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Lindsay Eltis, seen with image of a TB enzyme, wants to create a multidisciplinary TB research centre at UBC.

PHOTO: MARTIN DEE

Researchers Find Way to Starve TB

Insight offers route to combat drug-resistant strains

BY HILARY THOMSON

Sleuthing through soil has led UBC researchers to a key discovery about the world's most lethal infection – tuberculosis (TB).

Lindsay Eltis, a microbiologist and biochemist, spent the first part of his career in soil bacteria research, looking at how microbes in dirt degrade or break down pollutants such as polychlorinated biphenyls (PCBs). He has expert knowledge of a process called biocatalysis, where enzymes activate or accelerate chemical reactions.

TB scientists had earlier identified genes

suite of genes that contain the information required to make enzymes that degrade the cholesterol found in macrophage cell membranes. The bacilli use the degraded cholesterol for fuel to survive. In most infections, the macrophage is the enemy. In TB it's dinner.

The discovery offers the potential for an entirely new class of therapeutics – answering a critical need for new treatments to combat emerging drug resistant strains. Now that scientists know cholesterol is essential for TB bacilli's survival, they can work to inhibit

microbiology and immunology. “You just can't predict the benefits that spin off from good research. This work re-inforces the need for funding basic research.”

Next steps for the researchers include purifying the cholesterol-degrading enzymes and developing and testing compounds to inhibit the action of the enzymes.

TB is the leading killer among infectious diseases and is responsible for one in four adult preventable deaths, according to the World Health Organization (WHO). One-third of the world's population is currently infected. Particularly susceptible include

Patients generally feel better within weeks and often stop taking the drugs, allowing drug-resistant strains to develop.

One in 10 cases of TB are resistant to some first-line drugs and are described as multi-drug resistant TB or MDR-TB. The treatment for such cases involves using second-line drugs that must be taken for a year or more. TB resistant to both first- and second-line drugs is called extensive drug resistant TB or XDR-TB.

“XDR-TB is now virtually untreatable,” says Eltis, who joined UBC in 1999 from Quebec's Université Laval. “It's on every

“You just can't predict the benefits that spin off from good research. This work re-inforces the need for funding basic research.”

that helped *Mycobacterium tuberculosis* – the bacterial agent that causes TB – to survive, but no one knew exactly how the process worked. TB bacilli are unusual in that they can survive in macrophages – large immune cells that normally devour invading pathogens.

Eltis, UBC colleague Bill Mohn and co-investigators from UBC and Europe looked at similarities in the function of enzymes involved in PCB degradation and enzymes involved in TB. What they uncovered helps explain how TB survives. They found a

the enzymes that are responsible for cholesterol degradation. In effect, they would be taking cholesterol off the menu and starving the infection to death.

UBC's University Industry Liaison Office has filed a patent application for the technology leading to the discovery, and the work was published recently in the *Proceedings of the National Academy of Science*.

“This is a classic example of the serendipitous nature of discovery,” says Eltis, a UBC alumnus and professor of

those with a compromised immune system, elderly, homeless and undernourished people, and those living in overcrowded environments with poor ventilation such as some hospitals or prisons. In Canada, individuals of Aboriginal and Inuit heritage have a higher incidence of TB than the general population.

There have been no new drugs for TB in the last 40 years and the bacilli have developed drug resistance over time. Current treatment usually involves taking drugs over a period of six to 18 months.

major continent, and developed countries are making a serious mistake by not dealing with it aggressively. This disease is going to bite us.”


The WHO reports that TB takes an annual toll of two million lives, with eight million people developing TB every year. The highest rates per capita are in Africa with 29 per cent of all TB cases, often affecting HIV/AIDS patients. Half of all new cases are in six Asian countries: Bangladesh, China, India, Indonesia, Pakistan, and the Philippines.

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IN THE NEWS

Highlights of UBC Media Coverage in June 2007. COMPILED BY BASIL WAUGH

Performance Pay Drives Mergers and Income Inequality

The New York Times reported on two UBC studies in June – one by UBC economist Thomas Lemieux on income inequality and another by Sauder School of Business Prof. Kai Li on why mergers are win-win propositions for CEOs.

Lemieux co-authored a study that found that performance-based pay accounted for 25 per cent of the growth in wage inequality among male workers from 1976 to 1993.

"All the evidence we have suggests that this trend is continuing," said Lemieux, who noted that in 2003, 44.5 per cent of workers at Fortune 1000 companies received some form of performance-based pay, up from 34.7 percent in 1996.

Li co-authored a study published in the U.S.-based *Journal of Finance* that found CEOs have personal economic incentives to proceed with questionable mergers. Looking at 370 mergers of U.S. companies, Li found that CEO compensation was "completely insensitive" to poor post-merger performance.

What Are Dogs Thinking? More Than We Knew

UBC canine expert Stanley Coren featured prominently in international news coverage of a study that found dogs can do situation-specific imitations – a capability previously considered unique to humans.

Coren, a professor of psychology, said the Austrian study demonstrates that dogs have a sense of awareness. "It really shows a higher level of consciousness. This takes a real degree of consciousness."

Coren's commentary appeared in the *Washington Post*, *FOX News*, *MSNBC*, *Seattle Times* and Australia's *The Age*.



Psychology Prof. Stanley Coren says a new study shows that dogs have a higher level of consciousness.

Superconductor Discovery Solves 20-Year-Old Mystery

U.S.-based science journals *Nature* and *Science Daily*, along with the *Globe and Mail* and the *Toronto Star*, reported that a UBC team has contributed to the greatest advancement in superconductor research in a decade by growing the purest samples of superconductors to date.

Superconductors are a class of materials that conduct electricity with no resistance. They are used in medical imaging scanners, power lines and levitating trains, but advances have been stalled for 20 years because of a lack of understanding of their fundamental properties.

"We were able to supply our Canadian collaborators with the purest superconductor samples ever developed, which led to the unequivocal discovery that they are metal," said UBC Physics Prof. Douglas Bonn. "Up to now, it was unclear whether these materials were metals or insulators."


The UBC team also included Prof. Emeritus Walter Hardy

and Materials Scientist Ruixing Liang.

UBC Astronomer Looks for Extraterrestrial Life

USA Today, *MSNBC*, *Space.com*, *CBC* and *Toronto Star* reported that, according to UBC astronomer Jaymie Matthews, light produced by the star Gliese 581 may support habitable planets.

Using Canada Space Agency's suitcase-sized space telescope, the Microvariability and Oscillations of STars (MOST), Matthews conducted a scientific stakeout of Gliese 581, approximately 20.5 light years from the Earth. Matthews presented his findings at the annual meeting of the Canadian Astronomical Society.

"Gliese 581 seems remarkably stable over the six weeks it was monitored by MOST," said Matthews. "The brightness of the star changed by only a few tenths of a percent over that time. This level of stability means that it provides a stable source of light – hence heat – to the surface of planet Gliese 581c." 

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A Raw Deal:

Do Canadians benefit from our oil wealth?

BY LORRAINE CHAN

When it comes to black gold, Canada may have more in common with Iraq than first meets the eye.

“Canada and Iraq are among the world’s five top oil reserves,” explains Philippe Le Billon, an assistant professor in the Dept. of Geography and a researcher at the Liu Institute for Global Issues.

Given that international oil companies are looking for oil reserves with a 15-to-30-year time horizon. “Canada and Iraq could be among the only oil countries with both major reserves and open energy sectors,” he says, adding, “There’s little appetite to nationalize the oil sector in Canada and lots of appetite to privatize oil in Iraq.”

Le Billon is one of a dozen scholars worldwide studying the intersection between violence, governance and primary commodities. A common thread in his research is what Le Billon calls the “resource curse.” This occurs when local populations receive little or nothing from their land’s wealth, but suffer the most when war or fighting erupts.

He has mapped logging disputes in Cambodia’s civil war



Geography Asst. Prof. Philippe Le Billon looks at issues of governance and natural resources.

for revenue transparency, which require government and industry to publish what they pay, earn or spend in the oil, gas and mining sectors.

In terms of energy security issues, about 80 per cent of the world’s oil reserves are under nationalized systems, says Le Billon. In these cases, government rather than private

attention to how major oil companies are poised to strike deals in Iraq. Prior to the 2003 U.S. invasion, the state-owned Iraqi National Oil Corporation (INOC) controlled the oil sector, which had been progressively nationalized from western companies in the 1960s. Since 2003, the U.S. has promoted legislation to open Iraq’s

population of the provinces, explains Le Billon. It will also authorize regional authorities to develop new oil fields in their own area, rather than being subject to dictates from Baghdad.

“These measures are supposed to address regional concerns, notably Kurdish and Shia desire to avoid control by the central government. For the Sunni areas,

Unsurprisingly, notes Le Billon, oil has done little good for Iraqis. Until the 1960s, oil revenues largely flowed to foreign oil companies and then under Saddam Hussein’s regime oil fields were nationalized and revenues were spent on disastrous wars.

“Given the poor state of institutions and ongoing insecurity in Iraq, it is unlikely that Iraqis will soon finally benefit from the development of oil beneath their feet, either because of continued delays in oil production increase, unfair agreements passed with companies or corruption.”

And although Canada and Iraq sit at opposite ends of the spectrum in overall economic and social development, Le Billon says there are clear parallels with Canada’s liberalization of the energy sector.

“Do Canadians have cheaper oil prices than in the U.S.? No. The price of oil in Canada is the same as elsewhere. Do Canadians get the best deal out of their oil wealth? Well, this is a question that deserves serious consideration.”

In fact, says Le Billon, Canada’s energy and resource sector sees a pattern similar to

“Do Canadians have cheaper oil prices than in the U.S.? No.”

and the brutal impact of ‘blood diamonds’ in Sierra Leone. A priority issue for him is oil and governance in conflict-prone regions.

Le Billon recently took part in a UN Security Council seminar organized by Belgium on natural resources and armed conflict, and mechanisms that could reduce the likelihood of future conflicts. One such measure, he says, could be to extend global standards

corporations control oil fields and reap the profits.

He says the major exceptions are oil fields in the Gulf of Guinea off Africa’s west central coast in the Atlantic Ocean; Alberta’s tar sands; and Iraq (if a new law opening the sector is passed). “But oil reserves in the Gulf of Guinea are less than half of those in Iraq and a third of those in Canada.”

Le Billon will be paying close

nationalized oil sector to foreign direct investment.

“Before, a major question for the U.S. was how could U.S. companies access the oil,” says Le Billon. “They could do that only if oil laws changed and they could find local allies. In other words, make them need your company.”

New legislation in Iraq will allow for a distribution of oil revenues proportional to the

largely devoid of known reserves, the law should also guarantee equal access to oil revenues.”

He says now with “civil war” in Iraq, the country’s 26 million people are, in effect, divided into three major groups. “Each region is seeking security by setting up militias and their own sources of revenue. One of their primary sources has been tapping oil through smuggling and extortion schemes.”

that in many African countries, where foreign companies dominate and wealth is distributed through the market toward company executives and shareholders. “The only major difference is the level of embezzlement by local political elites – something that largely relates to stronger democratic institutions and a more diversified economy.”

In addition, there are significant energy supply security aspects. Canada has committed under NAFTA to export 63 per cent of its oil and 56 per cent of its natural gas to the U.S. Canada is a net exporter, but ends up importing 1.2 million barrels of oil a day to supply Atlantic Canada, Quebec and Ontario.

A role model for Canada could be Norway, which developed and maintained control of its oil and gas in the North Sea. In 1990, Norway set up a petroleum fund now worth about \$323 billion – compared to Alberta’s Heritage Fund of \$16.3 billion.

“That’s twelve times more per capita in Norway than Alberta,” observes Le Billon. “Although the oil sectors are different in a number of respects, Alberta has produced about as much oil as Norway since 1976 when Alberta set up the Heritage Fund.”

Le Billon’s research has received support from the Social Sciences and Humanities Research Council of Canada. **R**

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Principal Investigator: David Fraser, Land & Food Systems and Centre for Applied Ethics

GMOs Next Global Lightning Rod Issue

BY LORRAINE CHAN

Our ability to tinker with nature has outstripped our ability to regulate what we create, says Yves Tiberghien, a political scientist who specializes in global regulatory mechanisms for technology and trade.

Consider that almost 70 per cent of the products we buy at the grocery store contain genetically engineered food. Yet we don't know their long-term impact on our health, the environment, or how they may tip the future balance of power in the global economy.

"Corn and soy are the two main culprits since nearly all processed foods uses ingredients such as corn syrup, corn starch or soy lecithin," says Tiberghien.

GMO corn and soy first entered into the human food supply in 1996.

"It's a very big experiment – 11 years of genetically engineered corn and soy thus far," observes Tiberghien. "What does this mean? No one really knows."

Asst. Prof. Tiberghien teaches in the Dept. of Political Science and also heads a Liu Institute for Global Issues research initiative that looks at the global battle over the governance of genetically modified organisms (GMOs).

Between 2004 and 2006, he conducted 200 interviews with policy makers in Europe, Japan, Korea, and international organization bureaucrats. With further funding from the Social Sciences and Humanities Research Council of Canada, Tiberghien is extending this research to Canada and China.

To date, studies conducted on GMOs have found no proof of harm, but the amount of independent data is extremely limited. Tiberghien explains



A fresh ear of corn or Frankenfood? The struggle to settle this question has been far from democratic, says political scientist Yves Tiberghien.

that GMO toxicology testing is carried out by industry, which generally does only what is required to get approval.

Overseeing the companies and labs that produce GMO

seeds are national regulatory agencies and international bodies such as the World Trade Organization, the UN, the Codex Alimentarius Commission and the Organization for Economic

Other common GMO foods found at North American stores include canola oil, papayas and soon, rice. But even the most conscientious label-reading shopper wouldn't be

themselves are fragmented vertically and horizontally over the issue of "frankenfoods."

"The legitimacy of international and national regulatory bodies is in question. For example, Australia on a national level is pro GMO, yet nine of its 10 states are rabidly anti-GMO and have passed a moratorium on growing GMO crops."

Tiberghien says India and China are shaping up as the two largest future GMO battlefronts. China, for example, has the second largest GMO research next to the U.S. But bowing to public outcry, both countries now require mandatory labeling for GMOs, while at the same time are pouring millions of dollars into research and development in a bid for technological advances that could alleviate poverty.

"It's a very unstable situation," says Tiberghien. "On any given day, there are dozens of confrontations over GMOs taking place around the world."

By contrast, Canada is relatively quiet with very little media attention on the topic. Compared to 29 OECD countries, Canadians see the least amount of media reporting on GMOs.

"Canadians place a higher trust in the governmental regulatory agencies, which for GMOs is Health Canada."

He warns, however, that Canada is vulnerable to a backlash that would then catapult the issue into news headlines. Already, public opinion polls in B.C. and Quebec show that 85 per cent of the population support mandatory labeling of GMOs.

"These polls highlight the gap between citizens' preferences and existing

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Co-operation and Development (OECD).

The present framework is outmoded and rickety, says Tiberghien, with a decision-making process that's "essentially dominated by industry, the bureaucratic elite and scientific experts without citizens' participation."

He says as a society we are making decisions that are irreversible and far reaching, and we are doing it in a way that weakens democracy rather than strengthens it.

"Yes, we want wealth," says Tiberghien, "but not at any cost. We don't want to cross red lines where we endanger our health or the environment forever. We also want transparency and accountability."

able to detect GMO products. Seed producers argued against mandatory labeling, insisting there was "substantial equivalence," which means that GMOs provide the same nutrients as conventional crops and shouldn't be treated differently.

"Industry pushed for this and governments acquiesced," says Tiberghien.

Since then, civil society mobilization has forced the European Union and Japan to enact more stringent measures, including additional testing and mandatory labeling of GMOs. In turn, the EU seeks to sway other countries to do the same.

Overall, says Tiberghien, tensions are rife between global coalitions and nations, which

regulatory outcomes, offering room for groups or individuals to gain political mileage."

Tiberghien says GMOs could easily become the next climate change, a lightning rod that unites a broad spectrum of protestors as diverse as the anti-globalization movement, organic farmers, Greenpeace supporters, consumer organizations and the Council of Canadians.

An alternative to these pitched battles would be a more democratic process, says Tiberghien, pointing to a citizens assembly as one possible model.

"Imagine 400 citizens who are trained, know the issues and they're able to give input on regulatory design of GMOs." **R**

Damaged Goods?

Health system stereotypes still exist for teen mums



PHOTO: MARTIN DEE / ANN GONÇALVES

Graduate student Genevieve Creighton found surprising moral overtones in health literature about teen mothers.

BY HILARY THOMSON

Stigmatized or supported? How do teen mums fare in the health-care system?

Educational Studies and Health Promotion graduate student Genevieve Creighton wants to find out.

In a master's thesis project, Creighton reviewed and analyzed newsletters, Canadian public-health magazine articles and journals that discussed teen pregnancy and motherhood to find out how teen mums are characterized in public health

The average number of teens who give birth in Canada is 42 out of every 1,000 with Aboriginal teens becoming mothers at 18 times this rate, according to research published in 2005.

"There are lots of blaming messages out there for teen mothers," says Creighton. She found that mothers who didn't take health-care providers' advice on issues such as diet, substance use and exercise were characterized as immature and contrary.

Creighton's interest in the issue developed when she worked

many helping agencies," says the 34-year-old. "I found many of these mums to be strong, dedicated individuals who wanted to be good mothers. For some, having a child turned their lives around and motivated them to create a better life for themselves and their baby."

Her research showed that within the mainstream health-care system in Canada, adolescent mothers are characterized in academic health journals and nursing magazines that describe programs for young mothers, as poor decision-makers who risk their health and that of their child

negative impact on the health of these women, because they are reluctant to seek health-care services for fear they will be judged and not treated with the same respect as other patients."

A key problem, says Creighton, is a strong tendency to separate teen mothers from their social context when offering advice and care, and inadequate attention to the complexities of their lives. For example, health-care providers may focus on quitting smoking without understanding that smoking may be the woman's sole stress reliever in a demanding and

in Canada.

What do teen mothers need? "They need the same things that make life better for all mums and kids – social and financial support, child care, and good nutrition," says Creighton.

She is concerned that progressive health-care policies at the federal level can be over-ridden at the community level. Local communities and school boards can refuse to offer sex education or services of a public-health nurse in schools.

Creighton would like to see the women themselves creating and

"I found many of these mums to be strong, dedicated individuals who wanted to be good mothers."

literature and practice. Terms such as "babies having babies" and "sexually unrestrained" are common, she says.

"I was surprised by the moral tenor that still exists," she says. "Despite relatively progressive government health policies about youth and sexuality, teen mothers are still stereotyped as emotionally and socially lost or damaged girls and poor mothers."

for two-and-a-half years in a neighbourhood house in Surrey, B.C. She set up an educational and health-care program for young mothers whose situation did not match eligibility criteria, such as the age or number of children, for similar programs offered by the school district.

"My experience of these women was very different from the common perception found in

with the decision to continue their pregnancy. Stated risks included increased incidence of pre-and post-natal complications and increased risk of child abuse.

Creighton does not dispute the risks, but her research has led her to conclude that factors such as poverty, isolation and lack of social support are the causes, not the age of the mother.

"These attitudes can have a

socially complicated situation.

Models of enlightened and empowering relationships between health-care providers and young mothers do exist here in Canada, says Creighton, but are more commonly found in countries such as the Netherlands and Sweden where attitudes toward sex education and adolescent sexuality don't carry the moral overtones found

driving health-care and education programs that are meaningful for them, rather than having authorities impose programs. More and better programs for teen dads are also needed.

Starting a doctoral degree is the next step for Creighton. She will interview pregnancy clinic clients and health-care providers to assess how youth are treated and determine best practices. **R**

STARVE TB *continued from page 1*

In Canada, approximately 1,600 new cases of active TB are diagnosed annually and 63 per cent of those cases are found in people born outside of the country, according to the Canadian Lung Association.

Eltis and colleagues are working to create a multidisciplinary TB research centre at UBC, involving investigators in areas such as microbiology, chemistry and immunology. Their objective is

to establish a "pipeline" for the development of new therapies. Eltis cites UBC strengths such as top investigators, special lab facilities being constructed for biocontaminant research, and the Centre for Drug Research and Development that helps ready new therapies for commercialization.

"UBC is uniquely positioned to make a major contribution to a global threat," says Eltis.

There are currently only two

centres for TB research – in Lausanne, Switzerland and in Seattle, WA.

Along with UBC colleagues Yossef Av-Gay, Richard Stokes, Charles Thompson and others, Eltis envisions the centre offering shared services to enable targeted gene studies and development of inhibitors and vaccines.

For more information on TB, visit www.who.int. **R**

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Safeguarding the Keys to Knowledge

Indigenous scholar says preserving languages keeps cultural knowledge alive

BY BUD MORTENSON

If indigenous languages disappear so, too, will invaluable knowledge about our environment and sustainable ways of life, warns Lester-Irrabina Rigney, a visiting research fellow with UBC's Department of Education Studies.

"The world's indigenous languages are in crisis," Rigney points out. "The way things are going, only a few hundred languages amongst the world's 6,000 or so look like surviving in the long term. The rate of extinction of languages and cultures far exceeds that of fauna and flora."

An Aboriginal scholar from South Australia's Narungga Nation, Rigney is an associate professor with the Yunggoendi First Nations Centre for Higher Education and Research at Australia's Flinders University. He holds a PhD in indigenous research, and is collaborating with the newly formed Indigenous Education Research Institute of Canada located at UBC. The institute, he explains, is developing a Pacific consortium



Australian scholar Lester Rigney is at UBC on a research fellowship until January 2008, sharing his knowledge of Indigenous research, literacy, education and languages.

on research into indigenous education in partnership with researchers in Australia, Hawaii, New Zealand and Indonesia.

Rigney recently conducted a week-long seminar for UBC Okanagan's Summer Institute in Interdisciplinary Indigenous

languages in Canada, so they suffer a range of fates. Once they go to sleep, it's very hard to awaken them."

aware of a host of complex issues, legalities and ethics, and employ research techniques that are sensitive and productive for

"The rate of extinction of languages and cultures far exceeds that of fauna and flora."

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Studies, now in its second year offering PhD- and master's-level seminars for mature, mid-career indigenous students. He's teaching a new generation of researchers about pitfalls and best practices in conducting research with indigenous communities.

"Researchers are now starting to advance what we know about how you keep indigenous knowledge intact," says Rigney. "We now need to look at different ways for accessing indigenous knowledge. In any society, language holds the key to knowledge – indigenous communities are no different. The key to indigenous knowledge is indigenous language."

Rigney has observed the threatened state of these languages in all the colonized areas of the world he has visited, including Canada.

"What astounds me is that in Canada there's lots of emphasis on saving wildlife, rivers, and so on, yet you have indigenous languages that are not found anywhere else in the world," he says. "They are not official

He argues that when an indigenous language is firmly supported, it creates a stronger sense of place for its people, and allows services to be provided in ways that make people feel comfortable. That can lead to better education and greater development opportunities. For all these reasons, he says, "we need more numeracy and literacy in these languages."

Improving how research is conducted is important in the quest to better understand and help preserve First languages and cultures. Historically, researchers haven't done a good job, Rigney notes.

"Over the first 150 years of Australian – and Canadian – colonization, indigenous peoples were viewed as static, as if they were statues behind glass," he says. "In the past, research was done pretty inappropriately."

Communities were studied without engaging or even showing much consideration for the people who were studied. In what Rigney describes as being akin to "intellectual gymnastics," today's researchers must be

everyone.

He views programs like the UBC Okanagan Summer Institute as an important part of the solution. Only in the last decade or so, with a small but growing number of indigenous students earning advanced degrees, have indigenous people around the world become involved in researching their own communities, he observes.

A history of invasive research in indigenous communities remains sharp in people's minds, yet positive changes are taking place, Rigney suggests. "Research is still a dirty word for some. But now more and more people want to be a part of research – they see that it's a part of building the future."

"It's exciting – it has taken a long time to get indigenous researchers and scholars, and there are now some extraordinary researchers, from ethnobotany to speech pathology. I'm fortunate to be working with some of Canada's most skilled PhDs, and they will all make a difference." ■

KUDOS

Professor Ed Perkins, Canada Research Chair in the Department of Mathematics, has been elected to the Royal Society of London. As a Fellow of UK's national academy of science, he joins the likes of David Attenborough and Stephen Hawking.

Martin Rees, President of the Royal Society, said, "These new Fellows are at the cutting edge of science in the UK and beyond. Their achievements represent the enormous contribution science makes to society."

Fellows are elected for their contributions to science, both in fundamental research resulting in greater understanding, and also in leading and directing scientific and technological progress in industry and research establishments.

UBC has 8 faculty members who have been elected to the body.

New Sustainability Director Looks Beyond Kyoto

BY BASIL WAUGH

You are about to successfully reach Kyoto Protocol targets. What next?

The question may seem premature considering disagreement among world leaders on how to tackle climate change, but that is precisely the challenge facing Charlene Easton, the new Director of UBC's Sustainability Office (SO).

By the end of 2007, UBC will have reduced CO2 emissions six percent below 1990 levels, meeting Canada's 2012 Kyoto targets five years early. That achieved, along with more than \$18-million in energy savings, Easton says the university has turned its attention to a new challenge set by the B.C. government: zero net greenhouse gas emissions.

years in Jamaica, where she led the creation and adoption of a national environmental education plan and a comprehensive sustainable development plan for the city of Kingston.

In 2004, Easton moved to Vancouver, where she co-founded the Sustainability Purchasing Network and worked with mining companies to advance corporate social responsibility initiatives in Canada and Latin America.

Easton says she sees North America's West Coast as "an emerging sustainability hub with UBC right at the centre." She says she is most excited to work with the university's brain trust of students and researchers such as Prof. Bill Rees, creator of the environmental footprint analysis.

Easton, who telecommutes one day a week to reduce her car use, is currently looking

questions we are asking is 'What attributes does a UBC grad have, sustainability-wise, regardless of their field of study?'

Easton replaces the recently retired Freda Pagani, who helped establish UBC as a sustainability leader among Canadian universities through initiatives, including: Canada's first campus sustainability office, green buildings and the largest campus energy retrofit in the country – efforts that have twice been recognized by the U.S. World Wildlife Green Campus.

"In my experience, in capacity-building for sustainability it takes 20 years to influence systemic change, so it is amazing what UBC has achieved in the last 10 years," Easton says. "With such a strong foundation already in place, this is a very exciting time for campus sustainability at UBC." ■



PHOTO: DARIN DUECK

Charlene Easton has led green projects around the globe, including seven years in Jamaica.

Easton says she sees North America's West Coast as "an emerging sustainability hub with UBC right at the centre."

"In the 2007 throne speech, the B.C. government committed to become carbon neutral," says Easton, a native of Sarnia, Ont. "It is a monumental, but exciting challenge – and as an international leader in sustainability research and innovation, UBC has a major role to play in this enterprise."

Easton arrives at UBC with 25 years of experience with sustainability solutions and strategies. She has a Masters in Environmental Studies from York University and has worked to advance sustainability leadership and innovation across a variety of sectors in Canada, the Caribbean, Africa, Latin America and South East Asia. Career highlights include seven

to engage stakeholders about how the university will go forward in the next 10 years. She says the process will further incorporate UBC's Trek 2010 sustainability values into campus life, addressing everything from student learning, climate change and academic planning.

"UBC has been very successful at empowering students to authentically contribute to climate change solutions," says Easton of initiatives such as UBC's Social, Ecological, Economic Development Studies (SEEDS), an academic program that brings together students, faculty, and staff in projects that address sustainability issues.

"But I think there is still more we can do. One of the big-picture

SUSTAINABILITY PROGRAM HITS THE ROAD

UBC's Sustainability Coordinators Program has become an international model for how to create a culture of sustainability in the workplace.

Earlier this year, 24 universities, governments, businesses and other organizations from all over North America came to UBC to learn about how nearly 150 faculty and staff have helped save \$75,000 in electricity annually and inspire positive changes in waste generation and energy and transportation.

Due to popular demand, the Sustainability Office, in partnership with Continuing Studies and University-Industry Liaison Office, will be taking the workshops on the road this year. Sessions are planned for Maine, California and Vancouver.

"It's inspiring to see how UBC's leadership is helping others to foster sustainability in their organizations – from as far away as Texas and Toronto to right here in Vancouver and Victoria," says Ruth Abramson, Sustainability Office Marketing Manager.

MORE NEW UBC SUSTAINABILITY INITIATIVES

- » This summer marks the launch of the UBC Climate Action Partnership. This collaborative, student-led sustainability network brings together student groups including the Alma Mater Society, the Graduate Student Society, the UBC Okanagan Student Union and Common Energy.
- » The Sustainability Office will lead a six-month audit of UBC's greenhouse gas emissions, including those from buildings, automobile traffic and university-related air travel, including student exchanges.

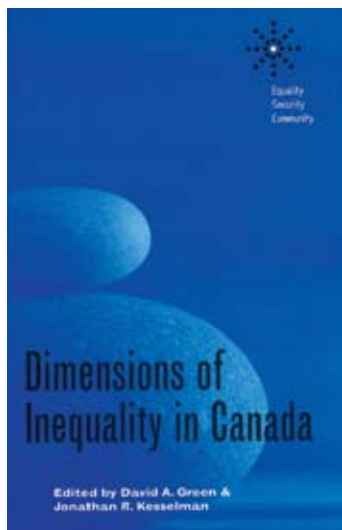
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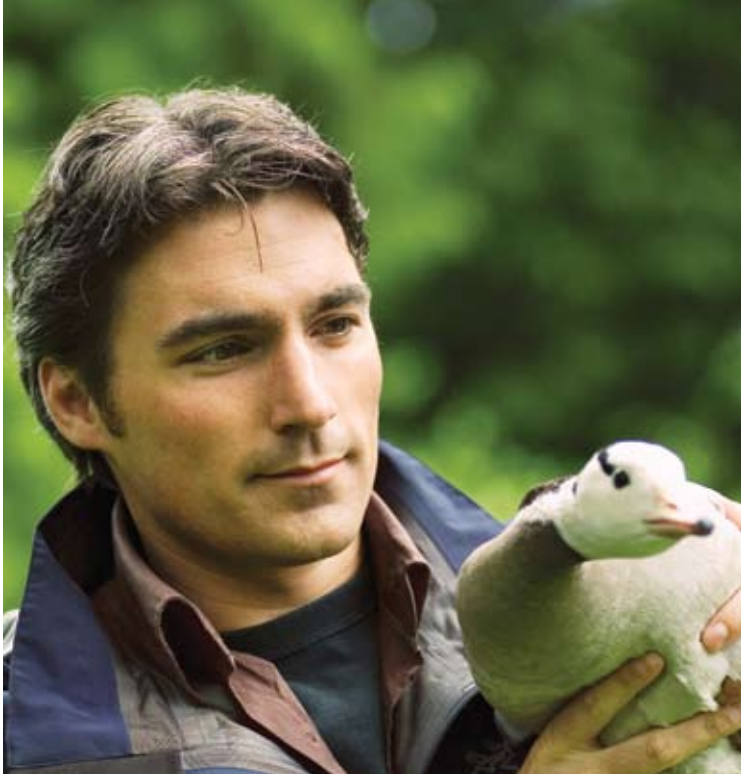
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High-flying Honkers Have Superhuman Power



PHOTOS: MARTIN DEE

Zoology PhD candidate Graham Scott is studying how bar-headed geese are capable of physical exertion in high altitudes.

BY BRIAN LIN

They may seem deceptively innocuous mixed in with other waterfowl, but bar-headed geese can do with ease what most elite high altitude athletes can't. Now a UBC zoologist is learning how.

Native to South and Central Asia, bar-headed geese, named for the dark stripes on the backs of their heads, are often bred in captivity as domestic garden birds. In the wild, they migrate annually between India and the Tibetan plateau in China, flying over the world's highest mountains on their way.

"They fly at altitudes up to 9,000 metres," says Zoology PhD candidate Graham Scott. "That's the equivalent of humans running a marathon at the altitudes commercial airlines fly."

Even at rest, humans struggle to cope with the low oxygen environments at high altitude. Mountaineers train for years before attempting to reach the peak of Mount Everest, where less than a quarter of the oxygen at sea level is available. Even with supplemental oxygen it takes them several weeks to summit. Some members of the highest human settlement – La Rinconada, a mining village in Peru, at

5,100 metres elevation – still suffer from lifelong symptoms of mountain sickness including headaches, nausea and sleep disorders.

Scientists have known that the blood of bar-headed geese – specifically their haemoglobin – is better at holding onto oxygen than low-altitude birds. "But there's long been suspicion that something else is contributing to their extraordinary abilities," says Scott.

By simulating high altitude conditions in the lab, Scott has learned one of the bar-headed goose's secrets: Unlike humans and many other mammals, which take more

frequent breaths to accommodate a lack of oxygen – think running up stairs – bar-headed geese take much deeper breaths.

"They take in almost twice as much air per breath as low-altitude birds and thus extract a lot more oxygen," says Scott. "That, coupled with the ability to carry more oxygen in their blood, allows bar-headed geese to send more oxygen to their flight muscles, fueling the metabolism required to fly."

The new insight allows scientists to better understand the limitations of human physiology and potentially find ways to exceed them, says Scott. **R**



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