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First gene cloned at UBC's Okanagan campus

By Jody Jacob

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Highlights of UBC media coverage in January 2011

Compiled by Heather Amos

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UBC RESEARCH Shrinking glaciers

Glaciers in the European Alps could shrink by 75 per cent by the end of the century, according to new research conducted by scientists from UBC that was picked up by *The Guardian*, *Agence France Presse*, the *Vancouver Sun* and others.

“The study concludes that mountain glaciers and ice caps are projected to lose 15-27 per cent of their volume by 2100. The researchers argue this will result in “substantial impacts” on regional water availability, as well as a rise in sea levels.

“Many small glaciers will actually disappear by the end of 21st century,” says glaciologist **Valentina Radic**, a professor at UBC and the lead researcher of the study. She noted that small glaciers are responsible for a substantial portion of sea level rise.

Gene discovery

The *Vancouver Sun*, the *Province*, *News 1130* and others reported that researchers at UBC and the Vancouver Coastal Health Research Institute have identified the gene that destroys brain cells in both Alzheimer's patients and people with Down syndrome.

Dr. **Weihong Song**, the Canada Research Chair in Alzheimer's disease and UBC professor of psychiatry who led the team, said the discovery opens the way to find a drug that could forestall dementia in people with either condition.

“It will likely take years to find a therapy or drug that could block the spread of the disease, and that's our next target,” he said.

Mysterious salmon infection

Large numbers of sockeye salmon are dying in the Fraser River before spawning because of a mysterious virus, suggests new research from UBC and the federal Department of Fisheries and Oceans that appeared in stories by *Wired*, *Reuters*, the *Globe and Mail*, *Postmedia News* and others.

“The new study suggests that the fish that die en route to their spawning beds have a common “genomic signature”—or a pattern that shows changes have taken place in an array of genes activated to fight infection.

“It may not be a virus ... but the hypothesis is that it is,” said **Tony Farrell**, research chair at UBC's Department of Zoology.

“We need to find out if it is a virus – and if it is picked up somewhere, we need to find out where.”

Scott Hinch, of the Department of Forest Sciences at UBC, said work is already under way to try to determine where in their life stage the fish get the infection.

SCIENTIFIC DEBATE Game changer

CBC wrote that a blog post by UBC microbiologist **Rosmary Redfield**, critiquing a paper by NASA scientists claiming they'd found a bacteria that could live off arsenic, was the biggest Canadian Science story of the year in 2010.

Redfield criticized the paper's methodologies on her blog, bringing the scientific debate to the public.

CNN, the *New York Times*, the *Independent*, *MSNBC* and others reported on Redfield's blog posting and her doubts about the results described in the NASA paper, which had been published in the journal *Science*.

Planetary doubt

Wired, *Scientific American*, *Canadian Press*, *CTV*, *CBC* and others picked up on a debate about the existence of a planet found orbiting in the habitable zone of another star. Using the exact same data that identified the small planet, UBC professor emeritus and astronomer **Phil Gregory** found no significant sign of the planet.

Using Bayesian statistics, Gregory questions last year's discovery of a planet known as Gliese 581g.

“I decided that I would have a go at the Gliese 58 g data because I bring to the table the unique system of Bayesian statistics,” he said.

Biology professor Soheil Mahmoud and his team of graduate researchers, PhD student Zerihun Demissie and MSc student Lukman Sarker, have cloned the first gene at UBC's Okanagan campus.

The gene produces beta-phellandrene—one of the compounds present in the essential oil of some lavender species. Lavender essential oils are used for a variety of purposes around the world—from cosmetic to medicinal. Mahmoud's research could potentially be used to develop new varieties of lavender that produce the specific essential oil in greater quantity or higher quality.

However, Mahmoud stresses his focus is on the bigger picture—better insight into how plants in general produce and store natural products, and how the genes that control the production of

these compounds could potentially be controlled.

“Using lavender as our test model,” he says, “we want to understand how plants produce and store natural products, and what genes are involved in this process. Once identified, these genes can be used to improve production of natural products in plants and other systems.”

Plants produce more than 200,000 natural products. Some produce colour; some produce aroma and scent. Some are toxic, while others are medicinal.

Mahmoud notes that understanding the production of natural products in organisms is important. He cites as an example the naturally produced compound Paclitaxel—which is obtained from the bark of the Pacific yew tree and has cancer-fighting abilities.

“There is not enough Paclitaxel in the world,” says Mahmoud. “In fact, there is very little of it available. But once you clone the genes responsible for its biosynthesis, you can use them to improve Paclitaxel production.”

“We just need to better understand the biosynthesis of natural products, which is what we are working on using the lavender plant as a model.”

“We are grateful to all supporters, including funding agencies and local businesses; in particular, Okanagan Lavender Herb Farm in Kelowna,” says Mahmoud.

With the assistance of Genome BC, Investment Agriculture Foundation of BC, and the National Research Council Plant Biotechnology Institute, Mahmoud's research team has produced the largest lavender genomics resource in the world, which

includes approximately 24,000 partially sequenced genes. The resource is facilitating the discovery of novel lavender genes.

“The cloning of beta-phellandrene synthase demonstrates that we have the technology to clone and characterize genes here,” says Mahmoud.

“I would estimate somewhere between 100 to 200 genes are involved in the production, secretion and storage of essential oil constituents in lavender, and so far only four have been cloned around the world. This is only the beginning.” ●

Plants produce more than 200,000 natural products. Some produce colour; some produce aroma and scent. Some are toxic, while others are medicinal.

Mapping the power of sunshine

Researchers find solar savings for North Vancouver home owners

By Heather Amos

British Columbia is known for its rainy weather and dark winter months but that hasn't stopped researchers in UBC's Faculty of Forestry from mapping solar energy potential in North Vancouver.

"Everyone thinks Canada has a cool wet climate, but we have more solar energy potential than parts of Germany; and Germany is the world leader in solar energy use and technology," says Nicholas Coops, a forestry professor and Canada Research Chair in Remote Sensing.

Coops and his PhD student Rory Tooke are using remote sensing technology, developed for natural resource industries like forestry and mining, to assess solar energy potential in an urban setting. They want to show residents of North Vancouver the benefits of using a rooftop-mounted solar thermal panel to heat water for their homes.

To do this, Coops and Tooke use a remote sensing technology known as light detection and ranging (LiDAR). LiDAR gathers data by emitting millions of laser pulses to the ground and recording their return time from a plane or helicopter.

This LiDAR data provides very detailed and previously unavailable information about the three-dimensional form of all buildings, trees and terrain over an area, and can be used to develop accurate models of urban environments. The technology can also give researchers an estimate of the heating and hot water demands of buildings by providing information about their size and structural characteristics.

Using LiDAR data for the District of North Vancouver, and in collaboration with the District, the UBC researchers developed a website that gives residents personalized information about the solar energy potential in their homes.

Residents of North Vancouver can go online, find their house and see how much sunlight hits their roof and where. The website will then tell them how much money they could save if they installed a solar hot water device, and the carbon dioxide emission savings.

The LiDAR information is so sophisticated it can indicate if a tree or building is blocking the sun's energy from reaching even a small portion of a resident's roof. The researchers found that a surprising number of homes in North Vancouver would benefit from installing solar-powered hot water systems.

"Many of the roofs are south facing and on a slope so they get a fair amount of sunlight, especially during the

summer months," says Tooke.

"On its own, a solar water heating device wouldn't be enough. But combined with traditional methods for heating water, a rooftop mounted solar thermal panel could provide financial savings."

"Within ten years, we expect that governments and businesses will be using this technology to assess energy demand and supply for all buildings in the city," says Coops. "Tools like this will benefit municipalities and help them reach their targets for renewable energy use."

The intent for the North Vancouver pilot project is to have similar tools adopted across a number of municipalities.

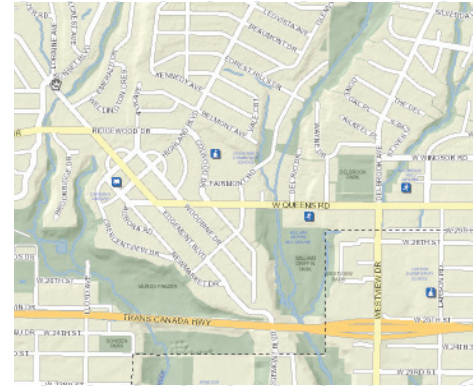
Most communities don't have LiDAR data available to them, but Coops and Tooke think it will become more common as LiDAR becomes less expensive. The District of North Vancouver is an ideal partner as they have access to LiDAR data and have made commitments to promoting solar energy through the Solar BC initiative, a group of B.C. communities working to encourage people to be less reliant on fossil fuels, and to tap into the energy provided by the sun.

In November, the District of North Vancouver was awarded first place in the leadership and innovation category at the 2010 conference of the Union of British Columbia Municipalities for the website that the District developed with the help of Coops and Tooke. ●

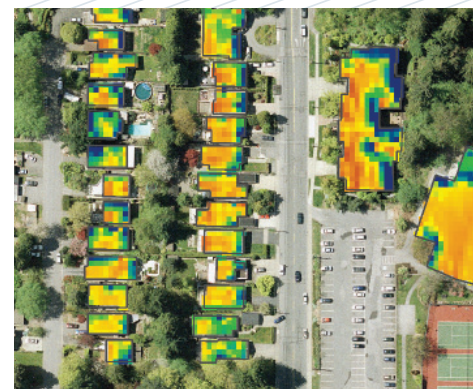
Residents of North Vancouver can go online, find their house and see how much sunlight hits their roof and where.

To use the website and see the power of sunshine, visit:
<http://www.geoweb.dnv.org/applications/solarapp/>

To watch a video tutorial of UBC student Rory Tooke using the solar calculator website visit:
<http://www.publicaffairs.ubc.ca/2011/02/01mapping-the-power-of-sunshine>



Residents in North Vancouver can find their homes on the solar calculator website.



Once residents have found their homes on the website the calculator will show them how much solar energy reaches their roof and where. The red/orange colours indicate more solar energy while the green and blue indicate less solar energy.

District of North Vancouver Images

UBC professor **Nicholas Coops** (left) and student **Rory Tooke** have developed a tool to help North Vancouver homeowners calculate their solar potential.

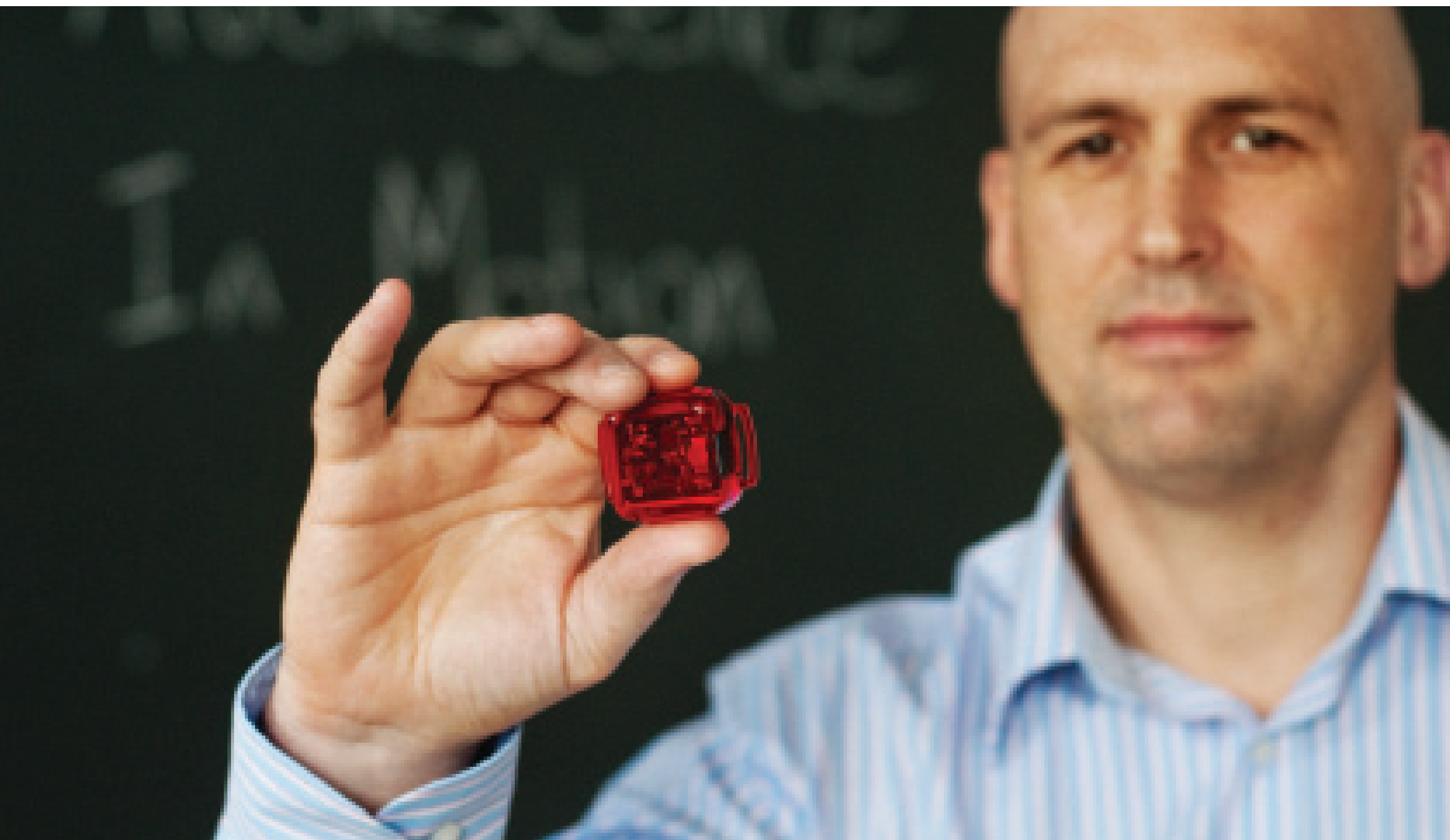
Martin Dee Photograph

Helping teachers motivate kids to move

A new study will target teachers to inspire Canadian adolescents to get active

By Heather Amos

UBC professor **Mark Beauchamp** will be giving adolescents small devices called accelerometers to monitor their physical activity.



Martin Dee Photograph

Mark Beauchamp, an associate professor in UBC's School of Human Kinetics, along with researchers at Queen's University and Acadia University, will be working with high school teachers to better motivate Grade 9 students to lead physically active lifestyles.

Physical activity guidelines recommend that adolescents get at least one hour of moderate-to-vigorous physical activity each day. These recommendations, released by the Canadian Society for Exercise Physiology in January, are intended to promote good health.

Estimates suggest that fewer than a half of Canadian adolescents are sufficiently active to meet international guidelines for healthy growth and development, says Beauchamp. This has implications for the individual's health but also for society. According to a report from the Canadian Medical Association Journal, the direct health costs of inactivity in Canada are estimated to be \$2.1-billion a year.

"As a researcher, it is great to be involved in intervention-based work that promotes good health and makes a difference," says Beauchamp.

For this study, funded by the Canadian Institutes of Health Research (CIHR), Beauchamp and his colleagues will conduct a randomized controlled trial, called "Adolescence In Motion," involving Grade 9 physical education teachers and their students in 36 schools in B.C., Ontario and Nova Scotia. Beauchamp and his colleagues will train teachers using principles from transformational leadership theory, and then measure the effects of the intervention in changing teacher behaviour as well as students' physical activity levels and motivation.

Transformational teaching involves teaching through the demonstration of personally held values; being optimistic about what students can achieve; addressing the individual needs of students; and stimulating students intellectually to address old problems in new ways.

"In our preliminary pilot work, students reported improvements in motivation and confidence to be physically active, after teachers participated in a transformational teaching workshop," says Beauchamp.

For this next study, involving more than 2,100 Grade 9 students, researchers will go beyond asking students to self-report their motivation, confidence, and healthy living intentions; they will collect objective measures of physical activity.

Students will be given a small device called an accelerometer, which works like a pedometer but gives detailed information about the intensity, duration and time of day of any physical activity. The results will be compiled along with student surveys to measure the impact of the intervention.

"Our primary goals are to improve physical activity levels among adolescents and see greater adoption of transformational teaching principles by school physical

"Students reported improvements in motivation and confidence to be physically active after teachers participated in a transformational teaching workshop."

education teachers," says Beauchamp. "In addition, we're also interested in the psychological mechanisms that might explain any changes in adolescent physical activity behavior."

Over the coming year, Beauchamp and his colleagues will also be looking to examine how parents who use transformational behaviours can inspire adolescents to make healthy lifestyle choices. ●

Getting seniors active

While one of its professors is embarking on a project to get Canadian adolescents physically active, UBC's School of Human Kinetics is running an outreach program, at the Bodyworks Fitness Centre on UBC's Vancouver campus, to get seniors moving.

The Changing Aging program is a fitness program for individuals 60 and older that aims to prevent many of the common problems associated with aging. It has been running since 1997 and provides support and supervision so older adults can exercise and participate in fitness classes and strengthening activities in a social setting. To date, more than 1,000 seniors have participated in the program.

"Physical activity can decrease the chances of osteoporosis, falls, cardiovascular diseases and delay the need for dependent living for older adults," says Barry Legh, senior instructor in the School of Human Kinetics.

Participants say this program has improved their overall health, making them feel stronger, more agile and giving them better balance and stamina, explains Legh, who is also the chair of the school's outreach programs.

The School of Human Kinetics developed the Changing Aging program as part of its mission to engage the local community. Through sharing expertise, the school provides a service for the local community while providing student employees enriched educational experiences to enhance their learning. ●



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To watch a video about the program or for more information about Changing Aging and how to apply, visit:
<http://www.hkin.educ.ubc.ca/fitness/changingaging.htm>



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Portal profiles UBC's growing Aboriginal community

By Basil Waugh

The University of British Columbia has launched a web portal with an emphasis on video to showcase the growing number of programs and opportunities for Aboriginal students and scholars at UBC.

The UBC Aboriginal Portal—aboriginal.ubc.ca—provides a single online destination to learn about UBC's Aboriginal student services, academic programs, research community and outreach programs.

Unlike many institutional websites, it uses video to help put a human face on the team that exists to support and mentor Aboriginal students through admissions, graduation and beyond.

"We want to help students and their families get to know the people who are here to support them," says Linc Kesler, Director of UBC's First Nations House of Learning and Senior Advisor to the President on Aboriginal Affairs. "We felt that a personal medium like video would help to do that."

The portal features dozens of videos of key UBC contacts. This ranges from basic information on admissions, scholarships and day care to profiles of UBC's Indigenous Academic Caucus, an informal association of 26 faculty members who identify as Indigenous and are actively involved in research, teaching and administration, much of it with an Aboriginal focus and substantial community engagement.

The portal opens with a welcome in the Coast Salish dialect of the Musqueam people by Larry Grant, a UBC adjunct professor and Musqueam elder. In another video, Ojibwa student Catherine Pitawanakwat shares her experience in UBC's Go Global student exchange program. Elsewhere, UBC Zoology Prof. David Close discusses a scientific discovery he made that could help conserve the Pacific lamprey, an important source of food for his community, the Confederated Tribes of the Umatilla Indian Reservation in eastern Oregon.

"These outstanding students and scholars are important role models for young people," says Kesler, a professor of Oglala Lakota ancestry who also leads UBC's Aboriginal Strategy, a university-wide initiative to increase recruitment, support and programming for Aboriginal students and researchers at UBC. "We hope their stories will inspire students to consider opportunities and pathways they may not have thought possible."

Since UBC's Aboriginal Strategy was launched in 2009, the university has nearly doubled its complement of Aboriginal faculty to 26, making UBC one of the top recruiters of Aboriginal faculty among research universities.

Enrolment is growing too. More than 630 UBC students current self-identify as Aboriginal. Graduate student enrolment has jumped 16 per cent since 2008. There is record enrolment in the Faculty of Law, home to UBC's First Nations Legal Studies Program that (along with the Faculty of Education's Native Indian Teacher

Education Program) was launched in 1975 to help address a national shortage in Aboriginal lawyers and educators.

Since 2008, UBC has created 13 courses with significant Indigenous content, bringing the total to 66 across the faculties of Medicine, Law, Business, Arts, Education, Forestry, Graduate Studies and Continuing Studies.

"UBC is emerging as a leading destination for Aboriginal students and scholars, so we have more stories to share," says Kesler, who encourages students to subscribe the portal's RSS feed to receive regular updates.

"Since 2009, UBC has nearly doubled its complement of Aboriginal faculty, making it one of the top recruiters of Aboriginal faculty among research universities."

"The UBC Aboriginal Strategy has created a real jump in interest from prospective students and faculty, First Nations bands, high schools and other universities."

While the idea of attending a large research-intensive university may be intimidating to some students, Kesler says those qualities produce a unique combination of opportunities for students.

"Our size allows us to offer more programs with an Aboriginal focus than any university in Canada," he says. "It means students can work beside top Aboriginal scholars and research important topics at much deeper levels of investigation—opportunities they might not get at smaller institutions."

Maija Tailfeathers, a UBC student who produced videos for the site, says the process was inspiring. "It was great to meet so many researchers working in areas that are important to Aboriginal communities. The site really shows some of the amazing things people are doing here."

Tailfeathers, whose heritage includes Blackfoot and Sami, an indigenous people from Scandinavia and Russia, says she is happy to contribute to something that will improve student life.

"When I think back to my first years here, this portal would have been really helpful," says Tailfeathers, sitting in the First Nations Longhouse, a home away from home for many Aboriginal students at UBC. "It shows you who to contact for things and helps you get to know them. It was a really fun project to work on." ●



Martin Dee Photograph

UBC's Aboriginal Portal will connect Aboriginal students with key UBC contacts, resources and opportunities, says student and videographer **Maija Tailfeathers**.

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Aboriginal
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Native Indian
Teacher Education
Program

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First Nations
Studies Program

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Frank Calder
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person elected to
any legislature in
Canada
NISGA'A
FIRST NATION

Howard Adams
Scholar and
activist
MÉTIS

Leonard Marchand
Retired senator,
UBC's first
Aboriginal
alumnus
OKANAGAN
FIRST NATION

Alfred Scow
Retired judge and
first Aboriginal
lawyer called to
the B.C. bar
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The value of vitamins

However wonderfully made, our bodies sometimes need extra help to keep healthy and strong.

By Lorraine Chan

Assistant professor **Yvonne Lamers** studies human nutrition and vitamin metabolism.



Martin Dee Photograph

In recent years, dietary supplements have gained popularity as a surefire route to wellbeing.

All the more reason, says Faculty of Land and Food Systems researcher Yvonne Lamers, to understand how we use nutrients from supplements as well as natural food sources and fortified food products.

A Canada Research Chair in Human Nutrition and Vitamin Metabolism, Lamers focuses on B vitamins, specifically the levels required for normal cellular activity. She explores the metabolic consequences of both high and low B-vitamin intake and aims to discover potential underlying mechanisms between nutrition and disease.

Asst. Prof. Lamers explains that B-vitamins such as folate and vitamin B-12 are necessary not only for making cells and DNA synthesis, but also to

keep the brain healthy.

“Lower levels of folate and vitamin B-12 have been linked to higher risk of pregnancy complications, heart disease, stroke, cancer and Alzheimer’s disease.”

Lamers is using an innovative research method that allows her to trace and quantify B-vitamin dependent pathways in the cell’s metabolic processes. Called a whole body kinetic study, the amino acids and vitamins have been “labeled” with stable isotopes, atoms that are naturally occurring and found in the environment, food and our bodies.

The labeled amino acids, or vitamins, are delivered into the study participants’ circulation either orally or intravenously. Over a time span of several hours, the researcher can take blood, breath or urine samples to evaluate the turnover of the labeled vitamins or amino acids, their ways of

degradation and their transformation into other cellular components.

“This approach helps us to clarify which pathway is affected to what extent by the altered B-vitamin level,” says Lamers. “For example, I can look at how different vitamin levels may assist or potentially impair and lower the formation of amino acids, which are the building blocks for proteins.”

Another line of inquiry for Lamers’s work is folic acid, a synthetic form of folate—a B vitamin that helps to prevent birth defects. Currently, women of childbearing age are recommended to take between 0.4 and one milligram of folic acid per day for the prevention of neural tube defects such as spina bifida, a type of birth defect that develops in the first few weeks of pregnancy.

In 1998, the Canadian federal government introduced a mandatory program to fortify foods such as white

Folate Foods: Spinach, cabbage, leafy greens, meat, liver, eggs, nuts, beans, lentils, grapes, tomatoes, oranges, whole grain bread, eggs, milk and dairy products.

flour, pasta, and cornmeal with folic acid. The food fortification program has succeeded in lowering the rates of neural tube defects. However, the high intake of fortified foods and supplements has made it possible for people to ingest large amounts of folic acid. Recently, scientists have raised questions about whether high intake levels of folic acid may create imbalances with other nutrients, specifically with a less than optimal vitamin B-12 status. “I want to look at the metabolic effects of high amounts

of folic acid in comparison to a naturally occurring folate form, whether folic acid impairs the pathways linked to DNA formation and cellular activity.” Lamers’s findings will feed into a review of current public health policies regarding nutrient intake, vitamin supplementation and food fortification. ●



Vitamin D for pregnant women

By Lorraine Chan

Blame it on Canada’s watery winter sun, but women who are pregnant or breastfeeding need to take vitamin D supplements, according to human nutrition researcher Tim Green.

“Our preliminary data shows that Vitamin D levels in the mother’s blood are fairly low,” says Green, an associate professor in the Faculty’s Food, Nutrition and Health program and lead investigator of the study funded by the Canadian Institute of Health Research.

He explains that vitamin D is vital for bone health. Without it, babies can develop rickets, a condition when bones are too soft and do not form properly. Green’s research partners include the BC Women’s Hospital and Health Centre and the departments of pediatrics and obstetrics and gynecology at UBC’s Faculty of Medicine.

“Although we get a small amount of vitamin D from food, our bodies create it as it absorbs sunlight,” says Green. “And during the Canadian winter, especially in Vancouver, there isn’t enough sun for this to happen.”

Green is exploring how much vitamin D pregnant and breastfeeding women are currently getting and how much they should take as supplements to ensure health for themselves and their babies. The study makes use of donated supplements created by Natural Factors.

With more than 200 pregnant women as study participants, the research team is measuring the effect of vitamin D supplements on the growth of the baby and on the bone health of mother and baby.

As well, the study investigates the possible effect of skin colour on vitamin D levels. Skin with darker pigments, either naturally or from a tan, tend to absorb less light, and therefore affects the amount of vitamin D the body produces. Researchers will measure how much light is reflected by a person’s skin using a device called a colorimeter. ●

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Last year, UBC's faculty researchers and students made international news headlines for their global advances. Their initiatives, innovations and insights are captured in the 2009|10 *Year in Headlines*.

ubc.ca/yih

The human touch: UBC to study green building inhabitants

By Salina Marshall

When it opens, **CIRS** is designed to be among the greenest and most comfortable buildings in the world.



Busby Perkins + Will Rendering

If you build it, they will come. But if you build a green building—one that aims to be environmentally responsible and resource-efficient—but people aren't comfortable living or working in it, you risk falling short of your green goals.

That's why UBC Master of Arts student Julia Reckermann is factoring people into the environmental equation, conducting one of the first pre-occupancy surveys ever to gather baseline data to help study the happiness of green building occupants. "Behavioural aspects can impact building performance," says Reckermann. For example, if one person opens a window to cool off while another cranks up the heat, energy efficiency is compromised. Additionally, if workers aren't happy in their offices, their productivity may decline, and green buildings will be more difficult to promote.

UBC is constructing the Centre for Interactive Research on Sustainability (CIRS). When it opens in summer 2011, CIRS will be a space for multidisciplinary education and research, and one of the greenest buildings on Earth. It will scavenge heat from neighbouring buildings and from the ground, draw ventilation from the wind and harvest its water from the rain. Using new technologies, CIRS will purify its wastewater and generate electricity by capturing solar energy in photovoltaic cells that are integrated into the building's exterior. And with wood as its primary building material, it will sequester more carbon than the carbon emitted in constructing the building and decommissioning it at the end of its life.

For her MA thesis in Resource Management and Environmental Studies, Reckermann hopes to shed light on how inhabitants affect the building's performance, and how

the building affects its inhabitants. "It's like an organism where all the components need to work together for the best result," she says. "You have to look at the internal organs as well as the shell...the influence of the building inhabitants has been largely ignored in the research."

In conventional buildings, systems tend to be automated, and tenants are passive recipients. At CIRS, inhabitants will have the option of opening windows for natural ventilation or using manually adjusted air diffusers, and working in naturally lit spaces or adjusting the intensity of overhead lamps through a web-based lighting control system. They will be able to review building performance data through a web-based interface and vote on building-wide adjustments. CIRS aims to continuously improve the building systems' performance as well as the health, productivity and happiness of inhabitants over time.

How will CIRS' inhabitants compare the green experience to their old one? Typically, inhabitants are surveyed only after they've occupied a green building, not before. John Robinson,

the Executive Director of the UBC Sustainability Initiative, is the principal investigator on a study that's significant because it's one of the first times a green building's inhabitants will be surveyed both pre- and post-occupancy.

Co-investigator Reckermann is handling the pre-occupancy survey, to be conducted in February. She will collect baseline data by surveying people from more than a dozen buildings who will be moving into CIRS. Among other things, the survey explores how satisfied people are with their current work environment (in terms of thermal comfort, acoustics, air quality, etc.), what they know about building systems and the activity surrounding them (for example, thermal controls) and their past experience with green and conventional buildings. It also looks at their expectations of the new building, to compare to their end experience.

Co-investigator Sylvia Coleman will follow-up with a post-occupancy evaluation one year after occupancy that will allow researchers to consider the significance and effectiveness of the CIRS approach.

The study is one example of how CIRS aims to bridge the gap between sustainability theory and practice by treating the campus as a living laboratory. According to Robinson, it's not enough to build an impressive green building. The university needs to "study it to death: what are all the features of the building, what works and what doesn't, how do we take that learning and get it out into the marketplace?"

With CIRS, UBC aims to create a model for sustainable development that can be replicated on its campuses and in cities around the world—a model that factors in the human element. ●

For more information on CIRS and sustainability at UBC, visit: www.cirs.ubc.ca.

For more information on the impact of UBC's green buildings, and on the university's innovative renewal program for aging buildings, visit: www.sustain.ubc.ca/green-buildings

1996

Setting a new green building standard, again



Martin Dee Photographer

The world-leading green CIRS project is not the first time UBC has influenced the green building industry. In 1996, UBC broke new ground when it opened its first official green building, the CK Choi Building for the Institute of Asian Research. The building was named one of the Top Ten Green Buildings by the American Institute of Architects in 2000.

A high-performing green campus icon that continues to draw significant interest from green building professionals, the CK Choi Building boasts:

50%

Construction materials that included 50 per cent reused or recycled materials

100%

100 per cent natural ventilation

1,000

Composting toilets that save more than 1,000 litres of water per day

23%

Overall energy use that is 23 per cent below a comparable building

1

One plant-based greywater recycling system that processes compost tea from the toilets and waste water from kitchen and bathroom sinks

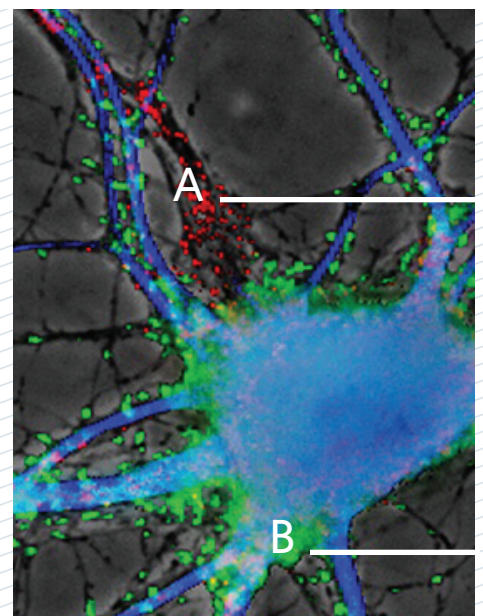
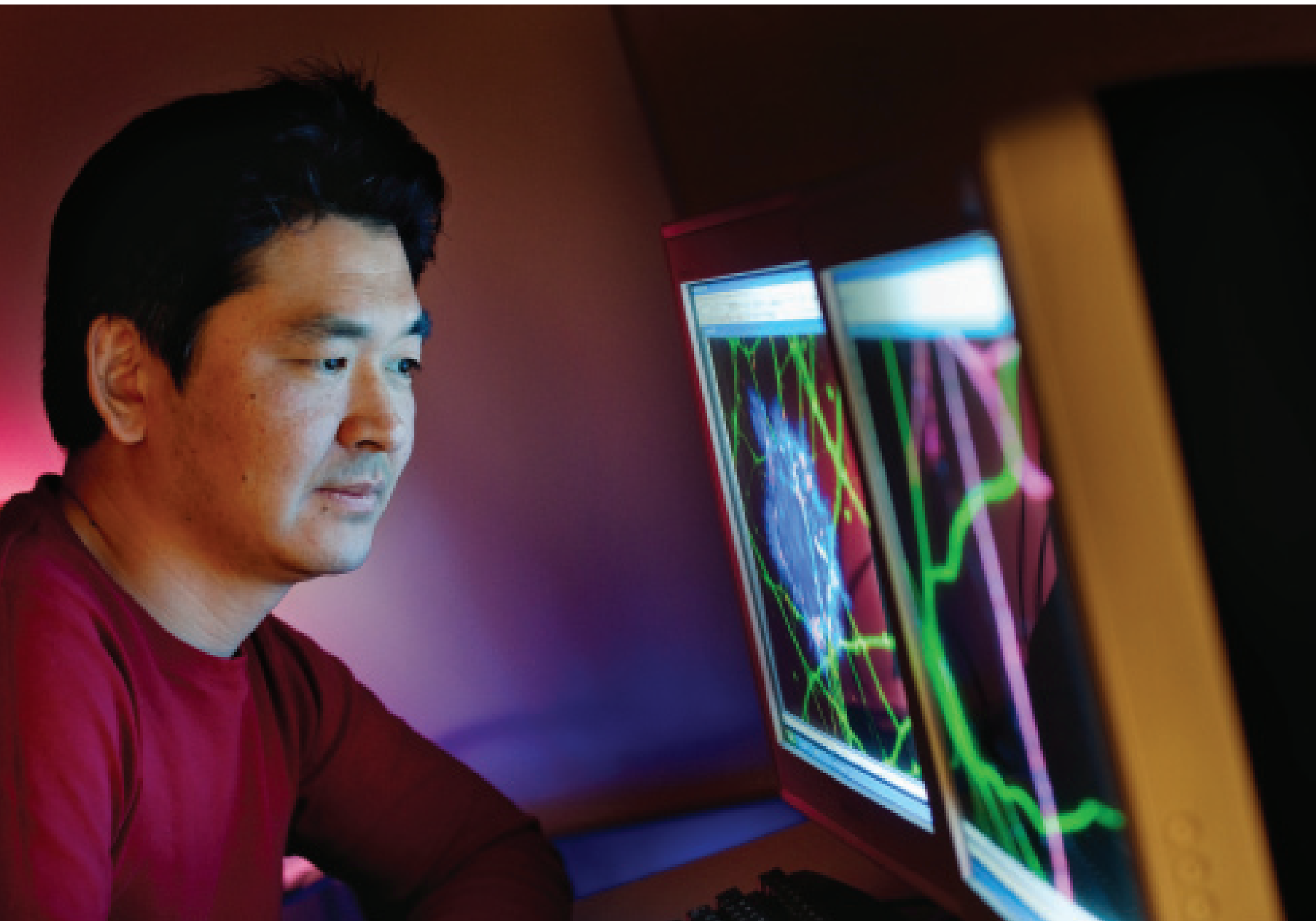
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Postdoc zeros in on genes linked to psychiatric disorders

By Brian Lin

Hideto Takahashi is zeroing in on a family of genes that may be responsible for neuropsychiatric disorders.



Excitatory and Inhibitory Synapses
Fluorescent neuro-imaging reveals synapses that serve (A) inhibitory roles and (B) excitatory roles in brain cell communication.

Martin Dee Photograph

Like a detective zeroing in on the Mafia, Hideto Takahashi is piecing together clues to reveal how a family of genes may be the culprit of debilitating neuropsychiatric disorders.

In Takahashi's genetic crime story, the victims are synapses, the basic units of communication in the brain. These tiny gaps between neurons either promote—called excitatory synapses—or diminish—called inhibitory synapses—electrical and chemical connection in the brain cell network. The suspects—six members of the *Slitrk* gene family—have been associated with obsessive compulsive disorder, autism, schizophrenia and Tourette's syndrome. The rap sheet goes on. A few years ago, a team led by UBC Psychiatry professor Ann Marie Craig developed a screen for the genes that promote the formation of synapses.

The suspects—six members of the *Slitrk* gene family— have been associated with obsessive compulsive disorder, autism, schizophrenia and Tourette's syndrome.

Using a combination of fluorescence imaging, molecular biology and electrophysiology, Craig, who holds a Canada Research Chair in Neurobiology, deciphers how nerve cells communicate. "A finely tuned balance of excitatory and inhibitory synapses is crucial for proper brain development and function," says Craig, who is also a member of the Brain Research Centre at UBC and Vancouver Coastal Health Research Institute. Building on Craig's work, Takahashi,

a postdoctoral researcher in UBC's Department of Psychiatry, recently found that the gene called *Slitrk2* promotes the formation of excitatory synapses, while other genes in the family appear to encourage the formation of inhibitory synapses. He was recently given a Young Investigator Award by NARSAD: The Brain and Behavior Research Fund, of up to \$60,000 over two years, to further define the roles played by other genes in the *Slitrk* family.

"Knowing which *Slitrk* gene plays what role in the formation of excitatory and inhibitory synapses will not only help us better understand what contributes to synapse balance, but provide valuable clues to other, similar genes that have also been associated with psychiatric disorders and behavioral abnormalities," says Takahashi. "Hideto is a very talented and hard-working researcher who has already identified multiple new genes that promote formation of synaptic connections," says Craig. "This kind of fundamental research that unites the molecular basis of brain development with the genetics of diseases will deepen our understanding of the mechanism that might cause psychiatric disorders and, I believe, ultimately lead to novel directed therapies." ●

outtakes

Reflections on academic life

Prof. Douglas Scott comments on the Planck Satellite Mission and the thrill of uncovering never-before-seen extraterrestrial objects

By Brian Lin

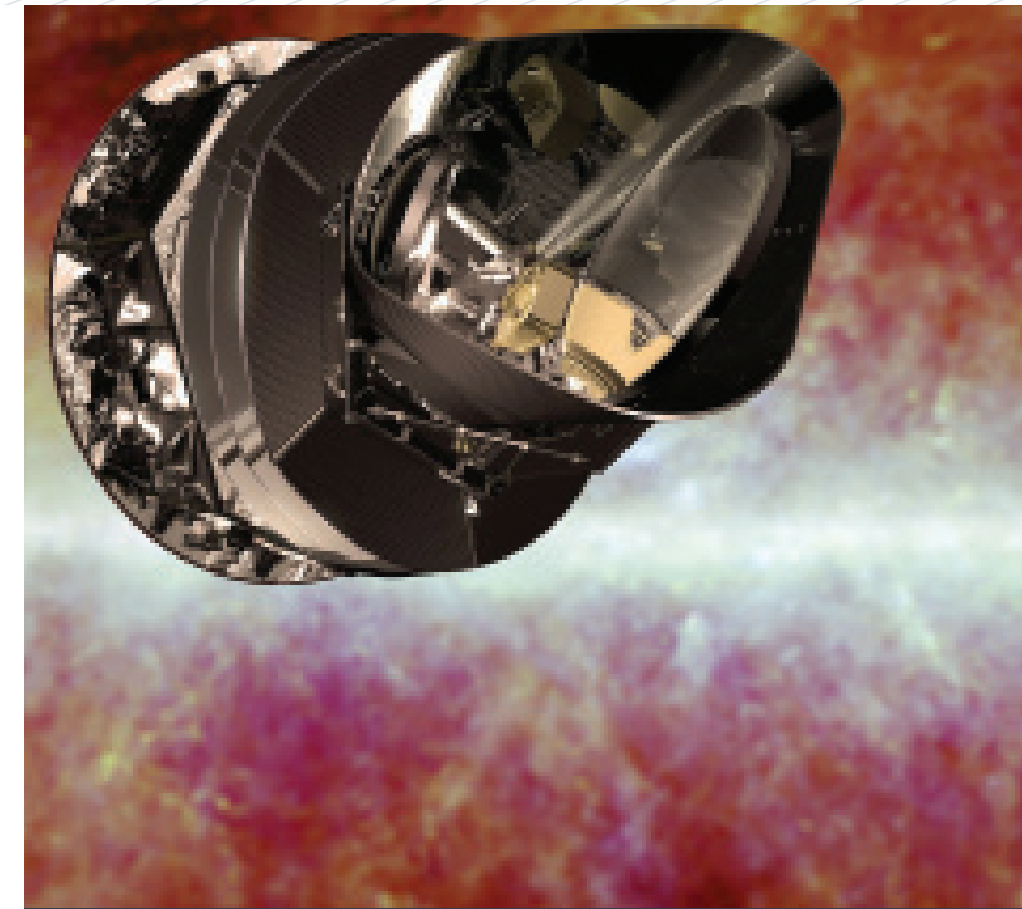
Douglas Scott, a professor in the Department of Physics and Astronomy, led one of two Canadian teams in an international collaboration that recently unveiled results from the first detailed survey of the entire sky.

Using the European Space Agency's \$1-billion telescope, the 15-nation team is poring over cosmic microwave background—the oldest source of light and remnant of the Big Bang—and revealing never-before-seen objects in the foreground. More than 300 of the world's top experts in physics, astronomy and cosmology gathered in Paris last month to show off a catalogue of more than 10,000 of these "exotic" extraterrestrial objects. Scott was there.

"I was trained as a cosmologist in an era when theory took the lead, because there was so little data available,"

"To say it was exciting would be an understatement," says Scott, who has been involved in the Planck Mission since 1996. "Watching the launch from French Guiana in 2009 was an emotional event, but there was uncertainty around how well the satellite would do its job and what the data would look like." These first results show that the satellite is working as expected and the quality of the data, Scott says, is simply unprecedented. He should know. Scott and his team—including research associates Adam Moss, Jim Zibin and programmer Andrew Walker—are developing software to analyze and calibrate the enormous amount of data being collected by the satellite. It will take years of data-crunching before scientists can truly decipher what secrets Planck's microwave detectors have witnessed, and they may cement—or fundamentally alter—our view of the Universe. "I was trained as a cosmologist in an era when theory took the lead, because there was so little data available," says Scott. "Now cosmologists around the world are watching this closely because the quality of the data is so good that theories have to catch up." As for a favourite memory of the Paris conference, "I delivered a humorous lecture peppered with in-jokes about the mission," says Scott. "The scientists really enjoyed them. The family members? Not so much." And this won't be the last such conference. "The best is yet to come," says Scott.

Artists illustration of the **Planck Satellite**, which is uncovering secrets of the universe.





Dentistry student **Marwan Hameed** enjoyed Smithers, BC.

Student discovers allure of rural practice

By Lorraine Chan

UBC student Marwan Hameed never pictured himself a small-town dentist until he came across a big-city practice in the heart of B.C.

“I’ve decided after graduating in June that I want to work in a rural area,” says Hameed. “From a dentistry perspective, the opportunities are amazing.” Currently in his fourth year of dentistry, Hameed hails from Baghdad and has lived most of his life in large cities including Vancouver, Toronto and London. However, last summer opened his eyes to new possibilities.

During July 2010, Hameed took part in the Faculty of Dentistry’s Summer Student Practitioner Program (SSPP), which enables students to experience the day-to-day operation and management of a dental practice.

Hameed was matched with supervisor Dr. Dan Kinkela, the sole dentist in Smithers, a picturesque town of 5,500 in northwestern B.C. During his three-week placement, Hameed had an opportunity to work on fillings and scaling along with more complex procedures such as root canals, crowns and surgeries.

Kinkela’s generous mentoring and well-equipped facility made a convincing case for re-location, says Hameed. “Dan’s office is one of the most advanced I’ve ever seen, even compared to Vancouver. And as a practitioner, Dan believes in continuing education for himself and his staff so they’re very up to date on new procedures.”

Employing 10 staff members, Kinkela’s office has six general dentistry chairs and two orthodontic chairs. Kinkela employs state-of-the-art electrodiagnostic equipment to treat disorders of the temporomandibular joint, which connects the jaw to the skull. As well, his practice offered

regular clinics for the public on topics such as sleep apnea and pain control through breathing techniques.

“What I learned in those three weeks easily compares with what I would have learned in three to four years on my own,” says Hameed. “Dan has vast knowledge of clinical dentistry since he does a lot of procedures that general dentists don’t do since the closest specialist is four hours away in Prince George.”

Kinkela also arranged for Hameed

foundation skills while providing a smoother transition from graduation into their own practice.

For participating dentists, the benefits include having a student to help deal with a patient backlog and “test drive” the idea of an associate, even considering whether the student is potentially a good fit for the office, says Walton.

The time is also rich for exchange, she says. “The practitioner can pick their brains about current techniques being

“Similar to medicine,” says Walton, “there can be problems with access to oral health care in rural areas of B.C. These placements enable students to experience a non-urban environment.”

to observe work in nearby Hazelton’s Wrinch Memorial Hospital where the dental clinic serves a large Aboriginal population.

Dr. Joanne Walton, associate dean of academic and student affairs, explains that the Faculty of Dentistry partnered with the B.C. Dental Association to focus on SSPP placements in communities beyond B.C.’s Lower Mainland, Kelowna and Greater Victoria.

“Similar to medicine,” says Walton, “there can be problems with access to oral health care in rural areas of B.C. These placements enable students to experience a non-urban environment.”

Established in 1982, the SSPP allows students to build upon their third-year

taught at UBC, as well as share ideas and philosophies.”

An SSPP participant since 2007, Kinkela says he values the students’ fresh optimism and dedication.

“I enjoy sharing my years of practice with someone who’s eager to learn. I can feel the energy go up in the whole office when the students are here.”

An extra pair of hands in the office also ends up benefitting the entire community, says Kinkela.

“I can ask the students to provide treatment for single moms and other families that are unable to afford the kind of dentistry that they need.” ●