to September 2001.

Tier 1

Wiktor Adamowicz
Rural Economy

Norman Beaulieu
Electrical and Computer Engineering

George Foxcroft
Agricultural, Food and Nutritional Science

Mark Freeman
Physics

Philip Halloran
Nephrology

Michael James
Biochemistry

Jack Jhamandas
Neurology

Gary Kelly
English

Mark Lewis
Mathematical Sciences and Biological Sciences

Jacob Masliyah
Chemical and Materials Engineering

Richard Rachubinski
Cell Biology

Derek Sayer
Sociology

Brian Sykes
Biochemistry

Nicole Tomczak-Jaegermann
Mathematical Sciences

John Vederas
Chemistry

Roderick Wasylishen
Chemistry

A wireless world

New mobile smart devices, like cell phones that surf the Net, are all the rage. More and more people want one and that's going to be a problem, says wireless researcher Dr Norman Beaulieu.

"Today's wireless technology won't be able to handle the exponential growth in the number of users and the growing bandwidth demand per user," he explains. "RandD is vital."

Beaulieu's particular research interest is interference – the 'waterfall' noise on your digital cell phone that not only disrupts conversations but can wreak havoc with data transmission. He is investigating ways to predict interference, which could then open the possibility of eliminating interference completely.

"The approach is highly mathematical," says Beaulieu. "We believe we can come up with practical solutions, but it's not always true that what you can do mathematically you can do in reality. These are the risks of research…and part of the excitement."

Norman Beaulieu
Electrical and Computer Engineering
Canada Research Chair, Tier 1, and iCORE Chair
www.normb.com

Norman Beaulieu

The politics of language and literature

There's a little bit of Dr Gary Kelly the student in every research project he does. "I was the first generation in my family to get a university education. I came from a single parent home. I couldn't have gone to university if it hadn't been for a student loan."

Kelly traces social changes as they are recorded in writing, from great literature to broadsheets. "Too often, scholars have focused only on 'high culture' as a reflection of a society," he says. "This ends up giving their work the same class-based bias." Kelly prefers to examine the relationships among gender, class, race, and ethnicity.

"My studies opened my eyes to how important language and literature are to understanding who we are and our place in society," he explains. "If I can introduce others to this fascinating area, it's my way of returning the favour of having the opportunity for advanced education."

Gary Kelly
English
Canada Research Chair, Tier 1
www.ualberta.ca/~englishd/kelly.htm

Feeling our way through infinity

It's the bizarre things that happen in infinite-dimensional worlds that fascinate Dr Nicole Tomczak-Jaegermann. Her work is in an area of pure mathematics called Geometric Functional Analysis and Banach space theory. It provides abstract frameworks for use of fundamental tools and structures of mathematics.

"I am interested in studying and connecting phenomena of finite- and infinite-dimensional nature," says Tomczak-Jaegermann. "By the methods I use we are able to detect patterns and regularities which could not be seen otherwise."

It is curiosity – a passion to know – that fuels Tomczak-Jaegermann's efforts to prove theorems that have gone unsolved for decades. Where this work will lead, and what applications it may have, is not known today.

Nicole Tomczak-Jaegermann
Mathematical Sciences
Canada Research Chair, Tier 1
www.math.ualberta.ca/

Beyond the images

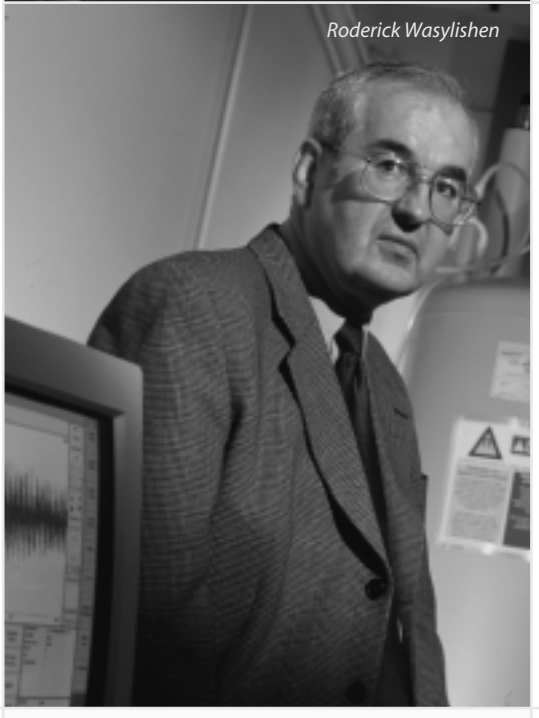
Nuclear magnetic resonance (NMR) is well known in medicine for its ability to produce images of the inside of the body. But imaging is only one application of NMR. The technique is also widely used by chemists such as Dr Roderick Wasylishen. His research focuses on NMR spectroscopy in the investigation of the structure and dynamics of molecules.

"A question that intrigues me is: What is the relationship between what you can measure in an NMR experiment and the three-dimensional structure of molecules?" says Wasylishen. "My goal is to use NMR to 'see' molecules – their shape and how they move. It is the structure of a molecule that ultimately dictates its properties, determining, for example, if it will be a powerful antibiotic or not."

Traditionally, NMR has been used to study liquid samples. Wasylishen and his research group are applying NMR spectroscopy to a range of solid materials including fossil fuels, catalysts, pharmaceuticals and polymers.

Roderick Wasylishen
Chemistry
Canada Research Chair, Tier 1
www.chem.ualberta.ca/facres.htm

Nicole Tomczak-Jaegermann


Roderick Wasylishen

Tier 2

Gwen Allison
Agricultural, Food and Nutritional Science

Sean Caulfield
Art and Design

Brent Davis
Secondary Education

Janet Elliott
Chemical and Materials Engineering

Daniel Kwok
Mechanical Engineering

X Chris Le
Public Health Sciences

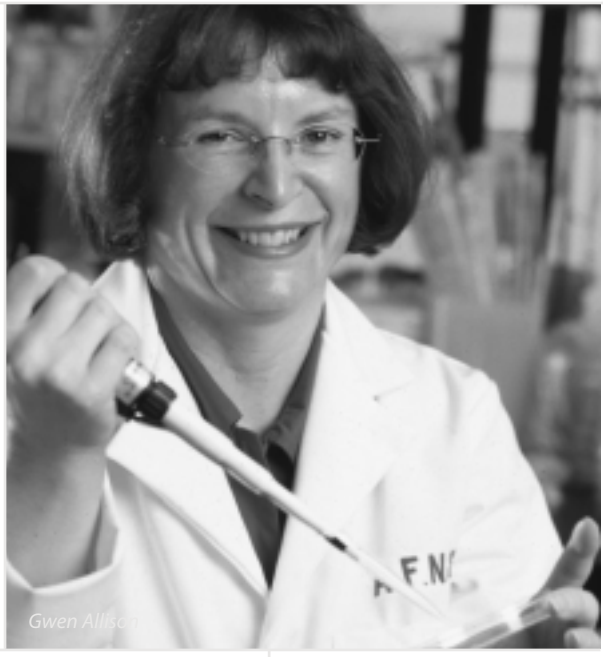
Brian Rowe
Emergency Medicine

Take your bacteria

Mention bacteria, and the first thought for most people is of disease. But not Dr Gwen Allison...she envisions the day when bacteria will be purposely put into our food, perhaps even prescribed as medicine.

Allison is conducting fundamental and applied research into probiotics, bacteriocins and bacteriophages. In her work on probiotics – bacteria taken to enhance health, the opposite of antibiotics which kill bacteria – she is trying to establish clear links between specific bacteria characteristics and their alleged health benefits. Allison's other interests include bacteriocins and bacteriophages, which are bacterial compounds and viruses, respectively, that are harmful or lethal to other bacteria. She is investigating whether these agents can be used for biopreservation of food, or in the battle against multi-drug resistant harmful bacteria.

Gwen Allison
Agricultural, Food and Nutritional Science
Canada Research Chair, Tier 2
www.afns.ualberta.ca/acad/Allison/biograph.htm



Gwen Allison


Sean Caulfield

A passion for printmaking

As the holder of the only Canada Research Chair in fine arts, Sean Caulfield is a name to live up to. Whether silkscreens, etchings or woodcuts, his passion for prints is explored in a visual language that is poetry for the eyes.

Caulfield's appointment is a coup for the University of Alberta, and a boon for printmaking in Canada. For his part, Caulfield is proud to be joining the strong team already in place, and he revels in future challenges. "So much hard work has been invested over the years to create the department's international profile," he says. "While I realize that I'm going to have to take it in new directions, I can't yet say where that will be."

Wherever it is, it is certain to be a fantastic voyage.

Sean Caulfield
Art and Design
Canada Research Chair, Tier 2
www.humanities.ualberta.ca/arts/research/Caulfield.htm

Attacking asthma

As a young doctor training to be an emergency physician, Dr Brian Rowe tended to countless asthma patients. But there were a few who really stood out. "I saw several young patients with severe asthma who had terrible outcomes due to poorly controlled asthma," he recalls. "Those experiences have left a lasting impression on me. Overall, these events are preventable and so our research program is dedicated to improving the care of patients with respiratory problems such as asthma."

Rowe is currently testing his hypothesis that providing asthma medication in the emergency department will improve patients' quality of life. Many patients receive appropriate treatment in emergency departments but do not receive the drugs they need either because their prescriptions are not filled or are not taken correctly.

Adds Rowe: "If our research results help to make patients lives better and physicians feel more comfortable with their treatment approach, then we will have accomplished a great deal."

Brian Rowe
Emergency Medicine
Canada Research Chair, Tier 2
www.chairs.gc.ca/english/profile

Brian Rowe

CANADIAN LANGUAGE AND LITERACY RESEARCH NETWORK

A newly approved Network of Centres of Excellence (NCE), the Canadian Language and Literacy Research Network has been awarded $14.2 million over four years, of which the University of Alberta will receive approximately $6 million to coordinate research on literacy. The University's Centre for Research on Literacy, headed by Dr Linda Phillips of the Department of Elementary Education, will be given nearly $2 million of those funds to work with scholars across Canada in an effort to understand the complex conditions aiding or hindering literacy. Grants of this magnitude are a rare event in the world of social science and humanities research.

Foundation for success

Communication and literacy skills provide the foundation for success in school, at work, and in life. Yet literacy levels in Canada are disturbing. For example, Statistics Canada reports that 25 per cent of Canadians can read only simple printed material. That's why the Canadian Language and Literacy Research Network (CLLRNet) is combining the expertise of researchers across Canada to improve the language and literacy skills of children.

The University of Alberta is playing a key role in this effort. Dr Linda Phillips and her team at the Faculty of Education's Centre for Research on Literacy are coordinating the four-year $1.9 million literacy arm of CLLRNet.

"[The grant] recognizes that in so much of what we do, literacy is fundamental," says Phillips. And yet despite a significant body of research, she says there is still much to be understood about literacy development. "We're looking at it from not just an educational perspective but from medical, health, psychological, social and economic perspectives as well.

"The coming together of minds on this is going to be really exciting."

Linda Phillips
Elementary Education
Director, Centre for Research on Literacy
www.nald.ca/crl.htm


Linda Phillips

SSHRC MAJOR COLLABORATIVE RESEARCH INITIATIVE

Dr Andrzej Weber of the Department of Anthropology heads a research program that is international in scope, innovative, and multi-disciplinary in design. He is the recipient of a $2.4 million grant (over five years) from the Social Sciences and Humanities Research Council of Canada Major Collaborative Research Initiative program. The research will focus on prehistoric hunting-gathering societies of the boreal forest during the Early and Middle Holocene periods in Siberia. This project is one of the most extensive undertakings in the history of boreal archaeology and is expected to produce results of general northern and world-wide anthropological and archaeological significance. An interdisciplinary team of scholars, representing the disciplines of archaeology, physical anthropology, ethnography, geophysics and geochemistry, molecular biology, and spatial and palaeoenvironmental studies, is exploring social, economic and cultural dynamics of prehistoric cultures of the Lake Baikal area in Siberia.

Siberia: Hotbed for anthropology research

Probably not many people would choose to spend their summers in Siberia, but for Dr Andrzej Weber, that's where the action is. Or at least it was 8,000 years ago. He and a team of twenty scholars are studying the cultural and biological dynamics of prehistoric boreal forest hunter-gatherer societies in the Lake Baikal region of Siberia. Weber's project was one of just six research projects across Canada to receive funding in SSHRC's eighth national competition under its Major Collaborative Research Initiatives Program.

Of nearly 1,000 graves found in the Lake Baikal area, human remains from about 400 individuals will be studied. They offer a remarkable glimpse into human history, as Weber explains: "Normally in hunter-gatherer cultures, formal cemeteries weren't developed. But the people around Lake Baikal used formal burial sites as long as 8,000 years ago.

"Now, using state-of-the-art techniques, we can study prehistoric human behaviour at a new level of detail. Each time we do field work in Siberia, we find something different. That's what makes it all so exciting."

Andrzej Weber
Anthropology
Principal Investigator, SSHRC Major Collaborative Research Initiative
www.arts.ualberta.ca/anthropology/index.htm

CANADA FOUNDATION FOR INNOVATION: NEW OPPORTUNITIES AWARDS

The Canada Foundation for Innovation has made funding available for researchers with new university faculty appointments, to assist with start-up infrastructure costs. The following University of Alberta researchers have been successful in the peer review competition for New Opportunities funds since August 1998.

Darryl Adamko
Paediatrics

John Aitchison
Cell Biology

Declan Ali
Biological Sciences

Stephen Archer
Medicine

Christopher Backhouse
Electrical and Computer Engineering

Marie Michele Barry
Medical Microbiology and Immunology

Richard Batycky
Chemical and Materials Engineering

Christian Beaulieu
Biomedical Engineering

David Bennett
Rehabilitation Medicine

Mark Boyce
Biological Sciences

Richard Brachman
Civil and Environmental Engineering

Deborah Burshtyn
Medical Microbiology and Immunology

Shelagh Campbell
Biological Sciences

Joseph Casey
Biological Sciences

K Ming Chan
Medicine

Rajni Chibbar
Laboratory Medicine and Pathology

Phillip Choi
Chemical and Materials Engineering

C Peter Constabel
Biological Sciences

Sandra Davidge
Obstetrics and Gynaecology

Jonathan Dennis
Biological Sciences

Abdulhakem Elezzabi
Electrical and Computer Engineering

Janet Elliott
Chemical and Materials Engineering

Kenneth Froese
Public Health Sciences

Theresa Garvin
Earth and Atmospheric Sciences

Moira Glerum
Medical Genetics

JN Glover
Biochemistry

Gregory Goss
Biological Sciences

Martin Guay
Chemical and Materials Engineering

Joel Haber
Chemistry

Kathleen Hegadoren
Nursing

Frank Hegmann
Physics

Biao Huang
Chemical and Materials Engineering

Pean-Yue Jar
Mechanical Engineering

Andrew Knight
Electrical and Computer Engineering

Paige Lacy
Medicine

Francis Lau
Business

Subhash Lele
Mathematical Sciences

Paul Lu
Computing Science

Michael Macgregor
Computing Science

Katherine Magor
Biological Sciences

Paul Melancon
Cell Biology

Alkiviathes Meldrum
Physics

Evelyn Merrill
Biological Sciences

Evangelos Michelakis
Medicine

Stephen Moore
Agricultural Food and Nutritional Science

Petr Musilek
Electrical and Computer Engineering

Mario Nascimento
Computing Science

Marcel Polikar
Civil and Environmental Engineering

Donald Raboud
Mechanical Engineering

Tracy Raivio
Biological Sciences

Robert Rankin
Physics

Pierre-Nicholas Roy
Chemistry

Arturo Sanchez-Azofeifa
Earth and Atmospheric Sciences

Felix Sperling
Biological Sciences

Colleen St Clair
Biological Sciences

Vincent St Louis
Biological Sciences

David Stuart
Biochemistry

Dwayne Tannant
Civil and Environmental Engineering

Ying Yin Tsui
Electrical and Computer Engineering

Rik Tykwinski
Chemistry

Harissios Vliagoftis
Medicine

Rachel Wevrick
Medical Genetics

Alan Wilman
Biomedical Engineering

Paul Wong
Biological Sciences

Tong Yu
Civil and Environmental Engineering

Osmar Zaiane
Computing Science


Stephen Archer

Making breathing easier

Vascular biology – the study of blood vessels – might seem like a specialty removed from the study of disease. But in fact they're closely related, explains vascular biologist Dr Stephen Archer: "A large number of the diseases that kill people, such as heart attack, stroke and pulmonary hypertension, are related to the health of their blood vessels. My interest, as a cardiologist, in treating these diseases more effectively drives my interest in vascular biology."

Archer is part of a team of physicians and scientists in the University of Alberta's Vascular Biology Group. He studies the mechanisms underlying the regulation of tone and oxygen sensing in blood vessels. One of his projects is investigating how oxygen makes the ductus arteriosus constrict and open. In the fetus, this vessel shunts blood away from the lungs; it should close after birth, but in some infants it does not. Using viruses to transfer genes for proteins called potassium channels, Archer's team is hoping to find a way to close the vessel in babies with this condition.

Stephen Archer
Medicine
CFI New Opportunities
www.ualberta.ca/~cardiorg/archer/sa.html


Kathleen Hegadoren

Women and depression

Dr Kathleen Hegadoren began her career as a nurse specializing in child and adolescent psychiatry. An insatiable curiosity about the brain and how it works led her to a doctorate in neuropsychopharmacology (drugs that affect thought processes in the brain) and neurobiology (the basic biology of the brain). She puts her unique combined background in nursing and basic research to work in the study of depression in women.

Passionate about improving the mental health of women, Hegadoren notes that twice as many women as men are diagnosed with depression. Her research could offer valuable information to help improve therapies specifically for women.

"Men and women are fundamentally, biologically different, she says. "However, most research on lab mice and rats is done on males. The results can be very different in females. We need more research with women so we can be sure drugs are just as effective and safe for women as they are for men."

Kathleen Hegadoren
Nursing
CFI New Opportunities
www.nursing.ualberta.ca/whru


Kathy Magor

Learning from ducks

You probably don't think of ducks when you think of the flu virus, but Dr Kathy Magor does. She studies the evolution of the immune response to pathogens; ducks interest her because they can catch the flu virus, but cannot rid it from their bodies (although it does not make them sick). A similar process occurs with a hepatitis B virus, which ducks carry and is closely related to the virus that infects humans.

By understanding why the duck cannot get rid of influenza or hepatitis viruses, Magor hopes to identify the ways in which these viruses elude our immune defences. "Determining which genes are being switched off could lead to a new approach to fighting the flu and treating hepatitis," she explains. "This is an example of how broadening our fundamental understanding of immunology may result in practical applications."

Kathy Magor
Biological Sciences
CFI New Opportunities
www.biology.ualberta.ca/magork.hp/magork.html

Sifting through the data

Our society collects tremendous amounts of data – business transactions, medical information, satellite images. The list goes on and on. Computer disk space is relatively cheap so we store all these data. But how to find the relevant information, understand it, and then use it in decision making? That's not so easy, says Dr Osmar Zaiane.

"With today's technology, we retrieve information quite well," he explains. "However, decision makers want to very rapidly and efficiently understand the general trends in the data. Knowledge discovery is a process that extracts implicit patterns from very large collections of data. We call this data mining and it is my main research interest.

"I enjoy the challenge of doing research because I like the personal reward of discovering new, more efficient and effective solutions knowing that they can have a significant impact on our everyday life."

Osmar Zaiane
Computing Science
CFI New Opportunities
www.cs.ualberta.ca/~zaiane/


Osmar Zaiane

NSERC DOCTORAL PRIZE FOR 2000-01

NSERC Doctoral Prizes are awarded annually in recognition of high quality research conducted by students completing their doctoral degrees in science and engineering at Canadian universities. Awards are based on the quality of the doctoral research, the student's potential for a research career and the significance of the student's contribution to knowledge, as well as the manner in which the results have been communicated. Four awards are made annually across Canada. Dr Yuri Leontiev, Department of Computing Science, received an NSERC Doctoral Prize in 2000-01.

Getting programs to work together

A book cannot drink water, but it can get wet. This is easy for us humans to understand. But how does a computer know that the expression, "A book drinks," doesn't make sense? This is what Dr Yuri Leontiev's PhD is about: getting different types of systems to work together.

Incompatible systems may make it difficult for programs to work together – just as it is hard for two people speaking different languages to communicate. But it is important that, for example, the program that displays your banking transactions can work with the database program that stores them.

"My research has provided a new way to combine the type of systems used to describe objects and the systems used to describe data in databases," Leontiev explains. "It has taken me years to address this challenge – years of hard but very exciting work."

Yuri Leontiev
NSERC Doctoral Prize
www.cs.ualberta.ca/~yuri/


Yuri Leontiev

J GORDIN KAPLAN AWARD FOR EXCELLENCE IN RESEARCH

The University of Alberta recognizes outstanding research contributions by faculty members through the J Gordin Kaplan Award for Excellence in Research. The award was originated by Gordin Kaplan, the first Vice-President (Research) at the University of Alberta, and was initially known as the University Research Prize; it was renamed in memory of Dr Kaplan on his death in 1988. Two awards are made annually, one to recognize excellence in the general area of the humanities, social sciences, law, education and fine arts, and the second in the general area of sciences and engineering.

1998

ED Blodgett
Modern Languages and Comparative Studies

D Lorne Tyrrell
Medical Microbiology and Immunology

1999

Susan McDaniel
Sociology

David Schindler
Biological Sciences

2000

CR (Bob) Hinings
Organizational Analysis

Nicole Tomczak-Jaegermann
Mathematical Sciences

2001

D Jean Clandinin
Elementary Education

Richard Stein
Physiology

D Jean Clandinin

Richard Stein

Listening to teachers

Dr D Jean Clandinin is shaking up education research by including the opinions and experiences of teachers. Sound strange? Well, before Clandinin and others like her began their pioneering brand of research in education, policies were often designed according to theories that were divorced from the classroom experience.

When Clandinin first started probing the nature of teacher knowledge, it was widely assumed teachers knew only the theory that was learned in teacher education. "We understand teacher's knowledge quite differently now," says Clandinin. "Teacher knowledge is now seen as a complex interaction of a number of factors, as something produced in context."

Clandinin is recognized worldwide as one of the leaders of the 'narrative' revolution – an approach that incorporates the experiences of teachers and others who work in schools into education policy and practice.

D Jean Clandinin
Elementary Education
Kaplan Award 2001
www.education.ualberta.ca/ed/department/L40L14

Helping people move

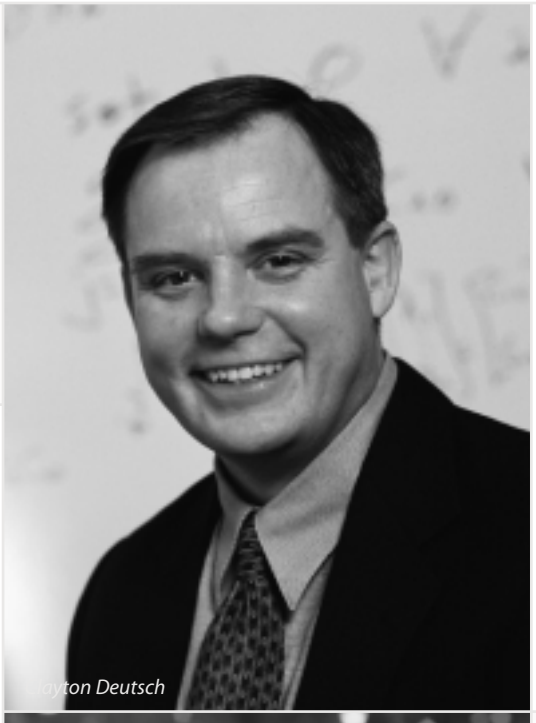
"As with many pursuits, you really only understand how something works when you can fix it after it breaks," says Dr Richard Stein, an expert in the field of neuroscience and how to apply it to help people with impaired mobility. He has devoted much of his forty-year career to the development of leg, arm and hand prostheses that offer better movement capabilities than existing prostheses. One of his current projects is a 'foot drop stimulator' for people who, after a stroke, tend to drag one of their feet when they walk. The WalkAide2 is in multi-centre clinical trials.

"I love research for two reasons," says Stein. "It's exciting to understand things that have never been understood before; and I love the fact that my curiosity in the lab and the research I've done has led to products that help the lives of disabled people."

Richard Stein
Physiology
Kaplan Award 2001
www.ualberta.ca/~ekarpins/stein.html

MARTHA COOK PIPER RESEARCH PRIZE

The Martha Cook Piper Research Prize was established in 1998 to commemorate the significant contribution Dr Piper made to the research community while she was Vice-President (Research) and Vice-President (Research and External Affairs) at the University of Alberta between 1993 and 1996. Since 2000, two prizes have been awarded annually to recognize faculty members who are at the early stages of their careers, who enjoy a reputation for original research, and who show outstanding promise as researchers. One prize is awarded in the sciences and engineering; the other in the general area of the humanities, social sciences, law, education and fine arts.



Clayton Deutsch

Kim Raine

1998

Mark Freeman
Physics

1999

Wayne D Grover
Electrical and Computer Engineering

2000

Timothy Caulfield
Law

X Chris Le
Public Health Sciences

2001

Clayton Deutsch
Civil and Environmental Engineering

Kim Raine
Agricultural, Food and Nutritional Science

KILLAM ANNUAL PROFESSORSHIPS

The Killam Annual Professorships were established in 1991 to give the Izaak Walton and Dorothy Killam Bequest to the University of Alberta appropriate recognition and publicity. The Professorships are awarded based on scholarly activities such as teaching, research, publication, creative activities, presented papers, supervision of graduate students and courses taught, as well as service to the community beyond the University. Recipients are named Killam Annual Professors from 1 July through 30 June.

1998-99

Simaan AbouRizk
Civil and Environmental Engineering

Wiktor Adamowicz
Rural Economy

David Chanasyk
Renewable Resources

Phillip Fedorak
Microbiology

Michael Gibbins
Business

Jonathan Hart
English

Ellie Prepas
Biological Sciences

Nallamuthu Rajaratnam
Civil and Environmental Engineering

1999-2000

Bert Almon
English

Glen Baker
Psychiatry

CR (Bob) Hinings
Business

Edward Knaus
Pharmacy and Pharmaceutical Sciences

Victor Lieffers
Renewable Resources

Debra Shogan
Physical Education and Recreation

Gregory Taylor
Biological Sciences

Nicole Tomczak-Jaegermann
Mathematical Sciences

2000-01

Martin Cowie
Chemistry

Murray Gray
Chemical and Materials Engineering

Susan Hannon
Biological Sciences

Herbert Northcott
Sociology

Linda Pilarski
Oncology

David Sego
Civil and Environmental Engineering

Dick Sobsey
Educational Psychology

Diane Taylor
Medical Microbiology and Immunology

2001-02

Miodrag Belosevic
Biological Sciences

JJ Roger Cheng
Civil and Environmental Engineering

Kerry Courneya
Physical Education and Recreation

Royston Greenwood
Strategic Management and Organization

John-Paul Himka
History and Classics

M Anne Naeth
Renewable Resources

Kumar Nandakumar
Chemical and Materials Engineering

Tom Priestly
Modern Languages and Cultural Studies

Kerry Courneya

Extending the benefits of exercise

Conventional wisdom says that cancer treatment takes a toll on the body that is best dealt with by rest and inactivity. Someone must have forgotten to tell that to Dr Kerry Courneya and his patients.

Courneya runs a unique exercise program for cancer patients eager to stretch and sweat their cancer-treatment side effects away. "We're trying to explode the myth about taking it easy," says Courneya. "We had to show these patients that they were capable of exercising, and that there are benefits to exercise."

Although dedicated to research, Courneya says seeing the results first-hand is more rewarding than simply analyzing the data. "Patients say it [exercise] has changed their lives. They regain a sense of control. It's a great sense of accomplishment."

Kerry Courneya
Physical Education and Recreation
Killam Annual Professor 2001-02
www.per.ualberta.ca/kcourneya/

Back to the land

With all of the resource activity going on in Alberta, Dr Anne Naeth is one busy person. Given her extensive research experience with soils and vegetation in disturbed areas, she is often consulted on reclamation and restoration of disturbed land. Naeth makes a careful distinction between the two. Reclamation is returning disturbed land to productive use and equivalent land capability. Restoration involves returning to the ecosystem that existed before the area was disturbed. "I think we can reclaim almost anything, but I'm not sure we can restore it," Naeth says.

"We talk about restoring land, but we don't always consider how to make it stay that way. I think restoration should be the goal in our national parks. But we are kidding ourselves if we think it's going to be easy. If we're going to restore the land, it entails a whole different vision of how we use parks."

Anne Naeth
Renewable Resources
Killam Annual Professor 2001-02
www.rr.ualberta.ca/Staff/naeth.htm

Anne Naeth

2001 ANDREW STEWART MEMORIAL GRADUATE PRIZE RECIPIENTS

The University of Alberta Andrew Stewart Memorial Graduate Prize is awarded in recognition of excellence at the doctoral level. It recognizes outstanding accomplishment and potential in pursuit of new knowledge. The following doctoral students were awarded Andrew Stewart Memorial Graduate Prizes in 2001.

Patience Akpan
Political Science

Rui Chen
Chemistry

Donna Chovanec
Educational Policy Studies

Judy Davidson
Physical Education and Recreation

Adam Dickinson
English

Kent Fowler
Anthropology

Nicholas Holt
Physical Education and Recreation

Jonathan Holzman
Electrical and Computer Engineering

Cleofe Hurtado
Cell Biology

Marie-Josee Johnston
Sociology

Debbie Kelly
Psychology and Biological Sciences

Kirsten MacLeod
English

Sukdev Manku
Chemistry

Manijeh Mannani
Comparative Literature, Religion, and Film/Media Studies

Henry Midgley
English

Kevin Moran
Chemical and Materials Engineering

Andrew Myles
Chemistry

Srdja Pavlovic
History and Classics

Mateusz Reszka
Mathematical Sciences

Kenneth Stadt
Renewable Resources

Ayako Tsuruta
Music

Merritt Turetsky
Biological Sciences

Jennifer Van Wijngaarden
Chemistry

Meitian Wang
Chemistry

Tarah Wright
Educational Policy Studies

INNOVATIVE RESEARCH CENTRES

The University of Alberta has more than one hundred research centres and institutes. Six of its newer research centres are multi-million dollar investments in innovative, collaborative research enterprises that cross the boundaries between traditional academic disciplines.

The principal researchers in these centres are internationally recognized leaders in their fields. These brilliant scientists attract to their teams promising young researchers who have demonstrated creativity, innovation and leadership, and who are eager to work in an exciting environment where collaboration and state-of-the-art equipment enable dramatic advances in knowledge. In turn, this lively concentration of world-class expertise attracts the best and brightest students, who will become the highly qualified personnel so sought after in today's knowledge economy.

The synergy created within these centres, and their multidisciplinary nature, gives researchers the ability to tackle complex problems from many different angles. More than anything, these outstanding, innovative research centres create an atmosphere that celebrates and nourishes research and researchers.

Alberta Synchrotron Institute (ASI)

The Alberta Synchrotron Institute (ASI) is a not-for-profit partnership of the University of Alberta, the University of Calgary and the University of Lethbridge. It strives to increase synchrotron expertise in Alberta's high tech sector, and it helps Alberta scientists to access and use new synchrotron technologies.

Synchrotrons produce an extremely bright form of electromagnetic radiation ranging from far infrared up to hard x-rays. Applications include chemically mapping microscopic areas of mineral samples, thin films, computer chips, human tissue, and even living cells; discovering the structures of large protein molecules for genomics and proteomics research; and developing new methods in medical imaging, radiotherapeutics, micromachining and nanotechnology.

The ASI also encourages Alberta industries to take advantage of the research and business opportunities presented at the University of Saskatchewan by Canada's new $173.5 million national facility, the Canadian Light Source (CLS) synchrotron. The ASI has a four-year $5.1 million operating budget, funded by the governments of Alberta and Canada. In addition, it administers Alberta-based funding of $9.2 million towards the construction of protein crystallography and X-ray microprobe facilities at the CLS.

Further information on the ASI, the CLS, and research applications of synchrotron radiation is available on the ASI web site at www.asi-cls.ca

Electrical and Computer Engineering Research Facility (ECERF)

The Electrical and Computer Engineering Research Facility (ECERF) is a new seven-storey $33 million building that was completed in August 2001. It provides 16,500 square metres of highly flexible space to house the research activities of the Department of Electrical and Computer Engineering. Highlights of the building include a world-class micro- and nanofabrication facility with over 1,600 square metres of cleanroom and lab space, as well as state-of-the-art research laboratories to enhance activities in such areas as telecommunications, electromagnetics and lasers, power engineering, robotics and systems, computer and software engineering, biomedical engineering, nanotechnology and microfabrication. Synergistically co-located within the building are the headquarters of TRLabs, Canada's largest non-profit telecommunications research consortium, and the start-up facilities of the National Research Council's recently announced $120 million National Institute for Nanotechnology (NINT).

These new facilities will greatly enhance the research activities of the Department of Electrical and Computer Engineering, which already includes

two NSERC Senior Industrial Research Chairs, the first iCORE Chair and two NSERC Steacie Fellows.

Funding for the project is provided by the federal and provincial governments and from significant private donations.

More information about ECERF is available on the web site www.ee.ualberta.ca

Institute for Biomolecular Design (IBD)

The Institute for Biomolecular Design (IBD) is a $25.6 million investment in research on the molecular nature of protein structure and function, or 'proteomics'. Since defects in proteins or their levels of expression account for virtually every known human disease, the research has the potential to dramatically improve quality of life, human health and even the environment.

The IBD is a prototype of multi-level collaboration, combining the research areas of protein structure and function, synthetic bio-organic chemistry, molecular biology, genomics and computer sciences. The current focus of the IBD's research activities is Project CyberCell, a multi-institutional, multi-disciplinary Genome Prairie initiative which aims to quantitatively determine the dynamic and structural nature of cellular processes in E. coli, with the ultimate goal of recreating the living cell computationally. The prospect of examining, controlling and predicting cell physiology *in silico* would establish a revolutionary trend in agriculture, environmental research, medicine and biotechnology. It will expedite the rational design and screening of pharmaceuticals and agriceuticals and will eventually form the basis for logical strategies in environmental risk assessment. IBD is the University of Alberta's contribution to Project CyberCell and the project's management and administrative centre.

The IBD also includes the Proteome Analysis Core Facililty (PACF), which provides comprehensive state-of-the-art technology support for proteomics research at the University, and a DNA microarray facility. Through Project CyberCell and the collaborations that have emerged from the PACF, IBD researchers have developed a range of experimental approaches and formed a number of key partnerships. The result is a research environment that maximizes the rate at which scientific discoveries are made and the ability to link these findings, capitalizes on discoveries quickly, and facilitates the transfer from basic research to medical advances that make important contributions to society as a whole.

IBD receives funding support from the University and federal and Alberta government initiatives.

For more information, see the IBD web site at www.med.ualberta.ca/news/page5

Multimedia Advanced Computational Infrastructure (MACI)

The Multimedia Advanced Computational Infrastructure (MACI) was created in recognition that an advanced communication and computation infrastructure is essential to meet the needs of Canada's expanding knowledge-based economy. Since 1997, MACI has been at the leading edge of computation infrastructure.

MACI is a collaborative project involving more than 100 researchers from the Universities of Alberta, Calgary and Lethbridge. Its goal is to establish and maintain an advanced communication and computing infrastructure that supports the highest quality research in science, engineering and the arts. The infrastructure is available to users in the private sector, all university researchers and government.

Today MACI provides its members with access to advanced computing, high-speed networking and multimedia resources that are at the emerging edge of modern technology. The project supports research in a variety of areas including El Niño climatic effects, broadband telecommunications network simulation, chemical reactions catalyst design, evidence-based health research, artificial intelligence and advanced computer visualization and animation. MACI includes 176 processor Silicon Graphics facilities at the University of Alberta, and 172 processor Compaq Alpha facilities at the University of Calgary with a gigabit connection between them. Because these powerful computation resources often result in very large, unwieldy data sets, advanced multimedia facilities are being developed under the MACI umbrella to enable the visualization of research results.

A $20 million investment, MACI was created with funding from the participating universities and support from federal and provincial government agencies and advanced technology companies.

For more information about MACI, visit the web site www.maci.ca

National High Field NMR Centre (NANUC)

At the core of the National High Field NMR Centre (NANUC) is an 800 MHz NMR spectrometer – one of the largest and most advanced instruments of its kind available in the world today.

The NMR spectrometer enables scientists to determine the complete three-dimensional structure of molecules, and begin to understand their function in biological systems on a molecular

level. This technology allows leading-edge biomedical research that may shorten the drug discovery cycle and lead to the design of new biological and pharmaceutical materials. Such compounds have applications not only in medicine but in the pulp and paper and petroleum industries as well.

Through extensive use of electronic links and shared software, the University has made the expensive, technologically advanced equipment accessible to researchers across the country, so that geographically distant scientists are able to perform experiments that will keep them at the forefront of their areas of expertise in structural biology, biochemistry and chemistry.

The initial $5.8 million investment in NANUC was supported with funding from the federal and Alberta governments.

Further information about NANUC is available on the web site www.nanuc.ca

Positron Emission Tomography Research Centre (PET)

The establishment of a Positron Emission Tomography (PET) Research facility at the Cross Cancer Institute will enable translational research (into diagnosing cancer, predicting treatment response, enhancing radiotherapy treatment planning, and monitoring treatment response) to move rapidly into the field of clinical practice, thereby enhancing significantly the quality of care that can be offered to patients with cancer.

The PET research facility is being established as an extension to the Cross Cancer Institute – the Centre for Biological Imaging and Adaptive Radiotherapy – which will also house the world's first helical tomography radiotherapy unit. The juxtaposition of these two units makes this centre unique in North America, with the tomotherapy unit being the first in the world to be installed.

With the availability of state-of the-art equipment, including two whole-body PET scanners (the only such scanners west of Ontario), together with a cyclotron dedicated to the production of medical radioisotopes, the research facility provides an exceptional environment for enhancing already existing world-class research in nuclear medicine, radiochemistry and radiopharmacy at the University. The research builds on successful programs already in place, including those of an internationally known University of Alberta research group in radiopharmaceutical development.

The goals of the program are to develop novel PET radiotracers that will enable oncologists to more accurately plan, monitor and undertake the treatment of patients with cancer. The PET facility will also establish the first Canadian research group monitoring the clinical and cost effectiveness of new PET technology, and assess the most appropriate ways in which these diagnostic interventions can be used to help manage patients.

This strong research focus, together with close cooperation between the University of Alberta and the Alberta Cancer Board, provides a framework for the development of a Western Canadian collaborative program in PET research. The facility is also expected to become a national training centre for scientists, technicians and technical staff in radiochemistry, radiopharmacy and PET radiopharmaceutical research.

For further information about PET, visit the web site www.ualberta.ca/ExpressNews/news/2000/072600

2001 GERHARD HERZBERG CANADA GOLD MEDAL FOR SCIENCE AND ENGINEERING

Established in 2000 as a millennium project of the Natural Sciences and Engineering Research Council of Canada, the Herzberg Canada Gold Medal for Science and Engineering is named after Gerhard Herzberg, winner of Canada's first Nobel Prize for research in Chemistry. The award guarantees the recipient $1 million in research funding, and is seen as Canada's premier research award.

From among three finalists, David Schindler was named the recipient of the 2001 Herzberg Gold Medal.

David Schindler

FELLOWS OF THE ROYAL SOCIETY (LONDON)

A passion for water

Growing up in northwestern Minnesota, Dr David Schindler had a favourite pastime – spending time at a lake. But in academic pursuits he was advised to take physics, the logic being that a love for the outdoors would not translate into a challenging career.

Schindler has proved that logic wrong. He is one of Canada's best known and most honoured limnologists (a scientist who studies lakes). His findings have spurred major changes in public policy, such as the phosphorus content in detergents and acid emissions into the atmosphere. Currently, one of his major research areas is climate change.

Schindler's impressive academic achievements have served to reinforce something he says he learned as a child at the lake: "We should be cautious with our environment."

David Schindler
Biological Sciences
Fellow, Royal Society (London)
www.biology.ualberta.ca/schindler.hp/schindle.html

Brian Sykes

The building blocks of life

Dr Brian Sykes believes in protein. But not the kind in your diet. Sykes' specialization is the proteins that make up the thin filaments in skeletal and cardiac muscle. They regulate things like heart contraction.

One of his projects has been to unravel the calcium-binding mechanism that regulates muscle contraction. The impact of the research should help scientists understand how calcium-sensitizer drugs interact with cardiac proteins. Where will this lead? Sykes and other researchers hope to eventually design drugs to inhibit or regulate protein activity in the body, providing next-generation medical treatments.

"Understanding more about proteins is central to understanding biological functions," he says. "Proteins catalyze the reactions, they move the muscles. Proteins are vital to life."

Brian Sykes
Biochemistry
Fellow, Royal Society (London)
www.biochem.ualberta.ca/Biochem/Faculty/Sykes/Sykes.html

Werner Israel*
Physics

Michael James
Biochemistry

Raymond Lemieux†
Chemistry

Brian Sykes
Biochemistry

David Schindler
Biological Sciences

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Comparative Literature and Film Studies

Patricia Clements
English

Jagannath Das*
Educational Psychology

Patricia Demers
English

Milan Dimic*
Comparative Literature and Film Studies

Vincent Di Lollo*
Psychology

Duncan Fishwick*
Classics

Leslie Green*
Political Science

Isobel Grundy
English

CR (Bob) Hinings
Organizational Analysis

William Jones*
History

Gary Kelly
English

John King-Farlow*
Philosophy

Leszek Kosinski*
Geography

Karol Krótki*
Sociology

Susan McDaniel
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English

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English

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English

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History

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Hiroomi Umezawa†
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Dennis Vance
Biochemistry

John Vederas
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Biological Sciences

Alfred Weiss
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Ernest Ingles
Learning Systems

** Now Professor Emeritus*
† Deceased

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