THE UNIVERSITY OF BRITISH COLUMBIA

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UBC REPORTS

2 UBC in the News 3 College Days 4 New Life Sciences Institute 9 Celebrate Research 12 Defence in Depth

Implantable Medical Devices Promise Better Life

Tiny gadgets could spare diabetes patients the pain of pricking fingers. BY BRIAN LIN

A UBC mechanical engineer is embarking on a multi-disciplinary project that could spare diabetes patients from ever pricking their fingers again.

For decades, diabetes patients have been drawing small amounts of blood regularly in order to monitor their glucose level, a procedure that is often painful and can be particularly tough on children or the elderly.

Now Mu Chiao, an assistant professor in the Faculty of Applied Science and Canada Research Chair in MicroElectro-Mechanical Systems (MEMS), has set his sights on creating a tiny, implantable device that could be used to monitor chemical levels such as glucose in diabetes patients or deliver regular doses of medication such as hormones from inside the body.

At no larger than 2 millimetres, these tiny chips would come fully equipped with highly sensitive screening and distribution mechanisms, and their own power source, all wrapped in material that prevents rejection by the body.

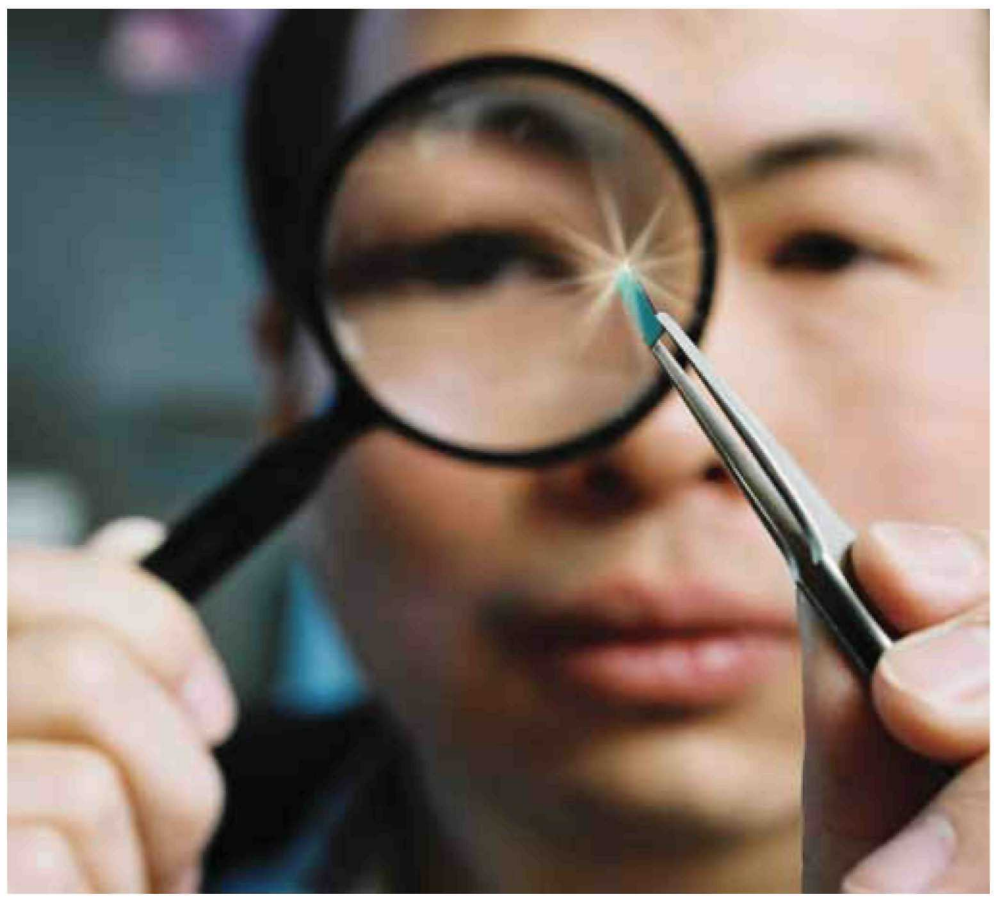


PHOTO: MARTIN DEE

Prof. Mu Chiao is working with a wide range of scientists to develop biosensors and monitoring devices.

In fact, some of them would be so inconspicuous that they could be left in the body once they've accomplished their missions.

Originally from the southern Taiwanese port city of Tainan, Chiao was trained in the Sensor and Actuator Center at University of California, Berkeley, a hotbed for MEMS and nano-technology research.

One of the hottest areas of mechanical engineering, MEMS technology has been used to make sensing devices that control airbag deployment in cars and switching devices in optical telecommunications cables.

For Mu, however, bio-medical applications of MEMS have a stronger attraction.

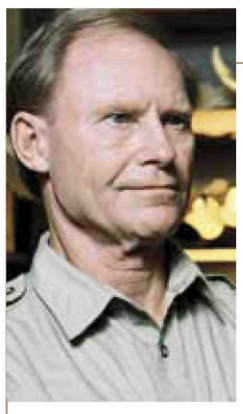
"I want to make a positive impact on people's daily lives," says Chiao, whose research could mean fewer physician visits and a better quality of life for patients with chronic diseases.

Chiao has already pioneered a tech-

continued on page 8

Saving the Serengeti

Anthony Sinclair's 40-year study of animal populations in African parks has helped define biodiversity science. BY HILARY THOMSON



As past director of UBC's Biodiversity Research Centre, Anthony Sinclair helped shape the vision for the new interdisciplinary Beaty Biodiversity Research Centre announced on January 31 under current director Prof. Dolph Schluter, Canada Research Chair in Evolutionary Biology.

It all started with dung beetles.

As a child in Africa, UBC zoologist Anthony Sinclair admired and collected the humble insect, marking the start of a career that has spanned four decades, three continents and earned Sinclair membership in the Royal Society of London, an academy of the world's most eminent researchers.

A world expert in ecosystem dynamics, biodiversity and conservation biology, Sinclair has conducted experiments in areas ranging from Australia and New Zealand to the Yukon, but most of his work has focused on the Serengeti region of Tanzania, in eastern Africa. His latest work, recently published in Science, concerns population dynamics of Serengeti lions.

Born and raised in Zambia, Sinclair's earliest memories revolve around time spent as an intrepid investigator of bugs, birds and mammals. He soon learned to mix caution with curiosity, however, after meeting a leopard during a night-time foray at age eight.

Educated in Tanzania and fluent in Swahili, Sinclair was sent to secondary school in England – at that time a three-day plane journey away. He originally studied to be an engineer but by his own admission was an indifferent student.

All that changed when he decided to follow his heart and become a biologist.

"It was just like pushing a button," says the 61-year-old. "I roared ahead."

An apt description, indeed. After earning a PhD at Oxford University, Sinclair has conducted 40 years of landmark research that has helped define biodiversity science and made him one of the world's most-cited investigators in the field of environment and ecology.

But to hear Sinclair tell it, his career has mostly turned on luck.

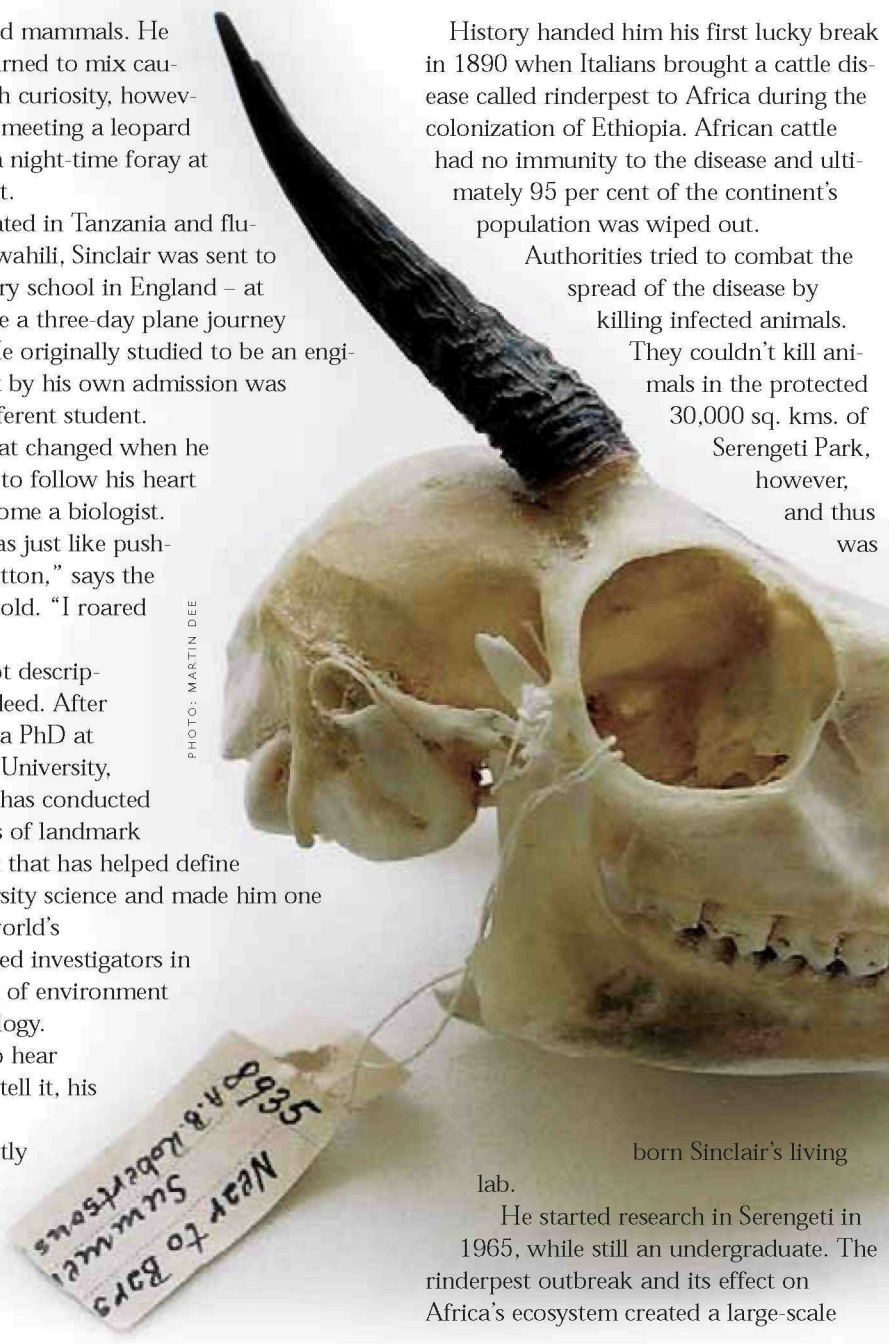


PHOTO: MARTIN DEE

History handed him his first lucky break in 1890 when Italians brought a cattle disease called rinderpest to Africa during the colonization of Ethiopia. African cattle had no immunity to the disease and ultimately 95 per cent of the continent's population was wiped out.

Authorities tried to combat the spread of the disease by killing infected animals.

They couldn't kill animals in the protected 30,000 sq. kms. of Serengeti Park, however, and thus was born Sinclair's living lab.

He started research in Serengeti in 1965, while still an undergraduate. The rinderpest outbreak and its effect on Africa's ecosystem created a large-scale natural experiment for him to test his theories of fluctuations in animal populations. He has used the area to create an ecological baseline by measuring natural changes in biodiversity within the park and comparing this data to human-induced changes seen outside the area.

He spent a decade focused on African buffalo and wildebeest, monitoring their resurgence after rinderpest was wiped out. The wildebeest population increased six-fold in about a 15-year period and Sinclair recalls standing on hilltops seeing nothing but the black hides of wildebeest for 30 miles in any direction.

"The changes in wildebeest population in Serengeti changed everything – vegetation, food supply for predators and for humans," says Sinclair.

"This natural experiment proved that everything is linked and that all living things are connected in an ecosystem, a concept that is well understood now but was just emerging when I started my work."

At that time, researchers were busy unraveling many mysteries in the region, but their work was unconnected. Sinclair suggested they consolidate their knowledge and has edited three books – Serengeti, published in 1979, *Serengeti* II in 1995 and *Serengeti* III, soon to be

continued on page 9

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IN THE NEWS

Highlights of UBC Media Coverage in February 2005. COMPILED BY BRIAN LIN

First Prescribed-Heroin Project Begins

Vancouver has opened North America's first safe heroin-injection site, a pilot project which, it claims, will curb disease and deaths among addicts.

The North American Opiate Medication Initiative (NAOMI), a two-year $8 Million study funded by the Canadian Institutes of Health Research, will also take place in Montreal and Toronto and enrol a total of 470 "treatment-resistant" addicts, reports ***The Economist***.

By keeping hardcore addicts from committing crimes to fund their habits, it is hoped that they will leave drugs behind and lead a more productive life. UBC HIV/AIDS researcher and the project's lead investigator, *Martin Schechter* says that in similar studies done in Europe, the participants "reduced their use of street drugs, their health improved, the level of employment went up and the levels of criminality fell drastically."

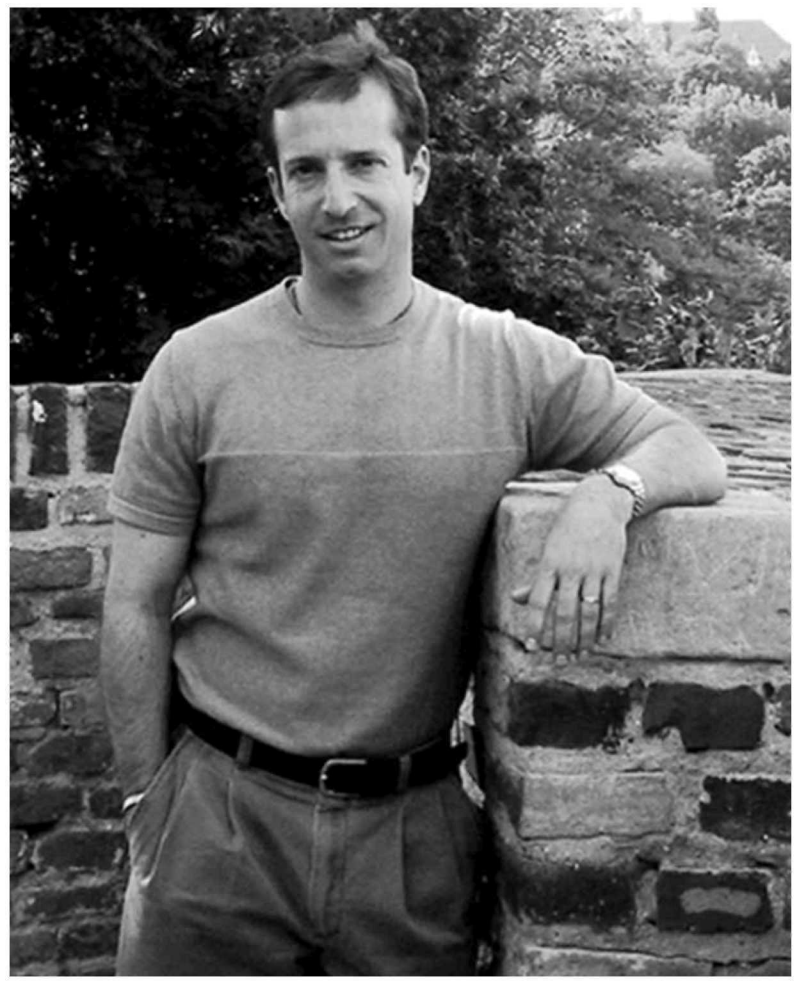

PHOTO: COURTESY OF LARRY FRANK

Associate Prof. Larry Frank has found people who live in sprawling suburbs are less likely to be physically active.

This Little Piggy Hurts

In a feature story on animal welfare in ***The Independent***, UBC agricultural sciences professor *Dan Weary* argues that conventional husbandry methods should be rethought on the basis of the animals' reactions.

For example, Weary suggests that pigs should be injected with hormones that neutralise the sex hormones – "immunocastration" – instead of being painfully castrated.

National Study Reports Drug Reactions

At least seven children's hospitals will participate in an $8.4-million nationwide project to report adverse reactions to drugs in children, ranging from rashes to drug-induced hepatitis.

Researchers will also collect DNA and blood samples, searching for genetic markers that could explain why a drug is safe for one child but not another.

"Instead of passively waiting, we're hiring people to go out and find (adverse drug reactions), catalogue them, put them in a central registry and share them among hospitals to see if there are any patterns," co-principal investigator *Dr. Bruce Carleton* of UBC's Centre for Healthcare Innovation and Improvement told ***The National Post***.

Urnbanites Healthier than Suburban Counterparts

UBC professor *Larry Frank* recently spoke to ***CTV's Canada AM*** about his research on urban sprawl and public health.

"We found that the people who live in the most walkable parts of the Atlanta region, who have shops and services near to where they live . . . are 2.4 times more likely to meet the US Surgeon-General's recommendation and the Heart and Stroke's recommendation of 30 minutes of moderate activity per day than people who live in the more sprawling parts of the same region.

"Non-leisure-time physical activity is a better way to guarantee that we will add up and collectively become more physically active, or less likely to be sedentary," he said.

Let Them Stay Up and Watch TV

Television programs designed to be entertaining, intelligent and educational can open a "cognitive window" and have a profound effect on formative young minds.

Studies have shown that television has the ability to stimulate both sides of the brain, making it easier to retain and understand information.

"There is no question about that any more. The research is in," UBC psychologist *Tannis MacBeth* told ***The Globe and Mail***. "Programs intended to be educational have positive effects on the children who watch them." □

UBC REPORTS

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College Days, College Nights

UBC students were in front of and behind the cameras for this view into student life

BY BRENDA AUSTIN

The title of this documentary alone should draw you in.

Over the course of the 2003-04 academic year, eight UBC film department students followed the joys and disappointments of 16 UBC undergraduates.

The entire 6-hour film aired in three parts March 1, 2 and 3, on the Documentary Channel. Now, CBC plans a shortened version to air in the fall.

The documentary revealed emotional discord between student and immigrant parents; the party scene; the stress of exams; romance; relationships with faculty; student achievements, and the struggle and defeat of those far from home.

The lynch pin of the whole project was John Zaritsky, a well-known journalist and film producer whose documentaries have aired on PBS, CBC and BBC. He became film production adjunct professor in the UBC Department of Theatre, Film and Creative Writing for this project.

Zaritsky broached the idea for this documentary at the 2000 Sundance Film Festival with Corus Entertainment, editors for the Documentary Channel, carried in Vancouver on Shaw's digital cable service. He wanted to know what it was like to be a college student in the new millennium.

His company, Point Grey Pictures, did the preliminary cast interviews for *College Days, College Nights* of about 70 volunteers from the UBC undergraduate student body who responded to campus advertisements.

"About half were eliminated in the first interview. The other half went on camera with a professional crew so we could gauge their reactions. We wanted a balance of gender, cultural background, university year and study course."

The crew members were fourth-year film production students and they interned with Point Grey Pictures for six UBC credits.

"They were fairly green to begin with, but knowledgeable in camera technology, easy to train and quick to learn, and were shooting up to professional standards at the end of the semester," Zaritsky said.

Mike Rae, one of Zaritsky's interns, lived in a house rented by Point Grey Pictures for four of the volunteer cast. This meant he could be part of their lives for parties, exams, family issues and so on.

"The experience changed my life," said Rae as he followed Leila, a first-year nursing student, Spencer, a political science student, who ran for Alma Mater Society Vice-President, and Jamie, a fluently bilingual French and English international relations student.

Another cast member, Melody Chan, was assigned to the fourth member of the house. She followed the roller coaster life of Sheila, the captain of the UBC women's basketball team, attending championship games with her and learning how to get a genuine story by working hard at keeping a good relationship.

A year in the life of... UBC film students at work on the documentary.

"Crew members were expected to observe closely the lives of their subjects, stay involved and bring ideas to weekly film department sessions," Chan said. The knowledge, expertise and connections she made led to subsequent contract work on 10 feature films.

Zaritsky's not surprised. "Melody, yes, she was a great shooter," he said. "And Mike is now my teaching assistant in a new course this year with a documentary called *Couples*."

"I have respect for all these students. They're more serious and hard working and more competent than I was as a student, although they are less politically committed and motivated than my generation."

Cast members each kept a video diary they could use at any time. This was often the truest record of their emotions. Zaritsky remembered a vignette of compelling honesty that touched on the universal experience of rejection. A student recorded his thoughts and feelings at 3 o'clock in the morning on the loss of his girl friend.

There were other tense incidents in the film and in the lives of the cast. But, overall, most felt they were doing the right thing at the right time at university, according to Alyson Drysdale, a film department faculty member responsible for organizing the internship documentary production course, which she co-taught with Zaritsky.

"Crew members were expected to observe closely the lives of their subjects, stay involved and bring ideas to weekly film department sessions."

"And for the student crew," she added, "this was a unique experience. Until now it was unheard of for students to leave university with six hours of on-screen professional credits to their name. This was a big accomplishment." □

KUDOS

UBC Film Studies

1990 UBC film production alumnus Reginald Harkema has been nominated for a 2005 Genie Award for Best Achievement in Editing for the feature film "Childstar," directed by Don McKellar. The Genie Awards will air on CityTV Vancouver at 8 p.m. on Monday, March 21.

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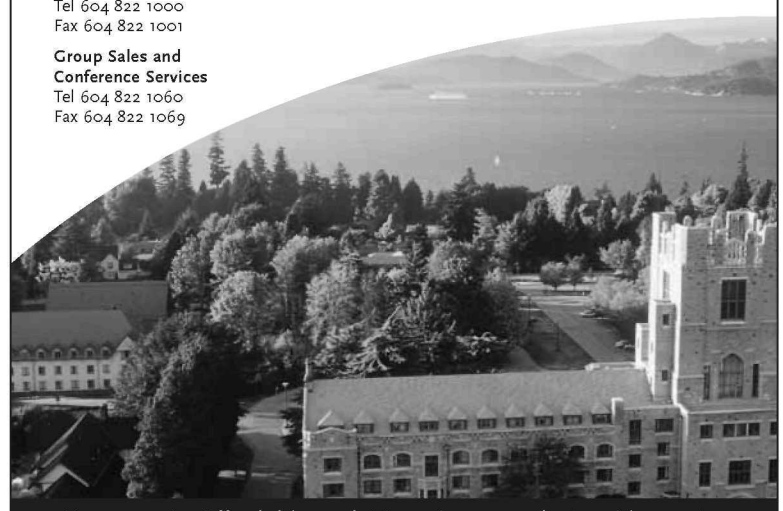

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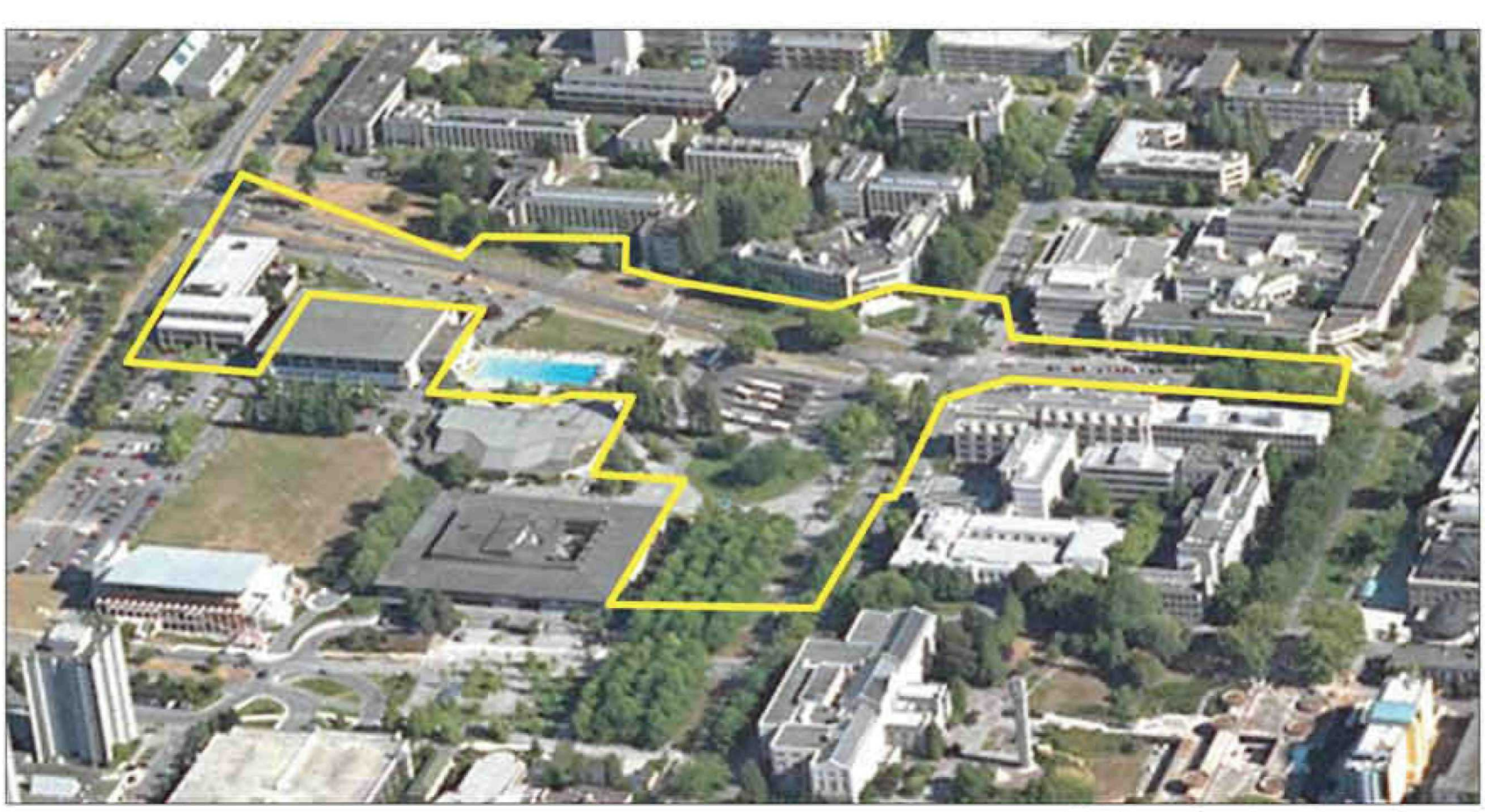

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- Moore Ruble Yudell Architects & Planners (Santa Monica)
  Hughes Condon Marler: Architects (Vancouver)
- Patkau Architects Inc. (Vancouver)

For more information about the competition and the campus community poll, please visit:
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UNIVERSITY TOWN

Senior Appointments

The University of British Columbia Board of Governors welcomes four new elected members. Andrew Irvine, a professor and deputy head in the Department of Philosophy at UBC, and Belle Dale-Wills, the associate director of UBC Facilities Services, have been appointed for three-year terms beginning February 1, 2005. Tim Louman-Gardiner, a first-year Faculty of Law student, and Quinn Omori, a fourth-year International Relations student, have been appointed for one-year terms beginning April 1, 2005.

The Board of Governors has approved the appointment of Prof. David Dolphin, a finalist for this year's Gerhard Herzberg Canada Gold Medal for Science and Engineering, as Acting Vice-President, Research, effective February 1, 2005. The Board has also approved the re-appointment of Mr. Terry Sumner as Vice-President, Administration and Finance for a six-year period, effective June 1, 2005.

Dolphin, who also serves as Vice-President, Technology and Development, with global bio-pharmaceutical company QLT Inc. and who is known for his role in the development of drugs treating macular degeneration, will fill the Vice-President, Research position held by departing Indira Samarasekera, who will become the President of the University of Alberta on July 1, 2005.

Sumner continues in his role as Vice-President, Administration and Finance, which he has held since 1996. With his leadership in administration and finance, UBC has greatly improved its financial position over the past decade and is investing heavily in campus development and new programming. ☐

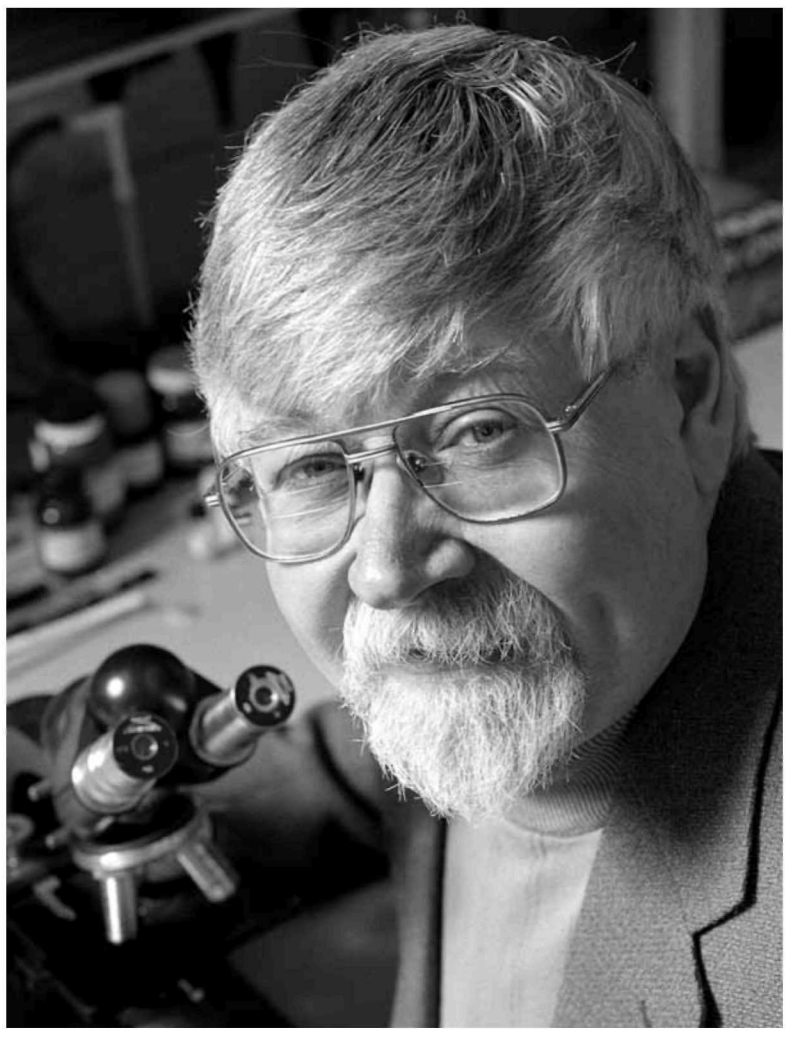

PHOTO: MARTIN DEE

Acting Vice-President, Research, David Dolphin was a finalist for Canada's top science award this year.

Tsunami Response Challege Nets $230,170 in First Six Weeks

As of February, the UBC website recorded $87,445 in gifts from the UBC community to relief agencies in response to the $2 Million Tsunami Challenge. A further $7,025 was committed through payroll deductions.

Events and student-led initiatives, ranging from theatre gate sales to charity concerts and organized runs, have raised a further $122,587. The campaign goal for funds raised for relief agencies is $1 million.

In addition, $13,113 has been raised for the UBC Global Services Learning Endowment, which will support UBC students, as global citizens, in their efforts to build a better world in areas around the globe wherever help is needed. UBC will match gifts to this endowment fund to a maximum of $1 million.

"People have been enormously generous in giving for immediate relief in the disaster areas," said Piper. "Long-term needs remain a high priority and many in our community want to express their sense of global solidarity in a continuing drive to reach our relief fund goals."

Record your gifts on the UBC accredited contribution form found at www.ubc.ca/tsunami, and help us track campaign progress. ☐

Join the UBC Two Million Dollar Tsunami Challenge

Join students, faculty, staff and alumni who have committed to contributing $2 million to provide short- and long-term assistance to South Asian survivors of the tsunami disaster.

Here's how:

1. Support your favourite relief agency. Continue to contribute to the eight major Canadian agencies collecting funds for immediate disaster relief, either directly or via payroll deductions. Our goal for this effort is $1 million.
2. Help establish a Global Service Learning Endowment. This fund will support UBC students, as global citizens, in efforts to build a better world in areas where help is needed around the globe. UBC will match gifts to the endowment to a maximum of $1 million.

And make sure you record your gifts on the UBC accredited contribution form on our campaign website to help us track our progress. **www.ubc.ca/tsunami**

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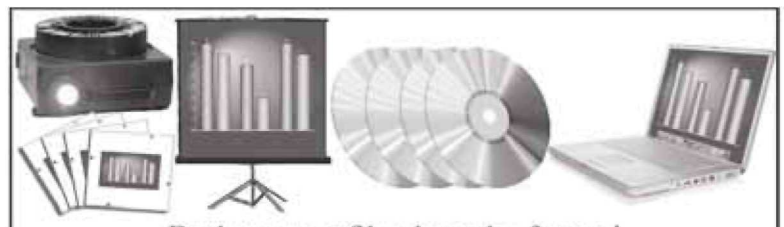
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It's Trek 2010, UBC's new strategic plan.
It's a path forward for our university that's been two years in the making.
It's the next step of our Trek journey. From the Trek 2000 vision published in 1998, a host of changes have materialized. We have a Downtown campus. UBC will soon open its doors in the Okanagan. There have been improvements in student financial assistance, co-op and grad student opportunities. There have been major classroom renovations. Research funding has trebled.
Now it's time to set new goals.
March 10
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Martha Piper will lay out a vision to guide UBC for the next five years.
Trek 2010 has some very big ideas to get our minds around. And we've got three of our community's best strategic thinkers to help us.
◆ Peter Boothroyd, Professor in Community and Regional Planning, will talk on Global Citizenship
◆ Dr. Margo Fryer, Director of the UBC Learning Exchange, will talk on Civil Society
◆ Dr. John Robinson, of the Sustainable Development Research Institute, will talk on Sustainability
March 10. The Chan. 11 a.m.
www.trek2010.ubc.ca
THE UNIVERSITY OF BRITISH COLUMBIA

The New UBC Life Sciences Institute *Home to Eight Research Groups.* BY HILARY THOMSON

An international hub for interdisciplinary, basic biological research will open next week in one of UBC's newest – and largest – buildings.

The Life Sciences Institute (LSI) will occupy more than 25,000 sq. metres and four floors of the Life Sciences Centre (LSC), a $134-million facility opened in November 2004.

"The institute offers an exceptional interdisciplinary environment to propel biological research at UBC to the forefront of innovative science," says David Dolphin, UBC acting vice-president, Research.

The LSI will house eight interdisciplinary research groups comprising investigators from faculties that include Medicine, Science, Dentistry, Applied Science, Pharmaceutical Sciences and Arts.

"The strength and uniqueness of the institute is the integration of disciplines to form research teams," says Alison Buchan, associate dean, Research, Faculty of Medicine and LSI co-director. "In fact, a condition of LSI membership is collaboration with other departments."

A major thrust of work at the LSI is rapid translation of new knowledge into improved health care and new economic ventures, adds zoology professor Hugh Brock, LSI co-director.

The eight research groups, include the following (also, see companion article on the Centre for Blood Research):

BACTERIAL ADAPTATION AND RESPONSE NETWORKS

Leader: Prof. Bill Mohn
Microbiology and Immunology

The group will study how bacteria adapt and respond to their environment, looking mainly at how networks of genetic regulation and protein interactions function. Group members will examine microbial diseases such as whooping cough and *campylobacter*, a type of food poisoning caused by bacteria found in raw poultry, as well as various aspects of antibiotics.

CARDIOVASCULAR

Leader: Assoc. Prof. Ed Moore
Cellular and Physiological Sciences

A key focus of the cardiovascular research group how the heart generates, maintains and regulates electrical activity. Researchers will look at the function of proteins that play a vital role in heart rhythm and protect against potentially lethal uneven heartbeat. Group investigators will develop drugs that target these proteins, in association with Cardiome laboratories.

CELLULAR MECHANISMS OF DEVELOPMENT AND DISEASE

Leader: Assoc. Prof. Vanessa Auld
Zoology

The group, the largest in the LSI, brings together more than 37 researchers to study the basic mechanisms of cell development that will improve understanding of human development function and disease. The group will help develop new therapies for illnesses such as epilepsy, multiple sclerosis and Alzheimer's disease. In addition, the group will focus on new cancer treatment strategies involving cell structure and regulation of cell growth.

DIABETES AND OBESITY

Leader: Prof. Chris McIntosh
Assistant Head, Cellular and Physiological Sciences

The group will look at both Type I and Type II diabetes and the gut hormones that regulate insulin production and protect insulin-releasing cells from damage. Researchers will also look at directly boosting blood insulin levels by converting gut cells into meal-sensitive insulin "bioreactors", to eliminate the need for insulin replacement by needle injection. The group will also collaborate with islet transplant expert Dr. Garth Warnock at the Ike Barber Human Islet Transplant Laboratory.

DRUG DESIGN AND TARGET IDENTIFICATION

Leader: Professor Emeritus Julian Davies
Microbiology and Immunology

The group studies cancer, microbial infections, antifungal and antibiotic drugs, and drug delivery systems, and are working to discover new proteins that will serve as effective drug targets. Researchers are developing a new cancer drug developed form a marine sponge extract. Scientists in the group have well-established links with researchers in Canada, the United States and Europe.

GENES, DEVELOPMENT AND HEALTH

Leader: Prof. Carolyn Brown
Medical Genetics

The group – which includes collaborators from the National Cancer Institute and a Vancouver-based biotechnology company – will study how genetic defects lead to diseases such as cancer and how cells know what genes to express and what type of cells to become. Researchers will also examine development disorders and mental illnesses such as depression, schizophrenia and autism.

IMMUNITY, INFLAMMATION AND INFECTION

Leaders: Assoc. Prof. Mike Gold, Prof. Pauline Johnson
Microbiology and Immunology

The group will focus on how the immune system develops and works to protect the body from disease. Working at the cellular level, researchers will examine molecular mechanisms that help combat infection, research that will contribute to development of vaccines for emerging diseases and existing infections such as SARS, West Nile virus, influenza and HIV/AIDS.

For more information on the LSI, visit http://www.lsi.ubc.ca/index.htm□

Three Canada Research chairs are part of director Ross MacGillivary's multi-disciplinary blood research team.

PHOTO: MARTIN DEE

Centre for Blood Research Attracts Top Investigators

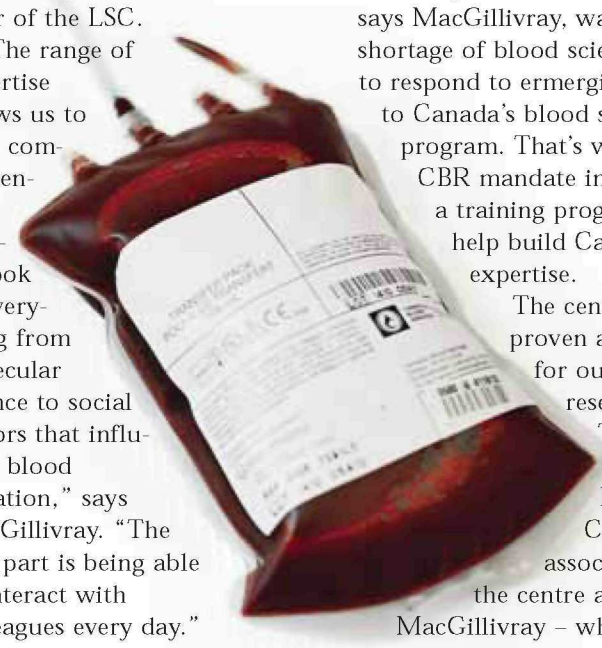
BY HILARY THOMSON

A key member of the new Life Sciences Institute is the Centre for Blood Research (CBR), a multidisciplinary facility that is unique in the world.

"No other research centre brings together biomedical, clinical and social scientists with ethicists, dentists and engineers," says Ross MacGillivray, a biochemist and director of CBR.

Through a more than $15 million grant from the Canada Foundation for Innovation (CFI), the centre pulls together 14 principal investigators who had previously been working in seven buildings scattered across campus with 19 other UBC researchers. Together with staff, students and trainees, a total of 120 CBR members will occupy 3,000 sq. metres of research space on the fourth floor of the LSC.

"The range of expertise allows us to do a comprehensive job – to look at everything from molecular science to social factors that influence blood donation," says MacGillivray. "The best part is being able to interact with colleagues every day."



The long-term goal of the CBR is to create new knowledge that will help make Canada a donor-free society by 2025.

Canadian Blood Services (CBS) estimates that only 3.5 per cent of eligible Canadians donate blood. With an aging boomer population and increasing numbers of cancer, transplantation and hip replacement surgeries, the need for donated or artificial blood and blood products is becoming critical.

The CBR was created in response to recommendations of the Krever commission that investigated Canada's tainted blood scandal of the '80s and '90s where patients were given blood products that were unknowingly contaminated with HIV/AIDS and hepatitis C. A major factor in the crisis, says MacGillivray, was the shortage of blood scientists to respond to ermerging threats to Canada's blood supply program. That's why the CBR mandate includes a training program to help build Canada's expertise.

The centre has proven a magnet for outstanding researchers. Three Canada Research Chairs are associated with the centre and MacGillivray – who himself

continued on page 11

Celebrate Research:
A Week-Long Focus on UBC Ingenuity

BY HILARY THOMSON

PHOTOS: MARTIN DEE

History Prof. Diane Newell (upper left) and Asst. Prof. of Botany Patrick Keeling well be honoured at the March 10 Celebrate Research Gala.

Killer spores, the aging brain and e-commerce hazards are some of the topics to be explored in Celebrate Research Week March 5-12 at UBC's Point Grey and UBC Robson Square campuses and partner hospital sites.

"This is a chance to showcase our outstanding research and investigators, many of whom are world leaders in their field," says David Dolphin, UBC acting vice-president, Research. "And it's an opportunity to share with the public, who funds much of our research, the results of their investment."

Ingenuity: Seeing the World Through New Eyes is the theme of this year's series.

"Many of the great discoveries in all areas of research have been made by standing back as it were and looking at things from different perspectives. It's these kind of stories that we want to highlight in this year's program," says Sid Katz, executive director, community affairs and Celebrate Research organizer.

• Ever wondered where you picked up that cough? Or why you just can't hear as well as you could? The many hidden health hazards in our environment, workplaces and homes will be revealed by scientists at UBC's Centre for Health & Environment Research and the School of Occupational and Environmental Hygiene in a presentation to take place Wed. March 9 at 8 p.m. at UBC Robson Square.

Karen Bartlett will discuss her work in tracking a deadly fungus found on Vancouver Island trees, Murray Hodgson will look at designing noise out of classrooms and Kay Teschke talks about risks associated with theatrical fogs and smokes. The scientists will offer tips on detection, measurement and protection.

• Fraud and discrimination in online communications is the topic for UBC Sauder School of Business professors Paul Chwelos and Marc-David Seidel in a discussion to take place at UBC Robson Square on Tuesday, March 8 at 5:30 p.m.

An expert in electronic marketplaces, Chwelos will offer suggestions on how to spot fraudulent practices in online purchasing. Seidel will discuss the role of e-mail in reputation management and offer a survival guide for telecommuters on how to protect their reputation and handle issues related to discrimination.

• Max Cynader, director of the Brain Research Centre at UBC will discuss the aging brain in a presentation on Sat. March 12 at 8:15 p.m. at the Woodward Instructional Resources Centre at UBC.

Fears of cognitive loss are widespread among older people. Cynader will discuss evidence showing it's possible to ward off age-related memory and cognitive loss by doing some very simple things. Activities as diverse as reading mystery stories, doing crossword puzzles, and frequent social interactions are all known to be predictive of successful aging.

• Breakthroughs in transplantation will be discussed by a panel of researchers from Vancouver Coastal Health Research Institute, Providence Health Care and B.C. Transplant Society, in a presentation at St. Paul's Hospital lecture theatre March 8 at 7 p.m.

Celebrate Research Week also includes daily noon-hour sessions at UBC Robson Square in subjects ranging from psychology to art history and offered by the Faculty of Arts. Prof. Michael Byers of the Liu Institute for Global Issues kicks off the series with a presentation of The Laws of War, U.S. Style.

A highlight of the week is the March 10 Celebrate Research Gala, where UBC honours its outstanding investigators. The accomplishments of more than 200 UBC research award winners will be celebrated with video vignettes and performances by members of the UBC School of Music.

For a complete listing of Celebrate Research Week events, visit www.research.ubc.ca and click on the information box. For free tickets to the gala, contact kally.basra@ubc.ca □

"Many of the great discoveries in all areas of research have been made by standing back as it were and looking at things from different perspectives. It's these kind of stories that we want to highlight in this year's program."

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seeing the world through new eyes

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MARCH 7 The Laws of War, U.S. Style
MARCH 8 Mouse-clicking Breaks Mao's Tradition
MARCH 9 Hamlet's Mirror
MARCH 10 Visual Art with Xiong Gu
MARCH 11 How Stress Affects Your Immune System
UBC Robson Square

MARCH 5 8:15 pm
COMMONWEALTH OF LEARNING LECTURE
Education for Development: Can Technology Help?
UBC – IRC Building, Lecture Hall 2

MARCH 7 7:30 pm
UBC FACULTY OF EDUCATION PRESENTS
New Ways of Living & Learning in a Global World
Robson Square Theatre

MARCH 8 7:30 pm
UBC DEPARTMENT OF CNERS PRESENTS
An Evening of Archaeology Experts
Robson Square HSBC Hall

MARCH 9 5:00 pm
UBC UNIVERSITY-INDUSTRY LIAISON OFFICE PRESENTS
Activate Ingenuity in UBC Life Sciences
Robson Square C680

MARCH 11 7:30 pm
TALK OF THE TOWN
From Monkey Bars to Monkey Business, Building Better Outdoor Playgrounds
Robson Square Theatre

MARCH 12 8:15 pm
UBC EXCELLENCE IN RESEARCH LECTURE
The Aging Brain
UBC – IRC Building, Lecture Hall 2

For more information on these and many more events, call 604.822.5675 or go to **www.research.ubc.ca**

Implantable Medical Devices

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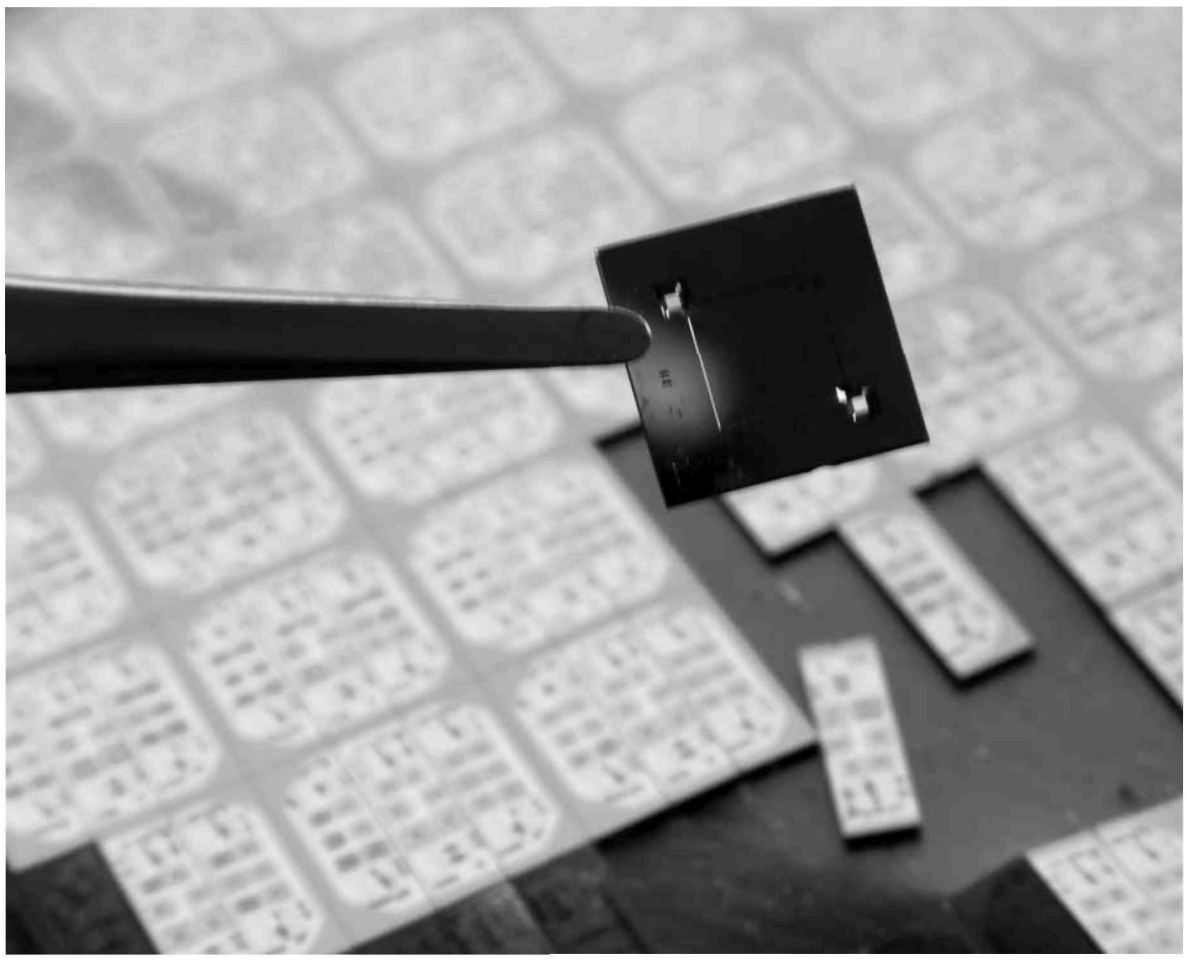

PHOTO: MARTIN DEE

nique called post-packaging frequency tuning, which uses pulsed laser emissions to tune the frequency of micro-devices after they've been assembled and sealed. "The process allows more precise manipulation of the devices while preventing damaging the parts during assembly," says Mu. But that's just a piece of the puzzle.

"There are some big challenges that have kept microscale medical devices from being a viable product on the market," says Chiao, "We need to come up with a long-lasting and reliable power source and safe packaging that allows the right kind of chemicals to go through, to enable screening."

To that end, and with funding from Canada Research Chairs Program, Canada Foundation for Innovation and the Natural Sciences and Engineering Research Council, Chiao has rounded up top researchers in pharmaceutics, nanotechnology and physics at UBC. But working among such a wide range of disciplines poses its own challenges.

At no larger than 2 millimetres, these tiny chips would come fully equipped with highly sensitive screening and distribution mechanisms, and their own power source...

"People in different fields often speak different languages – technically," says Chiao. "But everyone working on this project shares a passion for creating something that will greatly improve people's lives, and that makes the hard work worthwhile." □

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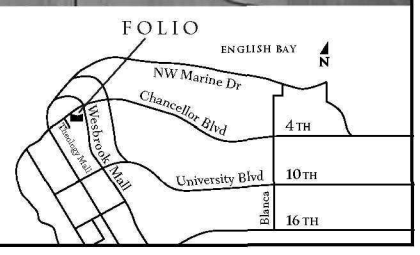

Saving the Serengeti

continued from page 1

submitted to his publisher.

Sinclair spent 10 years in the *Serengeti*. In addition to his wildebeest studies, he also looked at how the region's grassland changed to woodland because of ecosystem dynamics. Bushfires usually controlled growth of trees but wildebeest grazing had virtually eliminated fuel for the fires. Tree-munching elephants had also regulated tree growth, although extensive ivory poaching meant young trees could flourish.

When the political situation in Tanzania endangered his research – his team and materials were attacked by bandits, forcing a re-launch of the project – and became uncomfortable for his family, Sinclair moved in 1973 with his wife and two young daughters to Darwin, Australia, to conduct studies on Australian buffalo.

But fortune foisted another career development on the young researcher when, on Christmas Day, 1974, a fierce cyclone hit Darwin. It destroyed 95 per cent of the city and devastated Sinclair's research project. While helping evacuate residents, he spent a night huddled in a tent where, by candlelight, he scribbled his application for a job at UBC.

While at UBC, Sinclair has continued his work in the *Serengeti*, studied the Yukon's snowshoe hare and the Vancouver Island marmot, one of the most endangered mammals in the world.

He also served as director of UBC's Biodiversity Research Centre from 1996 to 2002 and helped shape the vision for a new interdisciplinary research centre, now under the leadership of Prof. Dolph Schluter. With major funding from the Canada Foundation for Innovation and a recent $8 million donation from Vancouver mining entrepreneur Ross Beaty, the centre that started as a dream in 1992 is expected to open in 2007.

After focusing on the large mammals of the *Serengeti* for decades, Sinclair is now turning his attention to the region's smaller mammals, birds, butterflies and plants.

"We don't yet know all the habitats in *Serengeti*," he says. "I want to describe the biodiversity in these different habitats and look at some of the geographical areas of the ecosystem that are still largely undescribed."

And what about plans for 2009, when it's time to retire?

"I want to write a book that will put the whole *Serengeti* story together," says Sinclair. "And I plan to move back to Tanzania for a few months each year – I've got a spot picked out by Lake Victoria where I plan to build a house and spend my time just watching nature."

For more information on the Biodiversity Research Centre, visit http://www.zoology.ubc.ca/biodiversity/ or http://www.publicaffairs.ubc.ca/media/releases/2005/mr-05-013.html □

Sinclair has conducted 40 years of landmark research that has ... made him one of the world's most-cited investigators in the field of environment and ecology.

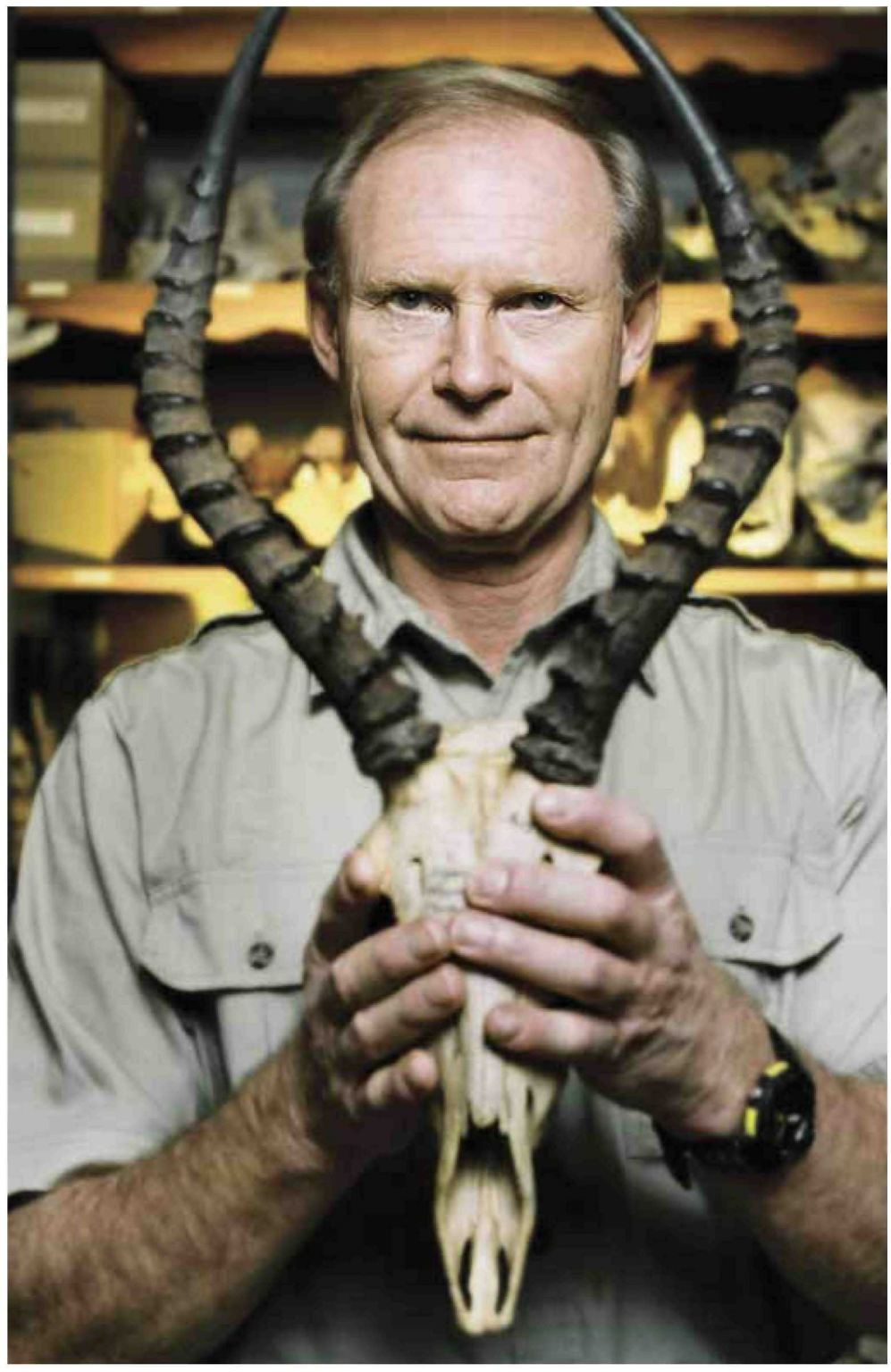

PHOTO: MARTIN DEE

Once retired, Sinclair plans to write a comprehensive book on the Serengeti.

Vice-President, Research

The University of British Columbia

The University of British Columbia (UBC) invites applications and nominations for the position of Vice-President, Research.

UBC aspires to enhance its research capacity, strengthen its research performance, promote its research findings to the wider community, and become the leading research university in Canada and one of the leading research universities in the world. The role of Vice-President, Research is central to the implementation of *Trek 2010*, UBC's strategic vision for the future.

Established in 1908, The University of British Columbia is a publicly supported, comprehensive university that now comprises two major campuses, one situated in Vancouver—including sites at Point Grey and four affiliated teaching hospitals—and the other in the Okanagan. At UBC Vancouver the current student population, including graduate students, is over 42,000; there are 2,000 faculty members (over 700 of whom were recruited since the year 2000) and 5,500 non-academic staff. The recently-established UBC Okanagan campus currently has about 200 faculty members and 3,000 undergraduate students. This new campus is expanding rapidly, with over 200 new faculty and 4,500 more students (including 500 graduate students) to be added over the next five years. Construction of additional laboratory and classroom space is underway, and plans for a dedicated research building are being drawn up. UBC's annual budget is $1.4 billion. The University attracts about $350 million annually in research funding, and has produced 115 spin-off companies over the past 20 years, more than any other university in Canada. For information on UBC and *Trek 2010*, please visit: **www.ubc.ca**.

The University of British Columbia engages in the search for new knowledge in activities ranging from clinical medicine and laboratory science to artistic performance and literary criticism to technology transfer and social policy development. Research is at the heart of what UBC does from teaching undergraduates to extending the frontiers of knowledge and contributing to the cultural and economic development of British Columbia and Canada. Thanks to the quality of its research, UBC has been ranked among the top 50 universities in the world over the past two years.

The Vice-President, Research, who reports to the President, will provide leadership in the development and administration of research and in the promotion of interdisciplinary research programs at both UBC Vancouver and UBC Okanagan. The Vice-President, Research will be an articulate, credible advocate for the full range of the University's research, and will establish and maintain effective liaison with external funding agencies, business, industry, government, and the broader community. The successful candidate will have an outstanding record of scholarship and demonstrated academic leadership, with superior administrative, communications, and interpersonal skills. He or she will have extensive experience in promoting research and an understanding of the financial, legal, ethical, and social implications of research for the wider community. The Vice-President, Research is a member of the University's senior management team, which works together to increase UBC's national and international reputation, and to establish research links around the world.

The appointment will ideally commence on July 1, 2005. Applications or nominations for this position, indicating the qualifications on the basis of which the individual merits consideration, should be sent to the address below.

UBC hires on the basis of merit and is committed to employment equity. The University encourages all qualified persons to apply.

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Architecture Grad's Prototype Home Earns Praise

BY BRENDA AUSTIN

Architecture firm Metis Design-Build aims to use common sense in house design and building, making simple changes that are economic for owners, environmentally astute and socially integrated.

Its partners design and build homes themselves, saying the interaction between the designer and builder is essential to implement their ecological principles. In this way, the firm provides a sustainable, alternative form of housing that costs less per square foot than comparable homes.

"Our name says it all," says Erick Villagomez, a graduate of the UBC School of Architecture who runs the firm with partner Jerin Dunsmoor and teaches in the UBC Environmental Design Program.

"Metis is a Greek work that indicates a wide array of practical skills and acquired knowledge developing in response to a constantly changing natural and human environment," says Villagomez, who is also a consultant with the Design Center for Sustainabilities.

Metis Design-Build recently launched the prototype of a home that incorporates their principles in Delta, B.C. Called the *Smart*Space Home Launch and Detached Dwelling Forum, the event received rave reviews from municipalities, the David Suzuki Foundation and financial institutions.

"Much thought went into this project which has a minimal ecological footprint but with a better quality of finish, higher standard of comfort and 30 percent lower cost per square foot."

"In this house, we used a narrow footprint and careful placement on site to maximize use of the lot space as well as the natural water, sun and wind paths," says Villagomez.

By placing windows in the living area of the house on the second level, above the bedrooms, they used passive solar design, bringing light to where

continued on page 11

Metis Design-Build is holding an open house for its prototype home at 213 66A St. in Tsawwassen on March 12.

Eric Villagomez (above) graduated from the School of Architecture in 2003 and works as a consultant for UBC's Design Centre for Sustainability.

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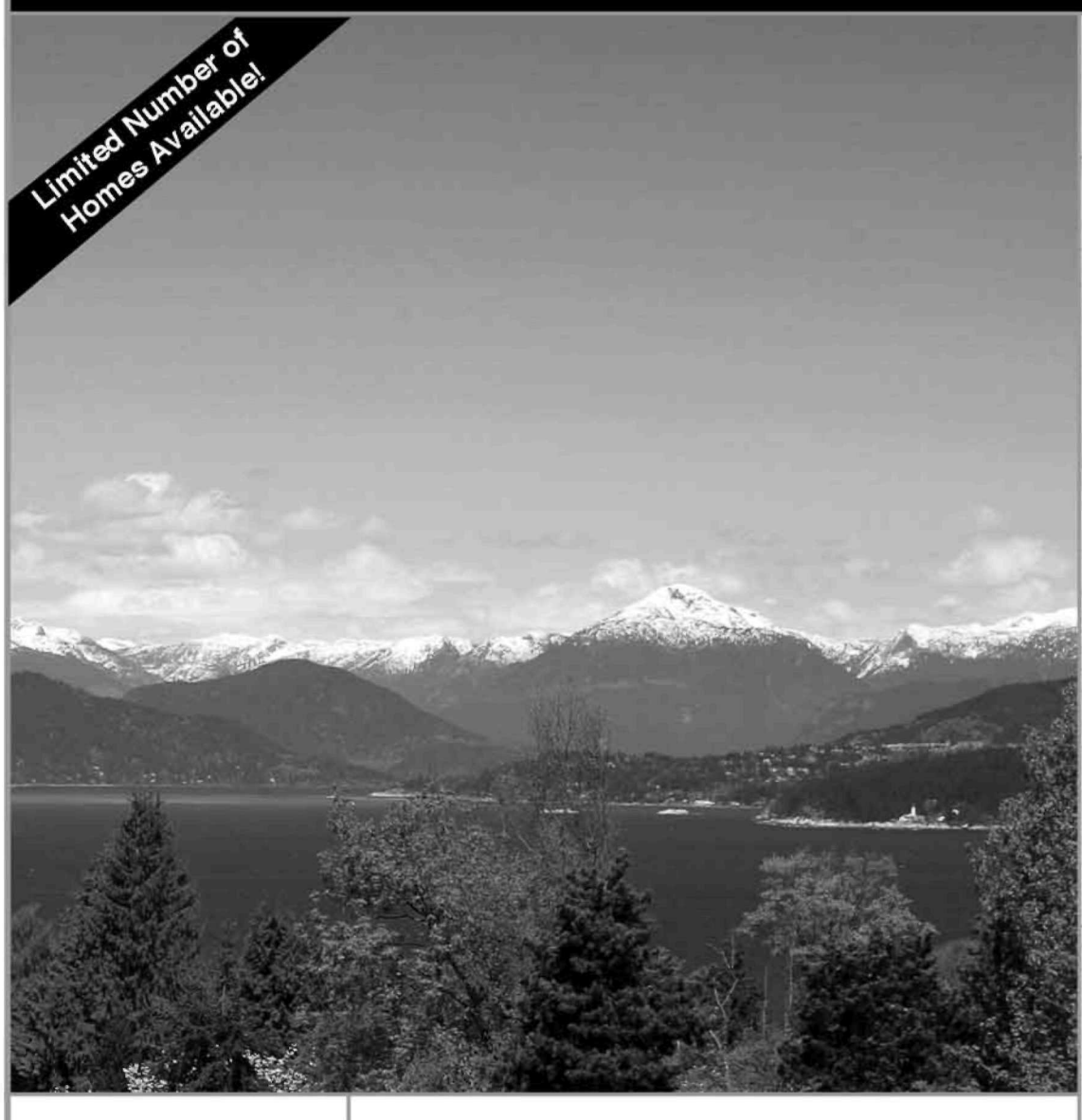

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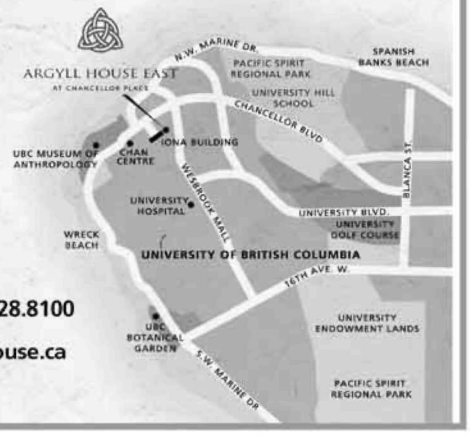

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TIMEPIECE 1915

PHOTO: COURTESY OF UBC ARCHIVES

Fairview "Shacks" BY CHRIS HIVES, *University Archives*

UBC first opened its doors on September 30, 1915 on the Fairview campus which was part of the current Vancouver General Hospital site. The outbreak of World War I halted construction of the University's Point Grey campus and the University held classes in a complex of buildings "affectionately" referred to as the Fairview "shacks" and, as enrolment at the University grew, in church basements, tents and private homes nearby. Although the facilities proved to be inadequate the University would spend its first decade at this overcrowded site before moving to its new Point Grey homein 1925. □

Prototype Home Earns Praise

continued from page 10

it is needed most and capitalizing on solar heat gain in the winter. A deck off the living area, above the garage, allowed privacy as well as interaction with the street and community.

To save the owner extra cost, Metis simplified the design and construction of the house, using affordable detailing and a compact layout. An appealing extra was the interior space that has one central "wet wall" structure with no load-bearing walls to make future design changes easy as the family's needs change.

The finishes are non-toxic throughout, and a permeable driveway allows rainwater to drain into the earth, two features, among others, that please Jose Etchevery, Research and Policy Analyst of the Climate Change Program for the David Suzuki Foundation.

"Much thought went into this project which has a minimal ecological footprint but with a better quality of finish, higher standard of comfort and 30 percent lower cost per square foot" he said. "This is a paradigm shift in this country." □

PHOTO: MARTIN DEE

Centre for Blood Research Attracts Top Investigators

continued from page 6

is a world expert in blood clotting proteins – feels that the CBR will be an excellent recruitment tool to attract top scientists, like Mark Scott.

Coming to UBC from Albany Medical School in the U.S., Scott looks at immunocamouflage. The process uses a compound to mask antigens in blood cells, platelets, and other blood components so the body doesn't "see" the blood cells as being foreign. The process would allow patients to accept cells of more than one blood type, greatly expanding available supply.

Other research areas include improving storage time and quality of donated blood as well as creating artificial blood components, such as albumin that is used to treat surgical and burn patients.

Research and training at the CBR are part of a network involving blood scientists from other Canadian universities as well as the Puget Sound Blood Center. Support within the centre comes from the CFI, the B.C. Knowledge Development Fund, Canadian Blood Services, Bayer Inc., the Canadian Institutes of Health Research, the Michael Smith Foundation for Health Research, and UBC.

For more information on the CBR, visit www.cbr.ubc.ca. For information on blood supply and blood research, visit www.bloodservices.ca. □

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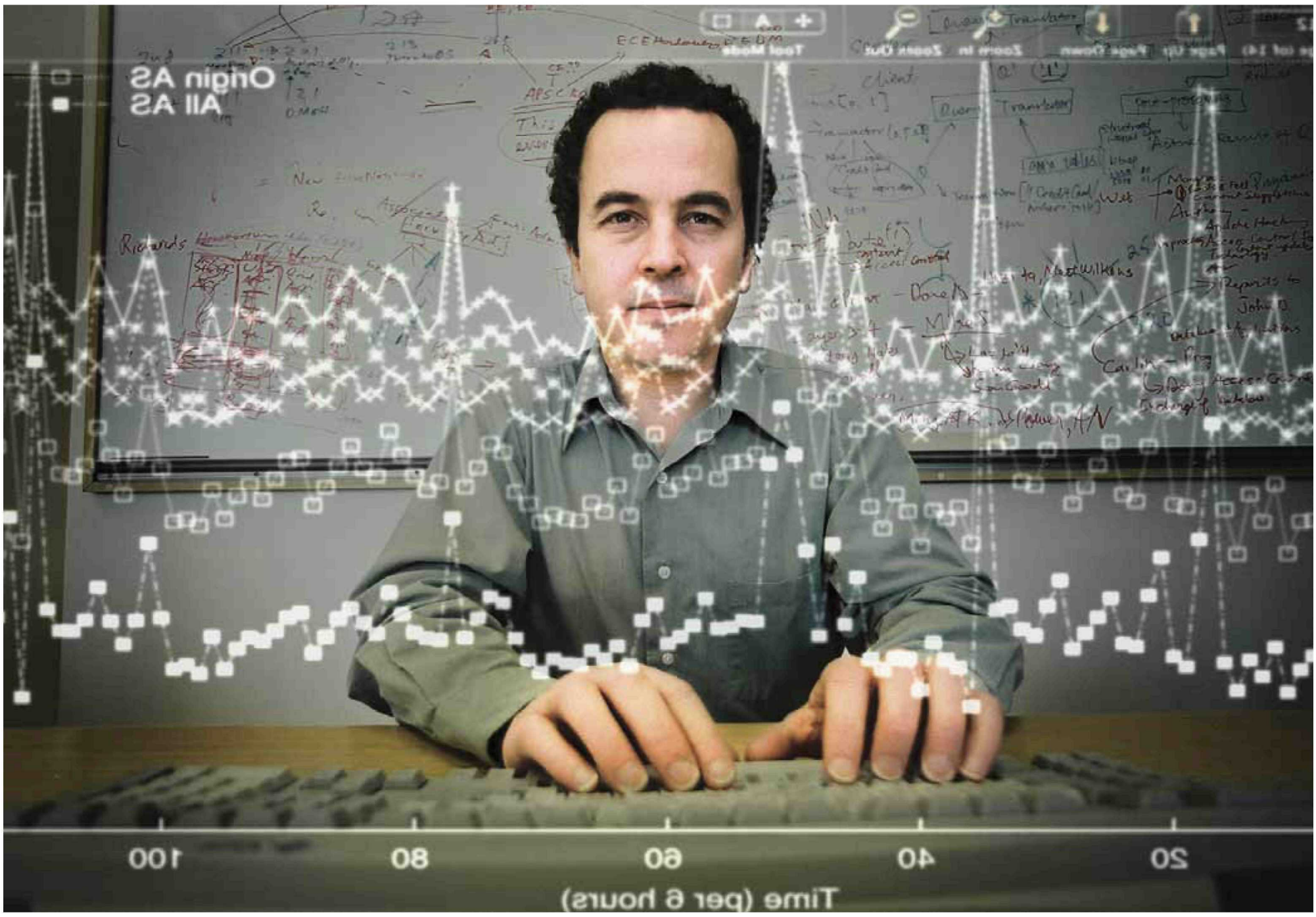

PHOTO: MARTIN DEE

William Aiello is fascinated with the management of complexity – defence in depth – that involves cryptography, system security and traffic analysis.

Defence in Depth

UBC's new head of computer science talks about the battle for your computer. **BY BRENDA AUSTIN**

The profile of a virus writer or hacker is young, male, intelligent and equipped with the one luxury people in full-time employment never have – time. He uses that time to reverse engineer software and zero in on the inevitable vulnerabilities.

Lining up against the hackers are researchers like William Aiello, the newly appointed head of the UBC Department of Computer Science. He focuses on new ways to increase computer security from the three most common large-scale threats: viruses, worms and denial-of-service attacks.

Aiello holds a PhD in applied mathematics from the Massachusetts Institute of Technology and comes to UBC from AT&T Research Labs in New Jersey, where he was the Director of Network Security Research.

"It is the initial engineering of the computers with areas of weakness, and the manufacturers' focus on features and functions instead of invulnerability, which provide the virus writer his opportunities," says Aiello.

That is one piece of the puzzle. The other is the fact that many people share the same type of software so there is a monoculture in which viruses and worms spread rapidly.

"When someone unleashes a piece of code – which is what every virus is – this causes a domino effect which might begin with an overload of network traffic and end in widespread denial of network service. This becomes a huge issue, wreaking havoc," says Aiello. In one aspect of Aiello's research, he grapples with how to defend against these large-scale attacks.

But, to develop software secure against every conceivable attack is not possible. Threats emerge on various fronts, not only from the virus writer but from hackers who can break into computers one by one, and spammers who drop a piece of software into a single computer system that then hosts a larger-scale attack.

"If you want to secure a complicated network you have to seek solutions from many different areas, not just the software. You may see something that went wrong on a large network, but finding the root cause can be very difficult," says Aiello.

This leads Aiello into his main area of interest called "defence in depth" – the management of complexity that evolves from cryptography research, system security, and traffic analysis.

Cryptography has been around in some form or other as long as humans have. Current cryptography research centres on the use of codes and limiting access to authorized persons.

The second area, system security, focuses on how different applications in a computer interact via the rules each computer uses. Firewalls and routing devices are two familiar examples.

The final area is traffic analysis, monitoring the system to spot abnormal activity. Akin to the canary in the coal mining era, the monitor prevents damage escalating, but in the case of computers, also analyses the root cause.

Given the propensity for damage and the inherent opportunities, how big is the criminal element researchers battle? This is not an area Aiello focuses on, but he says there is a complex underground economy among hackers, spammers and organized crime where the currencies of the realm are access to hacked machine, attack tips, bragging rights and money.

So, what's the mindset of a hacker? Aiello recalls an extremely bright colleague whose mind worked in a way he believes the minds of hackers must work. His colleague was able to make connections between areas of computer vulnerability in a way that made everyone glad he was legitimately employed on "their" side.

"The good news is we've made progress in our defences and as science progresses we can turn more mathematical theories into engineering artifacts," Aiello says.

"Computer science cuts across many disciplines such as mathematics, engineering, commerce and general sciences," Aiello adds. "Luckily, one of the department's strengths is interdisciplinary research, and my hope is we not only provide the computer tools and network security, but the intellectual concepts as well in a way that enables us to continue to grow as an intellectual leader within the university community." □

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Department Gains New Facilities

Newly arrived from AT&T Research Labs in New Jersey, Computer Science department head William Aiello has assumed leadership of 55 faculty members, 185 graduate students, approximately 900 undergraduates and 40 staff.

Known for its focus on interdisciplinary programs and research strength in areas such as computational intelligence and graphics, the department has welcomed the addition of new lecture and classroom space at the recently completed Dempster Pavilion.

A second facility to be shared with the Institute for Computing, Information and Cognitive Systems (ICICS) and named the ICICS/CS building, will provide additional administrative and lab space and strengthen ties among researchers in areas ranging from engineering and computing to psychology and medicine.

In the past two years, the department's top programming team has captured first place at the International Collegiate Programming Contest (Pacific Northwest Division), beating traditional powerhouse teams from Stanford and Berkeley and is headed to Shanghai in April to compete in the World Finals. □