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Helping students chew over their food sources

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Mario and Guitar Hero bring kids together

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Safety vs privacy: prof seeks balance

From police surveillance to Facebook, UBC Law Prof. Ben Goold studies where to draw the line between privacy and safety. BY BASIL WAUGH PAGE 4

PHOTO: MARTIN DEE

Is this water safe to drink?



UBC researchers Debbie Roberts (left) and Mina Hoorfar have constructed a device to detect pathogens in water in real time.

BY JODY JACOB

UBC RESEARCHERS hope to patent a device to detect water-borne pathogens in real time – a technology

that currently doesn't exist, and one that could potentially help prevent human illness caused from dangerous organisms that can infiltrate treated water systems.

“Currently, plant operators can't actually detect a pathogen in water on location at treatment facilities,” says Debbie Roberts, principal co-investigator and Associate Director of the School of Engineering at UBC's Okanagan campus. “They send samples away to labs for testing, and quite often that doesn't happen until after people have started to get sick.”

“The fact is, if I wanted to find out what is in my water to determine at that very moment if it is safe to drink, I couldn't do it. So I want to develop the technology that can.”

The device is a portable, box-like system called a capture cell that passes a stream of treated water over a series of plates that contain capture molecules, such as antibodies. The capture molecules have an ability to bind to pathogens present in the water.

Once the sample is collected, the plates are removed and dipped into a solution that contains signal molecules – known as micro retro-reflectors – that also contain an antibody. The result is an organism between two molecules, one of which has a reflector on it. This is then put into a detector and light is

shone on it. If any light bounces back, the sample contains a pathogen. If no light bounces back, it is a clean sample.

The micro retro-reflector technology was developed by colleagues of Roberts at the University of Houston, although they didn't have a practical application for it at the time.

“The technology was really all there, it just needed to be brought together. The biggest challenge was developing the actual capture device or sample cell,” says Roberts.

Mina Hoorfar, Assistant Professor of Engineering at UBC's Okanagan campus and co-investigator in the project, was able to use her knowledge in fluid mechanics to put the last piece in the puzzle.

“And now,” says Roberts, “we are confident we have a prototype that will help us show proof of concept, so we can secure funding and move the project forward.”

Roberts expects the capture cell will have important practical applications for developing countries, as well as developed countries. With this in mind, researchers are working to make the capture cell a fairly inexpensive

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IN THE NEWS

Highlights of UBC media coverage in May 2010. COMPILED BY HEATHER AMOS

Research by UBC's Harvey Richer suggests that several large chunks of the Milky Way formed at the same time, roughly between 11 billion and 12 billion years ago.

NEW HUBBLE PICTURES SUGGEST MILKY WAY FELL TOGETHER

Preliminary research led by **Harvey Richer** at UBC strikes a blow against the prevailing theory of galaxy formation. His research, which was reported in *Science News* and *Discovery News*, suggests that several large chunks of the Milky Way galaxy formed at the same time.

Richer and his colleagues are examining 47 Tucanae, a dense, elderly grouping of more than a million Milky Way stars with two Hubble Space Telescope cameras. The analysis reveals that 47 Tucanae formed between 11 billion and 12 billion years ago.

"This is not a young cluster. That's definitive," Richer said. But he cautioned that both the analysis and observations of 47 Tucanae are ongoing, so the precise age determination is still "very preliminary."

CANADIAN UNIVERSITIES ATTRACT TOP MINDS

Matthew Farrer was appointed UBC's first Canada Excellence Research Chair, receiving a grant of \$10-million over seven years.

Farrer studies neurodegenerative disorders, with a focus on molecular genetics and modelling of movement disorders such as Parkinson's disease.

The Globe and Mail, *CBC*, the *National Post* and *Maclean's* reported on the 19 inaugural chairholders appointed to 13 universities across Canada in a \$200-million international recruitment drive that signals Canada's commitment to big science.

UBC'S \$50M BIODIVERSITY CENTRE OPENS TO WORLD'S RESEARCHERS

The Globe and Mail, *CTV*, *Global TV*, *CBC*, *The Vancouver Sun* and the *Times Colonist* reported on the opening of UBC's Beaty Biodiversity Centre, which will bring together some of the world's leading researchers.

The centrepiece of the new facility is the awe-inspiring 25-metre-long skeleton of a blue whale that was washed ashore on Prince Edward Island in 1987.

"The Beaty Biodiversity Centre exemplifies UBC's goal to engage and inspire," said UBC President **Stephen Toope**. "The curiosity and reflection

inspired by the museum's public programs will have enormous impact on our understanding of our complex and interconnected world."

LIFE FOUND IN LIQUID ASPHALT LAKE

A Caribbean lake of liquid asphalt, the home of a unique mix of microorganisms, may provide clues to how life could survive in hydrocarbon lakes on Saturn's moon Titan, as was reported by *Fox News*, *Science News*, *Discover Magazine* and *CBC*.

Steven Hallam, of UBC, and his colleagues analyzed samples from several different parts of Pitch Lake on the island of Trinidad. They found each gram of sticky black goo in Pitch Lake can harbor up to 10 million microbes that feed on the hydrocarbons and pump out methane and metals.

"Every single sample that we looked at, the bacterial community was different," says Hallam. ■

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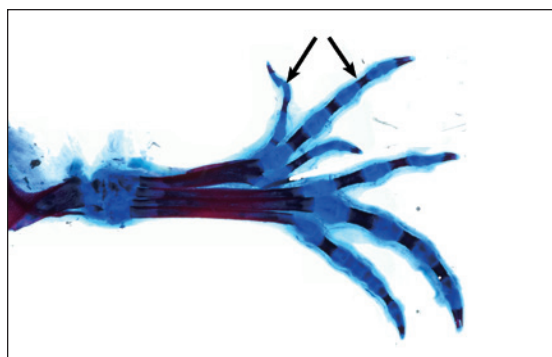
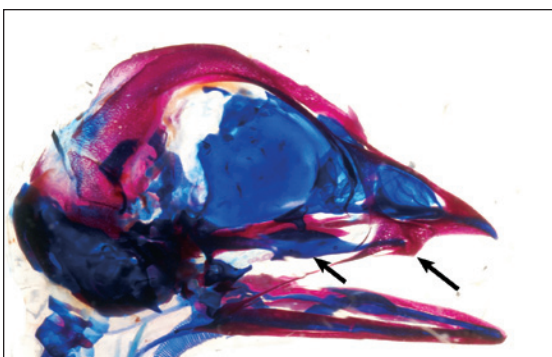


Dr. Joy Richman cuts a window the size of a postage stamp into the eggshell to observe face and limb development.

PICTURED BELOW: A 13-day chicken embryo whose skull and leg show extra beak parts and extra toes (indicated by arrows) produced by the introduction of a foreign gene.

PHOTO: MARTIN DEE

Chicken embryos illuminate cleft palate problems



BY LORRAINE CHAN

FOR DR. JOY RICHMAN eggs offer an untold wealth of information about human development.

A pediatric dentist and development biologist, Richman studies chicken embryos, focusing on the intricately patterned facial bones and limbs.

“The embryonic faces of vertebrates including humans, mice and chickens are very similar,” says Prof. Richman who teaches in the Faculty of Dentistry.

Her lab investigates the molecules that tell the initially indistinct cells in the embryo to form recognizable structures such as the skeleton of the jaw or hand. By tweaking molecules at an early stage it is possible to duplicate structures or transform one part of the embryo into another. Richman’s study on embryo patterning was recently awarded more than \$900,000 from

the Canadian Institutes of Health Research (CIHR).

She explains that face development for all mammalian embryos begins with discrete buds of tissues – called prominences – that surround the primitive oral cavity. These grow together to form the face.

Currently, one in 700 babies is born with a cleft lip or palate. For a variety of genetic and environmental reasons, the separate areas of the face do not join together as they would normally, resulting in a cleft.

Many times, facial defects are accompanied by limb or digit abnormalities, both of which require multiple surgeries, often followed by expensive dental or orthopedic treatments.

Given the intricacies of human embryos and the serious consequences of anomalies, Richman says it is important to study a model organism

that mirrors human development yet can be accessed during embryonic development.

“The chicken embryo is ideal to unravel these mysteries.”

“Our work will shed light on inherited birth defects that affect the skeleton including cleft lip, jaw size and shape abnormalities and disturbances in the bones of the hands and feet.”

To view what is happening in the chicken embryo, Richman cuts a window the size of a postage stamp into the eggshell. When researchers place the egg under the microscope, they can see the beating red heart, the face and limbs.

In work leading up to the CIHR grant, Richman traced jaw development to the presence of retinoic

acid, a vitamin A derivative and a protein linked to bone formation. By inserting tiny beads containing these molecules into the early chicken embryo, Richman found that the cheek bones were replaced with bones that normally are found in the centre of the face, essentially duplicating the upper beaks.

The experiment on beak duplication also led Richman to her current work which is to investigate the genes that make the centre of the face. Out of hundreds of genes involved in this process, one in particular caught her attention.

“This gene piqued my interest because it makes a protein that is secreted outside the cell and as such

could play a pivotal role,” says Richman. “It may act as an ‘orchestrator’ directing nearby cells into required patterns.”

She says the majority of studies on face development seek to unlock the secrets within the cell, looking at which gene levels are up or down. However, far fewer people are looking at what is happening outside the cells.

“It seems to me that we also need to

understand what is happening in the stage between the genes changing and the first signs of the skeleton appearing.”

Findings to date support her theory about the importance of an “orchestrator.” Richman discovered that the protein was strongly turned on in during the chicken embryo’s beak development. She also found that placing the gene for this protein into the embryo caused it to grow an extra beak and also to duplicate digits of the limb.

“We now want to manipulate the levels of this protein in the early chicken embryo to determine its roles in shaping the skeleton of the limbs and face.”

Study results will aid those yet unborn, says Richman. “Our work will shed light on inherited birth defects that affect the skeleton including cleft lip, jaw size and shape abnormalities and disturbances in the bones of the hands and feet.

She adds, “Our results may also one day help to improve healing after injuries to the skeleton.” ■

Safety vs privacy: prof seeks balance

BY BASIL WAUGH

A VIDEO CAMERA FOLLOWS a young man leaving his apartment. Undercover police officers snap photos of him from an unmarked car.

He boards public transit and security operators use an infra-red scanner to scour his body for suspicious packages. At work, his employer uses spyware to record what websites he visits and for how long.

He buys a book from his favorite online store and is surprised by how accurate its “personal recommendations” are.

According to Ben Goold, a new UBC professor who studies surveillance technology, civil liberties and law, these scenarios raise a number of concerns.

“The question is how we balance society’s legitimate interest in security with a commitment to individual privacy rights,” says Goold, who left Oxford University to join UBC’s Faculty of Law in January.

The 40-year-old has been on the front lines of this controversial debate for more than 15 years, having lived in the UK at the inception of closed-circuit television (CCTV) and New York for 9/11, and the subsequent crackdown on travel and civil liberties.

“Other countries need not follow the example of Britain’s CCTV and America’s Patriot Act,” says Goold, who has helped numerous government agencies in Europe think through public safety and privacy issues, including Britain’s House of Lords inquiry into surveillance and data collection, the UK Identity and Passport Service, and the European Forum for Urban Safety. “The benefit of hindsight allows us to make more informed decisions.”

Before considering surveillance technologies, Goold says there must be a clear understanding of their costs and benefits. And according to Goold, who teaches courses on privacy, security and law, one important cost that is often overlooked is the damage to public trust.

“Surveillance technologies have the potential to seriously undermine the relationships between individuals and the state,” says Goold. “In the UK we have seen CCTV cameras transform busy and vibrant city streets into

“CCTV can help deter crimes committed by people in rational states, like shoplifting and car theft, but not spur of the moment violent crimes.”

heavily monitored spaces in which young people and visible minorities are likely to be the main focus of attention. You need to ask, would adding police officers be more effective from a cost and community safety perspective, given the actual risk?”

Understanding surveillance technologies and their limitations is also key, says Goold, whose books include CCTV and *Policing and Security and Human Rights*. “Reducing violent crime is often used to justify CCTV, but cameras are not always particularly effective at that,” he

says. “CCTV can help deter crimes committed by people in rational states, like shoplifting and car theft, but not spur of the moment violent crimes or other offences committed due to the influence of drugs or alcohol.”

Since arriving at UBC, Goold has heard many debates that previously raged in the UK and the US heating up in Canada. Online, social networking websites like Facebook have been pilloried for not adequately protecting personal information, and according to civil liberties groups like the Public Space Network, proposed changes to the B.C. School Act may be opening the doors to CCTV-style cameras in B.C. high schools.

There is also still fallout from Canada’s largest-ever domestic security operation, the 2010 Olympics and

Paralympics Winter Games. While most of the 1,000 CCTV cameras that were installed for the operation have since been decommissioned, questions remain on how the City of Vancouver will use the remaining 14 cameras.

Goold says institutions need to determine exactly how surveillance technologies will be used before they are employed, not after. “If you don’t take the time to get things right from the beginning, that’s when problems occur, such as overzealous policing, violations of individual privacy, and the loss of sensitive personal data.”

For more information on Goold and UBC’s Faculty of Law, visit law.ubc.ca. ■

Two studies point way for stroke research



Post-doctoral fellow Sean Meehan and PhD student Jodi Edwards have uncovered new information about quality of life after a stroke and how the brain responds to new challenges.

BY BRIAN LIN

MORE CANADIANS are surviving severe stroke, but they are also experiencing poorer quality of life, according to a study published last month in the journal *Stroke* by UBC PhD student Jodi Edwards.

Meanwhile, Edwards’ lab mate, post-doctoral fellow Sean Meehan, has found that when learning a new movement post-stroke, the brain uses the prefrontal cortex – an area typically associated with cognition – to compensate for damage to motor regions of the brain. His study was published this April by the journal *Human Brain Mapping*.

The studies underscore the urgent need to develop rehabilitation strategies to help those who have

survived stroke and point the way to do just that, says Lara Boyd, Canada Research Chair in Neurobiology of Motor Learning and supervisor to both Edwards and Meehan.

“Jodi’s study tells us that quality of life after stroke has decreased in the past decade. A potential reason for this decline is that while we’re good at rehabilitating patients who have suffered mild and moderately severe strokes, we have very little to offer the increasing number of Canadians who have survived a severe stroke,” says Boyd, an assistant professor in the UBC Department of Physical Therapy. “But Sean’s study is pointing to ways to make a major impact in post-stroke care.”

Edwards sourced data from public health surveys published by Statistics Canada between 1996 and 2005 – a

decade that saw many significant advances in early acute stroke intervention – and analyzed stroke survivors’ self-assessment in eight quality-of-life attributes.

“Despite improvements in medical intervention, quality of life actually declined for Canadians who had suffered a stroke,” says Edwards, a Canadian Institutes of Health Research (CIHR) and Michael Smith Doctoral Scholar from the School of Population and Public Health and the Brain Behaviour Laboratory. “And the two areas of impairment that most impacted quality of life were motor and cognitive functions – which is in line with the most commonly identified residual deficits of severe strokes.”

“On the one hand, the findings are understandably discouraging for

those who work with stroke patients on a daily basis,” says Edwards, who works closely with stroke neurologists and physical therapists at Vancouver General Hospital and will present her findings at the upcoming Canadian Stroke Congress in Quebec City.

“On the other hand, we’ve now identified two domains where we could make the most impact in devising rehabilitation strategies and potentially improve quality of life.”

Just a few feet from Edwards’ desk, Meehan, a CIHR and Michael Smith post-doctoral fellow, studied functional magnetic resonance imaging (fMRI) images from both healthy and post-stroke individuals and saw the remarkable way the brain rallied around a new challenge.

When performing a joystick

tracking exercise, healthy participants demonstrated increased activity in the premotor cortex – an area typically associated with planning and learning movements.

In contrast, Meehan discovered that after stroke, people showed increased activity in a region of the brain associated with cognition, the prefrontal cortex, rather than the premotor areas.

“This shows us that the post-stroke brain can still learn motor skills, but that it’s using a different network to compensate for the damage,” says Meehan, whose study is the first to show the role of the prefrontal cortex in post-stroke motor learning. “This new information on how the brain compensates for damage suggests two potential strategies for rehabilitation: We could work on restoring the original brain function before the stroke occurred, or by promoting this new pathway.”

“The convergence of these findings from seemingly very divergent areas of research is telling us that the brain isn’t working in compartments – each area taking charge of certain functions that may be irrevocably damaged by injury or disease,” says Boyd, a member of the Brain Research Centre. “Rather, the different domains of the brain are inter-related and may work together to take on new challenges.

“This insight will go a long way to helping us devise rehabilitation strategies that will make the greatest positive impact” ■

The Brain Research Centre comprises more than 200 investigators with multidisciplinary expertise in neuroscience research ranging from the test tube, to the bedside, to industrial spin-offs. The Centre is a partnership of UBC and Vancouver Coastal Health Research Institute. For more information, visit www.brain.ubc.ca.

PHOTO: MARTIN DEE



NOT YOUR SAME-OLD CAFETERIA FOOD

UBC has been able to improve some of its own food systems thanks to hands-on teaching and learning about sustainability issues.

In 2006, the Faculty of Land and Food Systems' Alejandro Rojas and Assoc. Prof. Art Bomke introduced the UBC Food Security Project. The first initiative of its kind at a Canadian university, the UBC Food Security Project clarified sustainability principles and connected students with major stakeholders – the departments and people who manage the food, the campus farm and the waste at UBC.

As part of their curriculum, students analyzed aspects of UBC's food system and came up with recommendations, many of which have been implemented into operations. For example, UBC purchases, whenever possible, eggs and poultry from local producers, fair trade and organic coffee and seafood that meets Ocean Wise sustainability standards.

For more information about The UBC Food Security Project, visit: www.publicaffairs.ubc.ca/ubcreports/2006/06apr06/foodsystems.html

For more information about UBC Food Services' sustainability initiatives, visit: www.food.ubc.ca/about/initiatives.html

Planting school food gardens and orchards number among the ideas that Alejandro Rojas, a UBC food security researcher, is bringing to Vancouver's K-12 schools.

Helping students chew over their food sources

BY LORRAINE CHAN

RATHER THAN BITE into a ham or peanut butter sandwich, Vancouver students could soon be tucking into a lunch they had a hand in growing or preparing.

UBC researcher Alejandro Rojas is launching *The Think&EatGreen@School Project* which aims to connect Vancouver K-12 students to food and sustainability issues while helping schools lighten their ecological footprint and reduce greenhouse gas emissions.

The Think&EatGreen@School Project is a five-year interdisciplinary study that explores innovative ways to teach students about the impact of individual food choices on the planet's limited land and water resources.

"We're looking at ways in which the school system can contribute to reconnecting people, food and the environment," says Rojas. "In an age where most kids think of meal preparation as nuking a pizza pop in the microwave, we want to get them thinking of food as a powerful social and ecological connector and as a

means to protect rather than deplete the environment."

LFS professors Art Bomke, Gwen Chapman, Andrew Riseman and Brent Skura, and UBC Farm Project Manager Mark Bomford are co-investigators on the study, along with Assoc. Prof. Jolie Mayer-Smith, Dept. of Curriculum and Pedagogy in the Faculty of Education and Wendy Mendes from the School for Community and Regional Planning.

As principal investigator, Rojas recently received a \$1 million grant from the Social Sciences and Humanities Research Council of Canada, specifically a Strategic Research Grant from the Community-University Research Alliance (CURA) for Canadian Environmental Issues program.

UBC's partners include the Vancouver School Board, Vancouver Coastal Health, Vancouver Food Policy Council and numerous non-profit organizations working on food and environmental advocacy.

The study will investigate: the nutritional, ecological, social and economic practices of school food programs; the impact of on-site food production; the influence of

curriculum and school physical design on student learning about the relationships between food security, sustainability and climate change; and the impact of creating a sustainable school food system on the ecological and carbon footprint of a school.

"One of our exciting ideas is to expose students to meal planning and preparations with local, seasonal ingredients that have a low-carbon footprint," says Rojas. "We're also looking at planting school food

"If we succeed, at the end of the five years, the Vancouver School Board could be one of the most advanced metropolitan school districts in North America in regards to food garden practice."

gardens and orchards so students can get some hands-on learning about the growing and harvesting of food."

The research team anticipates working closely with about 12 elementary and secondary schools each year over five years. Helping them ensure smooth logistics are Project

Coordinator Will Valley, Project Manager Elena Orrego and Project Community Liaison Brent Mansfield.

The Think&EatGreen@School Project will also fund graduate students and bring entire classes of undergrads to contribute and gain experiential teaching and learning skills. School-specific projects could range from preparing the soil for a new "backyard" garden to improving the cafeteria menu.

"If we succeed, at the end of the five years, the Vancouver School Board

recent provincial legislation in B.C. requires all public institutions to be carbon neutral by 2012.

"This is a very exciting opportunity for students, teachers, parents and administrators to help develop models of best practice and policies that other school districts can use," says Kevin Millsip, Sustainability Coordinator, Vancouver School Board.

The Vancouver School District currently serves 56,000 students in the K-12 levels, more than 3,000 adult

could be one of the most advanced metropolitan school districts in North America in regards to food garden practice and supportive policies and innovative pedagogy," says Rojas.

As well, the initiative tackles institutional models of change for decreasing carbon emissions given that

education students and about 40,000 continuing education students in 108 schools.

"What we hope students will come away with is this simple fact – stewarding the planet involves small and large steps that we must take together," says Millsip. ■



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Sauder student **Thato Makgolane** is bringing a group of UBC students, faculty and alumni to his hometown of Phalaborwa, South Africa to run an MBA-style workshop.

Building a bridge with South Africa

BY HEATHER AMOS

SINCE fourth-year Sauder School of Business student Thato Makgolane left his hometown of Phalaborwa in South Africa, five years ago for school, he has been trying to find ways to give back to his community.



Thato Makgolane

"Growing up in Phalaborwa I had lots of mentors and people supporting me, and I felt a responsibility to give back" said Makgolane. "I've been

In exchange, the students are working in some of these businesses and will learn about doing business outside of Canada.

"We like to say we're building a bridge," says Kroeker. "The knowledge travels in both directions."

Makgolane stresses this to his peers: "you're not going to give, and you're not going to aid. You're going to share, and you're going to learn."

The students have adopted this mindset, and named the project the Arc Initiative, with the arc symbolizing the bridge and the two-way flow of knowledge.

Even developing the program for the Business Leadership Workshop involves sharing knowledge. The group has asked their community partner, the Palabora Foundation, to help develop workshop topics.

Teaming up with the Foundation – a local NGO that is already plugged-in and established in the community – is

South Africa will complete a six-week co-op placement in a local business. They will intern in tourism or food production businesses that the Palabora Foundation connects them with.

The students are also running a business competition for emerging business leaders in Phalaborwa. They are raising \$10,000 in SEED money which will be awarded to two business proposals.

When Makgolane and Kroeker started planning this project in February they felt Sauder needed more social enterprise and community outreach opportunities for students. They turned to UBC's Go Global office which facilitates international learning opportunities for students.

Go Global works with faculty and community to integrate the learning and service goals within programs to ensure there is a sustained capacity for the community. They also work with the students to get them prepared

Makgolane stresses this to his peers: "you're not going to give, and you're not going to aid. You're going to share, and you're going to learn."

looking for ways and opportunities to connect my experiences at UBC and Sauder with my town."

After a failed attempt to bring the One Laptop per Child program to his hometown, Makgolane was inspired by conversations with UBC accounting Professor Jeff Kroeker to try something out again this summer.

Makgolane and Kroeker have put their ideas together and are developing a pilot project that they hope could provide an alternative to the heavily criticized aid model currently used in Africa – where Western nations continuously give money and resources.

This July, Makgolane, Kroeker, students, faculty and alumni from Sauder and members of the Vancouver business community are traveling to Phalaborwa, on the north-eastern side of South Africa, to give it a whirl.

They are taking their skills and knowledge to the town and will be holding a four-day MBA style workshop for members of the Phalaborwa business community.

an essential component of Kroeker's new model.

"When we leave South Africa, the project isn't over. We want to keep talking with our partners and we want students and alumni to return," says Kroeker. "The key to making it sustainable is to have this partnership with the Foundation."

"If this project succeeds, it could be applied around the world. It has a great deal of potential," says Michael Bae, a fourth-year Sauder student and the team coordinator for the Arc Initiative.

Kroeker is hoping this pilot project can be fine-tuned so he can bring it to Ethiopia next year where he has been developing relationships with local NGOs. The focus and content of the workshop will be continually refined; however, he is certain that the Sauder students will get a lot from the experience. They are the ones who will be trying to apply their skills in a new environment, "travelling across the bridge!"

The five students traveling to

before they go abroad, and help them reflect on their work once they come back to Canada.

The Arc Initiative will be one of 11 International Service Learning programs heading out this summer. In total, Go Global has 56 students going to seven countries between May and August.

Team coordinator Bae applied to the Arc Initiative through Go Global because he knew it was an opportunity to broaden his business skills and knowledge.

"Collaboration is how international business is happening all over the world. I'm interested in doing business on a global level once I graduate."

Kroeker isn't surprised. He says there's been a significant shift in what students want out of their careers. This generation wants to excel in their jobs, collaborate on an international level and participate in community outreach all at once.

"I'm constantly inspired by students who don't see barriers," he says. ■



UBC SPORT CAMPS*

- UBC Sport Camps offers more than 100 athletic, artistic and leadership programs
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- Not all camps focus on athletics, including: Uniquely You (for girls); Junior Leadership Camp (for aspiring coaches and camp planners), and; Arcade Bunker (for youth who love video games).
- New camps this year: track and field, skateboard and BMX, golf, ultimate Frisbee and rugby
- For more information, visit: www.ubccamps.ca

* Academic departments and units across campus offer other summer camps, as well.

PHOTO: JOSHUA HODGE / ISTOCK PHOTOGRAPHY

Mario and Guitar Hero bring kids together

BY HEATHER AMOS

TWELVE-YEAR-OLD Cartier Assadbeigi will be a year younger than most of her peers when she starts high school this fall. She's also over 5' 8" tall, reads three books at once, and likes to watch old horror movies and post reviews on YouTube.

"Cartier is very mature for her age, but she's not sporty and she doesn't mingle very well," says her mother April. Like all parents, April wants her daughter to be happy, and to find people she can connect with.

Last year, Cartier and April discovered Arcade Bunker, a one-week video game camp for youth aged nine through 16 offered by UBC Sport Camps. Campers race Mario Carts,

Arcade Bunker who don't necessarily fit into other programs we offer."

With child obesity rates ballooning, a video game camp may seem like a step in the wrong direction. But Cupido says UBC Sport Camps, which has about 7,000 registrants every summer, is there to get children out of the house and actively participating in a variety of activities with their peers. "If their strength is in that field, let them develop that," says April. "I don't think the games are the problem. If a parent sits their kid down in front of a television or video game and doesn't pay any attention to them, that's the problem."

And, because the camp is only a half-day, many campers spend their mornings playing football or tennis at

Arcade Bunker was new last year, and Cartier was one of 23 campers who gave it a try. It's back this year, and campers get the added bonus of touring Electronic Arts' (EA) Burnaby facility.

EA is one of the largest and most successful video game development companies in the world, known for games like *FIFA Soccer* and *Need For Speed*. The campers will be trying out some of the cool technologies and fun facilities that EA employees use every day.

"Electronic Arts is participating in the camp to inspire youth who are passionate about video games so that they are aware of the amazing career opportunities available in this industry," says Jackie Copland, senior manager of Talent Acquisition for EA.

Campers race Mario Carts, compete in a Battle of the Bands with Guitar Hero, and participate in outdoor activities between gaming sessions.

compete in a Battle of the Bands with Guitar Hero, and participate in outdoor activities between gaming sessions.

For Cartier, who started gaming at age four when Pokemon came out, it was a perfect fit.

"She got to meet like-minded people," says April. "There were people Cartier could play with and give her social interaction."

Arcade Bunker emerged from this idea of creating an environment where children who aren't your typical campers, can go to socialize and excel in something they love.

"We want to have something for everybody," says Kyle Cupido, manager of UBC Sport Camps. "Kids come to

some of the other programs offered by UBC Sport Camps.

Arcade Bunker isn't the only camp that isn't all about sports. Uniquely You is a camp that helps teach girls about healthy lifestyles to improve their social and emotional well-being. Junior Leadership Camp gets young adults involved in the coaching and planning of camps, and provides workshops on coaching and teaching.

This year UBC Sport Camps has added programs in ultimate Frisbee, track and field, skateboard and BMX and golf. There are also the longstanding favourites, soccer and adventure camps, where campers kayak, rock climb and bike all over the Lower Mainland.

Inspiring youth and supporting personal development are just part of the reason UBC puts on summer camps. Most of the camp staff and counselors are UBC students and athletes.

"It really is a leadership and learning opportunity for UBC students," says Cupido. "Our instructors are positive role models for the campers."

"The more exposure youth have to university life, the more likely they are to attend an institution of higher learning." ■

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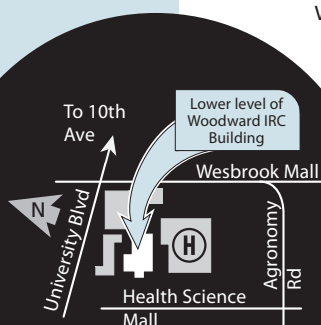
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The economics and politics of the HST



UBC economist Kevin Milligan says competitive retailers will pass tax savings from HST onto consumers.



Fight HST has benefitted from ex-premier Bill Vander Zalm's recognizability, UBC political scientist Fred Cutler says.

BY BASIL WAUGH

THE ENDGAME is approaching in the dramatic tax war that has raged since B.C. announced plans to scrap the PST in favor of a Harmonized Sales Tax (HST).

The anti-HST campaign, *Fight HST*, led by former Premier Bill Vander Zalm, has until July 5 to collect the signatures of 10 per cent voters of each of the province's 85 electoral ridings. If successful, they could trigger a referendum on the tax or even attempt to recall MLAs. If they fail, HST is scheduled to become law on July 1.

The rhetoric is flying, fast and furious. HST advocates call it

**Prof. Kevin Milligan,
UBC Department of Economics**

What is being proposed?

The Province hopes to amalgamate the 7-per-cent PST and 5-per-cent federal GST, creating a 12-per-cent HST.

How are the HST and PST different?

The HST is a value added tax, which means it is imposed on final consumption of goods and services. The PST is a retail sales tax, which can be charged on goods at different stages of production. This 'cascading' of hidden taxes can lead to very high effective tax rates for some goods, and inconsistencies. Few jurisdictions

What are the benefits of HST?

First, it levels the playing field among businesses, whether they are producing goods or providing services. Second, HST reduces administrative costs for both business and government. Third, it makes the tax more transparent as it is visible on final purchases, rather than partially embedded in prices, as it is with the PST. Finally, enabling firms to take credits for taxes they pay on capital inputs provides stronger incentive for new investment.

The drawbacks?

I can't think of an argument in favour of a retail sales tax like the PST over a value-added tax such as the HST.

If passed, who are HST winners and losers?

Firms that make goods with many levels of production will win because they currently must embed much of the PST they pay in the prices they charge customers. Companies that provide mostly services will lose their tax-favoured status and face the same taxes as goods-producers.

**Prof. Fred Cutler,
UBC Department of Political Science**

How have British Columbia's responded to the HST?

We are seeing general aversion to this new and renamed tax from a coalition of small-government and low-income groups – but also from service-providers whose products will be the object of a sudden tax increase. They worry about the reduction in demand for their services.

How does this compare to other tax backlashes?

The reaction in public opinion has been typical of reaction in Canada and elsewhere to new taxes. Although the HST is mostly a restructuring of tax collection, it does add slightly to a citizen's overall tax burden, though this may well be offset by lower prices for some goods. It is especially obvious because it's a new acronym for a tax consumers will pay on just about everything they buy.

Is B.C.'s anti-HST campaign unique?

What is different than in other places in Canada that have implemented the HST is that B.C. has legislation that makes public initiatives possible. That means people and groups who object strongly to the HST have more of an incentive to organize a campaign to channel and lead public opinion.

What's Bill Vander Zalm's role?

The recognizability of the former premier is important. Some people take notice of what he says, and the media reports it, so more people are likely to engage with the issue than in a province without an initiative process.

Will Fight HST succeed?

I think it's unlikely to succeed. They can probably get the required signatures and we might well see a referendum on this initiative draft bill. But to be successful in a referendum, they need "yes" votes from 50 per cent of registered voters in two-thirds of B.C.'s ridings – and anyone who doesn't vote is essentially counted as a "no" vote. I think the initiative will have trouble overcoming this built-in disadvantage.

What will be the political impact of the HST in B.C.?

I think the bar is set too high for the anti-HST campaign to succeed, but if it does, the NDP will very likely win the next provincial election. ■

"Some people are very skeptical about the claim that businesses will pass on their tax savings to consumers."

a "simpler, fairer, more transparent tax," which will reduce costs for employers and help them to expand their businesses and pay higher wages. Opponents say consumers will lose big as many services previously exempt from the PST will now be taxed, including restaurants and real estate sales.

To help navigate the controversy, UBC Reports asked two UBC professors watching the HST issue closely to explain what's at stake, economically and politically.

still use retail sales taxes like the PST because of inefficiencies like this.

Does the HST make economic sense?

Replacing a retail sales tax like the PST with a value added tax like the HST is advisable, generally. Several provinces have harmonized their PST with the federal GST. Investment has grown, consumer prices fell slightly, and economic activity has continued to expand.

I believe the fears being voiced by HST opponents are inconsistent with what has occurred in other regions.

What's a common HST misconception?

Some people are very skeptical about the claim that businesses will pass on their tax savings to consumers. But that is what happened in France and Atlantic Canada. Not because companies are being nice, but because they are competing for your business. Evidence suggests if B.C. consumers are careful with their retail dollars and insist on good deals from businesses, more savings will be passed on.

REAL-TIME PATHOGEN DETECTOR *continued from cover*

portable device with reusable pieces. Potentially, it could function as a water-quality detection device after a natural disaster such as an earthquake or tsunami.

To make the detection system a practical tool for developing countries, some tweaking is necessary to address

concerns related to temperature stability and potential lack of power sources. However, Roberts believes once the basic concept is proven, the device can be manipulated to serve a number of objectives.

"For example, take the earthquake in Haiti," says Roberts. "This device

could determine fairly quickly, in real time, what water sources contain the least amount of pathogens, or hopefully be clean and thus suitable for drinking with the least amount of treatment."

And although the prototype focuses specifically on detecting the microscopic water-borne parasite

Cryptosporidium, the capture cell could eventually contain an array of plates and capture molecules that are able to detect any organism, or even chemical, for which a capture molecule exists.

"We are working to detect *Cryptosporidium* right now because it is a well-known pathogen that

has a history of causing sickness in communities, and because there is a current technology using these antibodies, so we know they are commercially available and accepted by regulatory agencies," says Roberts. ■